# [Manual Testing Interview Questions & Answers-PART1](https://www.pavantestingtools.com/2016/02/manual-testing-interview-questions.html)

## Manual Testing Interview Questions & Answers-Part1

**1. What is Acceptance Testing?**

Testing conducted to enable a user/customer to determine whether to accept a software product. Normally performed to validate the software meets a set of agreed acceptance criteria.

**2. What is Accessibility Testing?**

Verifying a product is accessible to the people having disabilities (deaf, blind, mentally disabled etc.).

**3. What is Ad-Hoc Testing?**

A testing phase where the tester tries to 'break' the system by randomly trying the system's functionality. Can include negative testing as well. See also Monkey Testing.

**4. What is Agile Testing?**

Testing practice for projects using agile methodologies, treating development as the customer of testing and emphasizing a test-first design paradigm. See also Test Driven Development.

**5. What is Application Binary Interface (ABI)?**

A specification defining requirements for portability of applications in binary forms across different system platforms and environments.

**6. What is Application Programming Interface (API)?**

A formalized set of software calls and routines that can be referenced by an application program in order to access supporting system or network services.

**7. What is Automated Software Quality (ASQ)?**

The use of software tools, such as automated testing tools, to improve software quality.

**8. What is Automated Testing?**

Testing employing software tools which execute tests without manual intervention. Can be applied in GUI, performance, API, etc. testing. The use of software to control the execution of tests, the comparison of actual outcomes to predicted outcomes, the setting up of test preconditions, and other test control and test reporting functions.

**9. What is Backus-Naur Form?**

A metalanguage used to formally describe the syntax of a language.

**10. What is Basic Block?**

A sequence of one or more consecutive, executable statements containing no

branches.

**11. What is Basis Path Testing?**

A white box test case design technique that uses the algorithmic flow of the program to design tests.

**12. What is Basis Set?**

The set of tests derived using basis path testing.

**13. What is Baseline?**

The point at which some deliverable produced during the software engineering process is put under formal change control.

**14. What you will do during the first day of job?**

What would you like to do five years from now?

**15. What is Beta Testing?**

Testing of a rerelease of a software product conducted by customers.

**16. What is Binary Portability Testing?**

Testing an executable application for portability across system platforms and environments, usually for conformation to an ABI specification.

**17. What is Black Box Testing?**

Testing based on an analysis of the specification of a piece of software without reference to its internal workings. The goal is to test how well the component conforms to the published requirements for the component.

**18. What is Bottom Up Testing?**

An approach to integration testing where the lowest level components are tested first, then used to facilitate the testing of higher level components. The process is repeated until the component at the top of the hierarchy is tested.

**19. What is Boundary Testing?**

Test which focus on the boundary or limit conditions of the software being tested. (Some of these tests are stress tests).

**20. What is Boundary Value Analysis?**

BVA is similar to Equivalence Partitioning but focuses on "corner cases" or values that are usually out of range as defined by the specification. his means that if a function expects all values in range of negative 100 to positive 1000, test inputs would include negative 101 and positive 1001.

**21. What is Branch Testing?**

Testing in which all branches in the program source code are tested at least once.

**22. What is Breadth Testing?**

A test suite that exercises the full functionality of a product but does not test features in detail.

**23. What is CAST?**

Computer Aided Software Testing.

**24. What is Capture/Replay Tool?**

A test tool that records test input as it is sent to the software under test. The input cases stored can then be used to reproduce the test at a later time. Most commonly applied to GUI test tools.

**25. What is CMM?**

The Capability Maturity Model for Software (CMM or SW-CMM) is a model for judging the maturity of the software processes of an organization and for identifying the key practices that are required to increase the maturity of these processes.

**27. What is Cause Effect Graph?**

A graphical representation of inputs and the associated outputs effects which can be used to design test cases.

**28. What is Code Complete?**

Phase of development where functionality is implemented in entirety; bug fixes are all that are left. All functions found in the Functional Specifications have been implemented.

**29. What is Code Coverage?**

An analysis method that determines which parts of the software have been executed (covered) by the test case suite and which parts have not been executed and therefore may require additional attention.

**30. What is Code Inspection?**

A formal testing technique where the programmer reviews source code with a  
group who ask questions analyzing the program logic, analyzing the code with respect to a checklist of historically common programming errors, and analyzing its compliance with coding standards.

**31. What is Code Walkthrough?**

A formal testing technique where source code is traced by a group with a small set of test cases, while the state of program variables is manually monitored, to analyze the programmer's logic and assumptions.

**32. What is Coding?**

The generation of source code.

**33. What is Compatibility Testing?**

Testing whether software is compatible with other elements of a system with which it should operate, e.g. browsers, Operating Systems, or hardware.

**34. What is Component?**

A minimal software item for which a separate specification is available.

**35. What is Component Testing?**

Testing of individual software components (Unit Testing).

**36. What is Concurrency Testing?**

Multi-user testing geared towards determining the effects of accessing the same application code, module or database records. Identifies and measures the level of locking, deadlocking and use of single-threaded code and locking semaphores.

**37. What is Conformance Testing?**

The process of testing that an implementation conforms to the specification on which it is based. Usually applied to testing conformance to a formal standard.

**38. What is Context Driven Testing?**

The context-driven school of software testing is flavor of Agile Testing that advocates continuous and creative evaluation of testing opportunities in light of the potential information revealed and the value of that information to the organization right now.

**39. What is Conversion Testing?**

Testing of programs or procedures used to convert data from existing systems for use in replacement systems.

**40. What is Cyclomatic Complexity?**

A measure of the logical complexity of an algorithm, used in white-box testing.

**41. What is Data Dictionary?**

A database that contains definitions of all data items defined during analysis.

**42. What is Data Flow Diagram?**

A modeling notation that represents a functional decomposition of a system.

**43. What is Data Driven Testing?**

Testing in which the action of a test case is parameterized by externally defined data values, maintained as a file or spreadsheet. A common technique in Automated Testing.

**44. What is Debugging?**

The process of finding and removing the causes of software failures.

**45. What is Defect?**

Non-conformance to requirements or functional / program specification

**46. What is Dependency Testing?**

Examines an application's requirements for pre-existing software, initial states and configuration in order to maintain proper functionality.

**47. What is Depth Testing?**

A test that exercises a feature of a product in full detail.

**48. What is Dynamic Testing?**

Testing software through executing it. See also Static Testing.

**49. What is Emulator?**

A device, computer program, or system that accepts the same inputs and produces the same outputs as a given system.  
  
**50. What is Endurance Testing?**  
  
Checks for memory leaks or other problems that may occur with prolonged  
  
execution

**51. What is End-to-End testing?**

Testing a complete application environment in a situation that mimics real-world use, such as interacting with a database, using network communications, or interacting with other hardware, applications, or systems if appropriate.

**52. What is Equivalence Class?**

A portion of a component's input or output domains for which the component's behaviour is assumed to be the same from the component's specification.

**53. What is Equivalence Partitioning?**

A test case design technique for a component in which test cases are designed to execute representatives from equivalence classes.  
  
**54. What is Exhaustive Testing?**  
  
Testing which covers all combinations of input values and preconditions for an element of the software under test.

**55. What is Functional Decomposition?**

A technique used during planning, analysis and design; creates a functional hierarchy for the software.

# 54. What is Functional Specification?   A document that describes in detail the characteristics of the product with regard to its intended features.   55. What is Functional Testing?    Testing the features and operational behavior of a product to ensure they correspond to its specifications. Testing that ignores the internal mechanism of a system or component and focuses solely on the outputs generated in response to selected inputs and execution conditions. or Black Box Testing.   56. What is Glass Box Testing?   A synonym for White Box Testing.   57. What is Gorilla Testing?   Testing one particular module, functionality heavily.   58. What is Gray Box Testing?   A combination of Black Box and White Box testing methodologies? testing a piece of software against its specification but using some knowledge of its internal workings.   59. What is High Order Tests?   Black-box tests conducted once the software has been integrated.   60. What is Independent Test Group (ITG)?   A group of people whose primary responsibility is software testing,   61. What is Inspection?   A group review quality improvement process for written material. It consists of two aspects; product (document itself) improvement and process improvement (of both document production and inspection).   62. What is Integration Testing?   Testing of combined parts of an application to determine if they function together correctly. Usually performed after unit and functional testing. This type of testing is especially relevant to client/server and distributed systems.   63. What is Installation Testing?   Confirms that the application under test recovers from expected or unexpected events without loss of data or functionality. Events can include shortage of disk space, unexpected loss of communication, or power out conditions.   64. What is Load Testing?   See Performance Testing.   65. What is Localization Testing?   This term refers to making software specifically designed for a specific locality.   66. What is Loop Testing?   A white box testing technique that exercises program loops.   67. What is Metric?   A standard of measurement. Software metrics are the statistics describing the structure or content of a program. A metric should be a real objective measurement of something such as number of bugs per lines of code.   68. What is Monkey Testing?   Testing a system or an Application on the fly, i.e just few tests here and there to ensure the system or an application does not crash out.   69. What is Negative Testing?   Testing aimed at showing software does not work. Also known as "test to fail". See also Positive Testing.   70. What is Path Testing?   Testing in which all paths in the program source code are tested at least once.   71. What is Performance Testing?   Testing conducted to evaluate the compliance of a system or component with specified performance requirements. Often this is performed using an automated test tool to simulate large number of users. Also know as "Load Testing".   72. What is Positive Testing?   Testing aimed at showing software works. Also known as "test to pass". See also Negative Testing.   73. What is Quality Assurance?   All those planned or systematic actions necessary to provide adequate confidence that a product or service is of the type and quality needed and expected by the customer. 74. What is Quality Audit?   A systematic and independent examination to determine whether quality activities and related results comply with planned arrangements and whether these arrangements are implemented effectively and are suitable to achieve objectives.   75. What is Quality Circle?   A group of individuals with related interests that meet at regular intervals to consider problems or other matters related to the quality of outputs of a process and to the correction of problems or to the improvement of quality.   76. What is Quality Control?   The operational techniques and the activities used to fulfill and verify requirements of quality.   77. What is Quality Management?   That aspect of the overall management function that determines and implements the quality policy.   78. What is Quality Policy?   The overall intentions and direction of an organization as regards quality as formally expressed by top management.   79. What is Quality System?   The organizational structure, responsibilities, procedures, processes, and resources for implementing quality management.   80. What is Race Condition?   A cause of concurrency problems. Multiple accesses to a shared resource, at least one of which is a write, with no mechanism used by either to moderate simultaneous access.   81. What is Ramp Testing?   Continuously raising an input signal until the system breaks down.   82. What is Recovery Testing?   Confirms that the program recovers from expected or unexpected events without loss of data or functionality. Events can include shortage of disk space, unexpected loss of communication, or power out conditions 83. What is Regression Testing?   Retesting a previously tested program following modification to ensure that faults have not been introduced or uncovered as a result of the changes made.   84. What is Release Candidate?   A pre-release version, which contains the desired functionality of the final version, but which needs to be tested for bugs (which ideally should be removed before the final version is released).   85. What is Sanity Testing?   Brief test of major functional elements of a piece of software to determine if its basically operational.  86. What is Scalability Testing?   Performance testing focused on ensuring the application under test gracefully handles increases in work load.   87. What is Security Testing?   Testing which confirms that the program can restrict access to authorized personnel and that the authorized personnel can access the functions available to their security level.   88. What is Smoke Testing?   A quick-and-dirty test that the major functions of a piece of software work. Originated in the hardware testing practice of turning on a new piece of hardware for the first time and considering it a success if it does not catch on fire.   89. What is Soak Testing?   Running a system at high load for a prolonged period of time. For example, running several times more transactions in an entire day (or night) than would be expected in a busy day, to identify and performance problems that appear after a large number of transactions have been executed.   90. What is Software Requirements Specification?   A deliverable that describes all data, functional and behavioral requirements, all constraints, and all validation requirements for software/   91. What is Software Testing?   A set of activities conducted with the intent of finding errors in software.

**92. What is Static Analysis?**

Analysis of a program carried out without executing the program.

**93. What is Static Analyzer?**

A tool that carries out static analysis.

**94. What is Static Testing?**

Analysis of a program carried out without executing the program.

**95. What is Storage Testing?**

Testing that verifies the program under test stores data files in the correct directories and that it reserves sufficient space to prevent unexpected termination resulting from lack of space. This is external storage as opposed to internal storage.

**96. What is Stress Testing?**

Testing conducted to evaluate a system or component at or beyond the limits of its specified requirements to determine the load under which it fails and how. Often this is performance testing using a very high level of simulated load.

**97. What is Structural Testing?**

Testing based on an analysis of internal workings and structure of a piece of software. See also White Box Testing.

**98. What is System Testing?**

Testing that attempts to discover defects that are properties of the entire system rather than of its individual components.

**99. What is Testability?**

The degree to which a system or component facilitates the establishment of test criteria and the performance of tests to determine whether those criteria have been met.

**100. What is Testing?**

The process of exercising software to verify that it satisfies specified requirements and to detect errors. The process of analyzing a software item to detect the differences between existing and required conditions (that is, bugs), and to evaluate the features of the software item (Ref. IEEE Std 829). The process of operating a system or component under specified conditions, observing or recording the results, and making an evaluation of some aspect of the system or component. What is Test Automation? It is the same as Automated Testing.

**101. What is Test Bed?**

An execution environment configured for testing. May consist of specific hardware, OS, network topology, configuration of the product under test, other application or system software, etc. The Test Plan for a project should enumerated the test beds(s) to be used.

**102. What is Test Case?**

Test Case is a commonly used term for a specific test. This is usually the smallest unit of testing. A Test Case will consist of information such as requirements testing, test steps, verification steps, prerequisites, outputs, test environment, etc. A set of inputs, execution preconditions, and expected outcomes developed for a particular objective, such as to exercise a particular program path or to verify compliance with a specific requirement. Test Driven Development? Testing methodology associated with Agile Programming in which every chunk of code is covered by unit tests, which must all pass all the time, in an effort to eliminate unit-level and regression bugs during development. Practitioners of TDD write a lot of tests, i.e. an equal number of lines of test code to the size of the production code.

**103. What is Test Driver?**

A program or test tool used to execute tests. Also known as a Test Harness.

**104. What is Test Environment?**

The hardware and software environment in which tests will be run, and any other software with which the software under test interacts when under test including stubs and test drivers.

**105. What is Test First Design?**

Test-first design is one of the mandatory practices of Extreme Programming (XP).It requires that programmers do not write any production code until they have first written a unit test.

**106. What is Test Harness?**

A program or test tool used to execute a tests. Also known as a Test Driver.

**107. What is Test Plan?**

A document describing the scope, approach, resources, and schedule of intended testing activities. It identifies test items, the features to be tested, the testing tasks, who will do each task, and any risks requiring contingency planning.

**108. What is Test Procedure?**

A document providing detailed instructions for the execution of one or more test cases.

**109. What is Test Script?**

Commonly used to refer to the instructions for a particular test that will be carried out by an automated test tool.

**110. What is Test Specification?**

A document specifying the test approach for a software feature or combination or features and the inputs, predicted results and execution conditions for the associated tests.

**111. What is Test Suite?**

A collection of tests used to validate the behavior of a product. The scope of a Test Suite varies from organization to organization. There may be several Test Suites for a particular product for example. In most cases however a Test Suite is a high level concept, grouping together hundreds or thousands of tests related by what they are intended to test.

**112. What is Test Tools?**

Computer programs used in the testing of a system, a component of the system, or its documentation.

**113. What is Thread Testing?**

A variation of top-down testing where the progressive integration of components follows the implementation of subsets of the requirements, as opposed to the integration of components by successively lower levels.

**114. What is Top Down Testing?**

An approach to integration testing where the component at the top of the component hierarchy is tested first, with lower level components being simulated by stubs. Tested components are then used to test lower level components. The process is repeated until the lowest level components have been tested.

**115. What is Total Quality Management?**

A company commitment to develop a process that achieves high quality product and customer satisfaction.

**116. What is Traceability Matrix?**

A document showing the relationship between Test Requirements and Test Cases.

**117. What is Usability Testing?**

# Testing the ease with which users can learn and use a product.

**118. What is Use Case?**

The specification of tests that are conducted from the end-user perspective. Use cases tend to focus on operating software as an end-user would conduct their day-to-day activities.

**119. What is Unit Testing?**

Testing of individual software components.

120. how do the companies expect the defect reporting to be communicated by the tester to the development team. Can the excel sheet template be used for defect reporting. If so what are the common fields that are to be included ? who assigns the priority and severity of the defect

To report bugs in excel:  
Sno. Module Screen/ Section Issue detail Severity  
Prioriety Issuestatus  
this is how to report bugs in excel sheet and also set filters on the Columns attributes.  
But most of the companies use the share point process of reporting bugs In this when the project came for testing a module wise detail of project is inserted to the defect management system they are using. It contains following field  
1. Date  
2. Issue brief  
3. Issue description (used for developer to regenerate the issue)  
4. Issue status( active, resolved, on hold, suspend and not able to regenerate)  
5. Assign to (Names of members allocated to project)  
6. Priority(High, medium and low)  
7. Severity (Major, medium and low)

**121. How do you plan test automation?**

1. Prepare the automation Test plan  
2. Identify the scenario  
3. Record the scenario  
4. Enhance the scripts by inserting check points and Conditional Loops  
5. Incorporated Error Handler  
6. Debug the script  
7. Fix the issue  
8. Rerun the script and report the result  
122. Does automation replace manual testing?  
There can be some functionality which cannot be tested in an automated tool so we may have to do it manually. therefore manual testing can never be replaced. (We can write the scripts for negative testing also but it is hectic task)when we talk about real environment we do negative testing manually.

**123. How will you choose a tool for test automation?**

choosing of a tool depends on many things ...  
1. Application to be tested  
2. Test environment  
3. Scope and limitation of the tool.  
4. Feature of the tool.  
5. Cost of the tool.  
6. Whether the tool is compatible with your application which means tool should be able to interact with your application  
7. Ease of use

**124. How you will evaluate the tool for test automation?**

We need to concentrate on the features of the tools and how this could be beneficial for our project. The additional new features and the enhancements of the features will also help.  
  
1**25. How you will describe testing activities?**  
  
Testing activities start from the elaboration phase. The various testing activities are preparing the test plan, Preparing test cases, Execute the test case, Log teh bug, validate the bug & take appropriate action for the bug, Automate the test cases.

**126. What testing activities you may want to automate?**

Automate all the high priority test cases which needs to be executed as a part of regression testing for each build cycle.

**127. Describe common problems of test automation.**

The common problems are:  
1. Maintenance of the old script when there is a feature change or enhancement  
2. The change in technology of the application will affect the old scripts  
128. What types of scripting techniques for test automation do you know?  
5 types of scripting techniques:  
Linear  
Structured  
Shared  
Data Driven  
Key Driven

**129. What is memory leaks and buffer overflows ?**

# Memory leaks means incomplete deallocation - are bugs that happen very often. Buffer overflow means data sent as input to the server that overflows the boundaries of the input area, thus causing the server to misbehave. Buffer overflows can be used. 130. What are the major differences between stress testing,load testing,Volume testing? Stress testing means increasing the load ,and checking the performance at each level. Load testing means at a time giving more load by the expectation and checking the performance at that level. Volume testing means first we have to apply initial.

**Q: How do you introduce a new software QA process?**  
  
A: It depends on the size of the organization and the risks involved. For large organizations with high-risk projects, a serious management buy-in is required and a formalized QA process is necessary. For medium size organizations with lower risk projects, management and organizational buy-in and a slower, step-by-step process is required. Generally speaking, QA processes should be balanced with productivity, in order to keep any bureaucracy from getting out of hand. For smaller groups or projects, an ad-hoc process is more appropriate. A lot depends on team leads and managers, feedback to developers and good communication is essential among customers, managers, developers, test engineers and testers. Regardless the size of the company, the greatest value for effort is in managing requirement processes, where the goal is requirements that are clear, complete and  
testable.  
  
  
**Q: What is the role of documentation in QA?**  
  
A: Documentation plays a critical role in QA. QA practices should be documented, so that they are repeatable. Specifications, designs, business rules, inspection reports, configurations, code changes, test plans, test cases, bug reports, user manuals should all be documented. Ideally, there should be a system for easily finding and obtaining of documents and determining what document will have a particular piece of information. Use documentation change management, if possible.

**Q: What makes a good test engineer?**  
  
A: Good test engineers have a "test to break" attitude. We, good test engineers, take the point of view of the customer; have a strong desire for quality and an attention to detail. Tact and diplomacy are useful in maintaining a cooperative relationship with developers and an ability to communicate with both technical and non-technical people. Previous software development experience is also helpful as it provides a deeper understanding of the software development process, gives the test engineer an appreciation for the developers' point of view and reduces the learning curve in automated test tool programming.  
  
G C Reddy is a good test engineer because he has a "test to break" attitude, takes the point of view of the customer, has a strong desire for quality, has an attention to detail, He's also tactful and diplomatic and has good a communication skill, both oral and written. And he has previous software development experience, too.

**Q: What is a test plan?**  
  
A: A software project test plan is a document that describes the objectives, scope, approach and focus of a software testing effort. The process of preparing a test plan is a useful way to think through the efforts needed to validate the acceptability of a software product. The completed document will help people outside the test group understand the why and how of product validation. It should be thorough enough to be useful, but not so thorough that none outside the test group will be able to read it.  
  
**Q: What is a test case?**  
  
A: A test case is a document that describes an input, action, or event and its expected result, in order to determine if a feature of an application is working correctly. A test case should contain particulars such as a...  
•    Test case identifier;  
•    Test case name;  
•    Objective;  
•    Test conditions/setup;  
•    Input data requirements/steps, and  
•    Expected results.  
Please note, the process of developing test cases can help find problems in the requirements or design of an application, since it requires you to completely think through the operation of the application. For this reason, it is useful to prepare test cases early in the development cycle, if possible.

**Q: What should be done after a bug is found?**  
  
A: When a bug is found, it needs to be communicated and assigned to developers that can fix it. After the problem is resolved, fixes should be re-tested. Additionally, determinations should be made regarding requirements, software, hardware, safety impact, etc., for regression testing to check the fixes didn't create other problems elsewhere. If a problem-tracking system is in place, it should encapsulate these determinations. A variety of commercial, problem-tracking/management software tools are available. These tools, with the detailed input of software test engineers, will give the team complete information so developers can understand the bug, get an idea of its severity, reproduce it and fix it.  
 **Q: What is configuration management?**  
  
A: Configuration management (CM) covers the tools and processes used to control, coordinate and track code, requirements, documentation, problems, change requests, designs, tools, compilers, libraries, patches, changes made to them and who makes the changes. Rob Davis has had experience with a full range of CM tools and concepts, and can easily adapt to your software tool and process needs.

**Q: What if the software is so buggy it can't be tested at all?**  
  
A: In this situation the best bet is to have test engineers go through the process of reporting whatever bugs or problems initially show up, with the focus being on critical bugs.  
  
Since this type of problem can severely affect schedules and indicates deeper problems in the software development process, such as insufficient unit testing, insufficient integration testing, poor design, improper build or release procedures, managers should be notified and provided with some documentation as evidence of the problem.  
  
**Q: What if there isn't enough time for thorough testing?**  
  
A: Since it's rarely possible to test every possible aspect of an application, every possible combination of events, every dependency, or everything that could go wrong, risk analysis is appropriate to most software development projects.  
  
Use risk analysis to determine where testing should be focused. This requires judgment skills, common sense and experience. The checklist should include answers to the following questions:  
•    Which functionality is most important to the project's intended purpose?  
•    Which functionality is most visible to the user?  
•    Which functionality has the largest safety impact?  
•    Which functionality has the largest financial impact on users?  
•    Which aspects of the application are most important to the customer?  
•    Which aspects of the application can be tested early in the development cycle?  
•    Which parts of the code are most complex and thus most subject to errors?  
•    Which parts of the application were developed in rush or panic mode?  
•    Which aspects of similar/related previous projects caused problems?  
•    Which aspects of similar/related previous projects had large maintenance expenses?  
•    Which parts of the requirements and design are unclear or poorly thought out?  
•    What do the developers think are the highest-risk aspects of the application?  
•    What kinds of problems would cause the worst publicity?  
•    What kinds of problems would cause the most customer service complaints?  
•    What kinds of tests could easily cover multiple functionalities?  
•    Which tests will have the best high-risk-coverage to time-required ratio?

**Q: What if the project isn't big enough to justify extensive testing?**  
  
A: Consider the impact of project errors, not the size of the project. However, if extensive testing is still not justified, risk analysis is again needed and the considerations listed under "What if there isn't enough time for thorough testing?" do apply. The test engineer then should do "ad hoc" testing, or write up a limited test plan based on the risk analysis.  
  
**Q: What can be done if requirements are changing continuously?**  
  
A: Work with management early on to understand how requirements might change, so that alternate test plans and strategies can be worked out in advance. It is helpful if the application's initial design allows for some adaptability, so that later changes do not require redoing the application from scratch. Additionally, try to...  
•    Ensure the code is well commented and well documented; this makes changes easier for the developers.  
•    Use rapid prototyping whenever possible; this will help customers feel sure of their requirements and minimize changes.  
•    In the project's initial schedule, allow for some extra time to commensurate with probable changes.  
Move new requirements to a 'Phase 2' version of an application and use the original requirements for the 'Phase 1' version.  
Negotiate to allow only easily implemented new requirements into the project.  
•    Ensure customers and management understand scheduling impacts, inherent risks and costs of significant requirements changes. Then let management or the customers decide if the changes are warranted; after all, that's their job.  
•    Balance the effort put into setting up automated testing with the expected effort required to redo them to deal with changes.  
•    Design some flexibility into automated test scripts;  
•    Focus initial automated testing on application aspects that are most likely to remain unchanged;  
•    Devote appropriate effort to risk analysis of changes, in order to minimize regression-testing needs;  
•    Design some flexibility into test cases; this is not easily done; the best bet is to minimize the detail in the test cases, or set up only higher-level generic-type test plans;  
Focus less on detailed test plans and test cases and more on ad-hoc testing with an understanding of the added risk this entails.

**Q: How do you know when to stop testing?**  
  
A: This can be difficult to determine. Many modern software applications are so complex and run in such an interdependent environment, that complete testing can never be done. Common factors in deciding when to stop are...  
•    Deadlines, e.g. release deadlines, testing deadlines;  
•    Test cases completed with certain percentage passed;  
•    Test budget has been depleted;  
•    Coverage of code, functionality, or requirements reaches a specified point;  
•    Bug rate falls below a certain level; or  
•    Beta or alpha testing period ends.

# Q: What if the application has functionality that wasn't in the requirements? A: It may take serious effort to determine if an application has significant unexpected or hidden functionality, which it would indicate deeper problems in the software development process. If the functionality isn't necessary to the purpose of the application, it should be removed, as it may have unknown impacts or dependencies that were not taken into account by the designer or the customer. If not removed, design information will be needed to determine added testing needs or regression testing needs. Management should be made aware of any significant added risks as a result of the unexpected functionality. If the functionality only affects areas, such as minor improvements in the user interface, it may not be a significant risk.

**•    What if the application has functionality that wasn't in the requirements?**

\* It may take serious effort to determine if an application has significant unexpected or hidden functionality, and it would indicate deeper problems in the software development process. If the functionality isn't necessary to the purpose of the application, it should be removed, as it may have unknown impacts or dependencies that were not taken into account by the designer or the customer. If not removed, design information will be needed to determine added testing needs or regression testing needs. Management should be made aware of any significant added risks as a result of the unexpected functionality. If the functionality only effects areas such as minor improvements in the user interface, for example, it may not be a significant risk.

**How can QA processes be implemented without stifling productivity?**

\* By implementing QA processes slowly over time, using consensus to reach agreement on processes, and adjusting and experimenting as an organization grows and matures, productivity will be improved instead of stifled. Problem prevention will lessen the need for problem detection, panics and burn-out will decrease, and there will be improved focus and less wasted effort. At the same time, attempts should be made to keep processes simple and efficient, minimize paperwork, promote computer-based processes and automated tracking and reporting, minimize time required in meetings, and promote training as part of the QA process. However, no one - especially talented technical types - likes rules or bureacracy, and in the short run things may slow down a bit. A typical scenario would be that more days of planning and development will be needed, but less time will be required for late-night bug-fixing and calming of irate customers. (See the Books section's 'Software QA', 'Software Engineering', and 'Project Management' categories for useful books with more information.)

**What if an organization is growing so fast that fixed QA processes are impossible**

\* This is a common problem in the software industry, especially in new technology areas. There is no easy solution in this situation, other than:  
  
\* Hire good people  
  
\* Management should 'ruthlessly prioritize' quality issues and maintain focus on the customer  
  
\* Everyone in the organization should be clear on what 'quality' means to the customer

**How does a client/server environment affect testing?**

\* Client/server applications can be quite complex due to the multiple dependencies among clients, data communications, hardware, and servers. Thus testing requirements can be extensive. When time is limited (as it usually is) the focus should be on integration and system testing. Additionally, load/stress/performance testing may be useful in determining client/server application limitations and capabilities. There are commercial tools to assist with such testing. (See the 'Tools' section for web resources with listings that include these kinds of test tools.)

**How can World Wide Web sites be tested?**

\* Web sites are essentially client/server applications - with web servers and 'browser' clients. Consideration should be given to the interactions between html pages, TCP/IP communications, Internet connections, firewalls, applications that run in web pages (such as applets, javascript, plug-in applications), and applications that run on the server side (such as cgi scripts, database interfaces, logging applications, dynamic page generators, asp, etc.). Additionally, there are a wide variety of servers and browsers, various versions of each, small but sometimes significant differences between them, variations in connection speeds, rapidly changing technologies, and multiple standards and protocols. The end result is that  
•    testing for web sites can become a major ongoing effort. Other considerations might include:

**How is testing affected by object-oriented designs?**

\* What are the expected loads on the server (e.g., number of hits per unit time?), and what kind of performance is required under such loads (such as web server response time, database query response times). What kinds of tools will be needed for performance testing (such as web load testing tools, other tools already in house that can be adapted, web robot downloading tools, etc.)?  
  
\* Who is the target audience? What kind of browsers will they be using? What kind of connection speeds will they by using? Are they intra- organization (thus with likely high connection speeds and similar browsers) or Internet-wide (thus with a wide variety of connection speeds and browser types)?  
  
\* What kind of performance is expected on the client side (e.g., how fast should pages appear, how fast should animations, applets, etc. load and run)?  
  
\* Will down time for server and content maintenance/upgrades be allowed? how much?  
  
\* Will down time for server and content maintenance/upgrades be allowed? how much?  
  
\* How reliable are the site's Internet connections required to be? And how does that affect backup system or redundant connection requirements and testing?  
  
\* What processes will be required to manage updates to the web site's content, and what are the requirements for maintaining, tracking, and controlling page content, graphics, links, etc.?  
  
\* Which HTML specification will be adhered to? How strictly? What variations will be allowed for targeted browsers?  
\* Will there be any standards or requirements for page appearance and/or graphics throughout a site or parts of a site?  
\* How will internal and external links be validated and updated? how often?  
  
\* Can testing be done on the production system, or will a separate test system be required? How are browser caching, variations in browser option settings, dial-up connection variabilities, and real-world internet 'traffic congestion' problems to be accounted for in testing?  
\* How extensive or customized are the server logging and reporting requirements; are they considered an integral part of the system and do they require testing?  
  
\* How are cgi programs, applets, javascripts, ActiveX components, etc. to be maintained, tracked, controlled, and tested?  
\* Pages should be 3-5 screens max unless content is tightly focused on a single topic. If larger, provide internal links within the page.  
  
\* The page layouts and design elements should be consistent throughout a site, so that it's clear to the user that they're still within a site.  
\* Pages should be as browser-independent as possible, or pages should be provided or generated based on the browser-type.  
\* All pages should have links external to the page; there should be no dead-end pages.  
\* The page owner, revision date, and a link to a contact person or organization should be included on each page.  
What is Extreme Programming and what's it got to do with testing?  
  
\* Extreme Programming (XP) is a software development approach for small teams on risk-prone projects with unstable requirements. It was created by Kent Beck who described the approach in his book 'Extreme Programming Explained' (See the Softwareqatest.com Books page.). Testing ('extreme testing') is a core aspect of Extreme Programming. Programmers are expected to write unit and functional test code first - before the application is developed. Test code is under source control along with the rest of the code. Customers are expected to be an integral part of the project team and to help develope scenarios for acceptance/black box testing. Acceptance tests are preferably automated, and are modified and rerun for each of the frequent development iterations. QA and test personnel are also required to be an integral part of the project team. Detailed requirements documentation is not used, and frequent re-scheduling, re-estimating, and re-prioritizing is expected.

**Q: What is the general testing process?**

A: The general testing process is the creation of a test strategy (which sometimes includes the creation of test cases), creation of a test plan/design (which usually includes test cases and test procedures) and the execution of tests.

**Q: How do you create a test plan/design?**

A: Test scenarios and/or cases are prepared by reviewing functional requirements of the release and preparing logical groups of functions that can be further broken into test procedures. Test procedures define test conditions, data to be used for testing and expected results, including database updates, file outputs, report results. Generally speaking...  
•    Test cases and scenarios are designed to represent both typical and unusual situations that may occur in the application.  
•    Test engineers define unit test requirements and unit test cases. Test engineers also execute unit test cases.  
•    It is the test team that, with assistance of developers and clients, develops test cases and scenarios for integration and system testing.  
•    Test scenarios are executed through the use of test procedures or scripts.  
•    Test procedures or scripts define a series of steps necessary to perform one or more test scenarios.  
•    Test procedures or scripts include the specific data that will be used for testing the process or transaction.  
•    Test procedures or scripts may cover multiple test scenarios.  
•    Test scripts are mapped back to the requirements and traceability matrices are used to ensure each test is within scope.  
•    Test data is captured and base lined, prior to testing. This data serves as the foundation for unit and system testing and used to exercise system functionality in a controlled environment.  
•    Some output data is also base-lined for future comparison. Base-lined data is used to support future application maintenance via regression testing.  
•    A pretest meeting is held to assess the readiness of the application and the environment and data to be tested. A test readiness document is created to indicate the status of the entrance criteria of the release.  
Inputs for this process:  
•    Approved Test Strategy Document.  
•    Test tools, or automated test tools, if applicable.  
•    Previously developed scripts, if applicable.  
•    Test documentation problems uncovered as a result of testing.  
•    A good understanding of software complexity and module path coverage, derived from general and detailed design documents, e.g. software design document, source code, and software complexity data.  
Outputs for this process:  
•    Approved documents of test scenarios, test cases, test conditions, and test data.  
•    Reports of software design issues, given to software developers for correction.

**Q: How do you execute tests?**

A: Execution of tests is completed by following the test documents in a methodical manner. As each test procedure is performed, an entry is recorded in a test execution log to note the execution of the procedure and whether or not the test procedure uncovered any defects. Checkpoint meetings are held throughout the execution phase. Checkpoint meetings are held daily, if required, to address and discuss testing issues, status and activities.  
•    The output from the execution of test procedures is known as test results. Test results are evaluated by test engineers to determine whether the expected results have been obtained. All discrepancies/anomalies are logged and discussed with the software team lead, hardware test lead, programmers, software engineers and documented for further investigation and resolution. Every company has a different process for logging and reporting bugs/defects uncovered during testing.  
•    A pass/fail criteria is used to determine the severity of a problem, and results are recorded in a test summary report. The severity of a problem, found during system testing, is defined in accordance to the customer's risk assessment and recorded in their selected tracking tool.  
•    Proposed fixes are delivered to the testing environment, based on the severity of the problem. Fixes are regression tested and flawless fixes are migrated to a new baseline. Following completion of the test, members of the test team prepare a summary report. The summary report is reviewed by the Project Manager, Software QA Manager and/or Test Team Lead.  
•    After a particular level of testing has been certified, it is the responsibility of the Configuration Manager to coordinate the migration of the release software components to the next test level, as documented in the Configuration Management Plan. The software is only migrated to the production environment after the Project Manager's formal acceptance.  
•    The test team reviews test document problems identified during testing, and update documents where appropriate.  
Inputs for this process:  
•    Approved test documents, e.g. Test Plan, Test Cases, Test Procedures.  
•    Test tools, including automated test tools, if applicable.  
•    Developed scripts.  
•    Changes to the design, i.e. Change Request Documents.  
•    Test data.  
•    Availability of the test team and project team.  
•    General and Detailed Design Documents, i.e. Requirements Document, Software Design Document.  
•    A software that has been migrated to the test environment, i.e. unit tested code, via the Configuration/Build Manager.  
•    Test Readiness Document.  
•    Document Updates.  
Outputs for this process:  
•    Log and summary of the test results. Usually this is part of the Test Report. This needs to be approved and signed-off with revised testing deliverables.  
•    Changes to the code, also known as test fixes.  
•    Test document problems uncovered as a result of testing. Examples are Requirements document and Design Document problems.  
•    Reports on software design issues, given to software developers for correction. Examples are bug reports on code issues.  
•    Formal record of test incidents, usually part of problem tracking.  
•    Base-lined package, also known as tested source and object code, ready for migration to the next level.

**Q: How do you create a test strategy?**

A: The test strategy is a formal description of how a software product will be tested. A test strategy is developed for all levels of testing, as required. The test team analyzes the requirements, writes the test strategy and reviews the plan with the project team. The test plan may include test cases, conditions, the test environment, a list of related tasks, pass/fail criteria and risk assessment.  
Inputs for this process:  
•    A description of the required hardware and software components, including test tools. This information comes from the test environment, including test tool data.  
•    A description of roles and responsibilities of the resources required for the test and schedule constraints. This information comes from man-hours and schedules.  
•    Testing methodology. This is based on known standards.  
•    Functional and technical requirements of the application. This information comes from requirements, change request, technical and functional design documents.  
•    Requirements that the system can not provide, e.g. system limitations.  
Outputs for this process:  
•    An approved and signed off test strategy document, test plan, including test cases.  
•    Testing issues requiring resolution. Usually this requires additional negotiation at the project management level.

**Q: What is security clearance?**

A: Security clearance is a process of determining your trustworthiness and reliability before granting you access to national security information.  
  
Q: What are the levels of classified access?  
  
A: The levels of classified access are confidential, secret, top secret, and sensitive compartmented information, of which top secret is the highest.

**What's a 'test plan'?**

A software project test plan is a document that describes the objectives, scope, approach, and focus of a software testing effort. The process of preparing a test plan is a useful way to think through the efforts needed to validate the acceptability of a software product. The completed document will help people outside the test group understand the 'why' and 'how' of product validation. It should be thorough enough to be useful but not so thorough that no one outside the test group will read it. The following are some of the items that might be included in a test plan, depending on the particular project:  
  
\* Title  
  
\* Identification of software including version/release numbers.  
  
\* Revision history of document including authors, dates, approvals.  
  
\* Table of Contents.  
  
\* Purpose of document, intended audience  
  
\* Objective of testing effort  
  
\* Software product overview  
  
\* Relevant related document list, such as requirements, design documents, other test plans, etc.  
  
\* Relevant standards or legal requirements  
  
\* Traceability requirements  
  
\* Relevant naming conventions and identifier conventions  
  
\* Overall software project organization and personnel/contact-info/responsibilties  
  
\* Test organization and personnel/contact-info/responsibilities  
  
\* Assumptions and dependencies  
  
\* Project risk analysis  
  
\* Testing priorities and focus  
  
\* Scope and limitations of testing  
  
\* Test outline - a decomposition of the test approach by test type, feature, functionality, process, system, module, etc. as applicable  
  
\* Outline of data input equivalence classes, boundary value analysis, error classes  
  
\* Test environment - hardware, operating systems, other required software, data configurations, interfaces to other systems  
  
\* Test environment validity analysis - differences between the test and production systems and their impact on test validity.  
  
\* Test environment setup and configuration issues  
  
\* Software migration processes  
  
\* Software CM processes  
  
•    \* Test data setup requirements  
  
\* Database setup requirements  
  
\* Outline of system-logging/error-logging/other capabilities, and tools such as screen capture software, that will be used to help describe and report bugs  
  
\* Discussion of any specialized software or hardware tools that will be used by testers to help track the cause or source of bugs  
  
\* Test automation - justification and overview  
  
\* Test tools to be used, including versions, patches, etc.  
  
\* Test script/test code maintenance processes and version control  
  
\* Problem tracking and resolution - tools and processes  
  
\* Project test metrics to be used  
  
\* Reporting requirements and testing deliverables  
  
\* Software entrance and exit criteria  
  
\* Initial sanity testing period and criteria  
  
\* Test suspension and restart criteria  
  
\* Personnel allocation  
  
\* Personnel pre-training needs  
  
\* Test site/location  
  
\* Outside test organizations to be utilized and their purpose, responsibilties, deliverables, contact persons, and coordination issues.  
  
\* Relevant proprietary, classified, security, and licensing issues.  
  
\* Open issues  
  
\* Appendix - glossary, acronyms, etc.

**What's a 'test case'?**

\* A test case is a document that describes an input, action, or event and an expected response, to determine if a feature of an application is working correctly. A test case should contain particulars such as test case identifier, test case name, objective, test conditions/setup, input data requirements, steps, and expected results.  
  
\* Note that the process of developing test cases can help find problems in the requirements or design of an application, since it requires completely thinking through the operation of the application. For this reason, it's useful to prepare test cases early in the development cycle if possible.

**What should be done after a bug is found?**

\* The bug needs to be communicated and assigned to developers that can fix it. After the problem is resolved, fixes should be re-tested, and determinations made regarding requirements for regression testing to check that fixes didn't create problems elsewhere. If a problem-tracking system is in place, it should encapsulate these processes. A variety of commercial problem-tracking/management software tools are available (see the 'Tools' section for web resources with listings of such tools). The following are items to consider in the tracking process:  
  
\* Complete information such that developers can understand the bug, get an idea of it's severity, and reproduce it if necessary.  
\* Bug identifier (number, ID, etc.)  
  
\* Current bug status (e.g., 'Released for Retest', 'New', etc.)  
  
\* The application name or identifier and version  
  
\* The function, module, feature, object, screen, etc. where the bug occurred  
  
\* Environment specifics, system, platform, relevant hardware specifics  
  
\* Test case name/number/identifier  
  
\* One-line bug description  
  
\* Full bug description  
  
\* Description of steps needed to reproduce the bug if not covered by a test case or if the developer doesn't have easy access to the test case/test script/test tool  
  
\* Names and/or descriptions of file/data/messages/etc. used in test  
  
\* File excerpts/error messages/log file excerpts/screen shots/test tool logs that would be helpful in finding the cause of the problem  
  
\* Severity estimate (a 5-level range such as 1-5 or 'critical'-to-'low' is common)  
  
\* Was the bug reproducible?  
  
\* Tester name  
  
\* Test date  
  
\* Bug reporting date  
  
\* Name of developer/group/organization the problem is assigned to  
  
\* Description of problem cause  
  
\* Description of fix  
  
\* Code section/file/module/class/method that was fixed  
  
\* Date of fix  
  
\* Application version that contains the fix  
  
\* Tester responsible for retest  
  
\* Retest date  
  
\* Retest results  
  
\* Regression testing requirements  
  
\* Tester responsible for regression tests  
  
\* Regression testing results  
  
\* A reporting or tracking process should enable notification of appropriate personnel at various stages. For instance, testers need to know when retesting is needed, developers need to know when bugs are found and how to get the needed information, and reporting/summary capabilities are needed for managers.

**What if the software is so buggy it can't really be tested at all?**

\* The best bet in this situation is for the testers to go through the process of reporting whatever bugs or blocking-type problems initially show up, with the focus being on critical bugs. Since this type of problem can severely affect schedules, and indicates deeper problems in the software development process (such as insufficient unit testing or insufficient integration testing, poor design, improper build or release procedures, etc.) managers should be notified, and provided with some documentation as evidence of the problem.

**How can it be known when to stop testing?**

This can be difficult to determine. Many modern software applications are so complex, and run in such an interdependent environment, that complete testing can never be done. Common factors in deciding when to stop are:  
  
\* Deadlines (release deadlines, testing deadlines, etc.)  
  
\* Test cases completed with certain percentage passed  
  
\* Test budget depleted  
  
\* Coverage of code/functionality/requirements reaches a specified point  
  
\* Bug rate falls below a certain level  
  
\* Beta or alpha testing period ends

**What if there isn't enough time for thorough testing?**

\* Use risk analysis to determine where testing should be focused. Since it's rarely possible to test every possible aspect of an application, every possible combination of events, every dependency, or everything that could go wrong, risk analysis is appropriate to most software development projects. This requires judgement skills, common sense, and experience. (If warranted, formal methods are also available.) Considerations can include:  
  
\* Which functionality is most important to the project's intended purpose?  
  
\* Which functionality is most visible to the user?  
  
\* Which functionality has the largest safety impact?  
  
\* Which functionality has the largest financial impact on users?  
  
\* Which aspects of the application are most important to the customer?  
  
\* Which aspects of the application can be tested early in the development cycle?  
  
\* Which parts of the code are most complex, and thus most subject to errors?  
  
\* Which parts of the application were developed in rush or panic mode?  
  
\* Which aspects of similar/related previous projects caused problems?  
  
\* Which aspects of similar/related previous projects had large maintenance expenses?  
  
\* Which parts of the requirements and design are unclear or poorly thought out?  
\* What do the developers think are the highest-risk aspects of the application?  
  
\* What kinds of problems would cause the worst publicity?  
  
\* What kinds of problems would cause the most customer service complaints?  
  
\* What kinds of tests could easily cover multiple functionalities?  
  
\* Which tests will have the best high-risk-coverage to time-required ratio?

**What if the project isn't big enough to justify extensive testing?**

\* Consider the impact of project errors, not the size of the project. However, if extensive testing is still not justified, risk analysis is again needed and the same considerations as described previously in 'What if there isn't enough time for thorough testing?' apply. The tester might then do ad hoc testing, or write up a limited test plan based on the risk analysis.

**What can be done if requirements are changing continuously?**

# A common problem and a major headache \* Work with the project's stakeholders early on to understand how requirements might change so that alternate test plans and strategies can be worked out in advance, if possible. \* It's helpful if the application's initial design allows for some adaptability so that later changes do not require redoing the application from scratch. \* If the code is well-commented and well-documented this makes changes easier for the developers. \* Use rapid prototyping whenever possible to help customers feel sure of their requirements and minimize changes. \* The project's initial schedule should allow for some extra time commensurate with the possibility of changes. \* Try to move new requirements to a 'Phase 2' version of an application, while using the original requirements for the 'Phase 1' version. \* Negotiate to allow only easily-implemented new requirements into the project, while moving more difficult new requirements into future versions of the application. \* Be sure that customers and management understand the scheduling impacts, inherent risks, and costs of significant requirements changes. Then let management or the customers (not the developers or testers) decide if the changes are warranted - after all, that's their job. \* Balance the effort put into setting up automated testing with the expected effort required to re-do them to deal with changes. \* Try to design some flexibility into automated test scripts. \* Focus initial automated testing on application aspects that are most likely to remain unchanged. \* Devote appropriate effort to risk analysis of changes to minimize regression testing needs. \* Design some flexibility into test cases (this is not easily done; the best bet might be to minimize the detail in the test cases, or set up only higher-level generic-type test plans) \* Focus less on detailed test plans and test cases and more on ad hoc testing (with an understanding of the added risk that this entails).

**Q: What is performance testing?**

A: Although performance testing is described as a part of system testing, it can be regarded as a distinct level of testing. Performance testing verifies loads, volumes and response times, as defined by requirements.

**Q: What is load testing?**

A: Load testing is testing an application under heavy loads, such as the testing of a web site under a range of loads to determine at what point the system response time will degrade or fail.

**Q: What is installation testing?**

A: Installation testing is testing full, partial, upgrade, or install/uninstall processes. The installation test for a release is conducted with the objective of demonstrating production readiness.  
This test includes the inventory of configuration items, performed by the application's System Administration, the evaluation of data readiness, and dynamic tests focused on basic system functionality. When necessary, a sanity test is performed, following installation testing.

**Q: What is security/penetration testing?**

A: Security/penetration testing is testing how well the system is protected against unauthorized internal or external access, or willful damage.  
  
This type of testing usually requires sophisticated testing techniques.

**Q: What is recovery/error testing?**

A: Recovery/error testing is testing how well a system recovers from crashes, hardware failures, or other catastrophic problems.

**Q: What is compatibility testing?**

A: Compatibility testing is testing how well software performs in a particular hardware, software, operating system, or network  
This test includes the inventory of configuration items, performed by the application's System Administration, the evaluation of data readiness, and dynamic tests focused on basic system functionality. When necessary, a sanity test is performed, following installation testing.

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**Q: What is comparison testing?**

A: Comparison testing is testing that compares software weaknesses and strengths to those of competitors' products.

**Q: What is acceptance testing?**

A: Acceptance testing is black box testing that gives the client/customer/project manager the opportunity to verify the system functionality and usability prior to the system being released to production.  
  
The acceptance test is the responsibility of the client/customer or project manager, however, it is conducted with the full support of the project team. The test team also works with the client/customer/project manager to develop the acceptance criteria.

**Q: What is alpha testing?**

A: Alpha testing is testing of an application when development is nearing completion. Minor design changes can still be made as a result of alpha testing. Alpha testing is typically performed by a group that is independent of the design team, but still within the company, e.g. in-house software test engineers, or software QA engineers.

**Q: What is beta testing?**

A: Beta testing is testing an application when development and testing are essentially completed and final bugs and problems need to be found before the final release. Beta testing is typically performed by end-users or others, not programmers, software engineers, or test engineers.

**Q: What is a Test/QA Team Lead?**

A: The Test/QA Team Lead coordinates the testing activity, communicates testing status to management and manages the test team.

**Q: What testing roles are standard on most testing projects?**

A: Depending on the organization, the following roles are more or less standard on most testing projects: Testers, Test Engineers, Test/QA Team Lead, Test/QA Manager, System Administrator, Database Administrator, Technical Analyst, Test Build Manager and Test Configuration Manager.  
  
Depending on the project, one person may wear more than one hat. For instance, Test Engineers may also wear the hat of Technical Analyst, Test Build Manager and Test Configuration Manager.  
  
You CAN get a job in testing. Click on a link!

**Q: What is a Test Engineer?**

A: We, test engineers, are engineers who specialize in testing. We, test engineers, create test cases, procedures, scripts and generate data. We execute test procedures and scripts, analyze standards of measurements, evaluate results of system/integration/regression testing. We also...  
•    Speed up the work of the development staff;  
•    Reduce your organization's risk of legal liability;  
•    Give you the evidence that your software is correct and operates properly;  
•    Improve problem tracking and reporting;  
•    Maximize the value of your software;  
•    Maximize the value of the devices that use it;  
•    Assure the successful launch of your product by discovering bugs and design flaws, before users get discouraged, before shareholders loose their cool and before employees get bogged down;  
•    Help the work of your development staff, so the development team can devote its time to build up your product;  
•    Promote continual improvement;  
•    Provide documentation required by FDA, FAA, other regulatory agencies and your customers;  
•    Save money by discovering defects 'early' in the design process, before failures occur in production, or in the field;  
•    Save the reputation of your company by discovering bugs and design flaws; before bugs and design flaws damage the reputation of your company.

**Q: What is a Test Build Manager?**

A: Test Build Managers deliver current software versions to the test environment, install the application's software and apply software patches, to both the application and the operating system, set-up, maintain and back up test environment hardware.  
  
Depending on the project, one person may wear more than one hat. For instance, a Test Engineer may also wear the hat of a Test Build Manager.

**Q: What is a System Administrator?**

A: Test Build Managers, System Administrators, Database Administrators deliver current software versions to the test environment, install the application's software and apply software patches, to both the application and the operating system, set-up, maintain and back up test environment hardware.  
  
Depending on the project, one person may wear more than one hat. For instance, a Test Engineer may also wear the hat of a System Administrator.

**Q: What is a Database Administrator?**

A: Test Build Managers, System Administrators and Database Administrators deliver current software versions to the test environment, install the application's software and apply software patches, to both the application and the operating system, set-up, maintain and back up test environment hardware. Depending on the project, one person may wear more than one hat. For instance, a Test Engineer may also wear the hat of a Database Administrator.

**Q: What is a Technical Analyst?**

A: Technical Analysts perform test assessments and validate system/functional test requirements. Depending on the project, one person may wear more than one hat. For instance, Test Engineers may also wear the hat of a Technical Analyst.

**Q: What is a Test Configuration Manager?**

A: Test Configuration Managers maintain test environments, scripts, software and test data. Depending on the project, one person may wear more than one hat. For instance, Test Engineers may also wear the hat of a Test Configuration Manager.

**Q: What is a test schedule?**

A: The test schedule is a schedule that identifies all tasks required for a successful testing effort, a schedule of all test activities and resource requirements.

**Q: What is software testing methodology?**

A: One software testing methodology is the use a three step process of...  
1.    Creating a test strategy;  
2.    Creating a test plan/design; and  
3.    Executing tests.  
This methodology can be used and molded to your organization's needs. G C Reddy believes that using this methodology is important in the development and ongoing maintenance of his clients' applications.

# [Test Design Techniques](https://www.pavantestingtools.com/2016/04/test-design-techniques.html)

**1) Introduction to Software Test Design Techniques  
  
2) Static and Dynamic Test Design Techniques  
  
3) Black box Test Design Techniques**  
  
    a) Equivalence Partitioning (EP)  
  
    b) Boundary Value Analysis (BVA)  
  
    c) Decision Table Testing  
  
    d) State Transition Testing  
  
    e) Use Case Testing  
  
**1) Introduction to Software Test Design Techniques**  
   
**What is Technique?**  
  
An Efficient way of doing or achieving something.  
  
**What is Test Design Technique?**  
  
A test design technique is used to select a good set of tests from the all possible tests for a given system.  
  
**Why we need to use Test Design Techniques?**  
Exhaustive Testing is not possible, so we need to use Test Design Techniques in order to reduce the size of the input.  
  
Exhaustive Testing is a Test approach in which the test suite comprises all combination of input values and preconditions.  
  
Exhaustive Testing is not recommendable due to Time and Budget considerations.  
  
**Categories of Test Design Techniques?**  
  
There are two main categories of Test Design Techniques, They are:  
  
    a) Static Techniques  
    b) Dynamic Techniques  
  
**2) Static and Dynamic Test Design Techniques**  
  
A) Static Techniques  
   
Testing of the software documents manually or with a set of tools but without executing the Software.  
  
Two types of static testing techniques  
  
i) Reviews (Manual Examination)  
  
ii) Static Analysis (Automated Analysis)

i) Reviews  
   
Types of Reviews  
  
a) Informal Review  
b) Walkthrough  
c) Technical Review  
d) Inspection  
  
ii) Static Analysis  
   
Static analysis tools are typically used by developers, Compilers offer some support for Static analysis,  
  
B) Dynamic Test Design Techniques  
   
The software is tested by executing it on computer.  
  
Categories of Dynamic Test Design Techniques  
  
**i) Specification based or Black box Techniques**

    a) Equivalence Partitioning (EP)  
    b) Boundary Value Analysis (BVA)  
    c) Decision Table Testing  
    d) State Transition Testing  
    e) Use Case Testing Etc...  
  
**ii) Structure based or White box Techniques**

    a) Statement Testing and coverage  
    b) Decision Testing and Coverage  
    c) Condition Testing, Multi Condition Testing etc...  
  
**iii) Experience based Techniques**

    a) Error Guessing  
    b) Exploratory Testing  
  
**3) Black box Test Design Techniques**  
      
    a) Equivalence Partitioning (EP)  
  
    b) Boundary Value Analysis (BVA)  
  
    c) Decision Table Testing  
  
    d) State Transition Testing  
  
    e) Use Case Testing  
  
a) Equivalence Partitioning (EP)  
   
• It can be applied at any level of testing (Unit, Integration, System and Acceptance Testing)  
  
• In Equivalence Partitioning, inputs to the Software are divided into groups that are expected to exhibit similar behavior.  
  
• Equivalence Partitions/Classes can be found for both valid data and invalid data.  
  
Example 1 (Data Range):  
  
Tickets field in a Reservation system accepts 1 to 10 Tickets only.  
  
Partition 1    Partition 2    Partition 3  
  
0                 1 to 10         11 to 99 or above  
(Invalid)       (Valid)          (Invalid)  
  
Example 2 (Data Type):  
  
Customer Identification Number field in a CRM system accepts only numbers.  
  
Partition 1        Partition 2    Partition 3              Partition 4       
Alphabets      Numbers     Special Characters    Alpha-numeric   
(Invalid)          (Valid)         (Invalid)                  (Invalid)                 
  
Example 3 (Data Size)  
  
Phone Number filed accepts 10 digits number only  
  
Partition 1    Partition 2    Partition 3  
Below 10      10               Above 10  
(Invalid)       (Valid)         (Invalid)  
  
Example 4 (Others)  
  
A Payment management system accepts credit card payments only  
  
Partition 1     Partition 2         Partition 3  
Credit card    Net Banking      Cash on Delivery  
(Valid)          (Invalid)            (Invalid)  
  
b) Boundary Value Analysis (BVA)  
   
• The maximum and minimum values of a partition are its boundary values.  
  
• Behavior at edge of each equivalence partition is more likely to be incorrect than behavior within the partition.  
  
• Boundary value analysis can be applied at all Test levels(Unit, Integration, System and Acceptance Testing).  
  
Example 1:  
Partition 1    Partition 2    Partition 3  
  
0                  1 to 10        11 to 99 or above  
(Invalid)        (Valid)        (Invalid)  
  
Minimum/maximum 0  
Minimum 1  
Maximum 10  
Minimum 11  
Maximum 99  
-------------------------------------  
Example 3 (Data Size)  
  
Phone Number filed accepts 10 digits number only  
  
Partition 1    Partition 2    Partition 3  
Below 10      10               Above 10  
(Invalid)      (Valid)          (Invalid)  
  
Minimum -9  
Minimum and Maximum - 10  
Maximum -11  
----------------------------------------  
Example: User Id field accepts 10 to 20 characters  
  
Partition 1    Partition 2    Partition 3  
Below 10     10 to 20        11 to 99  
  
Minimum -1  
Maximum - 9  
  
Minimum - 10  
Maximum - 20  
  
Minimum - 21  
Maximum -99  
  
c) Decision Table Testing  
   
• The decision tables are good way to capture system requirements that contain logical conditions.  
  
• It may be applied for all situations when the action of the software depends on logical decisions.  
  
**BSRB (Govt) System Job eligibility criteria,**  
Age should be in between 21 and 35  
  
Conditions:  
i) For SC or ST Candidates 5 Years age relaxation  
ii) For BC Candidates 5 Years age relaxation  
iii) PHC Candidates 5 Years age relaxation  
  
Category        Age    Valid/Invalid  
----------------------------------------------  
OC                 20       Invalid  
OC                 21       Valid  
OC                 35       Valid  
OC                 36       Invalid  
BC                 36       Valid  
BC                 39       Valid  
SC                 39       Valid  
PHC               39       Valid  
ST                 40       Valid

**Banking System interest rates For fixed deposits.**1 to 2 years 7%  
2 to 3 Years 8%  
3 to 5 Years 10%  
  
Condition:  
  
For Senior citizens 0.5% extra for all ranges  
  
Age    Period    Interest Rate  
-----------------------------------  
25     1 year      7%  
35     2.5          8%  
56     4            10%  
66     4            10.5%  
  
d) State Transition Testing  
   
• In State transition Testing Test cases are designed to execute valid and invalid state transitions.  
  
• A System (Application Under Test) may exhibit a different response on current conditions or previous history.  
  
Example: Internet Banking System Fund Transfer operation  
  
Initial Balance: 45000  
  
Transaction 1    Transaction Amount        Transaction  
1                       20000                            Successful (Pass)  
2                       20000                            Successful (Pass)  
3                       20000                            Unsuccessful (Pass)  
  
e) Use Case Testing  
   
• In Use Case Testing Test Cases are designed to execute User Scenarios or Business Scenarios.  
  
• A Use Case describes interactions between actors, including users and the system.  
  
• A Use case usually has a mainstream scenario and sometimes alternative scenarios.  
  
Example:  
  
Business Scenario: ATM Cash Withdrawal operation  
  
Mainstream Scenario:  
   
1)  
User: Inserts ATM Card  
  
System: Asks for PIN  
  
2)  
User: Enters PIN  
  
System: Validates PIN and asks to select language  
  
3)  
User: Selects Language  
  
System: Asks to select Account Type  
  
4)  
User: Selects Account Type  
  
System: Asks to enter Amount  
  
5)  
User: Enters Amount  
  
System: Releases Money  
  
Alternatives  
   
2a) Suppose if user enters invalid Pin  
  
System: Shows error message and asks to enter correct PIN  
User: Enters Correct PIN  
  
4a) Suppose if user selects incorrect Account Type  
  
System: Shows error and asks to select correct Account Type  
User: Select correct account type  
  
5a) If User enters incorrect amount (More than the balance amount or more than the day limit)  
  
System: Shows Error message and asks to enter correct amount  
User: Enters correct amount

# [ETL Testing Interview Questions and Answers](https://www.pavantestingtools.com/2016/04/etl-testing-interview-questions-and.html)

**Question.1   What is a Data Warehouse?**

**Answer:** A Data Warehouse is a collection of data marts representing historical data from different operational data source (OLTP). The data from these OLTP are structured and optimized for querying and data analysis in a Data Warehouse.

**Question.2   What is a Data mart?**

**Answer:**   A Data Mart is a subset of a data warehouse that can provide data for reporting and analysis on a section, unit or a department like Sales Dept, HR Dept, etc. The Data Mart are sometimes also called as HPQS (Higher Performance Query Structure).

**Question.3   What is OLAP?**

**Answer:**      OLAP stands for Online Analytical Processing. It uses database tables (Fact and Dimension tables) to enable multidimensional viewing, analysis and querying of large amount of data.

**Question.4   What is OLTP?**

**Answer:**OLTP stands for Online Transaction Processing Except data warehouse databases the other databases are OLTPs. These OLTP uses normalized schema structure. These OLTP databases are designed for recording the daily operations and transactions of a business.

**Question.5   What are Dimensions?**

**Answer:**Dimensions are categories by which summarized data can be viewed. For example a profit Fact table can be viewed by a time dimension.

**Question.6   What are Confirmed Dimensions?**

**Answer:**  The Dimensions which are reusable and fixed in nature Example customer, time, geography dimensions.

**Question.7   What are Fact Tables?**

**Answer:**A Fact Table is a table that contains summarized numerical (facts) and historical data. This Fact Table has a foreign key-primary key relation with a dimension table. The Fact Table maintains the information in 3rd normal form.

            A star schema is defined is defined as a logical database design in which there will be a centrally located fact table which is surrounded by at least one or more dimension tables. This design is best suited for Data Warehouse or Data Mart.

**Question.8    What are the types of Facts?**

**Answer:**The types of Facts are as follows.

1.     Additive Facts: A Fact which can be summed up for any of the dimension available in the fact table.

2.     Semi-Additive Facts: A Fact which can be summed up to a few dimensions and not for all dimensions available in the fact table.

3.     Non-Additive Fact: A Fact which cannot be summed up for any of the dimensions available in the fact table.

**Question.9   What are the types of Fact Tables?**

**Answer:** The types of Fact Tables are:

1.     Cumulative Fact Table: This type of fact tables generally describes what was happened over the period of time. They contain additive facts.

2.     Snapshot Fact Table: This type of fact table deals with the particular period of time. They contain non-additive and semi-additive facts.

**Question.10   What is Grain of Fact?**

**Answer:** The Grain of Fact is defined as the level at which the fact information is stored in a fact table. This is also called as Fact Granularity or Fact Event Level.

**Question.11   What is Factless Fact table?**

**Answer:**The Fact Table which does not contains facts is called as Fact Table. Generally when we need to combine two data marts, then one data mart will have a fact less fact table and other one with common fact table.

**Question.12   What are Measures?**

**Answer:**Measures are numeric data based on columns in a fact table.

**Question.13   What are Cubes?**

**Answer:**Cubes are data processing units composed of fact tables and dimensions from the data warehouse. They provided multidimensional analysis.

**Question.14   What are Virtual Cubes?**

**Answer:**These are combination of one or more real cubes and require no disk space to store them. They store only definition and not the data.

**Question.15   What is a Star schema design?**

**Answer:**   A Star schema is defined as a logical database design in which there will be a centrally located fact table which is surrounded by at least one or more dimension tables. This design is best suited for Data Warehouse or Data Mart.

**Question.16   What is Snow Flake schema Design?**

**Answer:**  In a Snow Flake design the dimension table (de-normalized table) will be further divided into one or more dimensions (normalized tables) to organize the information in a better structural format. To design snow flake we should first design star schema design.

**Question.17   What is Operational Data Store [ODS] ?**

**Answer:**   It is a collection of integrated databases designed to support operational monitoring. Unlike the OLTP databases, the data in the ODS are integrated, subject oriented and enterprise wide data.

**Question.18   What is Denormalization?**

**Answer:**   Denormalization means a table with multi duplicate key. The dimension table follows Denormalization method with the technique of surrogate key.

**Question.19   What is Surrogate Key?**

**Answer:** A Surrogate Key is a sequence generated key which is assigned to be a primary key in the system (table).

# [Manual Testing Interview Questions and Answers](https://www.pavantestingtools.com/2016/04/manual-testing-interview-questions-and.html)

**Question.1  What is the difference between the QA and software testing?**

**Answer:**The role of QA (Quality Assurance) is to monitor the quality of the process to produce a quality of a product. While the software testing, is the process of ensuring the final product and check the functionality of final product and to see whether the final product meets the user’s requirement.

**Question.2  What is Testware?**

**Answer:**Testware is the subset of software, which helps in performing the testing of application.  It is a term given to the combination of software application and utilities which is required for testing a software package.

**Question.3  What is the difference between build and release?**

**Answer:**Build: It is a number given to Installable software that is given to testing team by the development team.

 Release: It is a number given to Installable software that is handed over to customer by the tester or developer.

**Question.4  What are the automation challenges that QA team faces while testing?**

**Answer:**Exploitation of automation tool

Frequency of use of test case

Reusability of Automation script

Adaptability of test case for automation

**Question.5  What is bug leakage and bug release?**

**Answer:**Bug release is when software or an application is handed over to the testing team knowing that the defect is present in a release.  During this the priority and severity of bug is low, as bug can be removed before the final handover.

Bug leakage is something, when the bug is discovered by the end users or customer, and missed by the testing team to detect, while testing the software.

**Question.6   What is data driven testing?**

**Answer:**Data driven testing is an automation testing part, which tests the output or input values. These values are read directly from the data files. The data files may include csv files, excel files, data pools and many more. It is performed when the values are changing by the time.

**Question.7   Explain the steps for Bug Cycle?**

**Answer:**Once the bug is identified by the tester, it is assigned to the development manager in open status.If the bug is a valid defect the development team will fix it and if it is not a valid defect, the defect will be ignored and marked as rejected**.**The next step will be to check whether it is in scope, if it is happen so that, the bug is not the part of the current release then the defects are postponed.

If the defect or bug is raised earlier then the tester will assigned a DUPLICATE status

When bug is assigned to developer to fix, it will be given a IN-PROGRESS status

Once the defect is repaired, the status will changed to FIXED at the end the tester will give CLOSED status if it passes the final test.

**Question.8  What does the test strategy include?**

**Answer:**  The test strategy includes introduction, resource, scope and schedule for test activities, test tools, test priorities, test planning and the types of test that has to be performed.

**Question.9  Mention the different types of software testing?**

**Answer:**

Unit testing

Integration testing and regression testing

Shakeout testing

Smoke testing

Functional testing

Performance testing

White box and Black box testing

Alpha and Beta testing

Load testing and stress testing

System testing

**Question.10  What is branch testing and what is boundary testing?**

**Answer:**The testing of all the branches of the application, which is tested once, is known as branch testing.  While the testing, which is focused on the limit conditions of the software is known as boundary testing.

**Question.11  What are the contents in test plans and test cases?**

**Answer:**

Testing objectives

Testing scope

Testing the frame

The environment

Reason for testing

The criteria for entrance and exit

Deliverables

Risk factors

**Question.12   What is Agile testing and what is the importance of Agile testing?**

**Answer:** Agile testing is software testing, which involves the testing of the software from the customer point of view.  The importance of this testing is that, unlike normal testing process, this testing does not wait for development team to complete the coding first and then doing testing. The coding and testing both goes simultaneously.  It requires continuous customer interaction.

It works on SDLC ( Systems Development Life Cycle) methodologies, it means that the task is divided into different segments and compiled at the end of the task.

**Question.13  What is Test case?**

**Answer:**Test case is a specific term that is used to test a specific element.  It has information of test steps, prerequisites, test environment and outputs.

**Question.14  What is the strategy for Automation Test Plan?**

**Answer:**The strategy for Automation Test Plan

Preparation of Automation Test Plan

Recording the scenario

Error handler incorporation

Script enhancement by inserting check points and looping constructs

Debugging the script and fixing the issues

Rerunning the script

Reporting the result

**Question.15   What is quality audit?**

**Answer:**The systematic and independent examination for determining the quality of activities is known as quality audit.  It allows the cross check for the planned arrangements, whether they are properly implemented or not.

**Question.16  How does a server or client environment affect software testing?**

**Answer:**   As the dependencies on the clients are more, the client or server applications are complex.

The testing needs are extensive as servers, communications and hardware are interdependent. Integration and system testing is also for a limited period of time.

**Question.17   What are the tools used by a tester while testing?**

**Answer:**

Selenium

Firebug

OpenSTA

WinSCP

YSlow for FireBug

Web Developer toolbar for firebox

**Question.18   Explain stress testing, load testing and volume testing?**

**Answer:**Load Testing: Testing an application under heavy but expected load is known as Load Testing.  Here, the load refers to the large volume of users, messages, requests, data, etc.

Stress Testing: When the load placed on the system is raised or accelerated beyond the normal range then it is known as Stress Testing.

Volume Testing:  The process of checking the system, whether the system can handle the required amounts of data, user requests, etc. is known as Volume Testing.

**Question.19   What are the five common solutions for software developments problems?**

**Answer:**Setting up the requirements criteria, the requirements of a software should be complete, clear and agreed by all.The next thing is the realistic schedule like time for planning , designing, testing, fixing bugs and re-testingAdequate testing, start the testing immediately after one or more modules development.Use rapid prototype during design phase so that it can be easy for customers to find what to expectUse of group communication tools.

# [Oracle Interview Questions and answers-1](https://www.pavantestingtools.com/2016/04/oracle-interview-questions-and-answers-1.html)

# Question.1   What is a database?

**Answer:**    Database offer a single point of mechanism for storing and retrieving information with the help of tables. Table is made up of columns and rows where each column stores specific attribute and each row displays a value for the corresponding attribute.  It is a structure that stores information about the attributes of the entities and relationships among them.It also stores data types for attributes and indexes.  Well known DBMS include Oracle, ibm db2, Microsoft sql server, Microsoft access, mysql and sqlLite.

**Question.2   What are the different types of storage systems available and which one is used by Oracle?**

**Answer:**Two types of storage systems are available

• Relational Database Management System (RDBMS) and Hierarchical Storage Management System (HSM)

• Most databases use RDBMS model, Oracle also uses RDBMS model.

• Hierarchical Storage Management System (HSM)

• Information Management System (IMS) from IBM.

• Integrated Database Management System (IDMS) from CA.[sociallocker]

**Question.3   Explain some examples of join methods?**

**Answer:**Join methods are of mainly 3 types

• Merge Join – Sorting both the tables using join key and then merge the rows which are sorted.

• Nested loop join – It gets a result set after applying filter conditions based on the outer table.Then it joins the inner table with the respective result set.

• Hash join – It uses hash algorithm first on smaller table and then on the other table to produce joined columns. After that matching rows are returned.

**Question.4   What are the components of logical data model and list some differences between logical and physical data model?**

**Answer:**Components of logical data model are

• Entity – Entity refers to an object that we use to store information. It has its own table.

• Attribute – It represents the information of the entity that we are interested in. It is stored as a column of the table and has specific datatype associated with it.

• Record – It refers to a collection of all the properties associated with an entity for one specific condition, represented as row in a table.

• Domain – It is the set of all the possible values for a particular attribute.

• Relation – Represents a relation between two entities.

• Logical data model represents database in terms of logical objects, such as entities and relationships.

• Physical data model represents database in terms of physical objects, such as tables and constraints.

**Question.5   What is normalization? What are the different forms of normalization?**

**Answer:**Normalization is a process of organizing the fields and tables of a relational database to minimize redundancy and dependency.It saves storage space and ensures consistency of our data.

There are six different normal forms

• First Normal Form – If all underlying domains contain atomic values only.

• Second Normal Form – If it is in first normal form and every non key attribute is fully functionally dependent on primary key.

• Third Normal Form – If it is in 2nd normal form and every non key attribute is non transitively dependent on the primary key.

• Boyce Codd Normal Form – A relation R is in BCNF if and only every determinant is a candidate key.

• Fourth Normal Form

• Fifth Normal Form

**Question.6 Differentiate between a database and Instance and explain relation between them?**

**Answer:**Database is a collection of three important files which include data files, control files and redo log files which physically exist on a disk. Whereas instance is a combination of oracle background process (SMON, PMON, DBWR, LGWR) and memory structure (SGA, PGA). Oracle background processes running on a computer share same memory area. An instance can mount and open only a single database, ever. A database may be mounted and opened by one or more instances (using RAC).

**Question.7   What are the components of SGA?**

**Answer:**SGA is used to store shared information across all database users.

It mainly includes Library cache, Data Dictionary cache, Database Buffer Cache, Redo log Buffer cache, Shared Pool. Library cache – It is used to store Oracle statements. Data Dictionary Cache – It contains the definition of Database objects and privileges granted to users. Data Base buffer cache – It holds copies of data blocks which are frequently accessed, so that they can be retrieved faster for any future requests.

**Question.8   Difference between SGA and PGA?**

**Answer:**SGA (System Global Area) is a memory area allocated during an instance start up.SGA is allocated as 40% of RAM size by default.SGA size is controlled by DB\_CACHE\_SIZE parameter defined in initialization parameter file (init.ora file or SPFILE).PGA (Program or Process Global Area) is a memory area that stores a user session specific information.PGA is allocated as 10% of RAM size by default.

**Question.9   What are the disk components in Oracle?**

**Answer:**These are the physical components which gets stored in the disk.

• Data files

• Redo Log files

• Control files

• Password files

• Parameter files

**Question.10   What is System Change Number (SCN)?**

**Answer:**SCN is a unique ID that Oracle generates for every committed transaction. It is recorded for every change in the redo entry.SCN is also generated for every checkpoint (CKPT) occurred. It is an ever increasing number which is updated for every 3 seconds**.**You can get the SCN number by querying select SCN from v$ database from SQLPLUS.

**Question.11   What is Database Writer (DBWR) and when does DBWR write to the data file?**

**Answer**:   DBWR is a background process that writes data blocks information from Database buffer cache to data files.

There are 4 important situations when DBWR writes to data file

• Every 3 seconds

• Whenever checkpoint occurs.

• When server process needs free space in database buffer cache to read new blocks.

• Whenever number of changed blocks reaches a maximum value.

**Question.12   What is Log Writer and when does LGWR writes to log file?**

**Answer:**GWR writes redo or changed information from redo log buffer cache to redo log files in database.It is responsible for moving redo buffer information to online redo log files, when you commit and a log switch also occurs.LGWR writes to redo files when the redo log buffer is 1/3 rd full.It also writes for every 3 seconds.Before DBWR writes modified blocks to the datafiles, LGWR writes to the log file.

**Question.13   Which Table spaces are created automatically when you create a database?**

**Answer:**

SYSTEM tablespace is created automatically during database creation.It will be always online when the database is open. Other Tablespaces include

• SYSAUX tablespace

• UNDO tablespace

• TEMP tablespace

• UNDO & TEMP tablespace are optional when you create a database.

**Question.14  Which file is accessed first when Oracle database is started and What is the difference between SPFILE and PFILE?**

**Answer:**Init.ora parameter file or SPFILE is accessed first .( SID is instance name)**.**Settings required for starting a database are stored as parameters in this file.

• SPFILE is by default created during database creation whereas PFILE should be created from SPFILE.

• PFILE is client side text file whereas SPFILE is server side binary file.

• SPFILE is a binary file (it can’t be opened) whereas PFILE is a text file we can edit it and set parameter values.

• Changes made in SPFILE are dynamically effected with running database whereas PFILE changes are effected after bouncing the database.

• We can backup SPFILE using RMAN.

**Question.15   What are advantages of using SPFILE over PFILE?**

**Answer:**SPFILE is available from Oracle 9i and above. Parameters in SPFILE are changed dynamically. You can’t make any changes to PFILE when the database is up.RMAN cant backup PFILE, It can backup SPFILE.SPFILE parameters changes are checked before they are accepted as it is maintained by Oracle server thereby reducing the human typo errors.

**Question.16   How can you find out if the database is using PFILE or SPFILE?**

**Answer:**    You can query Dynamic performance view (v$parameter) to know your database is using PFILE or SPFILE. SQL> select value from V$parameter where name= ‘SPFILE’;

 A non-null value indicates the database is using SPFILE. Null value indicates database is using PFILE.

 You can force a database to use a PFILE by issuing a startup command as SQL> startup PFILE = ‘full path of Pfile location’;

**Question.17    Where are parameter files stored and how can you start a database using a specific parameter file?**

**Answer:**In UNIX they are stored in the location $ORACLE\_HOME/dbs and ORACLE\_HOME/database for Windows directory.Oracle by default starts with SPFILE located in $ORACLE\_HOME/dbs.If you want to start the database with specific file we can append it at the startup command as

SQL > startup PFILE = ‘full path of parameter file ‘;

• You can create PFILE from SPFILE as create PFILE from SPFILE;

All the parameter values are now updated with SPFILE. Similarly, create SPFILE from PFILE; command creates SPFILE from PFILE.

**Question.18   What is PGA\_AGGREGATE\_TARGET parameter?**

**Answer:**PGA\_AGGREGATE TARGET parameter specifies target aggregate PGA memory available to all server process attached to an instance.Oracle sets its value to 20% of SGA.It is used to set overall size of work-area required by various components.Its value can be known by querying v$pgastat dynamic performance view.From sqlplus it can be known by using SQL> show parameter pga.

**Question.19  What is the purpose of configuring more than one Database Writer Processes? How many should be used? (On UNIX)**

**Answer:**DBWn process writes modified buffers in Database Buffer Cache to data files, so that user process can always find free buffers.To efficiently free the buffer cache to make it available to user processes, you can use multiple DBWn processes.We can configure additional processes (DBW1 through DBW9 and DBWa through DBWj) to improve write performance if our system modifies data heavily.The initialization parameter DB\_WRITER\_PROCESSES specifies the number of DBWn processes upto a maximum number of 20.If the Unix system being used is capable of asynchronous input/output processing then only one DBWn process is enough, if not the case the total DBWn processes required will be twice the number of disks used by oracle, and this can be set with DB\_WRITER\_PROCESSES initialization parameter.

# Question. 1    To display the name of all departments.

**Answer:**     SQL>SELECT dname FROM dept;

**Question.2   To display employee name, sal, job and deptno for all employees   in department 30.**

**Answer:**

SQL>SELECT ename,sal,job,deptno

2              FROM emp

3              WHERE deptno=30; [sociallocker]

**Question.3  To display employee name,job,salary,department number for those  employees in department 20 who earn 2000 or more, as well as all   employees in department 30.**

**Answer:**

SQL>SELECT ename,job,sal,deptno

2              FROM emp

3              WHERE sal>=2000 AND deptno=20 OR deptno=30;

**Question.4   To display employee name, job, salary, department number for     those employees in department 20 or 30 who earn 2000 or more.**

**Answer:**

                    SQL> SELECT ename,job,sal,deptno

2    FROM emp

3    WHERE sal>=2000 AND(deptno=20 OR deptno=30);

**Question. 5   To display employee name,job for all clerks and analysts.**

**Answer:**

SQL>SELECT ename, job

                2 FROM emp

                3 WHERE job IN (‘CLERK’,’ANALYST’ );

**Question.6   To display employee number,name, department number for those   hired between January 1,1995 and January 1,1996.**

**Answer:**

SQL>SELECT empno,ename,deptno,

2              hiredate FROM emp

3              WHERE hiredate BETWEEN ‘01-JAN-95’

4              AND ‘01-JAN-96’;

**Question.7   To display name, job, salary for those whose name begins with  letter A.**

**Answer:**

SQL Command  SQL> SELECT ename,job,sal

2              FROM emp

3              WHERE ename LIKE ‘A%’;

**Question.8   To display employee name, job, salary, department number for   employees whose name has I as the second character.**

**Answer:**

SQL Command  SQL> SELECT ename,job,sal,deptno

2              FROM emp

3              WHERE ename LIKE ‘\_I%’;

**Question.9  To display employee name, commission for employees who are    not eligible for commission.**

**Answer:**               SQL> SELECT ename,comm

                                        2 FROM emp

                                      3 WHERE comm IS NULL;

**Question.  10   List the name, salary and PF amount of all the employees (PF iscalculated as 10% of salary)**

**Answer:**

                SQL> SELECT ename,sal, sal\*.1

                            2 FROM emp ;

**Question.11  To display name and salaries of employees in department 20 in  ascending order of salary.**

**Answer:**               SQL> SELECT ename, sal, deptno

                                  FROM emp

                                  WHERE deptno=20

                                 ORDER BY SAL;

**Question. 12   To display name and salaries of employees in department 20 in  ascending order of salary, using the position of column in the  syntax.**

**Answer:**

SQL> SELECT ename,sal,deptno

2              FROM emp

3              WHERE deptno=20

4              ORDER BY 2;

**Question.13   To  display number,  name,  department  number,  salary  of  all  employees.  Order  the  result  by  department  number  and  in      descending order of salary.**

**Answer:**

SQL> SELECT empno,ename,deptno,sal

2              FROM emp

3              ORDER BY deptno,sal DESC;

**Question.14   Display all data from table dept.**

**Answer:**               SQL>SELECT \* FROM dept;

**Question. 15  To display distinct values returned by either query.**

**Answer:**

SQL>SELECT dname FROM dept UNION 2 SELECT dname FROM dept1;

**Question.16  To display all the values returned by both queries.**

**Answer:**

SQL>SELECT dname FROM dept UNION ALL

2 SELECT dname FROM dept1;

**Question. 17  To display common values which are present in the values returned  by both the queries.**

**Answer:**

SQL>SELECT dname FROM dept INTERSECT

2 SELECT dname FROM dept1;

**Question.18  To display values returned by the first query which are not present  in the values returned by the second query.**

**Answer:**

SQL>SELECT dname FROM dept MINUS

2 SELECT dname FROM dept1;

**Question. 19   To display values returned by the first query which are not present   in the values returned by the second query.**

**Answer:**

 SQL>SELECT dname FROM dept MINUS

2 SELECT \* FROM dept1;

# Question. 20     To display the number of employees working with the company.

**Answer:**               SQL>SELECT COUNT(\*) FROM emp;

**Question.21     To display the total salaries payable to employees.**

**Answer:**                SQL>SELECT SUM(sal) FROM emp; 

**Question.22       To  display  the  maximum  salary  of  employee  working  as  a   salesman.**

**Answer:**                SQL>SELECT MAX(sal) FROM emp

2   WHERE job = ‘SALESMAN’;

**Question.23       To display the minimum salary of employee**

**Answer:**                 SQL>SELECT  MIN(sal) FROM emp

**Question. 24    To display the average salary and number of employees working in   department 20.**

**Answer:**                SQL>SELECT  AVG(sal) , COUNT(\*) FROM emp

2     WHERE deptno = 20;

**Question.25     List the department numbers and number of employees in each   department.**

**Answer:**SQL>SELECT        deptno, COUNT(\*) FROM emp

2              GROUP BY deptno;

**Question. 26     List the jobs and the number of employees in each job. The result   should be in descending order of the employees.**

**Answer:**SQL>SELECT        job, COUNT(\*) FROM emp

2              GROUP BY job

3              ORDER BY 2 DESC ;

**Question.27     List the total    salary, maximum and minimum salary and the  average salary of employees job wise, for department number 20  only.**

**Answer:**SQL>SELECT  job, SUM(sal), AVG(sal), MAX(sal), MIN(sal)

2              FROM emp WHERE deptno = 20

3              GROUP BY job;

**Question. 28   List the average salary for all departments employing more than   five people.**

**Answer:**SQL>SELECT  deptno, AVG(sal) FROM emp

2              GROUP BY deptno

3              Having count(\*) > 5;

**Question.29    Create a new table using AS clause.**

**Answer:**SQL>CREATE TABLE new

2 AS SELECT ename, job, sal FROM emp;

**Question.30    To confirm the contents of table NEW**

**Answer:**                 SQL>SELECT \* FROM new;

**Question.31   Create an empty table.**

**Answer:**SQL>CREATE TABLE empty

2              AS SELECT \* FROM dept

3              WHERE 1 = 2;

**Question.32   To confirm the contents of the table empty.**

**Answer:**SQL>SELECT \* FROM empty;

**Question.33   Create a new table using references, check constraints and   Default values.**

**Answer:**SQL>CREATE TABLE SALESTAB

2              (id NUMBER(2),

3              custid REFERENCES customer,

4              orddate DATE DEFAULT SYSDATE,

5              shipdate DATE DEFAULT SYSDATE,

6              status CHAR(1),

7              CHECK(status IN(‘A’,’N’)));

**Question. 34   Change the commission of employee 1234 to 555 and job to SALESMAN.**

**Answer:**SQL>UPDATE emp

2              SET comm = 555, job=’SALESMAN’

3              WHERE empno = 1234;

**Question. 35   Increase salary of all employees of department 30 to 1.5 times the    previous salary.**

**Answer:**SQL>UPDATE emp

2 SET sal = sal \*1.5

3 WHERE deptno = 30;

**Question.36    Update loc of departments 40,60 of dept1 table to that of loc of  department  45  of  dept  table.(use  of  query  clause  of  update  statement)**

**Answer:**SQL>UPDATE dept1

2 SET loc=(SELECT loc FROM dept WHERE deptno=45)

3 WHERE deptno IN (40,60);

**Question. 37    Confirm the changes made by the above statement.**

**Answer:**                     SQL>SELECT \* FROM dept1;

**Question. 38   Display employee name, salary, 13% of salary as bonus rounded to  near whole number.**

**Answer:**                      SQL > SELECT ename, sal, ROUND(sal \* 0.13 , 0) BONUS    FROM emp;

**Question.39   Display employee name, salary, 13% of salary as bonus truncated   to near whole number.**

**Answer:**                       SQL > SELECT ename, sal, TRUNC(sal \* 0.13 , 0) BONUS

FROM emp;

# [SQL PRACTICE](https://www.pavantestingtools.com/2016/07/sql-practice.html)

[](https://3.bp.blogspot.com/-yuCtG5nCwtM/XDxGJfOuJMI/AAAAAAAAPbI/ENz3WQ6sHGorqbqC2gHK2G0C0POeXlPsACLcBGAs/s1600/Programs%2Bfor%2BSelenium%252811%2529.png)

1) Display the details of all employees

    SQL>Select \* from emp;

2) Display the depart information from department table

    SQL>select \* from dept;

3) Display the name and job for all the employees

    SQL>select ename,job from emp;

4) Display the name and salary  for all the employees

    SQL>select ename,sal from emp;

5) Display the employee no and totalsalary  for all the employees

    SQL>select empno,ename,sal,comm, sal+nvl(comm,0) as"total  salary" from

    emp

6) Display the employee name and annual salary for all employees.

    SQL>select ename, 12\*(sal+nvl(comm,0)) as "annual Sal" from emp

7) Display the names of all the employees who are working in depart number 10.

    SQL>select emame from emp where deptno=10;

8) Display the names of all the employees who are working as clerks and

   drawing a salary more than 3000.

   SQL>select ename from emp where job='CLERK' and sal>3000;

9) Display the employee number and name  who are earning comm.

   SQL>select empno,ename from emp where comm is not null;

10) Display the employee number and name  who do not earn any comm.

SQL>select empno,ename from emp where comm is null;

11) Display the names of employees who are working as clerks,salesman or

analyst and drawing a salary more than 3000.

SQL>select ename  from emp where job='CLERK' OR JOB='SALESMAN'

          OR JOB='ANALYST' AND SAL>3000;

12) Display the names of the employees who are working in the company for

the past 5 years;

SQL>select ename  from emp where to\_char(sysdate,'YYYY')-to\_char(hiredate,'YYYY')>=5;

13) Display the list of employees who have joined the company before

30-JUN-90 or after 31-DEC-90.

a)select ename from emp where hiredate < '30-JUN-1990' or hiredate >

'31-DEC-90';

14) Display current Date.

SQL>select sysdate from dual;

15) Display the list of all users in your database(use catalog table).

SQL>select username from all\_users;

16) Display the names of all tables from current user;

SQL>select tname from tab;

17) Display the name of the current user.

SQL>show user

18) Display the names of employees working in depart number 10 or 20 or 40

or employees working as

CLERKS, SALESMAN or ANALYST.

SQL>select ename from emp where deptno in (10, 20, 40) or job

in ('CLERKS','SALESMAN','ANALYST');

19) Display the names of employees whose name starts with alphabet S.

SQL>select ename from emp where ename like 'S%';

20) Display the Employee names for employees whose name ends with alphabet S.

SQL>select ename from emp where ename like '%S';

21) Display the names of employees whose names have second alphabet A in

their names.

SQL>select ename from emp where ename like '\_A%';

22) select the names of the employee whose names is exactly five characters

in length.

SQL>select ename from emp where length (ename) =5;

23) Display the names of the employee who ar e not working as MANAGERS.

SQL>select ename from emp where job not in ('MANAGER');

24) Display the names of the employee who are not work ing as SALESMAN OR

CLERK OR ANALYST.

SQL>select ename from EMP where job not

In ('SALESMAN','CLERK','ANALYST');

25) Display all rows from EMP table. The system should wait after every

Screen full of information.

SQL>set pause on

26) Display the total number of employee working in the company.

SQL>select count (\*) from emp;

27) Display the total salary beiging paid to all employees.

SQL>select sum (Sal) from emp;

28) Display the maximum salary from emp table.

SQL>select max (Sal) from emp;

29) Display the minimum salary from emp table.

K SQL>select min (Sal) from emp;

30) Display the average salary from emp table.

SQL>select avg(sal) from emp;

31) Display the maximum salary being paid to CLERK.

SQL>select max(sal) from emp where job='CLERK';

32) Display the maximum salary being paid to depart number 20.

SQL>select max(sal) from emp where deptno=20;

33) Display the minimum salary being paid to any SALESMAN.

SQL>select min(sal) from emp where job='SALESMAN';

34) Display the average salary drawn by MANAGERS.

SQL>select avg(sal) from emp where job='MANAGER';

35) Display the total salary drawn by ANALYST working in depart number 40.

SQL>select sum(sal) from emp where job='ANALYST' and deptno=40;

36) Display the names of the employee in order of salary i.e the name of

the employee earning lowest salary    should salary appear first.

SQL>select ename from emp order by sal;

37) Display the names of the employee in descending order of salary.

a)select ename from emp order by sal desc;

38) Display the names of the employee in order of employee name.

a)select ename from emp order by ename;

39) Display empno,ename,deptno,sal sort the output first base on name and

within name by deptno and with in deptno by sal.

SQL>select empno,ename,deptno,sal from emp order by

40) Display the name of the employee along with their annual salary(sal\*12).The name of the employee earning highest annual salary should apper first.

SQL>select ename,sal\*12 from emp order by sal desc;

41) Display name,salary,hra,pf,da,total salary for each employee. The

output should be in the order of total salary,hra 15% of salary,da 10% of salary,pf 5%

salary,total salary will be(salary+hra+da)-pf.

SQL>select ename,sal,sal/100\*15 as hra,sal/100\*5 as pf,sal/100\*10 as

da, sal+sal/100\*15+sal/100\*10-sal/100\*5 as total from emp;

42) Display depart numbers and total number of employees working in each

department.

SQL>select deptno,count(deptno)from emp group by deptno;

43) Display the various jobs and total number of employees within each job

group.

SQL>select job,count(job)from emp group by job;

44) Display the depart numbers and total salary for each department.

SQL>select deptno,sum(sal) from emp group by deptno;

45) Display the depart numbers and max salary for each department.

SQL>select deptno,max(sal) from emp group by deptno;

46) Display the various jobs and total salary for each job

SQL>select job,sum(sal) from emp group by job;

48) Display the depart numbers with more than three employees in each dept.

SQL>select deptno,count(deptno) from emp group by deptno having

count(\*)>3;

49) Display the various jobs along with total salary for each of the jobs

where total salary is greater than 40000.

SQL>select job,sum(sal) from emp group by job having sum(sal)>40000;

50) Display the various jobs along with total number of employees in each

job.The output should contain only those  jobs with more than three employees.

SQL>select job,count(empno) from emp group by job having count(job)>3

51) Display the name of the empployee who earns highest salary.

SQL>select ename from emp where sal=(select max(sal) from emp);

52) Display the employee number and name for employee working as clerk and

earning highest salary among clerks.

SQL>select empno,ename from emp where where job='CLERK'

           and sal=(select max(sal) from emp  where job='CLERK');

53) Display the names of salesman who earns a salary more than the highest

salary of any clerk.

SQL>select ename,sal from emp where job='SALESMAN' and sal>(select

max(sal) from emp

 where job='CLERK');

54) Display the names of clerks who earn a salary more than the lowest

salary of any salesman.

SQL>select ename from emp where job='CLERK' and sal>(select min(sal)

from emp

             where job='SALESMAN');

Display the names of employees who earn a salary more than that of

Jones or that of salary grether than   that of scott.

SQL>select ename,sal from emp where sal>

(select sal from emp where ename='JONES')and sal> (select sal from emp

where ename='SCOTT');

55) Display the names of the employees who earn highest salary in their

respective departments.

SQL>select ename,sal,deptno from emp where sal in(select max(sal) from

emp group by deptno);

56) Display the names of the employees who earn highest salaries in their

respective job groups.

SQL>select ename,sal,job from emp where sal in(select max(sal) from emp

group by job)

57) Display the employee names who are working in accounting department.

SQL>select ename from emp where deptno=(select deptno from dept where

dname='ACCOUNTING')

58) Display the employee names who are working in Chicago.

SQL>select ename from emp where deptno=(select deptno from dept where

LOC='CHICAGO')

59) Display the Job groups having total salary greater than the maximum

salary for managers.

SQL>SELECT JOB,SUM(SAL) FROM EMP GROUP BY JOB HAVING SUM(SAL)>(SELECT

MAX(SAL) FROM EMP WHERE JOB='MANAGER');

60) Display the names of employees from department number 10 with salary

greater than that of any employee working in other department.

SQL>select ename from emp where deptno=10 and sal>any(select sal from

emp where deptno not in 10).

61) Display the names of the employees from department number 10 with

salary greater than that of all employee working in other departments.

SQL>select ename from emp where deptno=10 and sal>all(select sal from

emp where deptno not in 10).

62) Display the names of the employees in Uppercase.

SQL>select upper(ename)from emp

63) Display the names of the employees in Lowecase.

SQL>select lower(ename)from emp

64) Display the names of the employees in Propercase.

SQL>select initcap(ename)from emp;

65) Display the length of Your name using appropriate function.

SQL>select length('name') from dual

66) Display the length of all the employee names.

SQL>select length(ename) from emp;

67) select name of the employee concatenate with employee number.

SQL>select ename||empno from emp;

68) User appropriate function and extract 3 characters starting from 2

characters from the following  string 'Oracle'. i.e the out put should be 'ac'.

SQL>select substr('oracle',3,2) from dual

69) Find the First occurance of character 'a' from the following string i.e

'Computer Maintenance Corporation'.

SQL>SELECT INSTR('Computer Maintenance Corporation','a',1) FROM DUAL

70) Replace every occurance of alphabhet A with B in the string Allens(use

translate function)

SQL>select translate('Allens','A','B') from dual

71) Display the informaction from emp table.Where job manager is found it

should be displayed as boos(Use replace function).

SQL>select replace(JOB,'MANAGER','BOSS') FROM EMP;

72) Display empno,ename,deptno from emp table.Instead of display department

numbers[[B1]](https://www.blogger.com/null)  display the related department name(Use decode function).

SQL>select empno,ename,decode(deptno,10,'ACCOUNTING',20,'RESEARCH',30,'SALES',40,'OPRATIONS') from emp;

73) Display your age in days.

SQL>select to\_date(sysdate)-to\_date('10-sep-77')from dual

74) Display your age in months.

SQL>select months\_between(sysdate,'10-sep-77') from dual

75) Display the current date as 15th Augest Friday Nineteen Ninety Saven.

SQL>select to\_char(sysdate,'ddth Month day year') from dual

76) Display the following output for each row from emp table.

scott has joined the company on wednesday 13th August ninten nintey.

SQL>select ENAME||' HAS JOINED THE COMPANY ON  '||to\_char(HIREDATE,'day

ddth Month  year')   from EMP;

77) Find the date for nearest saturday after current date.

SQL>SELECT NEXT\_DAY(SYSDATE,'SATURDAY')FROM DUAL;

78) Display current time.

SQL>select to\_char(sysdate,'hh:MM:ss') from dual.

79) Display the date three months Before the current date.

SQL>select add\_months(sysdate,3) from dual;

80) Display the common jobs from department number 10 and 20.

SQL>select job from emp where deptno=10 and job in(select job from emp

where deptno=20);

81) Display the jobs found in department 10 and 20 Eliminate duplicate jobs.

SQL>select distinct(job) from emp where deptno=10 or deptno=20

           (or)

SQL>select distinct(job) from emp where deptno in(10,20);

82) Display the jobs which are unique to department 10.

SQL>select distinct(job) from emp where deptno=10

83) Display the details of those who do not have any person working under them.

SQL>select e.ename from emp,emp e where emp.mgr=e.empno group by

e.ename having count(\*)=1;

84) Display the details of those employees who are in sales department and

grade is 3.

SQL>select \* from emp where deptno=(select deptno from dept where

dname='SALES')and sal between(select losal from salgrade where grade=3)and

             (select hisal from salgrade where grade=3);

85) Display those who are not managers and who are managers any one.

i)display the managers names

SQL>select distinct(m.ename) from emp e,emp m where m.empno=e.mgr;

ii)display the who are not managers

SQL>select ename from emp where ename not in(select distinct(m.ename)

         from emp e,emp m where m.empno=e.mgr);

86) Display those employee whose name contains not less than 4 characters.

SQL>select ename from emp where length(ename)>4;

87) Display those department whose name start with "S" while the location

name ends with "K".

SQL>select dname from dept where dname like 'S%' and loc like '%K';

88) Display those employees whose manager name is JONES.

SQL>select p.ename from emp e,emp p where e.empno=p.mgr and

e.ename='JONES';

89) Display those employees whose salary is more than 3000 after giving 20%

increment.

SQL>select ename,sal from emp where (sal+sal\*.2)>3000;

90) Display all employees while their dept names;

SQL>select ename,dname from emp,dept where emp.deptno=dept.deptno

91) Display ename who are working in sales dept.

SQL>select ename from emp where deptno=(select deptno from dept where

dname='SALES');

92) Display employee name,deptname,salary and comm for those sal in between

2000 to 5000 while location is chicago.

SQL>select ename,dname,sal,comm from emp,dept where sal  between 2000

and 5000

          and loc='CHICAGO' and emp.deptno=dept.deptno;

**93) Display those employees whose salary greter than his manager salary.**

**SQL>select p.ename from EMP e, EMP p where e.empno=p.mgr and p.sal>e.sal**

**94) Display those employees who are working in the same dept where his**

**manager is work.**

**SQL>select p.ename from emp e,emp p where e.empno=p.mgr and**

**p.deptno=e.deptno;**

**95) Display those employees who are not working under any manager.**

**SQL>select ename from emp where mgr is null**

96) Display grade and employees name for the dept no 10 or 30 but grade is

not 4 while joined the company before 31-dec-82.

SQL>select ename, grade from EMP, salgrade where Sal between losal and

Hisal and deptno     in (10, 30) and grade<>4 and hiredate<'31-DEC-82';

97) Update the salary of each employee by 10% increments that are not

Eligiblw for commission.

SQL>update emp set sal=sal+sal\*10/100 where comm is null;

98) SELECT that employee who joined the company before 31-dec-82 while

Their dept location is newyork or Chicago.

**SQL> SELECT EMPNO, ENAME, HIREDATE, DNAME, LOC FROM EMP, DEPT**

**WHERE (EMP.DEPTNO=DEPT.DEPTNO) AND**

**HIREDATE <'31-DEC-82' AND DEPT.LOC IN ('CHICAGO','NEW YORK');**

99) DISPLAY EMPLOYEE NAME, JOB, DEPARTMENT, LOCATION FOR ALL WHO ARE WORKING

AS MANAGER?

SQL>select ename, JOB, DNAME, LOCATION from EMP, DEPT where mgr is not

Null;

100) DISPLAY THOSE EMPLOYEES WHOSE MANAGER NAME IS JONES? --

          [AND ALSO DISPLAY THEIR MANAGER NAME]?

SQL> SELECT P.ENAME FROM EMP E, EMP P WHERE E.EMPNO=P.MGR AND

E.ENAME='JONES';

101) Display name and salary of ford if his salary is equal to hisal of his

Grade

a)  Select ename, sal, grade from EMP, salgrade where sal between losal and

hisal

 and ename ='FORD' AND HISAL=SAL;

102) Display employee name, job, depart name, manager name, his grade and make

out an under department wise?

SQL>SELECT E.ENAME, E.JOB, DNAME, EMP.ENAME, GRADE FROM EMP,EMP

E, SALGRADE, DEPT

WHERE EMP.SAL BETWEEN LOSAL AND HISAL AND EMP.EMPNO=E.MGR

 AND EMP.DEPTNO=DEPT.DEPTNO ORDER BY DNAME

103) List out all employees name,job,salary,grade and depart name for every

one in the company  except 'CLERK'.Sort on salary display the highest salary?

SQL>SELECT ENAME,JOB,DNAME,SAL,GRADE FROM EMP,SALGRADE,DEPT WHERE

SAL BETWEEN LOSAL AND HISAL AND EMP.DEPTNO=DEPT.DEPTNO AND JOB

 NOT IN('CLERK')ORDER BY SAL ASC;

104) Display the employee name,job and his manager.Display also employee who

are without manager?

SQL>select e.ename,e.job,eMP.ename AS Manager from emp,emp e where

emp.empno(+)=e.mgr

105) Find out the top 5 earners of company?

SQL>SELECT DISTINCT SAL FROM EMP E WHERE 5>=(SELECT COUNT(DISTINCT SAL)

FROM

           EMP A WHERE A.SAL>=E.SAL)ORDER BY SAL DESC;

106) Display name of those employee who are getting the highest salary?

SQL>select ename from emp where sal=(select max(sal) from emp);

107) Display those employee whose salary is equal to average of maximum and

minimum?

SQL>select ename from emp where sal=(select max(sal)+min(sal)/2 from

emp);

108) Select count of employee in each department  where count greater than 3?

SQL>select count(\*) from emp group by deptno having count(deptno)>3

109) Display dname where at least 3 are working and display only department

name?

SQL>select distinct d.dname from dept d,emp e where d.deptno=e.deptno

and 3>any

           (select count(deptno) from emp group by deptno)

110) Display name of those managers name whose salary is more than average

salary of his company?

SQL>SELECT E.ENAME,EMP.ENAME FROM EMP,EMP E

           WHERE EMP.EMPNO=E.MGR AND E.SAL>(SELECT AVG(SAL) FROM EMP);

111)Display those managers name whose salary is more than average salary of

his employee?

SQL>SELECT DISTINCT EMP.ENAME FROM EMP,EMP E WHERE

            E.SAL <(SELECT AVG(EMP.SAL) FROM EMP

            WHERE EMP.EMPNO=E.MGR GROUP BY EMP.ENAME) AND

EMP.EMPNO=E.MGR;

112) Display employee name,sal,comm and net pay for those employee

whose net pay is greter than or equal to any other employee salary of

the company?

SQL>select ename,sal,comm,sal+nvl(comm,0) as NetPay from emp

          where sal+nvl(comm,0) >any (select sal from emp)

113) Display all employees names with total sal of company with each

employee name?

SQL>SELECT ENAME,(SELECT SUM(SAL)  FROM EMP) FROM EMP;

114) Find out last 5(least)earners of the company.?

SQL>SELECT DISTINCT SAL FROM EMP E WHERE

           5>=(SELECT COUNT(DISTINCT SAL) FROM EMP A WHERE

A.SAL<=E.SAL)

           ORDER BY SAL DESC;

115) Find out the number of employees whose salary is greater than their

manager salary?

SQL>SELECT E.ENAME FROM EMP ,EMP E WHERE EMP.EMPNO=E.MGR

        AND EMP.SAL

116) Display those department where no employee working?

SQL>select dname from emp,dept where emp.deptno not in(emp.deptno)

117) Display those employee whose salary is ODD value?

SQL>select \* from emp where sal<0 o:p="">

118) Display those employee whose salary contains alleast 3 digits?

SQL>select \* from emp where length(sal)>=3;

119) Display those employee who joined in the company in the month of Dec?

SQL>select ename from emp where to\_char(hiredate,'MON')='DEC';

120) Display those employees whose name contains "A"?

SQL>select ename from emp where instr(ename,'A')>0;

                          or

SQL>select ename from emp where ename like('%A%');

121) Display those employee whose deptno is available in salary?

SQL>select emp.ename from emp, emp e where emp.sal=e.deptno;

122) Display those employee whose first 2 characters from hiredate -last 2

characters of salary?

SQL>select ename,SUBSTR(hiredate,1,2)||ENAME||substr(sal,-2,2) from emp

123) Display those employee whose 10% of salary is equal to the year of

joining?

SQL>select ename from emp where to\_char(hiredate,'YY')=sal\*0.1;

124) Display those employee who are working in sales or research?

SQL>SELECT ENAME FROM EMP WHERE DEPTNO IN(SELECT DEPTNO FROM DEPT WHERE

           DNAME IN('SALES','RESEARCH'));

125) Display the grade of jones?

SQL>SELECT ENAME,GRADE FROM EMP,SALGRADE

            WHERE SAL BETWEEN LOSAL AND HISAL AND Ename='JONES';

126) Display those employees who joined the company before 15 of the month?

a)select ename from emp where to\_char(hiredate,'DD')<15 o:p="">

127) Display those employee who has joined before 15th of the month.

a)select ename from emp where to\_char(hiredate,'DD')<15 o:p="">

128) Delete those records where no of employees in a particular department

is less than 3.

SQL>delete from emp where deptno=(select deptno from emp

           group by deptno having count(deptno)<3 o:p="">

129) Display the name of the department where no employee working.

SQL> SELECT E.ENAME,E.JOB,M.ENAME,M.JOB FROM EMP E,EMP M

 WHERE E.MGR=M.EMPNO

130) Display those employees who are working as manager.

SQL>SELECT M.ENAME MANAGER FROM EMP M ,EMP E

WHERE E.MGR=M.EMPNO GROUP BY M.ENAME

131) Display those employees whose grade is equal to any number of sal but

not equal to first number of sal?

SQL> SELECT ENAME,GRADE FROM EMP,SALGRADE

            WHERE GRADE NOT IN(SELECT SUBSTR(SAL,0,1)FROM EMP)

132) Print the details of all the employees who are Sub-ordinate to BLAKE?

SQL>select emp.ename from emp, emp e where emp.mgr=e.empno and

e.ename='BLAKE';

133) Display employee name and his salary whose salary is greater than

  highest average of department number?

SQL>SELECT SAL FROM EMP WHERE SAL>(SELECT MAX(AVG(SAL)) FROM EMP

         GROUP BY DEPTNO);

134) Display the 10th record of emp table(without using rowid)

SQL>SELECT \* FROM EMP WHERE ROWNUM<11 o:p="">

             MINUS

             SELECT \* FROM EMP WHERE ROWNUM<10 o:p="">

135) Display the half of the ename's in upper case and remaining lowercase?

SQL>SELECT

SUBSTR(LOWER(ENAME),1,3)||SUBSTR(UPPER(ENAME),3,LENGTH(ENAME))

           FROM EMP;

136) Display the 10th record of emp table without using group by and rowid?

SQL>SELECT \* FROM EMP WHERE ROWNUM<11 o:p="">

             MINUS

             SELECT \* FROM EMP WHERE ROWNUM<10 o:p="">

             Delete the 10th record of emp table.

SQL>DELETE FROM EMP WHERE EMPNO=(SELECT EMPNO FROM EMP WHERE ROWNUM<11 o:p="">

             MINUS

             SELECT EMPNO FROM EMP WHERE ROWNUM<10 o:p="">

137) Create a copy of emp table;

SQL>create table new\_table as select \* from emp where 1=2;

138) Select ename if ename exists more than once.

SQL>select ename  from emp e group by ename having count(\*)>1;

139) Display all enames in reverse order?(SMITH:HTIMS).

SQL>SELECT REVERSE(ENAME)FROM EMP;

140) Display those employee whose joining of month and grade is equal.

SQL>SELECT ENAME FROM EMP WHERE SAL BETWEEN

           (SELECT LOSAL FROM SALGRADE WHERE

             GRADE=TO\_CHAR(HIREDATE,'MM')) AND

        (SELECT HISAL FROM SALGRADE WHERE

GRADE=TO\_CHAR(HIREDATE,'MM'));

141) Display those employee whose joining DATE is available in deptno.

SQL>SELECT ENAME FROM EMP WHERE TO\_CHAR(HIREDATE,'DD')=DEPTNO

142) Display those employees name as follows

               A ALLEN

               B BLAKE

SQL> SELECT SUBSTR(ENAME,1,1),ENAME FROM EMP;

143) List out the employees ename,sal,PF(20% OF SAL) from emp;

SQL>SELECT ENAME,SAL,SAL\*.2 AS PF FROM EMP;

144) Create table emp with only one column empno;

SQL>Create table emp as select empno from emp where 1=2;

145) Add this column to emp table ename vrachar2(20).

SQL>alter table emp add(ename varchar2(20));

146) Oops I forgot give the primary key constraint.  Add in now.

SQL>alter table emp add primary key(empno);

147) Now increase the length of ename column to 30 characters.

SQL>alter table emp modify(ename varchar2(30));

148) Add salary column to emp table.

SQL>alter table emp add(sal number(10));

149) I want to give a validation saying that salary cannot be greater 10,000

(note give a name to this constraint)

SQL>alter table emp add constraint chk\_001 check(sal<=10000)

150) For the time being I have decided that I will not impose this validation.My boss has agreed to pay more than 10,000.

SQL>again alter the table or drop constraint with  alter table emp drop constraint chk\_001 (or)Disable the constraint by using  alter table emp modify constraint chk\_001 disable;

151) My boss has changed his mind.  Now he doesn't want to pay more than

10,000.so revoke that salary constraint.

SQL>alter table emp modify constraint chk\_001 enable;

152) Add column called as mgr to your emp table;

SQL>alter table emp add(mgr number(5));

153) Oh! This column should be related to empno.  Give a command to add this

constraint.

SQL>ALTER TABLE EMP ADD CONSTRAINT MGR\_DEPT FOREIGN KEY(MGR) REFERENCES

EMP(EMPNO)

154) Add deptno column to your emp table;

SQL>alter table emp add(deptno number(5));

155) This deptno column should be related to deptno column of dept table;

SQL>alter table emp add constraint dept\_001 foreign key(deptno)

reference dept(deptno)

             [deptno should be primary key]

156) Give the command to add the constraint.

SQL>alter table

157) Create table called as newemp.  Using single command create this table

as well as get data into this table(use create table as);

SQL>create table newemp as select \* from emp;

SQL>Create table called as newemp.  This table should contain only

empno,ename,dname.

SQL>create table newemp as select empno,ename,dname from emp,dept where

1=2;

158) Delete the rows of employees who are working in the company for more

than 2 years.

SQL>delete from emp where (sysdate-hiredate)/365>2;

159) Provide a commission(10% Comm Of Sal) to employees who are not earning

any commission.

SQL>select sal\*0.1 from emp where comm is null

160) If any employee has commission his commission should be incremented by

10% of his salary.

SQL>update emp set comm=sal\*.1 where comm is not null;

161) Display employee name and department name for each employee.

SQL>select empno,dname from emp,dept where emp.deptno=dept.deptno

162)Display employee number,name and location of the department in which he

is working.

SQL>select empno,ename,loc,dname from emp,dept where

emp.deptno=dept.deptno;

163) Display ename,dname even if there are no employees working in a

particular department(use outer join).

SQL>select ename,dname from emp,dept where emp.deptno=dept.deptno(+)

164) Display employee name and his manager name.

SQL>select p.ename,e.ename from emp e,emp p where e.empno=p.mgr;

165) Display the department name and total number of employees in each

department.

SQL>select dname,count(ename) from emp,dept where

emp.deptno=dept.deptno group by dname;

166)Display the department name along with total salary in each department.

SQL>select dname,sum(sal) from emp,dept where emp.deptno=dept.deptno

group by dname;

167) Display itemname and total sales amount for each item.

SQL>select itemname,sum(amount) from item group by itemname;

168) Write a Query To Delete The Repeted Rows from emp table;

SQL>Delete from emp where rowid not in(select min(rowid)from emp group

by ename)

169) TO DISPLAY 5 TO 7 ROWS FROM A TABLE

SQL>select ename from emp

         where rowid in(select rowid from emp where rownum<=7

         minus

  select rowid from empi where rownum<5 o:p="">

170)  DISPLAY  TOP N ROWS FROM TABLE?

SQL>SELECT \* FROM

             (SELECT \*  FROM EMP ORDER BY ENAME DESC)

              WHERE ROWNUM <10 o:p="">

171) DISPLAY   TOP 3 SALARIES FROM EMP;

SQL>SELECT SAL FROM ( SELECT  \* FROM EMP ORDER  BY SAL DESC )

                   WHERE ROWNUM <4 o:p="">

172) DISPLAY  9th FROM THE EMP TABLE?

SQL>SELECT ENAME FROM EMP

                     WHERE ROWID=(SELECT ROWID FROM EMP WHERE ROWNUM<=10

                     MINUS

                     SELECT ROWID FROM EMP WHERE ROWNUM <10 o:p="">

                     select second max salary from emp;

                     select max(sal) fromemp where sal<(select  max(sal) from emp);

# [MANUAL TESTING REAL TIME INTERVIEW QUESTIONS & ANSWERS](https://www.pavantestingtools.com/2016/08/manual-testing-real-time-interview.html)

**1. How will you receive the project requirements?**

A. The finalized SRS will be placed in a project repository; we will access it from there

**2. What will you do with SRS?**

A. SRS stands for software requirement specification. SRS is used to understand the project functionality from business and functional point of view.

**3. What is FRS? How it different from SRS?**

A.srs describes what client is expecting from the system. For example in case of Gmail SRS consists details like first page should be login, to access mail box user should be authenticated. FRS describes how above requirements will be developed .in FRS, the        functionality in SRS will be written down in more technical terms. For example in case of Gmail FRS consists details like for login what fields should be present and what are valid inputs. This means FRS will have screen level details of the application.

 Note: In many projects SRS itself will be designed at screen level details of the application.

**4. Is the testing team involved in SRS preparation?**

A. Business analyst prepare the SRS document by interacting with the client. However a senior testing team member can also be involved in requirements collections along with the development team and the business analyst team.

**5. How does your requirements document look like?**

A. It contains lots of use cases where each use case explains one or more functionalities

**6. How will you understand the requirements?**

A. If it is known domain by going through use cases i can understand the requirements. if i have some queries, i will discuss them with business analyst(BA) for clarifications. if it is new domain, first i will get domain training them i go through the use cases. If the    project requirements are very confusing, then (BA) can also walk through each use case.

**7. How do u understand functionality without screens?**

A. We get wireframes in the usecases which helps a lot to understand the functionality

**8. What is wireframe?**

A. A diagram which stimulates the feel of the actual screen.

**9. What is usecase?**

A. Usecase explains the step by step procedure of how a particular functionality of s/w is used by the end user.usecase contains sections such as

     . usecase id

     . usecase name

     . decription

     . flow of events

     . alternative flow of events

     . pre,post conditions

**10. Where you involved in writing the usecases?**

A. I am aware of how usecases looks like and i can write if required. but i have never got an opportunity to write the usecases because these are prepared by requirements gathering team .Any how i have reviewed the usecases of certain functionalities and have given my inputs for betterment of the same.

**11. What are the different sections present in SRS?**

 A. overview

       Scope

      Features

      User characteristics

     Software requirements

     Hardware requirements

     Performance requirements

     Use cases

     Security and reliability requirements

**12. How long do u spend on understanding SRS?**

 A. It depends on the familiarity of the domain and complexity of the project. if it is a familiar domain, we can understand around 25 pages of the documentation every day. For a new complex domain, we manage around 15 pages per day.

**13. After understanding the SRS what do you do?**

A.  My lead asks for presentation of the functionalities i am assigned with if i am in a position to explain the functionalities clearly to the team, then i am considered as comfortable with functionalities.

**14. Should you understand the whole project functionality or only the functionality assigned to you?**

A.  I should have a big picture of the whole project. In other words i should have an overview of the whole project and detailed screen and field level understanding of the assigned functionalities.

**15. What are the different models generally followed in documenting requirements?**

A.  Two models are followed in documenting the requirements which are usecase model and paragraph model. in paragraph model business requirements are written like a paragraph which is old model. Now a days almost all companies follow the usecase model      where the requirements are written by stating thier clear objectives and explained with the help of screen shots.

**16. How big is your SRS?**

 A. You can answer anything like approx 250 pages. This question is asked just to cross check whether u have seen SRS or not

**17. What will be the problem without SRS?**

A.   without srs we will not be able to understand the project features correctly. Hence we will not able to test the project in depth and deliver the best quality product.

**18. What is SRS?**

A.  BRS is business requirement specification which is usually prepared before preparing an srs. This document gives a high-leval view of what is being required by the customer to meet business needs.

**19. What is technical requirements specification?**

A.  This is also called as high-leval design, which consists of different modules present in the project.

**20. What is user story?**

A.   user story is the method of documenting requirements in the agile model.

**21. What is Review?**

A.  Review is a meeting in which a work product is verified by set if members (stake holders)

**22. Explain the review process you follow in your organization?**

A.  The various phases of the review process followed in my organization are:

**Planning**:

             >selecting the personal for review

              >allocating roles

               >defining entry and exit criteria.

**Kick**-**off**:

             >Distributing documents

             >explaining the objectives

             >checking entry criteria, etc.

**Individual** **preparation**:

               > in the phase, each of the participants will work before the review meeting and be ready with questions and comments.

**Review** **Meeting**:

            > Discussion among the review members by going through each line of the work product.

             > Logging comments

              > Making decision about the defect.

**Rework**:

             > Fixing defects found during the review, typically done by the author.

**Follow**-**up**:

             > checking the defects that have been addressed.

             >gathering metrics and checking the exit criteria.

**23. What are the roles present in the review?**

A.   **Manager:**

             >decides on execution of reviews.

            > allocates time in project schedules.

               > determines if the review objectives have met.

**Moderator:**

             >leads the review, including planning and running the meeting

             >follows-up after the meeting.

**Author:**

             The author is the person who has  created the item to be reviewed. the author may also be asked questions within the review.

**Reviewer**:

             The reviewer are the attendees of the review who attempt to find errors in the item under review. they should come from different perspectives in order to provide a well balanced review of the item.

**scribe**:

                The scribe or recorder is the person who is responsible for documenting issues raised during the process of the review meeting.

**24. What is peer review?**

A.   Is a review of a software work product by colleagues?

**25. What is the difference between static and dynamic testing?**

A.   Static testing means testing the project without executing the software and dynamic testing means testing the project by executing the software . i.e. by running the application and going through screens. To conduct dynamic testing you must use application       screens and enter valid and invalid inputs and verify the application behavior. For static testing, we do not use any screens of application instead we use static techniques like review. During review, experts go through each line of the work products like             requirement document, design document and identify mistakes in these documents. Any mistakes identified during this review are nothing but defects in the work product.

**26. I want you to choose one among static and dynamic testing for your project. Which one will you choose and why?**

A. static testing reduces the cost of fix and dynamic testing gives the complete confidence to release the product. According to me both are equally important and both of them contribute equally for the project success. so i prefer to have both. however if i have to

      choose one, i choose dynamic testing since i cannot let the project to be released until i see with my eyes that it is working.

**27. out of formal and informal review, which one do you prefer?**

A.   In my view, both are important: informal review is fast and formal review is effective. we have to use both depending on the data we are reviewing . I prefer formal and informal review techniques as follows.

**Formal Review:**

            > Reviewing test case document created

             > Reviewing test plan document created

              > reviewing test scripts developed

**Informal Review:**

              > reviewing tests used for retesting

              > Reviewing minor changes in test case, test plan or test scripts.

**28. How do you decide the review outcome?**

A.  The review outcome is decided by the moderator. i can share my views with him. for example in test cases review, the outcome decision it as follows Review observation                                                                                                  Review outcome

A.  Most of the critical test cases are missed

B.   Documentation standards are poor

      Major changes are suggested …....Accept after correction with another round of review

      Minor changes are suggested ….. Accept after correction without another round of review

      No changes suggested …………………………………………………Accepts as it is

**29. Explain what do you document during the review process?**

A. we document page and line number of defect, origin of defect, severity of defect. We also document other information like work product ID, reviewers, etc

**30. How much information you can review in one day?**

A. per hour we review around 20 pages if it is documentation and 200 lines if it is code.

**31. How do you say review was successful?**

A. if every reviewer prepares well before the review and provides good comments for improvement of the work product, we can say that the review was successful.

**32. What is code review?**

A. code review is the process of reviewing the code written. code reviews are conducted for the code developed by the developer and also for the automation scripts developed by the automation engineer.

**33. What is desk check?**

A. This is an informal review where a colleagues comes to the desk/computer of the author and quickly goes through the work product along with the author and also shares comments while going through it.

**34. What are the entry criteria for release?**

A.  > system testing results must show that all requirements are completed and project is stable.

     > Alpha and beta testing must be completed.

    > All medium and above severity bugs must be fixed.

    >The release package is available.

    > The release CD label is ready.

**35. What is the release process you follow?**

A.   In our organization, the release process is coordinated by a person called release manager. After successful beta testing, the release manger sends an email to all stake holders ( development manager, test manager, documentation manager) for their

      Approval for final release. The test manager further forwards the same mail to team members requesting their internal approval. Based on internal approval. The test manager can send approval to the release manager.

**36. What is your involvement in the release process?**

A.   As a testing team member, i go through the defect tracking tool and check whether all the defects are fixed. In case any defects are not fixed i communicate the same to my test lead and test manager, sharing my opinion regarding each bug whether it must be       fixed before release or it can be fixed after release. The test manager takes the final decision on whether to fix or not after discussion with the development manager.

      I am further involved in preparing release notes, where  i document known issues in my module along with the issues resolved from the previous release.

     Exit criteria for release are:

     > All stake holders have approved for release.

> The new package is deployed in production and users are happy about the release.

     > The code has been base lined in the configuration management**.**

**37. What is a code Freeze?**

A.   code freeze means the code has been locked from further modifications from developers. After the code freeze the code should be changed by any developer. if at all any changes are required it should be only for very critical bugs after taking permission

       from the top management of the project. code freezes are often employed in the final stages of development.

**38. What are the entry and exit criteria for test execution?**

**Entry criteria:**

       --------------------------------

               > coding should be completed

               > test cases should be ready and base lined

               > RTM should be updated

               > test data should be read and base lined

               > test environment/set up should be ready.

               >s/w tools should be ready and approved.

**Exit criteria:**

      -----------------------------

            > All test cases must be executed and passed

            > All defects identified must be fixed, retested and closed

            > Test execution summary report must be prepared

**39. Explain different test execution strategies?**

A.    There are 3 test execution strategies.

They are pass1, pass2, pass 3

**Pass1 Test execution strategy:**

      ------------------------------

      In this execution model one execution cycle will be there. In this one execution cycle

      Itself testers log defects and retest that defect. This is useful in stable, small with

**2nd pass:**

      ----------------------------

      Development team releases new build claiming all the defects are fixed. Testing team retest all defects with adhoc regression. if new defects are found development team release new build and the life cycle is repeated until no new defects.

**3rd pass:**

      ---------------------------

       Testing team runs full regression suite and this phase completes only when full regression is completed. This is good model for large, complex and critical projects. In case of getting large no of defects in pass -2 strategy, one may have to move to pass-3 strategy.

**40.  How do you know you have a build ready for testing?**

A.   Frequency of build creation would vary from project to project .however below is the guideline to answer this question. In our project automatic build creation deployment happens on every x day. we receive a confirmation mail on every day morning about       successful deployment along with URL for testing .please refer our build process FAQ'S for exactly how build deployment and release process.

**41. How many test cases can you execute per day?**

 A. it depends on the size and complexity of the test cases. Approximately i execute around 50 test cases per day which comes to 40 pages approx.

**42. How do you run the test cases?**

 A.  I will perform each step in the test case on the application and compare the application behavior with expected result of the step. if it is same as expected result then step is passed else step is failed. if the password field shows \* or some other special       character while entering the password, it is called password masking, NOT password encryption. Encryption means converting the user entered characters into different characters before sending over the network. This can be checked with the help of

      network sniffers.

      example s/w for this is WIRESHARK. These s/ was capture every data packet travelling over the network including the IP address of source and destination computers. By analyzing these packets we can identify whether the password string is encrypted

      or not.

**43. How do you check broken links?**

A.  Many tools are available for this. we use tools like menu.

**44. What is test log?**

A.   It is a report of what tests have been executed and thier status like pass/ fail. it is also known as Test execution report.

**45. Did you observe any application logs during the test execution?**

A. yes. We do observe logs of the application server to check whether the server has thrown any runtime errors.

**46. Do you run all regression tests for every bug fixed?**

A.  No, I didn’t run regression test cases for every bug fixed. I run regression tests once for every build.

**47. Do you run all regression tests every time ?**

A.  Depends. if we are sure that the fix might not affect other modules, we run regression tests specific to the module of the bugs fixed, else we run for the entire project.

**48. In the modules you have worked on, are there any issues identified after release?**

A. projects if i am supposed to write stubs or drivers in the current project i am confident that i can handle it.

**49. When you fill the data in the application form, how do you ensure that the data is stored in the correct tables and columns?**

A. we can write an SQL query to retrieve data from the data base and compare the query result with the data we have filled in the application forms.

**50. What is test case?**

A.   Test case is a set of inputs, conditions and expected outcomes which a tester will determine whether an application is working correctly or not.

**51. What fields a test case will have?**

A.   The following are the fields that a test case will usually have.......

       test case id, description, precondition, step name, expected results, actual results and status.

**52. Where do you write test case?**

A.   Depending on the project we can write test cases in an excel or in QC.

**53. How do you know for which functionalities you should write test case?**

A.  My lead writes top level requirements in QC and assigns to each team member. we divide test requirements further into sub requirements. Then we identify test conditions for each sub requirement and create test cases. test cases are reviewed after that. Reviewed and approved test cases will go to ready state.

**54. What is test scenario?**

A.   Test scenario is nothing but a functional scenario for which testing is to be conducted. It is also called as a test condition.

**55. What is the difference between test scenario and test case?**

A. Test scenario is a high level description of business requirements, which is latter decomposed in to a set of test cases. These test cases will be reviewed and approved by peers. we follow formal review process for approving test cases written for each functionality.

**56.  How do you know your test cases are completed?**

A.  We follow two step approaches to ensure that test cases are completed.

 a. reviews-- it ensures that quality of the test cases is good.

 b. Requirement traceability matrix ---it ensures that all requirements have been covered through test cases.

**57.  How do you find whether a test case is a good test case or bad test case?**

A.  A good test case is one which finds the bug or one which has a high probability of finding the bug. A good test case should be documented clearly, so that it can be executed by anyone without any difficulties and confusion.

**58. What is the percentage of positive and negative test cases that you write?**

A. Approx 30% positive and 70% negative

**59. Do you update the test cases after receiving build based on the application screen?**

A. During execution, if we feel any test case requires an update, we will do it with the approval of the team lead. but this work is very limited.

**60. Explain one scenario where you were not able to write test cases for a given requirement?**

A. Effort for a new domain by putting extra effort for through understanding of the domain.

**61. What is the difference between a positive and negative test case?**

A. A positive test caes checks whether the system does what it is suppose to do. I.e. to check that we got the desired result with a valid set of inputs.

 ex: the user should login in to the system with a valid user name and password.

Negative test case: A negative test case checks whether the system will do what it is not supposed to do .i.e to check the system generates the correct error or warning messages with an invalid set of inputs.

    ex: if the user entered the wrong user name or password, then the user should not login in to the system and appropriate error message should be shown.

**62.  What are the documents required for test analysis?**

A. 1. SRS/FRS

      2. Use case

      3. Architecture document

**63. What is an entry criterion for test closure?**

A. Decision to stop testing

**64. Who takes this decision?**

A.  The Test Manager

**65. What parameters do the test manager considers to take the decision to stop testing ?**

 A.  The important parameters a test manager looks into are

      > Whether all requirements have been developed or not.

      > Whether all requirements have been covered through testing.

      > Whether all requirements have been handled through fixed or differed status.

**66. What are the exit criteria for test closure?**

 A. > checking whether planned deliverables have been delivered.

      > Finalizing and archiving test ware.

      > Hand over of test ware for maintenance.

      > analyzing lessons learned for improvement of test maturity.

      > Testing sign off.

**67.  What is testware?**

 A.   Test ware is Artifacts produced during the testing process. Test ware include test cases, test plan, automation scripts, test data, test environment set-up and clear up procedures and any additional software or utilities used in  testing.

**68. What is lessons learnt document?**

 A. > no of test cases/scenarios blocked

      > No of defects verified and their respective status.

      > Weekly status reporting:

      > Test case summary

      > Issues found

      > Issues resolved

      > Critical issues which are still open and which requires immediate attention from the client side

      > The report should also contain high plan for the next week.

**69. What is the status can give to a test case?**

 A.  Status are pass, fail, blocked, no run.

**70. What is web server log?**

A.   Every time a web page is requested, the webserver automatically logs the following information.

      > The IP address of the visitor

      > Date and time of the request

      >The url of the requested file

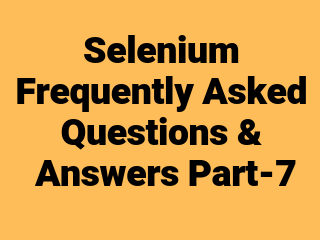
      > The url, the visitor came from immediately before

      > The visitors web browser type and os

# [Selenium Frequently Asked Questions & Answers Part-6](https://www.pavantestingtools.com/2016/08/selenium-real-time-interview-questions.html)

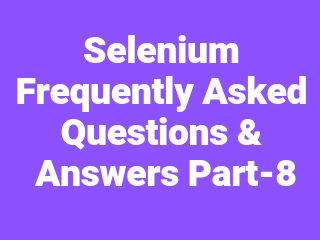
**Ques.126. How do you handle HTTP Proxy Authentication pop ups in browser?**  
Form authentications URL - http://UserName:Password@Example.com  
Example:  
http://the-internet.herokuapp.com/basic\_auth  
https://admin:admin@the-internet.herokuapp.com/basic\_auth  
  
**Ques.127. How do you handle Ajax dropdowns?**  
With help of Selenium Sync commands like ImplicitWait, WebDriverWait or FluentWait.  
  
**Ques.128. What is the default port for Selenium Grid?**  
4444  
    
**Ques.129. How to run tests in multiple browser parallel?**   
Using selenium grid  
 **Ques.130. How to find broken images in a page using Selenium Web driver.**  
Get xpath and then using tag name 'a'; get all the links in the page  
Use HttpURLConnector class and sent method GET  
Get the response code for each link and verify if it is 404/500  
  
List links = driver.findElements(By.tagName("a"));  
  
for (int i = 0; i < links.size(); i++) {  
WebElement element = links.get(i);  
  
// By using "href" attribute, we could get the url of the requried link  
String url = element.getAttribute("href");  
  
//System.out.println(url);  
URL link = new URL(url);  
  
// Create a connection using URL object (i.e., link)  
HttpURLConnection httpConn = (HttpURLConnection) link.openConnection();  
  
// Set the timeout for 2 seconds  
httpConn.setConnectTimeout(2000);  
  
// connect using connect method  
httpConn.connect();  
  
// use getResponseCode() to get the response code.  
if (httpConn.getResponseCode() >= 400) {  
    System.out.println(url + " - " + "is Broken Link");  
    } else {  
        System.out.println(url + " - " + "is valid Link");  
    }  
  
**Ques.131. How to disable cookies in browser?**  
Using deleteAllVisibleCookies() in selenium  
  
**Ques.132. How does u handle dynamic elements without using XPath?**  
By using classname or css.  
 **Ques.133. Write down scenarios which we can't automate?**  
Barcode Reader, Captcha etc.  
  
**Ques.134. How do you manage the code versions in your project?**  
Using SVN, GitHub or other versioning tools  
  
**Ques.135. How to count total no of hyperlinks in a page?**  
Listalllinks=driver.finElements(By.tagname("a");  
System.out.println(alllinks.size());  
 **Ques.136. What are the benefits of Automation Testing?**  
Saves time and money. Automation testing is faster in execution.  
Reusability of code. Create one time and execute multiple times with less or no maintenance.  
Easy reporting. It generates automatic reports after test execution.  
Easy for compatibility testing. It enables parallel execution in the combination of different OS and browser environments.  
Low-cost maintenance. It is cheaper compared to manual testing in a long run.  
It is mostly used for regression testing. Supports execution of repeated test cases.  
Minimal manual intervention. Test scripts can be run unattended.  
Maximum coverage. It helps to increase the test coverage.  
  
**Ques.137. What type of tests have you automated?**  
Our main focus is to automate test cases to do Regression testing, Smoke testing, and Sanity testing. Sometimes based on the project and the test time estimation, we do focus on End to End testing.  
  
**Ques.138. How many test cases you have automated per day?**  
It depends on Test case scenario complexity and length.  
I did automate 2-5 test scenarios per day when the complexity is limited.  
Sometimes just 1 or fewer test scenarios in a day when the complexity is high.  
  
**Ques.139. What is Selenium IDE?**  
Selenium IDE (Integrated Development Environment) is a Firefox plugin.  
It is the simplest framework in the Selenium Suite.  
It allows us to record and playback the scripts. Even though we can create scripts using Selenium IDE, we need to use Selenium WebDriver to write more advanced and robust test cases.  
  
**Ques.140. What is Selenese?**  
Selenese is the language which is used to write test scripts in Selenium IDE.  
  
**Ques.141. What is Selenium RC?**  
Selenium RC (Selenium 1).  
Selenium RC was the main Selenium project for a long time before the WebDriver merge brought up Selenium 2.  
Selenium 1 is still actively supported (in maintenance mode). It relies on JavaScript for automation. It supports Java, Javascript, Ruby, PHP, Python, Perl and C#. It supports almost every browser out there.  
  
**Ques.142. What is Selenium WebDriver?**  
Selenium WebDriver (Selenium 2) is a browser automation framework that accepts commands and sends them to a browser.  
It is implemented through a browser-specific driver.  
It controls the browser by directly communicating with it.  
Selenium WebDriver supports Java, C#, PHP, Python, Perl, Ruby.  
 **Ques.143. When do you use Selenium Grid?**  
Selenium Grid can be used to execute same or different test scripts on multiple platforms and browsers concurrently so as to achieve distributed test execution.  
  
**Ques.144. What are the advantages of Selenium Grid?**  
It allows running test cases in parallel thereby saving test execution time.  
It allows multi-browser testing  
It allows us to execute test cases on multi-platform  
  
**Ques.145. What is a hub in Selenium Grid?**  
A hub is a server or a central point that controls the test executions on different machines.  
 **Ques.146. What is a node in Selenium Grid?**  
Node is the machine which is attached to the hub. There can be multiple nodes in Selenium Grid.  
  
**Ques.147. What are the types of WebDriver APIs available in Selenium?**  
Firefox Driver  
InternetExplorer Driver  
Chrome Driver  
HTMLUNIT Driver  
Opera Driver  
Safari Driver  
Android Driver  
iPhone Driver  
  
**Ques.148. Which WebDriver implementation claims to be the fastest?**  
The fastest implementation of WebDriver is the HTMLUnitDriver. It is because the HTMLUnitDriver does not execute tests in the browser.  
 **Ques.149. What are the Programming Languages supported by Selenium WebDiver?**  
Java  
C#  
Python  
Ruby  
Perl  
PHP  
  
**Ques.150. What are the Operating Systems supported by Selenium WebDriver?**  
Windows  
Linux  
Mac

# [Selenium Frequently Asked Questions & Answers Part-7](https://www.pavantestingtools.com/2016/06/selenium-interview-questions-answers.html)

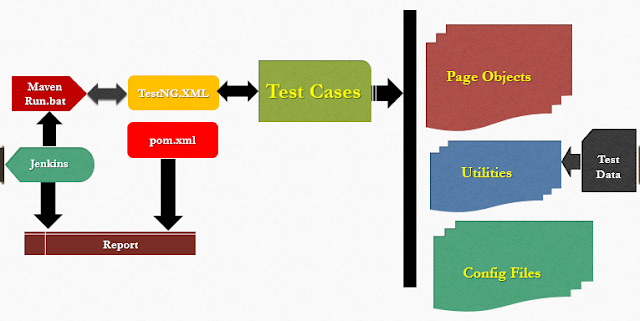
[](https://4.bp.blogspot.com/-kPR3qXQqo4w/XEl9Czn6N0I/AAAAAAAAPqE/ex8jgE2l6LQ1FDIgypPZnLdtMLYwsGYtwCLcBGAs/s1600/Programs%2Bfor%2BSelenium.png)

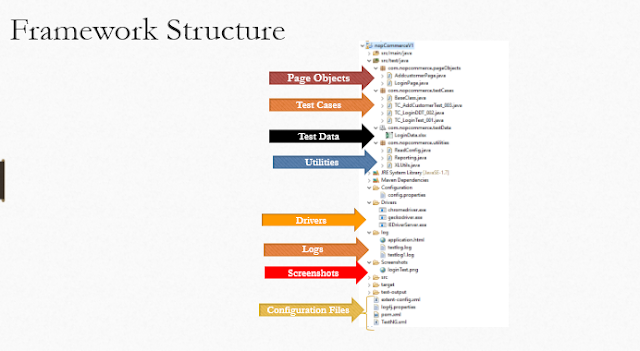
**Ques.151. What are the Open-source Frameworks supported by Selenium WebDriver?**  
JUnit  
TestNG  
CUCUMBER  
JBHEAVE  
   
**Ques.152. What is the super interface of WebDriver?**  
SearchContext.  
   
**Ques.153. What are the types of waits available in Selenium WebDriver?**  
In Selenium we could see three types of waits such as Implicit Waits, Explicit Waits and Fluent Waits.  
Implicit Waits  
Explicit Waits   
Fluent Waits   
PageLoadTimeOut  
Thread.sleep() – static wait  
 **Ques.154. How to clear the text in the text box using Selenium WebDriver?**  
By using clear() method  
  
WebDriver driver = new FirefoxDriver();  
driver.get("https://www.gmail.com");  
driver.findElement(By.xpath("xpath\_of\_element1")).sendKeys("Software Testing ");  
driver.findElement(By.xpath("xpath\_of\_element1")).clear();  
  
**Ques.155. How to get a text of a web element?**  
By using getText() method  
 **Ques.156. How to get an attribute value using Selenium WebDriver?**  
By using getAttribute(value);  
  
**Ques.157. List some scenarios which we cannot automate using Selenium WebDriver?**  
Bitmap comparison Is not possible using Selenium WebDriver  
Automating Captcha is not possible using Selenium WebDriver  
We can not read bar code using Selenium WebDriver  
windows OS based pop ups  
third party calendars/element  
Image  
Word/PDF  
  
**Ques.158. How can you use the Recovery Scenario in Selenium WebDriver?**  
By using “Try Catch Block” within Selenium WebDriver Java tests.  
try {  
     driver.get("www.xyz.com");  
}catch(Exception e){  
     System.out.println(e.getMessage());  
}  
  
**Ques.159. Database testing in Selenium?**  
We can use JDBC driver to connect to any database in Java.  
 **Ques.160. How to schedule the Test Suite Execution?**  
We can schedule the test suite execution using CI tools like hudson(Jenkins), Bamboo. Alternatively, we can use windows scheduler to launch the test execution.  
 **Ques.161. How to send an email stating the execution status to all stakeholders in Selenium?**  
We can send mail in Java using javax.mail library.  
  
**Ques.162. What is desired capabilities?**  
Capabilities are used to set the values of the browser attributes before we launch any browser using selenium web driver.  
  
**Ques.163. Version control tools like SVN, GIT?**  
We use version control tools like gitHub/SVN to track the changes to the files in a project and work in collaboration.  
  
**Ques.164. Build tools - Ant, Maven?**  
We use these tools to manage build activities for the Java project.  
   
**Ques.165. CI tools - Jenkin, Bamboo?**  
These are continuous integration tools helping in quick deployment of applications, testing them and reporting the issues in the code before it is too late. It helps in getting the application into production quickly and with more quality confidence.

# [Selenium Frequently Asked Questions & Answers Part-8](https://www.pavantestingtools.com/2016/04/selenium-interview-questions-and-answers.html)

[](https://4.bp.blogspot.com/-JnCB38c7HI4/XEl9r7n1ASI/AAAAAAAAPqM/4ivcZHj0sMYbzHleegNeeyjeNNrQYMWXACLcBGAs/s1600/Programs%2Bfor%2BSelenium%25282%2529.png)

**Ques.166. What is a Framework?**  
A framework defines a set of rules or best practices which we can follow in a systematic way to achieve the desired results. There are different types of automation frameworks and the most common ones are:  
Data Driven Testing Framework  
Keyword Driven Testing Framework  
Hybrid Testing Framework  
  
**Ques.167. Have you created any Framework?**  
If you are a beginner: No, I didn’t get a chance to create a framework. I have used the framework which is already available.  
If you are an experienced tester: Yes, I have created a framework.  Or I have involved in the creation of the framework.  
 **Ques.168. Can you explain the Framework which you have used in your Selenium Project?**  
Here you have to clearly explained each component of Framework.

[](https://1.bp.blogspot.com/-6zGDn3YNtuM/XEl-_4ORK1I/AAAAAAAAPqY/9kuCzibgeoIavVQ2dSNuP9QfYCWgStcEgCLcBGAs/s1600/Capture.PNG)

[](https://4.bp.blogspot.com/-OmSzG_0FLrs/XEl_Tftb2MI/AAAAAAAAPqg/9ZdWnseTCdIfI-WAU7Q_8ixrhAiVTo5VQCLcBGAs/s1600/Capture%2B1.PNG)

**Ques.169. Why do you prefer Selenium Automation Tool?**  
Free and open source  
Have large user base and helping communities  
Cross browser compatibility  
Platform compatibility  
Multiple programming languages support

# [SQL for Testers](https://www.pavantestingtools.com/2016/08/sql-for-testers.html)

**SQL (Structured Query Language):**

This is a standard language for accessing the database which is used for retrieval and management of data. It includes database creation, deletion, fetching rows and modifying rows etc.

SQL is the standard language for Relation Database System.

**DBMS and RDBMS:**

**DBMS:**Database Management System is where the data is stored in the form of Flat files and having aParent Child relationship. It’s not that in DBMS, the data cannot be stored in tables, but it is that even though the data is stored in tables, it will not have any relation between them

**RDBMS:**Relational Database Management System is where the data is always stored in the form oftables. The table is a collection of related data entries and it consists of columns and rows.

**DDL Commands:**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Command** | | **Description** |
|  | CREATE | | Creates a new table, a view of a table, or other object in database |
|  | ALTER | | Modifies an existing database object, such as a table. |
|  | DROP | | Deletes an entire table, a view of a table or other object in the database. |
| **DML Commands:** | | |  |
|  |  |  |  |
|  | **Command** |  | **Description** |
|  | INSERT |  | Creates a record |
|  | UPDATE |  | Modifies records |
|  | DELETE |  | Deletes records |
| **DQL Commands:** | | |  |
|  |  | |  |
|  | **Command** |  | **Description** |
|  | SELECT |  | Selects a dataset based on the conditions |

**SQL Material**

**1.1 DDL Commands:**Data Definition Language (DDL) is a part of SQL that is used to create, modify, anddelete database objects such as table, view, and index. Below are the most common DDL commands:

**1.1.1 CREATE TABLE:**Every data is stored in a table in the database. The way we do it is by CREATETABLE statement. A table is made up of rows and columns. Each row represents one piece of data, and each column can be thought of as representing a component of that piece of data.

**The Syntax for creating the table is as below:**

CREATE TABLE (CONSTRAINTS, (CONSTRAINTS,

... )

**Below is the Example:**

CREATE TABLE Customer (Customer\_Idint,

First Name char(50), Last Name char(50), Address char(50), City char(50), Country char(25, Birth Datedatetime);

**Six types of constraints can be placed when creating a table:**

o  **NOT NULL Constraint**: Ensures that a column cannot have NULL value.

o **DEFAULT Constraint:** Provides a default value for a column when none is specified. o **UNIQUE Constraint**: Ensures that all values in a column are different.

o **CHECK Constraint:** Makes sure that all values in a column satisfy certain criteria. o **Primary Key Constraint:** Used to uniquely identify a row in the table.

o  **Foreign Key Constraint:** Used to ensure referential integrity of the data.

**1.1.2 CREATE VIEW:**View is a virtual table. A view consists of rows and columns just like a table. Thedifference between a view and a table is that views are built on top of other tables and do not hold data themselves. If data is changing in the underlying table, the same changes are reflected in the view. A view can be built on top of a single table or multiple tables.

**The Syntax for Creating a View is as below:**

CREATE VIEW

AS SELECT \* FROM

**Below is the Example:**

CREATE VIEW Customer\_VW

As

Select \* from Customer

**1.1.3 CREATE INDEX:**The INDEX is used to create and retrieve data from the database very quickly.Index can be created by using single or group of columns in a table. When index is created, it is assigned a ROWID for each row before it sorts out the data. Proper indexes are good for performance in large databases, but you need to be careful while creating index. Selection of fields depends on what you are using in your SQL queries.

**The Syntax for Creating and Index is as below:**

CREATE INDEX

ON (COLUMN\_NAME1,COLUMN\_NAME2,…)

**Below is the Example:**

CREATE INDEX idx1 on Customer(birth\_date)

**1.1.4 ALTER TABLE:**The ALTER TABLE command is used to add, delete or modify columns in an existingtable. You would also use ALTER TABLE command to add and drop various constraints on an existing table.

The constraints that are explained above can also be used for creating as well for altering.

**The Syntax for Alter Table is as below:**

ALTER TABLE [ADD|DROP|MODIFY] COLUMN\_NAME [DATATYPE]

**Below is the Example:**

ALTER TABLE Customer ADD Age int

ALTER TABLE Customer DROP COLUMN Age

ALTER TABLE Customer MODIFY COLUMN Age varchar(2)

The same ADD/DROP/MODIFY commandsare used to modify the constraints that are required

**1.1.5**        **ALTER VIEW:**The ALTER VIEW command is used to alter the query that was used to create aview

**The Syntax for Alter View is as below:**

ALTER VIEW As

SELECT QUERY ON TABLES

**Below is the Example:**

ALTER VIEW as Select Customer\_id, Age from Customer

**1.1.6**        **ALTER INDEX:**You cannot alter the index by using any command. All you have to do is to dropthe index first and then recreate the index based on the requirement

**1.1.7**        **DROP TABLE:**Sometimes we need to clear off the table from the database where it is notnecessary. This is when we need to get rid of the table from the database which helps DBA in maintenance activities.

**The Syntax for DROP TABLE is as below:**

DROP TABLE

**Below is the Example:**

DROP TABLE Customer

DROP TABLE Customer

**1.1.8**        **DROP VIEW:**When you have a view in the database, you need a way to drop the view if it is nolonger needed.

**The syntax is as given below:**

DROP VIEW

**Below is the Example:**

DROP VIEW Customer\_VW

**1.1.9**        **DROP INDEX:**An index can be dropped if you don’t require the index on a particular column or ifyou want to alter the index. Care should be taken when dropping an index because performance may be slowed or improved.

**The syntax is as given below:**

DROP INDEX

**Below is the Example:**

ALTER TABLE Customer

DROP INDEX idx1

**1.2 DML Commands:**Data Manipulation Language (DML) is used for managing data in the database.These commands can be rolled back. But in SQL they are committed unless you write them in a transaction.

**1.2.1**        **INSERT:**This command is used to insert the data into the table.

**The syntax for the INSERT command is as below:**

INSERT INTO VALUES (Value1,Value2…etc)

**Below is the Example:**

INSERT INTO CUSTOMER values(‘Rahul’,’A’,’ADDRESS’,’HYDERABAD’,’INDIA’,1985-01-01’)

**1.2.2**        **UPDATE:**

This command updates the already existing rows in the table.

**The Syntax for the Update command is as below:**

UPDATE set =Value

**Below is the Example:**

UPDATE CUSTOMER SET CUSTOMER\_NAME=’RAJU’ WHERE CUSTOMER\_NO=1001

**1.2.3 DELETE:**This command deletes the rows from the table.

**Syntax for this command is as below:**

DELETE FROM

**Below is the Example:**

DELETE FROM CUSTOMER

**1.2.4 TRUNCATE TABLE:**Sometimes we need to delete all the data in the table when we don’t needthe particular data.

**Syntax for TRUNCATE TABLE is as below:**

TRUNCATE TABLE

**Below is the Example:**

TRUNCATE TABLE Customer

**Difference between DELETE and TRUNCATE:**

Both of these statements deletes the rows in the table but Delete can also use with the condition where it can delete some rows that satisfies the condition.

But there is one more difference in these two statements where the DELETE requires more system resources, and hence takes longer to complete, because the RDBMS has to record all changes one row at a time in the transaction log, while a TRUNCATE TABLE operation does not record the change one row at a time, so it can be completed quicker.

**Difference between DROP and TRUNCATE:**

DROP TABLE will delete the table from the database which means the table will not be physically existing in the database whereas TRUNCATE will delete all the rows in the table and table will physically exist in the database.

**1.2.5 Except:**This is used to find the difference between the dataset in between two tables.

**The Syntax is as below:**

Select from table\_name

EXCEPT

Select from table\_name

**Below is the Example:**

Select \* from Customer

Except

Select \* from Employee

**1.3 DQL Commands:**Data Query Language (DQL) is used for selecting data from the database. Thiscommand is used to select the data from the tables that are present on the Database even by putting the conditions.

**1.3.1**        **SELECT:**

This command is used to select the data from one or more tables.

**The syntax for the SELECT command is as below:**

SELECT ,….

FROM

**Below is the Example:**

SELECT \* from Customer

SELECT Customer\_Id,FirstName,Last Name from Customer

The Select Statement can have many clauses that can be used to fetch the correct data for the Requirement.

**1.3.2**        **TOP Clause:**This Clause will pick up the Top n number of rows from the Table in the Selectstatement

**The syntax is as below:**

SELECT TOP(required number of rows) column1, column2....columnNFROMtable\_name

**Below is the Example:**

SELECT TOP(100) First Name, Last Name from Customer

To select all the rows from the table the query can be written as below

SELECT TOP(100)\* from Customer

Here \* denotes all the columns in the Customer Table

**1.3.3**        **DISTINCT Clause:**This Clause as the name itself gives the distinct values from the Table in theSelect statement.

**The syntax is as below:**

SELECT DISTINCT column1, column2....column FROM table\_name

**Below is the Example:**

SELECT DISTINCT First Name, Last Name from Customer

**1.3.4**        **WHERE Clause:**This Clause is used for fetching the data based on a certain condition.

**The Syntax is as below:**

SELECT column1, column2....columnN FROM table\_name WHERE CONDITION

**Below is the Example:**

SELECT Customer\_Id, First Name, Last Name from Customer where Age>18

There can also be n number of conditions that can be Specified in the where clause where the data set that comes out as an output satisfies all the conditions OR a certain number of Conditions when we use a AND /OR clause in between the conditions

**1.3.5**        **IN Clause:**This Clause is used to fetch the dataset from the Where clause where the data setcontains the data present in the IN Clause.

**The Syntax is as below:**

SELECT column1, column2....columnN FROM table\_name

WHERE column\_name IN (val-1, val-2,...val-N)

**Below is the Example:**

SELECT Customer\_Id, First Name, Last Name from Customer where Age IN (18,20,21)

**1.3.6**        **BETWEEN Clause:**This Clause is used to fetch the dataset from the Where clause where theData output is in between the given Values inclusive of the Start and the End value.

**The Syntax is as below:**

SELECT column1, column2....columnNFROMtable\_name

WHERE column\_name BETWEEN val-1 AND val-2

**Below is the Example:**

SELECT Customer\_Id,First Name,LastName from Customer where Age Between 18 and 23

**1.3.7**        **LIKEClause:**This Clause is used to fetch the dataset from the Where clause where the Dataoutput likely matches with the given format. This need not be the exact match.

The Syntax is as below:

SELECT column1, column2....columnNFROMtable\_name

WHERE column\_name LIKE { PATTERN }

**Below is the Example:**

SELECT Customer\_Id,First Name,LastName from Customer where First Name like ‘%Ram%’

**1.3.8**        **ORDER BY Clause:**This Clause is used to sort the dataset either in the Ascending order or on theDescending order..If No order is specified, then its Ascending, If DESC is specified ,its Descending order which means by default its Ascending.

**The Syntax is as below:**

SELECT column1, column2....columnN FROM table\_name

WHERE CONDITION

ORDER BY column\_name {ASC|DESC}

**Below is the Example:**

SELECT Customer\_Id, First Name, Last Name from Customer Order by Customer\_ID SELECT Customer\_Id, First Name, Last Name from Customer Order by Customer\_IDdesc

**1.3.9**        **GROUP BY Clause:**This Clause is used to group a particular dataset based on the requirement tofind the statistics.

**The Syntax is as below:**

SELECT SUM(column\_name) FROM table\_name WHERE CONDITION GROUP BY column\_name;

**Below is the Example:**

SELECT SUM(marks) from Student group by student\_name

SELECT SUM(marks) from Student  where roll\_no between 1 and 5 group by student\_name

**1.3.10  COUNT Clause:**This Clause is used to give the count of the dataset that satisfies the condition.

**The Syntax is as below:**

SELECT COUNT(column\_name) FROM table\_name WHERE CONDITION

**Below is the Example:**

SELECT COUNT(\*) from Customer

**1.3.11**     **HAVING Clause:**This Clause is used to satisfy the condition after grouping the data where thecondition is dependent on the grouping.

**The Syntax is as below:**

SELECT SUM(column\_name) FROM table\_name WHERE CONDITION

GROUP BY column\_nameHAVING (arithematic function condition)

**Below is the Example:**

SELECT SUM(marks) from Student where roll\_no between 1 and 5 group by student\_name having SUM(Marks)>150

**1.3.12**     **CASE Statement :**This Clause is used to validate the data for a certain condition which in simpleterms can be called as an If Else condition.

**The Syntax is as below:**

SELECT

CASE Column1

WHEN Expression1 THEN Value1 WHEN Expression2 THEN Value2 WHEN Expression3 THEN Value3 ELSE Value4

END,

Column2,Column3 From TableName

**Below is the Example:**

SELECT EmpId,

Gender=

CASE

WHEN Gender='M' THEN 'Male'

WHEN Gender='F' THEN 'Female'

ELSE ''

END,

Designation

FROM Employeedetails

**1.3.13**     **Date Functions:**

**GETDATE():**Gives the current date of the ServerSelect getdate()

**Result :**2015-05-15 07:38:01.340

Sometimes we may have to convert the date in the desired format and below are some examples for it

SELECT CONVERT(VARCHAR(11),GETDATE(),6)

**Result :**15 May 15

SELECT CONVERT(VARCHAR(11),GETDATE(),106) **Result :**15 May 2015

SELECT CONVERT(VARCHAR(10),GETDATE(),10) **Result :**05-15-15

SELECT CONVERT(VARCHAR(10),GETDATE(),110) **Result :**05-15-2015

SELECT CONVERT(VARCHAR(24),GETDATE(),113) **Result :**15 May 2015 12:13:27:234

**DATEPART() :**This function will give the part of the date which means Day,Month and year ofthe date as desired

select DATEPART(Day,GetDate()) ---15 select DATEPART(Month,GetDate()) ---5 select DATEPART(Year,GetDate())----2015

**DATEADD():**This function adds or subtracts the time interval from given date.

**The Syntax is as below:**

SELECT DATEADD(Datepart,Number,date)

**Below is the Example:**

Select DATEADD(dd,10,getdate()) –This adds 10 days to the current date.

**DATEDIFF():**This functions returns the tme interval between two dates.

**The Syntax is as below:**

SELECT DATEDIFF(datepart,startdate,Enddate)

**Below is the Example :**

Select datediff(Day,’2014-01-01’,’2015-01-01’) –This will return the number of days from the start date to the end date which means 365 days.

**Main Concepts of the Group By and Having Clause:**

·          To use Group By Clause, we need to use at least one aggregate function.

·          All columns that are not used by aggregate function(s) must be in the Group By list.

·          We can use Group By Clause with or without Where Clause.

·          To use Having Clause, we have to use Group By Clause since it filters data that we get from Group By Clause.

**Joins**

SQL Joins are used to relate information in different tables. A Join condition is a part of the SQL query that retrieves rows from two or more tables. A SQL Join condition is used in the SQL WHERE Clause of select, update, delete statements.

A SQL join is used to combine rows from two or more tables, based on a common field between them and it can actually perform this for more tables as well.

**The Syntax for Joins is as below:**

SELECT col1, col2, col3...

FROM table\_name1, table\_name2

WHERE table\_name1.col2 = table\_name2.col1

**The Syntax can also be in the below format as well:**

SELECT col1, col2, col3...

FROM table\_name1 join table\_name2

on ( table\_name1.col2 = table\_name2.col1)

**Types of Joins that are used in SQL:**

·        Inner Join

·        Left Join

·        Outer Join

·        Full Outer Join

The join will result in a Cartesian product if the joining does not be on the Columns.Let us now take an example and then see how the Joins represent the data.

**Customer Table:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ID** | **NAME** | **AGE** | **ADDRESS** | **SALARY** |
| 1 | Ramesh | 32 | Ahmedabad | 2000 |
| 2 | Khilan | 25 | Delhi | 1500 |
| 3 | Kaushik | 23 | Kota | 2000 |
| 4 | Chaitali | 25 | Mumbai | 6500 |
| 5 | Hardik | 27 | Bhopal | 8500 |
| 6 | Komal | 22 | MP | 4500 |
| 7 | Muffy | 24 | Indore | 10000 |

**Orders Table:**

|  |  |  |  |
| --- | --- | --- | --- |
| **OID** | **DATE** | **CUSTOMER\_ID** | **AMOUNT** |
| 102 | 2014-10-08 | 3 | 3000 |
| 100 | 2014-10-08 | 3 | 1500 |
| 101 | 2014-11-20 | 2 | 1560 |
| 103 | 2014-05-20 | 4 | 2060 |

**Inner Join:**Returns all rows when there is at least one match in both tables.

SELECT C.ID, O.OID, C.NAME, C.ADDRESS, O.AMOUNT

FROM CUSTOMER C INNER JOIN ORDERS O

ON (C. ID=O.CUSTOMER\_ID)

This query will return the rows where the Id matched with the customer id in the order table.

**The output of the Inner join will be as below:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** |  | **OID** | **NAME** | **Address** |  | **AMOUNT** |  |
| 3 |  | 102 | kaushik | Kota |  | 3000 |  |
| 3 |  | 100 | kaushik | Kota |  | 1500 |  |
| 2 |  | 101 | Khilan | Delhi |  | 1560 |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 4 | 103 | Chaitali | Mumbai | 2060 |

**Left Outer Join:**Returns all rows from the left table, and the matched rows from the right table.

SELECT C.ID, O.OID, C.NAME, C.ADDRESS, O.AMOUNT

FROM CUSTOMER C LEFT OUTER JOIN ORDERS O

ON (C. ID=O.CUSTOMER\_ID)

This Query returns the all the rows with the matched data of the two tables then remaining rows of the Left table and NULL for the Right tables column.

**The Output of the Left Outer join is as below:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ID** | **OID** | **NAME** | **Address** | **AMOUNT** |
| 1 | NULL | Ramesh | Ahmedabad | NULL |
| 2 | 101 | Khilan | Delhi | 1560 |
| 3 | 102 | kaushik | Kota | 3000 |
| 3 | 100 | kaushik | Kota | 1500 |
| 4 | 103 | Chaitali | Mumbai | 2060 |
| 5 | NULL | Hardik | Bhopal | NULL |
| 6 | NULL | Komal | MP | NULL |
| 7 | NULL | Muffy | Indore | NULL |

**Right Outer Join:**Returns all rows from the Right table, and the matched rows from the left table.

SELECT C.ID, O.OID, C.NAME, C.ADDRESS, O.AMOUNT

FROM CUSTOMER C RIGHT OUTER JOIN ORDERS O

ON (C. ID=O.CUSTOMER\_ID)

This Query returns the all the rows with the matched data of the two tables then remaining rows of the Right table and NULL for the Left tables column.

The Output of the Right Outer join is as below:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ID** |  | **OID** |  | **NAME** | **Address** | **AMOUNT** |
|  | 3 |  | 102 | kaushik | Kota | 3000 |
|  | 3 |  | 100 | kaushik | Kota | 1500 |
|  | 2 |  | 101 | Khilan | Delhi | 1560 |
|  | 4 |  | 103 | Chaitali | Mumbai | 2060 |

**Full Outer Join:**Returns rows when there is a match in one of the tables.

SELECT C.ID, O.OID, C.NAME, C.ADDRESS, O.AMOUNT

FROM CUSTOMER C FULL OUTER JOIN ORDERS O

ON (C. ID=O.CUSTOMER\_ID)

This Query returns the all the rows with the matched data of the two tables then remaining rows of the Left table and Right table .

**The Output of the Full Outer join is as below:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ID** | **OID** | **NAME** | **Address** | **AMOUNT** |
| 1 | NULL | Ramesh | Ahmedabad | NULL |
| 2 | 101 | Khilan | Delhi | 1560 |
| 3 | 102 | kaushik | Kota | 3000 |
| 3 | 100 | kaushik | Kota | 1500 |
| 4 | 103 | Chaitali | Mumbai | 2060 |
| 5 | NULL | Hardik | Bhopal | NULL |
| 6 | NULL | Komal | MP | NULL |
| 7 | NULL | Muffy | Indore | NULL |

**Sub Query**

A subquery is a SQL query nested inside a larger query.

·        The subquery can be used inside a SELECT, INSERT, UPDATE, or DELETE statement or inside another subquery.

·        A subquery is usually added within the WHERE Clause of another SQL SELECT statement.

·        You can use the comparison operators, such as >, <, or =. The comparison operator can also be a multiple-row operator, such as IN, ANY, or ALL.

·        A subquery can be treated as an inner query

·        The inner query executes first before its parent query so that the results of inner query can be passed to the outer query.

**The Syntax is as below:**

SELECT (columnnames) from Tablename

Where column name IN (select columnname from tablename)

**Below is the Example:**

SELECT EmpId,Age,design,gender from Employee

Where Empid IN (Select empid in department where deptno=20)

**Q & A**

**1.  To get the list of tables and views in Database**

**Ans :**SELECT \* FROM information\_schema.tables (will display both tables,views)SELECT \* FROM information\_schema.views (will display on views)

**2.  List the details about “SMITH”**

**Ans:**Select \* from employee where last\_name=’SMITH’;

**3.**      **List out the employees who are working in department 20 Ans:**Select \* from employee where department\_id=20

**4.**      **List out the employees who are earning salary between 3000 and 4500 Ans:**Select \* from employee where salary between 3000 and 4500

**5.**      **List out the employees who are working in department 10 or 20**

**Ans:**Select \* from employee where department\_id in (20,30)

**6.  Find out the employees who are not working in department 10 or 30**

**Ans :**Select last\_name, salary, commission, department\_id from employee where department\_idnot in (10,30)

**7.  List out the employees whose name starts with “S”**

**Ans:**Select \* from employee where last\_name like ‘S%’

**8.  List out the employees whose name start with “S” and end with “H”**

**Ans:**Select\* from employee where last\_name like ‘S%H’

**9.  List out the employees whose name length is 4 and start with “S”**

**Ans :**Select \* from employee where last\_name like ‘S\_\_\_’

**10.**   **List out the employees who are working in department 10 and draw the salaries more than 3500**

**Ans:**Select \* from employee where department\_id=10 and salary>3500

**11.**   **List out the employees who are not receiving commission. Ans:**Select \* from employee where commission is Null

**12.**   **List out the employee id, last name in ascending order based on the employee id. Ans:**Select employee\_id, last\_name from employee order by employee\_id

**13.**   **List out the employee id, name in descending order based on salary column**

**Ans :**Select employee\_id, last\_name, salary from employee order by salary desc

**14.**   **list out the employee details according to their last\_name in ascending order and salaries in descending order**

**Ans:**Select employee\_id, last\_name, salary from employee order by last\_name, salary desc

**15.**   **list out the employee details according to their last\_name in ascending order and then on department\_id in descending order.**

**Ans:**Select employee\_id, last\_name, salary from employee order by last\_name, department\_iddesc

**16.**   **How many employees who are working in different departments wise in the organization Ans :**Select department\_id, count(\*), from employee group by department\_id

**17.**   **List out the department wise maximum salary, minimum salary, average salary of the employees**

**Ans:**Select department\_id, count(\*), max(salary), min(salary), avg(salary) from employee group bydepartment\_id

**18.**   **List out the job wise maximum salary, minimum salary, average salaries of the employees. Ans:**Select job\_id, count(\*), max(salary), min(salary), avg(salary) from employee group by job\_id

**19.**   **List out the no. of employees joined in every month in ascending order.**

**Ans:**Select to\_char(hire\_date,’month’)month, count(\*) from employee group byto\_char(hire\_date,’month’) order by month

**20.**   **List out the no of employees for each month and year, in the ascending order based on the year, month.**

**Ans:**Select to\_char(hire\_date,’yyyy’) Year, to\_char(hire\_date,’mon’) Month, count(\*) “No. ofemployees” from employee group by to\_char(hire\_date,’yyyy’), to\_char(hire\_date,’mon’)

# [Agile Scrum for Testers](https://www.pavantestingtools.com/2016/08/agile-scrum-for-testers.html)

**What is agile and scrum?**

•        **Agile meaning:**Able to move quickly and easily.

•        **Scrum meaning:**a Rugby play

**Agile Scrum:**

•        It is an iterative and incremental **agile software** development framework for managing product development.

•        It defines a flexible product development strategy where a development team works as a unit to reach a common goal.

•        It is an **Incremental** and **Iterative** model.

•        It is a self- organized and focused team.

•        No huge document, rather have precise and to point stories.

•        Close communication with user Representative.

•        Have definite time lines of 1 week to 4 weeks

•        Instead of doing everything at a time scrum does a little of everything at a given interval.

•        Resources capability and availability is considered before committing any thing.

**Why Agile Scrum?**

•        Incremental approach breaks complex projects down into simpler mini-projects

•        Accommodates change easily

•        Improves ROI through frequent and regular delivery of value to the business

•        Increased business involvement and satisfaction

•        Increased visibility (progress, obstacles, risks, etc) Reasons to use Agile

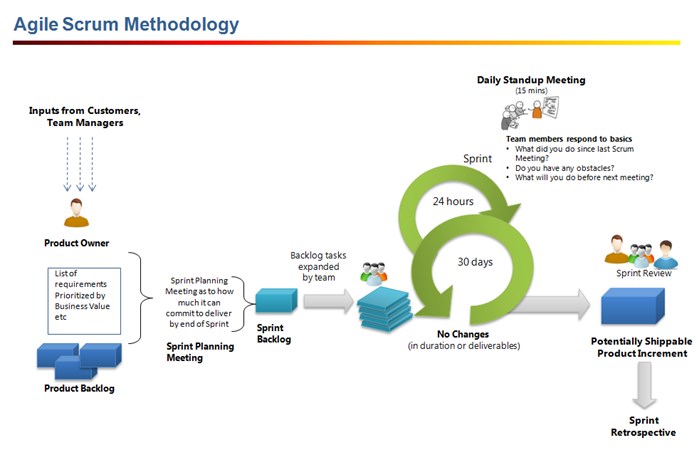
•        Lower development risk, higher quality, less defects

•        Shorter cycles produce working software and incremental product quickly

•        Progress measured by running tested software

•        Early and regular process improvement driven by frequent inspection

**Agile Scrum overview:**

[](https://1.bp.blogspot.com/-NKGCBlLYj6w/V76F8CXA5WI/AAAAAAAAKA4/PxAZWgmqursQEfMkEu2bXT2B-TYnaKHFACLcB/s1600/agile_scrum_methodology.jpg)

**Advantages**

•        We can save time and cost of the project.

•        The quality can be ensured because each and every sprint will be tested multiple times.

•        The requirements change can be accepted at any level of the project maintenance.

•        All are participating in Scrum meting so that transparency can be maintained.

•        Each and every sprint we are delivering to the client so we can maintain the customer’s satisfaction and we can avoid delivery risk of the project.

***Scrum Terminology***

—**Roles**: Product Owner, Scrum Master, Team

—**Ceremonies**: Sprint Planning, Sprint Review, Sprint Retrospective, & Daily ScrumMeeting

—**Artifacts**: Product Backlog, Sprint Backlog, and Burn down Chart

***Product Owner***

—Define the features of the product

—Decide on release date and content

—Be responsible for the profitability of the product (ROI)

—Prioritize features according to market value

—Adjust features and priority every iteration, as needed

—Accept or reject work results.

***The Scrum Master***

—Represents management to the project

—Responsible for enacting Scrum values and practices

—Removes impediments

—Ensure that the team is fully functional and productive

—Enable close cooperation across all roles and functions

—Shield the team from external interferences

***Scrum Team***

—Typically 5-10 people

—Cross-functional

—QA, Programmers, UI Designers, etc.

—Members should be full-time

***Meetings***

—Sprint Planning Meeting

—Daily Scrum

—Sprint Review Meeting

—Sprint Retrospective Meeting

***Daily Scrum Meeting***

—Parameters

—Daily

—15-minutes

—Stand-up

—Not for problem solving

—Three questions:

—What did you do yesterday

—What will you do today?

—What obstacles are in your way?

***Sprint Review Meeting***

—Team presents what it accomplished during the sprint

—Typically takes the form of a demo of new features or underlying architecture

—Informal

—2-hour prep time rule

—Participants

—Customers

—Management

—Product Owner

—Other engineers

***Sprint Retrospective Meeting***

—Scrum Team only

—Feedback meeting

—Three questions

—What went well

—What went wrong

—What can be done(Improvement)

—Don’t skip for the first 5-6 sprints!!!

**Frequently Asked Questions**

**Q1) What is Agile Testing?**

•        Agile Testing is a practice that a QA follows in a dynamic environment where testing requirements keep changing according to the customer needs.

•        It is done parallel to the development activity where testing team receives frequent small codes from the development team for testing.

Q2) **Who are involved in Scrum cycle?**

•        **Product Owner:**Manages the product backlog. PO is the voice of the business andcreate new features to be developed for the application.

•        **Scrum Master:**Responsible for managing the sprint, remove any impediments andkeeps track of the progress of the project.

•        **Scrum Team:**Composed of developers, designers and QA. This forms the team which isresponsible for delivering high quality software.

Q3) **what is the difference b/w Product backlog and sprint backlog?**

•        **Product backlog:**It contains a list of all desired features/user stories and is owned bythe product owner

•        **Sprint backlog:**It is a subset of the product backlog owned by development team andcommits to deliver it in a sprint. It is created in Sprint Planning Meeting

Q4) **what is an epic, user stories and task?**

•        **Epic:**A customer described software feature that is itemized in the product backlog isknown as epic. Epics are sub-divided into stories

•        **User Stories:**From the client perspective user stories are prepared which definesproject or business functions, and it is delivered in a particular sprint as expected.

•        **Task:**Further down user stories are broken down into different task

Q5) **what is burn-up and burn-down chart?**

To track the project progress burn-up and burn down, charts are used

•        **Burn-up Chart**: It shows the progress of stories done over time

•        **Burn-down Chart**: It shows how much work was left to do overtime

Q6) **What is story points/efforts/ scales?**

It is used to discuss the difficulty of the story without assigning actual hours.

•        The most common scale used is a Fibonacci sequence ( 1,2,3,5,8,13,….100).

•        Some teams use linear scale (1,2,3,4….),

Example: Cloth size (XS, S ,M,L, XL)

Q7) **What** **is ‘Testing is done’ in Agile?**

The below testing are done then test engineer can say ‘Testing is done’

•        The primary testing activities during Agile is -

üAutomated unit testing

üExploratory testing.

•    Tester will execute -

üFunctional and

üNon-functional tests on AUT

üRegression

Q8) **Explain Velocity in Agile?**

•        Velocity is a metric that is calculated by addition of all efforts estimates associated with user stories completed in a iteration.

•        It predicts how much work Agile can complete in a sprint and how much time will require to complete a project.

Q9) **Explain the difference between traditional Waterfall model and Agile testing?**

•        Agile testing is done parallel to the development activity whereas in traditional waterfall model testing is done at the end of the development.

•        As done in parallel, agile testing is done on small features whereas in waterfall model testing is done on whole application

Q10) **Explain the Iterative and Incremental Development in Agile?**

•        Agile testing is done parallel to the development activity whereas in traditional waterfall model testing is done at the end of the development.

•        As done in parallel, agile testing is done on small features whereas in waterfall model testing is done on whole application

 Q11) **How QA can add a value to an agile team?**

•        QA can provide a value addition by thinking differently about the various scenarios to test a story. They can provide quick feedback to the developers whether new functionality is working fine or not

Q12) **What is importance of daily stand up meeting?**

Daily stand up meeting is essential for any team in which-

•        Team discuss about how much work has been completed.

•        What are the plans to resolve technical issues.

•        What steps need to done to complete the projects etc

Q13) **What is Agile manifesto?**

•        Agile manifesto defines an iterative and people-centric approach to software development.

•        It has basically 4 key values and 12 principles

Q14) **What is re-factoring?**

Modification of the code without changing its functionality to improve the performance is called re-factoring.

# [ETL TESTING REAL TIME INTERVIEW QUESTIONS & ANSWERS](https://www.pavantestingtools.com/2016/08/etl-testing-real-time-interview.html)

**1.**      **What is Data warehouse**

**Ans:**A Data warehouse is a subject oriented, integrated ,time variant, non volatile collection of data in support of management's decision making process.

Subject oriented : means that the data addresses a specific subject such as sales, inventory etc.

Integrated : means that the data is obtained from a variety of sources.

Time variant : implies that the data is stored in such a way that when some data is changed.

Non volatile : implies that data is never removed. i.e., historical data is also kept.

**2.**      **What is the difference between database and data warehouse**

**Ans:**A database is a collection of related data. Where as Data Warehouse stores historical data, the business users take their decisions based on historical data only.

**3.**      **What is the difference between dimensional table and fact table**

**Ans:**A dimension table consists of tuples of attributes of the dimension. A fact table can be thought of as having tuples, one per a recorded fact. This fact contains some measured or observed variables and identifies them with pointers to dimension tables.

**4.**      **What is the difference between Data Mining and Data Warehousing**

**Ans: Data mining** - analyzing data from different perspectives and concluding it into useful decision making information. It can be used to increase revenue, cost cutting, increase productivity or improve any business process. There are lot of tools available in market for various industries to do data mining. Basically, it is all about finding correlations or patterns in large relational databases.

**Data warehousing** comes before data mining. It is the process of compiling and organizing data into one database from various source systems where as data mining is the process of extracting meaningful data from that database (data warehouse).

**5.**      **What is Data Mart**

**Ans :** A data mart is a simple form of a data warehouse that is focused on a single subject (or functional area), such as Sales, Finance, or Marketing. Data marts are often built and controlled by a single department within an organization. Given their single-subject focus, data marts usually draw data from only a few sources. The sources could be internal operational systems, a central data warehouse, or external data.

**6.**      **Difference between OLTP and OLAP**

**Ans:**Online transactional processing (OLTP) is designed to efficiently process high volumes of transactions, instantly recording business events (such as a sales invoice payment) and reflecting changes as they occur.

Online analytical processing (OLAP) is designed for analysis and decision support, allowing exploration of often hidden relationships in large amounts of data by providing unlimited views of multiple relationships at any cross-section of defined business dimensions.

**7.**      **What is ETL?**

**Ans:** ETL - extract, transform, and load.

Extracting data from outside source systems.

 Transforming raw data to make it fit for use by different departments.

 Loading transformed data into target systems like data mart or data warehouse.

**8.**      **Why ETL testing is required**

Ans:  To verify the correctness of data transformation against the signed off business requirements and rules.

 To verify that expected data is loaded into data mart or data warehouse without loss of any data.

To validate the accuracy of reconciliation reports (if any e.g. in case of comparison of report of transactions made via bank ATM – ATM report vs. Bank Account Report).

 To make sure complete process meet performance and scalability requirements

Data security is also sometimes part of ETL testing

To evaluate the reporting efficiency

**9*.******What are ETL tester responsibilities***

Ans :An ETL tester is responsible for writing SQL queries for various scenarios. They run a number of tests including primary key, duplicate, default, and attribute tests of the process. In addition, they are in charge of running record count checks as well as reconciling records with source data. They also confirm the quality of the data and the loading process overall.

**10.**   **What are the Key benefits of ETL Testing**

**Ans:**Minimise the risk of Data loss

Data Security

Data Accuracy

Reporting effciency

**11.**   **To get the list of tables and views in Database**

**Ans :**SELECT \* FROM information\_schema.tables (will display both tables,views)

SELECT \* FROM information\_schema.views (will display on views)

**12.**   **List the details about “SMITH”**

**Ans:** Select \* from employee where last\_name=’SMITH’;

**13.**   **List out the employees who are working in department 20**

**Ans:** Select \* from employee where department\_id=20

**14.**   **List out the employees who are earning salary between 3000 and 4500**

**Ans:** Select \* from employee where salary between 3000 and 4500

**15.**   **List out the employees who are working in department 10 or 20**

**Ans:** Select \* from employee where department\_id in (20,30)

**16.**   **Find out the employees who are not working in department 10 or 30**

**Ans :**Select last\_name, salary, commission, department\_id from employee where department\_id not in (10,30)

**17.**   **List out the employees whose name starts with “S”**

**Ans:**  Select \* from employee where last\_name like ‘S%’

**18.**   **List out the employees whose name start with “S” and end with “H”**

**Ans:**  Select \* from employee where last\_name like ‘S%H’

**19.**   **List out the employees whose name length is 4 and start with “S”**

**Ans :** Select \* from employee where last\_name like ‘S\_\_\_’

**20.**   **List out the employees who are working in department 10 and draw the salaries more than 3500**

**Ans:**  Select \* from employee where department\_id=10 and salary>3500

**21.**   **List out the employees who are not receiving commission.**

**Ans:**  Select \* from employee where commission is Null

**22.**   **List out the employee id, last name in ascending order based on the employee id.**

**Ans:**  Select employee\_id, last\_name from employee order by employee\_id

**23.**   **List out the employee id, name in descending order based on salary column**

**Ans :** Select employee\_id, last\_name, salary from employee order by salary desc

**24.**   **list out the employee details according to their last\_name in ascending order and salaries in descending order**

**Ans:**  Select employee\_id, last\_name, salary from employee order by last\_name, salary desc

**25.**   **list out the employee details according to their last\_name in ascending order and then on department\_id in descending order.**

**Ans:**  Select employee\_id, last\_name, salary from employee order by last\_name, department\_id desc

**26.**   **How many employees who are working in different departments wise in the organization**

**Ans :** Select department\_id, count(\*), from employee group by department\_id

**27.**   **List out the department wise maximum salary, minimum salary, average salary of the employees**

**Ans:**  Select department\_id, count(\*), max(salary), min(salary), avg(salary) from employee group by department\_id

**28.**   **List out the job wise maximum salary, minimum salary, average salaries of the employees.**

**Ans:**  Select job\_id, count(\*), max(salary), min(salary), avg(salary) from employee group by job\_id

**29.**   **List out the no.of employees joined in every month in ascending order.**

**Ans:**  Select to\_char(hire\_date,’month’)month, count(\*) from employee group by to\_char(hire\_date,’month’) order by month

**30.**   **List out the no.of employees for each month and year, in the ascending order based on the year, month.**

**Ans:**  Select to\_char(hire\_date,’yyyy’) Year, to\_char(hire\_date,’mon’) Month, count(\*) “No. of employees” from employee group by to\_char(hire\_date,’yyyy’), to\_char(hire\_date,’mon’).

# [Behavioural Interview Questions for Software Testers](https://www.pavantestingtools.com/2016/09/behavioural-interview-questions-for.html)

# As a Software Tester, you will be interacting with a lot of people from different sections of a business. For example, if you are a QA in an Agile team, you need to be constantly talking with developers, product owners, scrum masters and other fellow testers. It is possible that sometimes you face a difficult situation, have to make snap decisions and deal with awkward colleagues. The way you handle these situations can say a lot about your attitude towards work and other colleagues and will help the interviewer to judge whether you are suitable for the role or not.

# Honesty is important but you need to be diplomatic in how you answer these questions.

# These set of Interview Questions may or may not be asked at a Software Testing Interview, but it is useful to prepare in case you get asked any of these questions.

### Answers to these interview questions are related to the situation and the person so answers are not provided, but the interview questions are food for thought.

### 

### 1. How do you normally deal with conflict?  Give me an example.

### 2. Tell me about a time when you strongly disagreed with an idea or plan a co-worker had.  How did you get him/her to change his/her mind?

### 3. Tell me about a goal you recently set for yourself.  Did you reach it and if so how did you go about achieving it?

### 4. Tell me about a goal you set for yourself that you failed at.  Why do you believe you failed?

### 5. What have you done in the past or recently to help foster a positive team spirit or environment within your department?

### 6. Tell me about a time that you had multiple assignments to finish within a short time frame.  How did you go about getting them all done?

### 7. Tell me about a time when you had to tell a subordinate they weren’t doing their job well.

### 8. Tell me about a time when you had to go beyond the call of duty to get a job done.

### 9. Tell me about a difficult decision you’ve made within the last year.

### 10. Tell me about a situation where a co-worker or boss was extremely difficult to work with.  How did you handle the situation?

### 11. Tell me about an instance or situation at your company that you were particularly proud of?  Something that you accomplished that no one else at the company had succeeded in doing before. Why were you successful in this task when no one else was?

### 12. Tell me about a time when something was extremely important to you, where you were forced to speak up and sell your ideas to others.

### 13. Tell me about a situation when you were asked to do something that you thought was a conflict of interest.  How did you deal with the situation?

### 14. Tell me about a time when you were asked to complete a task that you didn’t know anything about.  How did you complete the task?

### 15. Tell me about the worst customer you ever had and how you dealt him/her.

### 16. Describe the steps you would take if a customer came to you with a problem that was beyond your knowledge and/or responsibilities.

### 17. Describe a recent situation when you didn’t know with whom you needed to speak with in an organization to get something done. What did you do?

### 18. Describe how you handle rude, difficult or impatient people.

### 19. Tell me about a time when you had to follow your boss’ orders when you did not agree with him or her.

### 20. Describe the types of people you get along with best and why.

### 21. Describe the types of people you have difficulty getting along with and why.

### 22. Tell me about a situation where you had difficulties with a team member.  What, if anything, did you do to resolve your differences?

### 23. Give me an example of a time that you were faced with a very difficult task.  What resources did you use to accomplish the task?  How did you prioritize your time to finish the task?

### 24. Describe a work situation in which you weren’t proud of your performance.  What did you learn from the situation?

### 25. Give me an example of when you were able to meet the personal and professional demands in your life yet still maintain a healthy balance.

# [Test Automation During Sprint](https://www.pavantestingtools.com/2016/09/test-automation-during-sprint.html)

The automated task for every story should be the story’s definition of done. Ideally you should aim to automate the stories within the current sprint.

The way to do this is to have an automation framework which speeds up writing automated scripts, so that you just focus on the scenarios rather than spending time creating functions.

In your test automation framework, you need to separate the layers. The base layer should be your application framework code that talks to the automation tool, such as WebDriver.

The next layer up is your page objects which model your applications. In these classes or page objects you need to write many functions to full control over writing user scenarios. This is where the magic happens and how things are done.

The last layer is your scenarios. These should just call the functions in your page objects. You only need to define what needs to be done and the page objects should take care of it.

In this way even when you have a short time at the end of the sprint, you can quickly create automated scenarios if you have a solid foundation.

Automating regression tests during the sprint requires discipline.

The scope of the regression tests increases and so the maintenance also increases. You need to be aware that **not all tests require to be automated**.

You should only automate the tests that provide value for the business.

# [Guide to Writing Good Agile User Stories](https://www.pavantestingtools.com/2016/09/guide-to-writing-good-agile-user-stories.html)

One of the first steps in delivering a quality product, is writing good user stories. A user story is a place to capture product functionality and as the name suggests, user stories describe how a customer or user will use the product.

In this post, we describe how to write good user stories and what should be included.

A user story represents a small piece of functionality which has a business value that a team can deliver in a sprint. The difference between a user story and a traditional requirement document is the level of detail.

Requirement documents tend to contain a lot of text and are very detailed, whereas user stories are mainly based around conversations.

We can break down the structure of a user story as:

* The brief description of the need
* The conversations that happen during backlog grooming and sprint planning to solidify the details
* The acceptance tests that confirm the story’s satisfactory completion

An important point to bear in mind when writing user stories is that they are written from the perspective of the user who will ultimately use the product, hence it is important that we clearly identify who the user is when writing user stories.

## How to Write Good User Stories

As a rule of thumb, a good user story should adhere to the INVEST acronym:

**I**ndependent – user stories should not depend on each other so they can be developed in any order.

**N**egotiable – Avoid too much detail; keep them flexible so the team can adjust how much of the story to implement.

**V**aluable – the story should provide some value to its users.

**E**stimable – the team must be able to estimate the story.

**S**mall – user stories should be small enough to fit in a sprint; large stories are hard to estimate and plan.

**T**estable – ensure what is being developed can be verified and tested adequately.

### What Format is Used to Write User Stories?

User stories generally have the following format:

*As a , I want to so that .*

Example: As a **customer** of abc.com, I want a **login** functionality so that I can **access my account details online**.

As mentioned earlier, pay particular attention to who the user of the product is and avoid the generic role of “User”. If you don’t know who the users and customers are and why they would want to use the product, then you should **not** write any user stories.

**Narrative**

* The first part of the user story is the Narrative. 2-3 sentences used to describe the intent of the story. It is just a summary of the intent.

**Conversations**

* The most crucial aspect of a user story is the conversations that should happen continuously between the development team, customer, Product Owner and other stakeholders to solidify the details of the user story.

**Acceptance Criteria**

* Acceptance criteria represent the conditions of satisfaction which are written as scenarios, usually in Gherkin (Given, When, Then) format. Acceptance criteria also provide the Definition of Done for the story.

### Who Should Write User Stories?

In most cases, user stories are written by a **Product Owner** or Business Analyst and prioritized in the product backlog. However, that’s not to say that it is the responsibility of only the Product Owner to write user stories. In fact, any team member can write user stories, but it is the Product Owner’s responsibility to ensure a backlog of user stories exist and are prioritized.

What’s important, is that user stories **should not** be treated like requirements document which when written will get handed off to development team for implementation.

User stories should be seen as a means of encouraging conversations between the Product Owner and the development team, and thus should be written collaboratively during the product backlog grooming sessions.

An advantage of involving the development team in writing user stories is that if there are any technical constraints, they can be highlighted well in advance. **Testers can particularly add value** in constructing effective acceptance criteria and plan in advance on what needs to be tested and how.

### How Detailed Should User Stories Be?

User stories focus on customer value.

The basic difference between user stories and other forms of requirements specification is the level of detail. A user story is a metaphor for the work being done, not a full description of the work.  The actual work being done is fleshed out via collaboration revolving around the user story as system development progresses.

If the description becomes too lengthy (more than what will fit on an index card), you should revisit the user story. It is likely that you are trying to include too much detail.

Remember that the purpose of a user story is to encourage collaboration. It is not meant to document every aspect of the work, as it’s normally the case in traditional requirements statements.

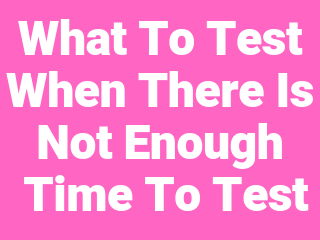
Moreover, too much information in the description can lead to missing information in acceptance criteria.

Before agreeing to work on a story, the team must understand the acceptance criteria. These are essential for knowing what needs to be done in order to satisfy the user story. Acceptance criteria should be detailed enough to define when the user story is satisfied, yet not so detailed as to quash collaboration.

### Common Mistakes When Writing User Stories

* **Too formal or too much detail.** Product owners with good intentions often try to write extremely detailed user stories.  If a team sees a story at iteration planning that looks like an IEEE requirements document, they often assume that all the details are there and will skip the detailed conversation.
* **Writing user stories for Technical tasks.** Much of the power of Agile comes from having a working increment of software at the end of each iteration.  If your stories are really just technical tasks, you often do not end up with working software at the end of each iteration, and you lose flexibility in prioritization.
* **Skipping the conversation.**Stories are intentionally vague before iteration planning.  If you skip the acceptance criteria conversation, you risk moving in the wrong direction, missing edge cases or overlooking customer needs.

# [What to Test When There is Not Enough Time to Test](https://www.pavantestingtools.com/2016/09/what-to-test-when-there-is-not-enough.html)

[](https://3.bp.blogspot.com/-um_Krut1b-E/XDmj7zqHwvI/AAAAAAAAPZQ/YZWvfbScUO0pEozW2aSpH8VRzx3BMJEywCLcBGAs/s1600/Programs%2Bfor%2BSelenium%252813%2529.png)

Quite often testers will find themselves running out of time when testing an application.

One of the major tasks of a Test Manager is to prioritize which tests need to be run when there is not enough time to execute all the tests.

### Use risk analysis to determine where testing should be focused.

Since it’s rarely possible to test every possible aspect of an application, every possible combination of events, every dependency, or everything that could go wrong, risk analysis is appropriate to most software development projects. This requires judgment skills, common sense, and experience. (If warranted, formal methods are also available.)

Considerations can include:

* Which functionality is most important to the project’s intended purpose?
* Which functionality is most visible to the user?
* Which functionality has the largest safety impact?
* Which functionality has the largest financial impact on users?
* Which aspects of the application are most important to the customer?
* Which aspects of the application can be tested early in the development cycle?
* Which parts of the code are most complex, and thus most subject to errors?
* Which parts of the application were developed in rush or panic mode?
* Which aspects of similar/related previous projects caused problems?
* Which aspects of similar/related previous projects had large maintenance expenses?
* Which parts of the requirements and design are unclear or poorly thought out?
* What do the developers think are the highest-risk aspects of the application?
* What kinds of problems would cause the worst publicity?
* What kinds of problems would cause the most customer service complaints?
* What kinds of tests could easily cover multiple functionalities?
* Which tests will have the best high-risk-coverage to time-required ratio?

# [Test Automation Tips and Best Practices](https://www.pavantestingtools.com/2016/09/test-automation-tips-and-best-practices.html)

[](https://1.bp.blogspot.com/-GCwOr4-4pSE/XDmkOsyeDhI/AAAAAAAAPZY/o2pCCM2DqloZlX3yVoma17e8UAMlM6LoACLcBGAs/s1600/Programs%2Bfor%2BSelenium%252814%2529.png)

Automated Testing is an important testing activity during the software development life cycle because it can provide quick feedback to the team when a new feature has been developed. It also removes the burden from QA to repeatedly run regression tests which saves time for QA to focus on other testing activities.

Test Automation, when done right, can be very beneficial to the team. The tips below will help you get the most value from your automated testing process and activity and highlights pitfalls to avoid when starting to automate your tests.

### Manual vs Automated – Testing vs Checking

Avoid comparison between manual and automated testing. They are both needed as each serves a different purpose. Automated tests are a set of instructions written by a person to do a specific task. Every time an automated test is run, it will follow exactly the same steps as instructed and only check for things that is being asked to check.

On the other hand, during manual testing, tester’s brain is engaged and can spot other failures in the system. The test steps may not necessarily be the same every time, as the tester can alter the flows during the testing; this is specially true in case of exploratory testing.

### Automate Regression Tests

**The main reason you want to automate a test**, is because you want to execute the test repeatedly on every new release. If the test requires to be executed only once, then the effort to automate the test can outweigh the benefits.

Regression tests are required to be executed repeatedly as the software under test evolves. This can be very time consuming and a boring task for QA to have to run regression tests every day. Regression tests are good candidates for test automation.

### Design Tests Before Automating Them

It is always a good practice to create the test cases and scenarios before starting to automate the tests. It is the good test design than can help in identifying defects, automated tests only execute the test design.

The danger in jumping straight to automation is that you’re only interested in making the script to work and usually only automate positive and happy flow scenarios rather than thinking about the other possible scenarios that can be tested.

Also don’t reduce the scope of testing just to make the test work or pass.

### Remove Uncertainty from Automated Tests

One of the key points of automated testing is the ability to give consistent results, so that we can be certain that something has actually gone wrong when a test fails.

If an automated test passes in one run and fails in the next run, without any changes on the software under test, we cannot be certain if the failure is due to the application or due to other factors, such as test environment issues or problems in the test code itself.

When there are failures, we have to analyse the results to see what had gone wrong, and when we have lots of inconsistent or false positive results, it increases analysis time.

Don’t be afraid to remove unstable tests from regression packs; instead aim for consistent clean results that you can rely on.

### Review Automated Tests for Validity

You will be alarmed by the sheer number of automated tests that are outdated, just don’t check for anything or are not checking the most important verifications!

This could be a symptom of jumping straight to automation without spending enough time before hand planning on what needs to be done and designing good test scenarios.

Always have a colleague to review the automated tests for validity and sanity. Make sure tests are up to date.

### Don’t Automate Unstable Functionality

As a new feature or functionality is being developed, many things can go wrong and even the feature may no longer be applicable because the business have changed their mind.

If you started automating tests as the feature was being developed, the tests need to be updated many times as the feature evolves and can be quite daunting trying to keep up with all the changes. And if the feature is no longer applicable, all that effort on test automation is wasted.

Therefore, it is always best to automate a functionality once it has been stabilized and less subject to change.

**Don’t Expect Magic From Test Automation**

The primary reason for test automation is to free up QA time for interesting exploratory testing and to give confidence to the team that the application is still in good order as new changes are delivered.

**Don’t expect automation to find lots of bugs**. In fact, the number of bugs found by automation is always much less than manual and exploratory testing.

### Don’t Rely Solely on Automation – Beware of Passing Tests

Automated regression tests can give a sense of confidence for the team because regression tests should still pass as new functionality is delivered.The team start relying on the tests and having a good set of regression tests can act as a safety net.

However, note that not all tests are automated or can be automated, therefore always accompany automated tests with exploratory testing.

Sometimes a change in the software should fail a test; however, if all tests are passing that means the defect is missed and because there was no call to action, the defect went unnoticed.

### Aim for Fast Feedback

Quick feedback is one of the objectives of automated tests, because developers are keen to know if what they have developed works and hasn’t broken current functionality.

In order to get this quick feedback loop, the tests need to be automated at component or API layer without relying on the UI.

Tests run on UI are much slower and prone to error due to GUI changes. In other words, the functionality still works as expected but the tests fail due to changes in the UI. Therefore the tests can become unreliable.

### Understand the Context

Tests can be automated at any layer, Unit, API, Service, GUI. Each layer serves a different purpose for testing.

Unit Tests ensure that the code works at class level, that it compiles and the logic is as expected. Tests at this layer are more verification than validation.

API Tests or Integration Tests ensure a set of functions and classes can work together and data can be passed from one class to another.

GUI Tests on the other hand test user flows and journeys. Generally we would not test for functionality from the UI. This should be done at lower layers.

The main purpose of UI tests is to ensure the whole system works as per some common user scenarios and use cases. Testing at this layer is more Validation rather than Verification

At UI level, we automate scenarios rather than stories.

### Don’t Automate Every Test

100% Test Coverage is not possible since there can be millions of combinations. We always execute a subset of possible tests. The same principle applies to automated testing.

To create an automated script, it requires time and effort, and aiming for “Automating Every Test”, we require lot of resource and time, which in many cases is not possible.

Instead use a Risk based approach to determine which tests should be automated. To get the most value out of automation, only automate the most important business cases and scenarios.

Also a high number of automated tests adds maintenance cost and difficult to maintain.

Another note to bear in mind, is that not all tests can be automated. Some tests are very complex in nature and require many downstream system checking and can be inconsistent. In these cases, it is best to leave these checks for manual testing.

### Use Test Techniques in Test Automation

The test techniques that you learned in ISTQB, are not just for manual testing. They are also applicable to automated testing. Techniques such as Boundary Value Analysis, Equivalence Partitioning, State Transition Testing, Pairwise Testing can provide a lot of benefits in automated testing.

### Don’t Automate Chaos

In order to get the most out of your automated testing, a good QA process should be in place. If the QA process is chaotic and we add automated testing to that chaos, all we get is faster chaos.

Try to answer questions like, What to automate, **When to automate**, When to execute the automated tests, Who shall automate the tests, What tools should be used for test automation, etc…

These tips are gathered mostly from experience as an Automation Tester and some good practices followed by others.

[Good Test Automation Framework Checklist](https://www.pavantestingtools.com/2019/11/good-test-automation-framework-checklist_10.html):-

Reusable methods or page classes – Create reusable methods wherever you discover repeatable code. Don’t duplicate an equivalent thing multiple tests.

Data driven – Test data like URLs / User Names and Passwords are maintained in properties file or Excel files. Don’t hard code everywhere.

Explicit waits – Thread sleep delays everywhere in test scenarios. Also reduce the performance. So attempt to use Explicit waits.

Variables names should be meaning full.

Try to use public API’s rather than creating more utility files from scratch.

Reporting – Don’t print results using System.out.println. Always use Reporting mechanisms.

Headless test execution support when there's a necessity

Don’t hard code absolute paths given to files utilized in the framework, instead of just putting the files into a folder relative to the framework.

Data should read from test scenarios but not in page classes.

Try to reduce Unnecessary program loops within the code.

Test framework should organize into well-defined packages

Pages – Where page classes reside

Test – Where test reside

Utility – Where utility classes resides. like reporting and file reading classes

Documentation on deploying the test framework

Logging facility for frameworks, when something goes wrong

Base driver support to run in multiple browsers

Good naming conventions for page class and test class naming

Tests should be independent when executing

Detailed reports on test executions and failures

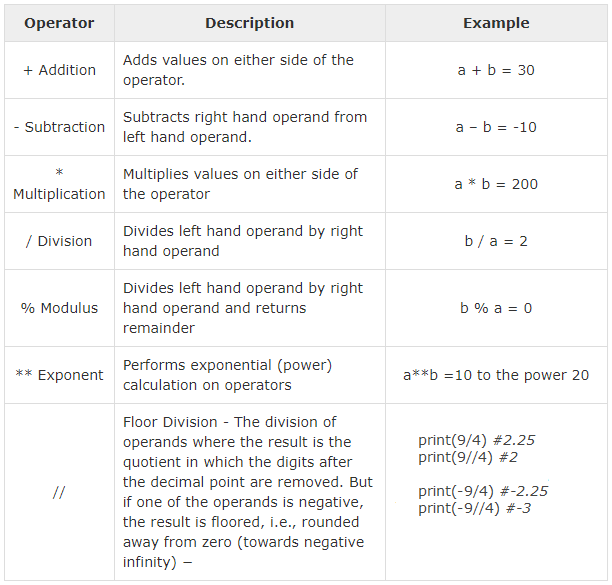
Use design patterns and principals

Use BDD – But this is often not mandatory always

Screen shots on failures - Helps failure investigation easy.

Use dependency management like Maven for Java, Nuget for .net, PIP for Python

**1)  A = 10, 20, 30**  
**In the above assignment operation, what is the data type of ‘A’ that Python appreciates as?**  
  
Unlike other languages, Python appreciates ‘A’ as a tuple. When you print ‘A’, the output is (10,20,30). This type of assignment is called “Tuple Packing”.  
  
**2)  A = 1,2,3,4**  
**a,b,c,d = A**  
**In the above assignment operations, what is the value assigned to the variable ‘d’?**  
  
4 is the value assigned to d.  This type of assignment is called ‘Tuple Unpacking’.  
  
**3) a = 10**  
**b = 20**  
**Swap these two Variables without using the third temporary variable?**  
  
a, b = b, a   
  
This kind of assignment is called a parallel assignment.  
 **4)  What is a Variable in Python?**  
When we say Name = ‘john’ in Python, the name is not storing the value ‘john’. But, ‘Name’ acts like a tag to refer to the object ‘john’. The object has types in Python but variables do not, all variables are just tags. All identifiers are variables in Python. Variables never store any data in Python.  
  
**5)  a = 10**  
**b = a**  
**a = 20**  
**print b**  
**What is the output?**  
Output is 10.  
  
**6) How do you find the type and identification number of an object in Python?**  
type() gives the type of the object that variable is pointing to, and id() give the unique identification number of the object that variable is pointing to. Ex:  
  
print(type(b)) #  
print(id(b)) #1452987584  
  
**7)  a = 0101**  
**b = 2**  
**c = a+b**  
 **What is the Value of c?**  
  
In Python2, any number with leading 0 is interpreted as an octal number. So, variable a points to 65(Equalent in Decimal) then the variable c will be pointing to the value 67 i.e 65+2.In Python3, a=0101  (Doesn’t support syntax)  
 **8) What are the Arithmetic Operators that Python supports?**



**10)  What are the basic Data Types Supported by Python?**  
Numeric Data types: int, long, float, NoneType  
String: str  
Boolean: (True, False)  
NoneType: None  
  
**11) How do you check whether the two variables are pointing to the same object in Python?**  
In Python, we have an operation called ‘is’ operator, which returns true if the two variables are pointing to the same object.  
  
Example:  
a = "Hello world"  
c = a  
print(a is c) #Returns true if the two variables are pointing to the same object  
print(id(a)) #64450416  
print(id(c)) #64450416  
  
**12) What is for-else and while-else in Python?**  
Python provides an interesting way of handling loops by providing a function to write else block in case the loop is not satisfying the condition.  
  
Example :  
  
a = "Hello world"  
c = a  
print(a is c) #Returns true if the two variables are pointing to the same object  
print(id(a)) #64450416  
print(id(c)) #64450416  
  
The same is true with while-else too.  
  
**13) How do you programmatically know the version of Python you are using?**  
The version property under sys module will give the version of Python that we are using.  
import sysprint(sys.version)  
  
**14) How do you find the number of references pointing to a particular object?**  
The getrefcount() function in the sys module gives the number of references pointing to a particular object including its own reference.   
  
import sys  
x = "JohnShekar"  
y = xprint(sys.getrefcount(x))  
  
Here, the object ‘JohnShekar’ is referred by x, y and getrefcount() function itself. So the output is 3.   
  
**15) How do you dispose a variable in Python?**  
‘del’ is the keyword statement used in Python to delete a reference variable to an object.  
  
import sys  
x = "JohnShekar"  
y = xprint(sys.getrefcount(x))  
del xprint(sys.getrefcount(x)) #NameError: name 'x' is not defined  
  
**16) What is the difference between range() and xrange() functions in Python?**  
range() and xrange() are two functions that could be used to iterate a certain number of times in for loops in Python.  
In Python 3, there is no xrange , but the range function behaves like xrange in Python 2.  
If you want to write code that will run on both Python 2 and Python 3, you should use range().  
  
Example:  
# initializing a with range()  
a = range(1, 10000)  
  
# initializing a with xrange()  
x = xrange(1, 10000)  
  
print("The return type of range() is : ")  
print(type(a))  
  
# testing the type of x  
print("The return type of xrange() is : ")  
print(type(x))  
  
**17) What are the ideal naming conventions in Python?**  
All variables and functions follow lowercase and underscore naming convention.  
  
Examples: is\_prime(), test\_var = 10 etc  
  
Constants are all either uppercase or camel case.  
  
Example: MAX\_VAL = 50, PI = 3.14  
  
None, True, False are predefined constants follow camel case, etc.  
  
Class names are also treated as constants and follow camel case.  
  
Example:    UserNames  
  
**18) What happens in the background when you run a Python file?**  
When we run a .py file, it undergoes two phases. In the first phase it checks the syntax and in the second phase it compiles to bytecode (.pyc file is generated) using Python virtual machine, loads the bytecode into memory and runs.  
  
**19) What is a module in Python?**  
A module is a .py file in Python in which variables, functions, and classes can be defined. It can also have a runnable code.  
  
**20) How do you include a module in your Python file?**  
The keyword “import” is used to import a module into the current file.  
  
Example: import sys  #here sys is a predefined Python module.  
  
**21) How do you reload a Python module?**  
There is a function called reload() in Python, which takes module name as an argument and reloads the module.  
  
**22) What is List in Python?**  
The List is one of the built-in data structures in Python. Lists are used to store an ordered collection of items, which can be of different type.  
  
Elements in a list are separated by a comma and enclosed in square brackets.  
  
Examples of List are:  
  
    A = [1,2,3,4]  
    B = [‘a’,’b’,’c’]  
    C = [1,’a’,’2’,’b’]  
  
List in Python is sequence type as it stores ordered collection of objects/items. In Python String and tuple are also sequence types.  
  
**23)  When do you choose a list over a tuple?**  
When there is an immutable ordered list of elements, we choose tuple. Because we cannot add/remove an element from the tuple. On the other hand, we can add elements to a list using append () or extend() or insert(), etc., and delete elements from a list using remove() or pop().  
  
Simple tuples are immutable, and lists are not. Based on these properties one can decide what to choose in their programming context.  
  
**24) How do you get the last value in a list or a tuple?**  
When we pass -1 to the index operator of the list or tuple, it returns the last value. If -2 is passed, it returns the last but one value.  
  
Example:  
  
a = [1,2,3,4] #List  
print(a[-1])#4  
print(a[-2])#3  
b = (1,2,3,4) #Tuple  
  
print(b[-1])#4print(b[-2])#3  
  
**25) What is Index Out Of Range Error?**  
When the value passed to the index operator is greater than the actual size of the tuple or list, Index Out of Range error is thrown by Python.  
  
a = [1,2,3,4] #Listprint(a[5])#IndexError: list index out of range   
  
**26) What is slice notation in Python to access elements in an iterator?**  
In Python, to access more than one element from a list or a tuple we can use ‘:’ operator. Here is the syntax. Say ‘a’ is list  
  
    a[startindex:EndIndex:Step]  
  
Example:  
  
a = [100,200,300,400,500,600,700,800]  
  
print(a[3:]) # Prints the values from index 3 till the end [400, 500, 600, 700, 800]  
print(a[3:6])#Prints the values from index 3 to index 6. [400, 500, 600]  
print(a[2::2])#Prints the values from index 2 till the end of the list with step count 2. [300, 500, 700]  
  
The above operations are valid for a tuple too.  
  
**27) How do you convert a list of integers to a comma separated string?**  
List elements can be turned into a string using join function.  
  
a = [1,2,3,4,5,6,7,8]  
print(a)  
  
numbers = ','.join(str(i) for i in a)  
print(numbers)  
  
**28) What is the difference between Python append () and extend () functions?**  
The extend() function takes an iterable (list or tuple or set) and adds each element of the iterable to the list. Whereas append takes a value and adds to the list as a single object.  
  
Example:  
  
a = [1,2,3,4,5]  
b = [6,7,8]  
a.extend(b)  
print(a)#[1, 2, 3, 4, 5, 6, 7, 8]  
c = ['a','b']  
  
a.append(c)  
print(a) #[1, 2, 3, 4, 5, 6, 7, 8, ['a', 'b']]

**29)  Tell me about a few string operations in Python?**  
Here are the most commonly used text processing methods.  
  
**#Creating strings**  
name = "John" # a string  
mychar = 'S' # a character  
print(name)  
print(mychar)  
  
**#you can also use the following syntax to create strings.**  
name1 = str() # this will create empty string object  
name2 = str("newstring") # string object containing 'newstring'  
print(name1)  
print(name2)  
  
**#====Strings are immutable====**  
str1="welcome"  
str2="welcome"  
  
print(id(str1),id(str2))  #57660416 ,57660416  
  
str2=str2+"to python"  
print(id(str1),id(str2))  #57660416 ,59955200(changed means immutable)  
  
**#==== + and \* with string=====**  
str="welcome"  
print(str+" to Python programming") # welcome to Python programming  
print(str \*3) #welcomewelcomewelcome  
  
**#=======Slicing ==============**  
str="welcome"  
print(str[1:3]) #el  
print(str[:6])#welcom  
print(str[4:])#ome  
print(str[1:-1]) #elcom #elimate 1 char from end  
print(str[1:-2]) #elco  #eleminate 2 chars from end  
  
**#=======String Functions in Python=======**  
print(len("hello")) #5  
print(max("abc")) #c  
print(min("abc")) #a  
  
**#========in  and not in  operators=====**  
s1 = "Welcome"  
print("come" in s1)# True  
print("come" not in s1) #False  
  
**#========Strings comparison=======**  
print("tim" == "tie") #False  
print("free" != "freedom") #True  
print ("arrow" > "aron") #True  
print ("right" >= "left") #True  
print ("teeth" < "tee") #False  
print ("yellow" <= "fellow") #False  
print ("abc" > "") #True  
  
**#======Testing strings===========**  
s = "welcome to python"  
print(s.isalnum()) #False  
print("Welcome".isalpha()) #True  
print("2012".isdigit()) #True  
print("first Number".isidentifier())#False  
print(s.islower()) #True  
print("WELCOME".isupper()) #True  
print(" ".isspace()) #True  
  
**#======Searching for Substrings========**  
s = "welcome to python"  
print(s.endswith("thon")) #True  
print(s.startswith("good")) #False  
print(s.find("come")) #3  
print(s.find("become")) #-1  
print(s.count("o")) #3  
  
**#=========Converting Strings==========**  
s = "String in PYTHON"  
s1 = s.capitalize()  
print(s1) #String in python  
  
s2 = s.title()  
print(s2)#String In Python  
  
s3 = s.lower()  
print(s3) #string in python  
  
s4 = s.upper()  
print(s4) #STRING IN PYTHON  
  
s5 = s.swapcase()  
print(s5) #sTRING IN python  
  
s6 = s.replace("in", "on")  
print(s6) #String on PYTHON  
  
print(s) #String in PYTHON  
  
**30) How do you create a list which is a reverse version on another list in Python?**  
Python provides a function called reversed(), which will return a reversed iterator. Then, one can use a list constructor over it to get a list.  
  
**Example:**  
a =[10,20,30,40,50]  
print(a)  
b = list(reversed(a))#[10, 20, 30, 40, 50]  
print(b) #[50, 40, 30, 20, 10]  
  
**31) What is a dictionary in Python?**  
In Python, dictionaries are kind of hash or maps in another language. Dictionary consists of a key and a value. Keys are unique, and values are accessed using keys. Here are a few examples of creating and accessing dictionaries.  
  
**Examples:**  
  
**######Retrieving, modifying and adding elements in the dictionary########**  
friends = {'tom' : '111-222-333','jerry' : '666-33-111'}  
print(friends) #{'tom': '111-222-333', 'jerry': '666-33-111'}  
  
**#Retrieving elements from the dictionary**  
print(friends['tom']) # 111-222-333  
  
**#Adding elements into the dictionary**  
friends['bob'] = '888-999-666'  
print(friends) #{'tom': '111-222-333', 'jerry': '666-33-111', 'bob': '888-999-666'}  
  
**#Modify elements into the dictionary**  
friends['bob'] = '888-999-777'  
print(friends) #{'tom': '111-222-333', 'jerry': '666-33-111', 'bob': '888-999-777'}  
  
**#Delete element from the dictionary**  
del friends['bob']  
print(friends) #{'tom': '111-222-333', 'jerry': '666-33-111'}  
  
**32) How do you merge one dictionary with the other?**  
Python provides an update() method which can be used to merge one dictionary on another.  
Example:  
a = {'a':1}  
b = {'b':2}  
a.update(b)  
print(a) #{'a': 1, 'b': 2}  
  
**33) How to walk through a list in a sorted order without sorting the actual list?**  
In Python we have function called sorted(), which returns a sorted list without modifying the original list.   
  
**Here is the code:**  
  
a=[500,300,400,200,100]  
print(a)#[500, 300, 400, 200, 100]  
print(sorted(a)) #[100, 200, 300, 400, 500]  
  
**34) names = [‘john’, ‘fan’, ‘sam’, ‘megha’, ‘popoye’, ’tom’, ‘jane’, ‘james’,’tony’]**  
**Write one line of code to get a list of names that start with character ‘j’?**  
**Solution:**  
names = ['john', 'fan', 'sam', 'megha', 'popoye', 'tom', 'jane', 'james', 'tony']  
jnames=[name for name in names if name[0] == 'j']     #One line code to filter names that start with ‘j’  
print(jnames)  
  
**35) What is a set?**  
A Set is an unordered collection of unique objects.  
  
**36) a = “this is a sample string with many characters”**  
**Write a Python code to find how many different characters are present in this string?**  
**Solution:**  
a = "this is a sample string with many characters"  
print(len(set(a))) #16  
  
**37) Name some standard Python errors you know?**  
TypeError: Occurs when the expected type doesn’t match with the given type of a variable.  
ValueError: When an expected value is not given- if you are expecting 4 elements in a list and you gave 2.  
NameError: When trying to access a variable or a function that is not defined.  
IOError: When trying to access a file that does not exist.   
IndexError: Accessing an invalid index of a sequence will throw an IndexError.  
KeyError: When an invalid key is used to access a value in the dictionary.  
  
**38) How Python supports encapsulation with respect to functions?**  
Python supports inner functions. A function defined inside a function is called an inner function, whose behavior is not hidden. This is how Python supports encapsulation with respect to functions.  
  
**39) How do you open an already existing file and add content to it?**  
In Python, open(,) is used to open a file in different modes. The open function returns a handle to the file, using which one can perform read, write and modify operations.  
 **Example:**  
  
    F = open(“simplefile.txt”,”a+”) #Opens the file in append mode  
    F.write(“some content”)    #Appends content to the file.  
    F.close()    # closes the file.  
  
**39) What are the built-in type does python provides?**  
There are mutable and Immutable types of Pythons built in types.   
**Mutable built-in types**  
List  
Sets  
Dictionaries  
**Immutable built-in types**  
Strings  
Tuples  
Numbers  
  
**40) What is module and package in Python?**  
In Python, module is the way to structure program. Each Python program file is a module, which imports other modules like objects and attributes.  
The folder of Python program is a package of modules. A package can have modules or subfolders.  
  
**41) Explain how can you generate random numbers in Python?**  
To generate random numbers in Python, you need to import command as  
import random  
print(random.random())  
This returns a random floating point number in the range [0,1)  
  
**42) How to connect to the Oracle Database using python script?**  
Using cx\_Oracle module.  
  
**Example:**  
  
import os  
import cx\_Oracle  
# Set folder in which Instant Client is installed in system path  
os.environ['PATH'] = 'E:\\app\\OracleHomeUser1\\instantclient\_18\_3'  
# Connect to hr account in Oracle Database 11g Express Edition  
con = cx\_Oracle.connect("hr", "hr", "localhost:1521/pdborcl")  
cur = con.cursor()  
query="select \* from employees"  
cur.execute(query)  
for cols in cur:  
    print(cols[0],"  ",cols[1],"  ",cols[2])  
print("Completed!!!")  
cur.close()  
con.close()  
  
**43) How to connect to the Microsoft Excel and read write data in to excel using python script?**  
 **Reading data from Excel:**  
  
# import openpyxl module  
import openpyxl  
  
# Give the location of the file  
path = "C:\SeleniumPractice\data3.xlsx"  
  
workbook = openpyxl.load\_workbook(path)  
sheet = workbook["Sheet1"]  
  
rows=sheet.max\_row  
cols=sheet.max\_column  
  
print(rows) # print the total number of rows  
print(cols) # ptint total number of column  
  
for r in range(1,rows+1):  
    for c in range(1,cols+1):  
        print(sheet.cell(row=r, column=c).value,end='     ')  
    print()  
  
**Writing  data into Excel:**  
# import openpyxl module  
import openpyxl  
  
# Give the location of the file  
path = "C:\SeleniumPractice\Test2.xlsx"  
  
workbook = openpyxl.load\_workbook(path)  
sheet= workbook.active  
  
for r in range(1,5):  
    for c in range(1,3):  
        sheet.cell(row=r, column=c).value = "abcdef" #(or)sheet.cell(row=r, column=c, value='xyz')  
  
workbook.save(path)  
  
**44) What is the difference between list and tuples?**

|  |  |
| --- | --- |
| **LIST** | **TUPLES** |
| Lists are mutable i.e they can be edited. | Tuples are immutable (tuples are lists which can’t be edited). |
| Lists are slower than tuples. | Tuples are faster than list. |
| Syntax: list\_1 = [10, ‘Chelsea’, 20] | Syntax: tup\_1 = (10, ‘Chelsea’ , 20) |

**45). Explain Inheritance in Python with an example.**  
Inheritance allows One class to gain all the members(say attributes and methods) of another class. Inheritance provides code reusability, makes it easier to create and maintain an application. The class from which we are inheriting is called super-class and the class that is inherited is called a derived / child class.  
  
They are different types of inheritance supported by Python:  
1. Single Inheritance – where a derived class acquires the members of a single super class.  
2. Multi-level inheritance – a derived class d1 in inherited from base class base1, and d2 are inherited from base2.  
3. Hierarchical inheritance – from one base class you can inherit any number of child classes  
4. Multiple inheritance – a derived class is inherited from more than one base class.  
  
**46). How can you randomize the items of a list in place in Python?**  
  
**Consider the example shown below:**  
  
from random import shuffle  
x = ['Keep', 'The', 'Blue', 'Flag', 'Flying', 'High']  
shuffle(x)  
print(x)  
  
**47). Write a sorting algorithm for a numerical dataset in Python.**  
The following code can be used to sort a list in Python:  
  
list = ["1", "4", "0", "6", "9"]  
list = [int(i) for i in list]  
list.sort()  
print (list)  
  
**48) How to print current date &  time?**  
Time module is available.  
  
**Example:**  
  
import time;  
localtime = time.asctime( time.localtime(time.time()) )  
print ("Local current time :", localtime)

[Selenium with Python | Oracle Database Connectivity using cx\_Oracle | Data Driven Testing](https://www.pavantestingtools.com/2019/03/selenium-with-python-oracle-database.html)

About cx\_Oracle

cx\_Oracle is a Python extension module that enables access to Oracle Database. It conforms to the Python database API 2.0 specification with a considerable number of additions and a couple of exclusions.

**Overview**

To use cx\_Oracle 7 with Python and Oracle Database you need:  
  
Python 2.7 or 3.5 and higher. Older versions of cx\_Oracle may work with older versions of Python.  
  
Oracle client libraries. These can be from the free Oracle Instant Client, or those included in Oracle Database if Python is on the same machine as the database. Oracle client libraries versions 18, 12, and 11.2 are supported on Linux, Windows and macOS. Users have also reported success with other platforms.  
  
An Oracle Database. Oracle’s standard client-server version interoperability allows cx\_Oracle to connect to both older and newer databases.

**Quick Start cx\_Oracle Installation**

An installation of Python is needed. Python 2.7 and Python 3.5 and higher are supported by cx\_Oracle 7.

**Install cx\_Oracle from PyPI with:**

python -m pip install cx\_Oracle --upgrade

**Pre-requisites**

**1) Oracle data base**  
 http://www.oracle.com/webfolder/technetwork/tutorials/obe/db/12c/r1/Windows\_DB\_Install\_OBE/Installing\_Oracle\_Db12c\_Windows.html  
 **2) Oracle instant client**  
 https://www.oracle.com/technetwork/topics/winsoft-085727.html  
  
**3) cx\_Oracle though command prompt**  
 Command should execute in command prompt: pip install cx-Oracle  
  
**4) cx\_Oracle in Pycharm**  
 Select project-->File-->Settings-->Project interpreter--> Click on + -->cx\_Oracle-->select-->install package.

**Database operations using Pyhton(cx\_Oracle Module)**

1) Connect to database  
2) How to execute queries(insert, update, delete)  
3) How to select data from database  
4) Data driven testing

**Connect to database**

import cx\_Oracle  
import os  
os.environ['PATH']='E:\\app\\OracleHomeUser1\\instantclient\_18\_3'  
  
#Establish connection to the database  
con=cx\_Oracle.connect("hr","hr","localhost/pdborcl")  
print("Connected!!!")  
con.close()

**How to execute queries(insert, update, delete)**

import cx\_Oracle  
import os  
os.environ['PATH']='E:\\app\\OracleHomeUser1\\instantclient\_18\_3'  
  
#Establish connection to the database  
con=cx\_Oracle.connect("hr","hr","localhost/pdborcl")  
  
cur=con.cursor()  
  
query1="insert into student values(102,'JOHN')"  
query2="update student set sname='XYZ' where sid=102"  
query3="delete student where sid=102"  
  
cur.execute(query3)  
  
cur.close()  
con.commit()  
con.close()  
  
print("Completed!!!")

**How to select data from database**

import cx\_Oracle  
import os  
os.environ['PATH']='E:\\app\\OracleHomeUser1\\instantclient\_18\_3'  
  
#Establish connection to the database  
con=cx\_Oracle.connect("hr","hr","localhost/pdborcl")  
  
cur=con.cursor()  
  
query="select \* From employees"  
  
cur.execute(query)  
  
for cols in cur:  
    print(cols[0],"     ",cols[1],"     ",cols[2])  
  
cur.close()  
con.close()  
  
print("Completed!!!")

**Data Driven testing**

from selenium import webdriver  
import time  
import cx\_Oracle  
import os  
os.environ['PATH']='E:\\app\\OracleHomeUser1\\instantclient\_18\_3'  
  
driver=webdriver.Chrome(executable\_path="C:\Drivers\chromedriver\_win32\chromedriver.exe")  
  
driver.get("http://newtours.demoaut.com/")  
driver.maximize\_window()  
  
#Establish connection to the database  
con=cx\_Oracle.connect("hr","hr","localhost:1521/pdborcl")  
  
cur=con.cursor()  
query="select \* From users"  
cur.execute(query)  
  
for cols in cur:  
    driver.find\_element\_by\_name("userName").send\_keys(cols[0])  
    driver.find\_element\_by\_name("password").send\_keys(cols[1])  
    driver.find\_element\_by\_name("login").click()  
    time.sleep(5)  
  
    # validation started  
    if driver.title == "Find a Flight: Mercury Tours:":  
        print("Test passed")  
    else:  
        print("Test failed")  
    driver.find\_element\_by\_link\_text("Home").click()  
  
cur.close()  
con.close()  
  
print("Data Driven test Completed!!!")

[Software Testing Interview Questions and Answers](https://www.pavantestingtools.com/2018/08/software-testing-interview-questions.html)

**Q1.How do you define Bug and Defect?**

Defect – This is what if software misses any function or feature which are there in requirement list, then this is known as a defect.

Bug – A bug is a flaw or a failure in a system that causes it to yield an unexpected or incorrect result.

**Q2. What are the various categories of defects? Explain.**

There are basically three main categories of defects: Wrong, Missing and Extra.

Wrong: This is when the provided and specified requirements have been implemented incorrectly.

Missing: This is a case where customer’s provided requirement might be missed or not properly noted. So the customer is not served, in the end, with his requirement.

Extra: An extra and unwanted requirement is added into the product that was not even specified by the end customer. It is considered a defect as a variance is there from the existing requirement list.

**Q3. Explain risk-based testing?**

Risk-based Testing – It is an approach used for creating a test strategy. This approach is based on prioritizing the tests by risks by risk level. Each risk is specified with its corresponding test(s), starting with the risk of highest priority first.

**Q4. What is Decision table based testing and when it is used?**

Decision table testing is used for testing those systems for which the specifications takes the form of cause-effect combinations or rules. Here, in the decision tables, all the inputs are listed in a column, and just below the each input, its corresponding output is maintained.

In the remaining table, combinations of various inputs are defined along with their produced outputs.

**Q5. Expand and explain CMM?**

CMM stands for Capability Maturity Model for Software. It is also represented as SW-CMM. It is a model that judges the maturity of the software processes of an organization and identifies the key practices that can be used for increasing the maturity of these processes, for the betterment of the organization.

**Q6. Elaborate PDCA cycle?**

PDCA stands for Plan-Do-Check-Act cycle. As we are aware of the fact that Software testing is a vital part of the software development process. So P-D-C-A are actually the 4 important steps that are used in a normal software development.

Plan: This step defines the objective and a proper plan to achieve the objective.

Do: This step is also called ‘Execute’. During the planning stage, a plan strategy is finalized, which is executed accordingly in this phase.

Check: This step is also called ‘Test’. This one keeps a check on the process and ensure that plan is being followed properly and desired result is being generated.

Act: If in the above check, any issue or abnormality is found, then it means that need of taking appropriate action is there. Sometimes, the whole plan is also revised.

**Q7. How do you differentiate these three testing – white box, black box, gray box?**

Black box testing – It is a testing strategy that is based completely on the specifications and requirements. No knowledge of structures or internal paths is needed here in this strategy.

White box testing – It is a testing strategy that is based on code structures, internal paths and implementation of the software being tested. The White box tester must have detailed programming skills.

Gray Box testing – It is a testing strategy in which we thoroughly look into the box that is being tested to have a proper understanding of its implementation. Then we need to choose more effective black box tests using our knowledge.

**Q8. What are the steps involved in testing policy?**

Mainly four steps are involved in testing policy.

Definition: It’s for defining one unique testing definition within the organization so that everyone follows the same testing only.

How to achieve: This step includes the way to achieve the objective. Few things are being considered here like committee to do the testing, mandatory test plans, etc.

Evaluate: After testing, the next step is evaluating. This adds value to the project.

Standards: In this step, the focus is on the standards that are needed to be achieved by testing.

**Q9. What is Equivalence Class and Equivalence Partitioning?**

Equivalence Class – It is a portion of an input of the component for which the component’s behavior is assumed to be similar as that of the component’s specification.

Equivalence Partitioning – It is a technique for component’s test case designing. Here test cases are designed to execute representatives from the equivalence classes.

**Q10. Define Inspection?**

Inspection is basically a check-up process. It is a quality improvement process for the writing material, considered as a group review.  
Basically two aspects involve under this –product improvement and process improvement.

**Q11. What is Bottom Up Testing?**

Bottom Up Testing is an approach to do the integration testing. Here, firstly, the test is done for the lowest level components, then the higher level components are being facilitated.

**Q12. What RAD stands for? Explain it in your words?**

RAD stands for Rapid Application Development. It is an integration for parallel development of functions & subsequent integration. The functions are developed in parallel and the developments are then time-boxed, delivered, and assembled into the working prototypes.

This helps customers to see the progress at the early level, and thus he can give a quick feedback regarding their requirements. Using this method, rapid alteration and development of the product is possible.

**Q13. What do you understand by usability testing?**

Usability testing – It is a testing methodology for the ease of customers. Here the end customers are asked to use the software to evaluate if the product is up to the mark and is easy to use. This puts forth the customer’s perception too. It is recommended to use the prototype or mock-up software during the initial stages so as to finalize the customer point of view of usability. The customer is provided with this prototype before the development begins. This helps in confirming that things are being processed keeping user’s point of view in mind.

**Q14. Is there any difference between testing tools and testing techniques? Explain?**

Yes, the difference is there.

Testing Tool – It is for performing the test process. This testing tool is a resource to the tester, but it is insufficient to conduct testing.

Testing technique – It is a process for ensuring that some aspects of the application unit or system are functioning properly.

**Q15. What are the different Agile Development Model methodologies?**

Total 7 different agile methodologies are there.

Extreme Programming (XP)

Agile Unified Process

Crystal

Dynamic Systems Development Model

Lean Software Development

Scrum

Feature-Driven Development

**Q16. What is QA (Quality Assurance)?**

Under Quality Assurance, all the planned actions that are necessary to provide enough confidence about the product are kept in mind. It maintains the desired quality level of the product or service.

**Q17. Define Quality Circle and Quality Control?**

Quality Circle – It is actually a group of individuals, all having a similar interest. They meet at regular intervals to discuss consider problems related to the quality of outputs and to discuss about correcting the problems so as to improve on the quality of the product.

Quality Control – It includes the operational activities and the techniques that are used for verifying the requirements of quality.

Q18. In which phase, number of defects are more – designing phase or coding phase?

It will be more in the designing phase than the coding phase.

One of the major and most frequently occurring defect is that the product does not cover the complete customer requirements.  
Another defect can be a wrong architecture.

Third one is technical decision.

This way, the design phase is the most critical phase.

**Q19. Which testing model is best as per your understanding, and why?**

Tailored models are considered the best out of all as they consist of all the best features of the Waterfall, Iterative, and other testing models. The tailored model can easily fit into the real life projects. They are also considered the most productive.  
But if the case is that it’s a pure testing project, then in such case, the V model is the best model.

**Q20. What do you mean by monkey testing?**

Monkey Testing – In this type of testing, the data ares often generated on random basis using an automated mechanism or some tool. The system is tested with this randomly generated input data. But this testing is less reliable, so it is generally used by the beginners. Monkey testing is also called Random testing.

**Q21. What are the main phases or steps of a formal review?**

There are basically 6 phases involved in a formal review. They are cited below in a sequence:

Planning

Kick-off

Preparation

Review meetings

Rework

Follow-ups.

**Q22. Differentiate between positive and negative testing?**

Positive testing – This testing aims at showing software works. This is also called – “test to pass”.

Negative testing – This testing aims at showing software that does not work. This one is also called – “test to fail”.

**Q23. What is configuration management?**

Configuration management – It is a detailed recording and also updating information for software and hardware components. A track record of changes in requirement, designing or test cases is also maintained under this.

It is always said to follow a process while executing and changing. But when the changes are being done in an adhoc manner, then the chances of occurring of chaotic situations rise up and also chances of defects also increases.

Therefore, changes should be done with proper planning and in a controlled manner. Also tracking of proper version should be done so that in case if needed, we should be able to revert back to the previous version.

**Q24. What role does the moderator plays in review process?**

The moderator is also called as the review leader. Their role is to lead the review process. The review leader performs the entry check, and also performs the follow-up on the rework. All this is done to control the quality of the input & output of the review process.

Another role of a moderator is to schedule the meetings, circulate the documents before the meeting, and to store the data that are being collected through these meetings and discussions.

**Q25. What are the types of impact ratings in a project?**

There are three types of impact ratings in a project – Minor, Major and Critical.

Minor: It is having a very low impact, thus it does not affect the operations on a large scale.

Major: It actually affects the operations on a very large scale.

Critical: This one is the most critical of all. It brings the system to a halt and thus stops the whole show.

**Q26. Define Quality Audit?**

Quality Audit – It is a systematic examination to determine whether all is going as planned, i.e. whether the goal and plans are strictly followed. It is an independent examination.

**Q27. What is Verification, and what are its two types?**

Verification – It is defined as the static type of software. The product is assessed by going through the code.  
Code is not executed under this step. Types of verification are: Walkthrough and Inspection.

Walkthrough: These are informal. These are initiated by the author of the software product so as to locate the max possible defects and thus work in suggesting the correcting and improving way.Walkthoughs are generally unplanned.

Inspection: It is a thorough checking of a software product word-by-word. The intention is locating the defects, and confirming the best implementation of the planned strategy as per the specified requirements.

**Q28. At what time, Regression Testing should be performed?**

Regression testing should be done only after either the software has changed or the environment. The changes may also include configuration change and software enhancements too.

**Q29. Explain the following testings : – Unit Testing, Integration Testing, System Testing & Acceptance Testing?**

Unit testing – Testing that is performed on a single and a stand-alone module (or unit module) is called Unit testing.

Integration testing – This comes after Unit testing. It is a testing is performed on groups of modules. This testing ensures that the data and control are properly passed between modules.

System testing – System testing is for predetermined combining of tests. When these are executed successfully, requirements should meet.

Acceptance testing – This testing ensures that the system meets the needs of both the customer(s) as well as the organization too. It validates whether the right system is built.

**Q30. Define test log?**

Test log – It is a document that contains the sequential record of the relevant details about the test cases and their execution.

**Q31. Throw some light on BVA?**

BVA’s expansion is Boundary Value Analysis. It is a software testing technique. This one is quite similar to Equivalence Partitioning, except of the fact that it is putting more focus on corner cases. By corner cases, we mean the out of range values.

**Q32. Define Test bed?**

Test Bed – It is basically a test execution environment that is configured for testing. It consists of Operating System, specific software and hardware, application software, network configuration and the product that is needed to be tested.

**Q33. Tell the five common problems that come in the path of software development process?**

Unclear or poor requirements

Unfeasible working schedule

Insufficient testing

Lack of communication between developer and customer

Change in requirements from the end user, when the development is already done or in midway.

**Q34. What is your definition of a ‘good design’?**

It should include the following features as per my knowledge:

The overall structure should be clear.

Robustness – capable enough for handling the errors.

Proper functioning of product or service.

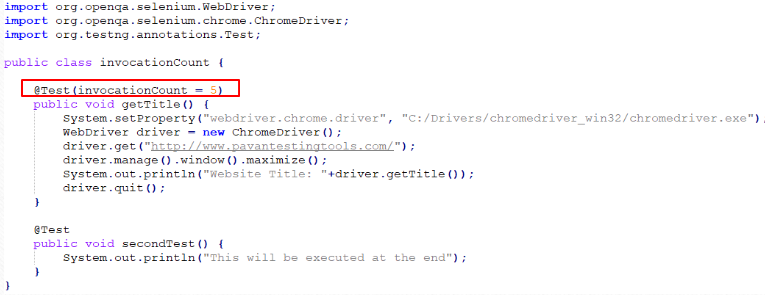
Easy maintenance.

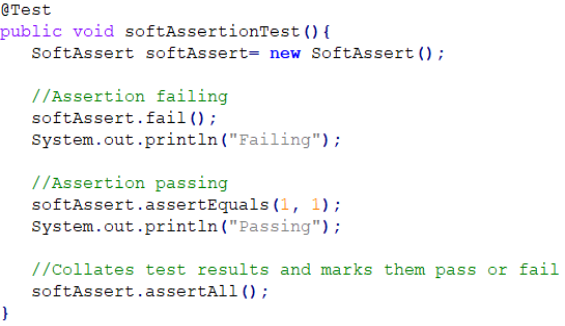
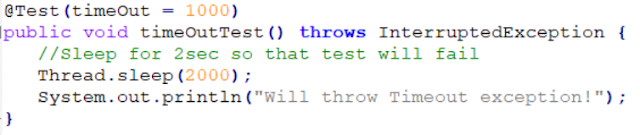
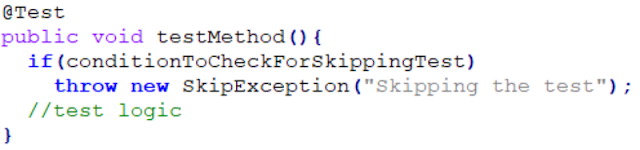
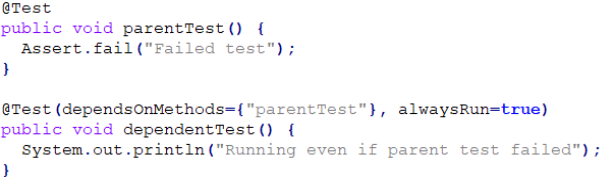
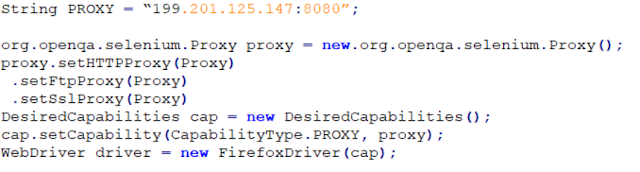
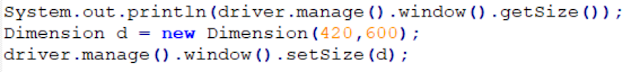
Easy to operate and to modify too (in case of new requirements from customer’s end).

**Q35. How can we test for drastic (severe) memory leakages?**

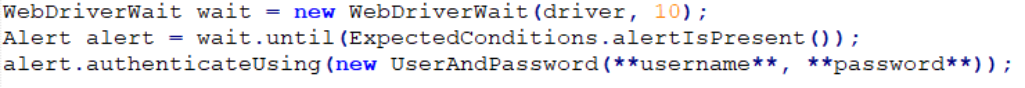
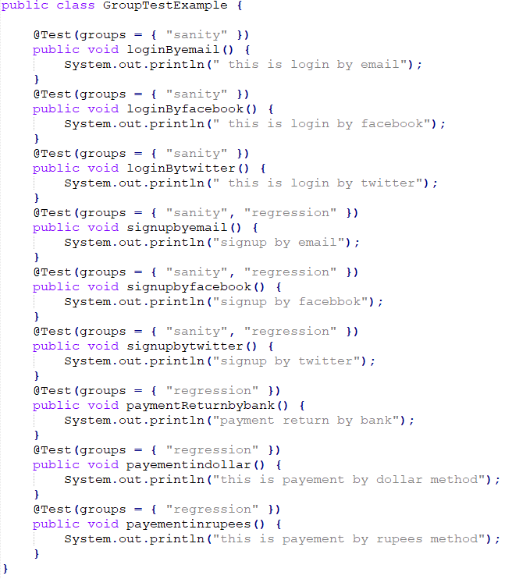
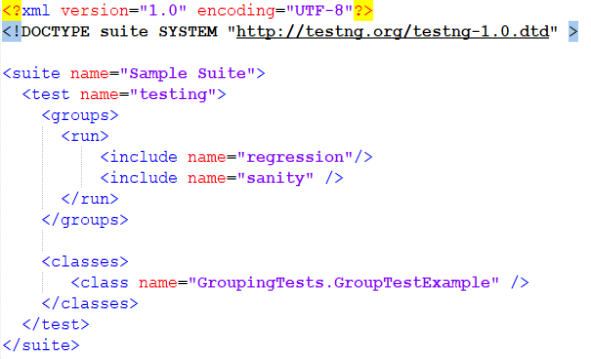
By using Endurance testing, we can achieve it. Endurance testing is a non-functional type of software testing. It checks for the memory leakage or other related problems that may occur over an extended period of time. Another name for this testing is Soak testing.

*Ques.101. How can we run a Test method multiple times in a loop(without using any data provider)?*  
Ans. Using invocationCount parameter and setting its value to an integer value, makes the test method to run n number of times in a loop.

[](https://4.bp.blogspot.com/-onesatuMaT4/XEbgs-HA0SI/AAAAAAAAPhs/hd3G11jMgAs-_-DxMRUitGaAvA7GfS4HACEwYBhgL/s1600/Untitled.png)

*Ques.102. What is the default priority of test cases in TestNG?*  
Ans. The default priority of test when not specified is integer value 0. So, if we have one test case with priority 1 and one without any priority then the test without any priority value will get executed first (as default value will be 0 and tests with lower priority are executed first).  
*Ques.103. What is the difference between soft assertion and hard assertion in TestNG?*  
Ans. Soft assertions (SoftAssert) allows us to have multiple assertions within a test method, even when an assertion fails the test method continues with the remaining test execution.  
The result of all the assertions can be collated at the end using softAssert.assertAll() method.  
Here, even though the first assertion fails still the test will continue with execution and print the message below the second assertion.  
Hard assertions on the other hand are the usual assertions prodived by TestNG. In case of hard assertion in case of any failure, the test execution stops, preventing execution of any further steps within the test method.  
  
[](https://4.bp.blogspot.com/-_2lsH_RbITw/XEbiEbvZYfI/AAAAAAAAPh0/o908sW2DLc884XRRG07O1I9jefuk_Ui6ACLcBGAs/s1600/Picture2.png)  
  
*Ques.104. How to fail a testNG test if it doesn't get executed within a specified time?*  
Ans. We can use timeOut attribute of @Test annotation.  
The value assigned to this timeOut attribute will act as an upperbound, if test doesn't get executed within this time frame then it will fail with timeOut exception.  
  
[](https://3.bp.blogspot.com/-nebl2w8rVUQ/XEbiPvdHAuI/AAAAAAAAPh4/a62UeZS09_oWLXTSy3wq7Fi8wYEedN_LgCLcBGAs/s1600/Picture3.png)  
  
*Ques.105. How can we skip a test case conditionally?*  
Ans. Using SkipException, we can conditionally skip a test case. On throwing the skipException, the test method  marked as skipped in the test execution report and any statement after throwing the exception will not get executed.  
  
[](https://1.bp.blogspot.com/-FQzndrp6WhI/XEbifr7bDOI/AAAAAAAAPiE/zCSD9hc2jZYegAbtRkz1D1mJjDDdK8EFACLcBGAs/s1600/Picture4.png)  
  
*Ques.106. How can we make sure a test method runs even if the test methods or groups on which it depends fail or get skipped?*  
Ans. Using "alwaysRun" attribute of @Test annotation, we can make sure the test method will run even if the test methods or groups on which it depends fail or get skipped.  
Here, even though the parentTest failed, the dependentTest will not get skipped instead it will executed because of "alwaysRun=true". In case, we remove the "alwaysRun=true" attribute from @Test then the report will show one failure and one skipped test, without trying to run the dependentTest method.  
  
[](https://3.bp.blogspot.com/-jrVFU0S9XT8/XEbkhN6WFII/AAAAAAAAPiQ/v4UNagQnusEMEwY6x8OSI0ZDxU6NxdXjgCLcBGAs/s1600/Picture5.png)  
  
*Ques.107. Why and how will you use an Excel Sheet in your project?*  
The reason we use Excel sheets is because it can be used as data source for tests. An excel sheet can also be used to store the data set while performing DataDriven Testing.  
*Ques.108. How can you redirect browsing from a browser through some proxy?*  
Selenium provides a PROXY class to redirect browsing from a proxy. Look at the example below:  
  
[](https://4.bp.blogspot.com/-1B4xDDo0YDA/XEbkzeWXbkI/AAAAAAAAPiY/hc8YNL0C_18s5VQcQ768lZGm6ryB5vwwQCLcBGAs/s1600/Picture6.png)  
  
*Ques.109. How to scroll down a page using JavaScript in Selenium?*  
We can scroll down a page by using window.scrollBy() function.  
Example:  
((JavascriptExecutor) driver).executeScript("window.scrollBy(0,500)")  
*Ques.110. How to scroll down to a particular element?*  
To scroll down to a particular element on a web page, we can use the function scrollIntoView().  
Example:  
((JavascriptExecutor) driver).executeScript("arguments[0].scrollIntoView();", element);  
   
*Ques.111. How to set the size of browser window using Selenium?*  
To maximize the size of browser window, you can use the following piece of code:driver.manage().window().maximize(); – To maximize the window  
To resize the current window to a particular dimension, you can use the setSize() method.  
  
[](https://2.bp.blogspot.com/-ua94NRHXZoU/XEblBhrQ5OI/AAAAAAAAPic/3VwdOB451P0NJpCHtASwXD4CedCHlcb5QCLcBGAs/s1600/Picture7.png)  
  
*Ques.112. Can we enter text without using sendKeys()?*  
Yes. We can enter/ send text without using sendKeys() method. We can do it using JavaScriptExecutor.

[https://3.bp.blogspot.com/-deTOHSsRxnM/XEblOUF73gI/AAAAAAAAPis/E4dd_YIbaEkEDgHkrYbdfhoCg69fprmXgCEwYBhgL/s1600/Picture8.png](https://3.bp.blogspot.com/-deTOHSsRxnM/XEblOUF73gI/AAAAAAAAPis/E4dd_YIbaEkEDgHkrYbdfhoCg69fprmXgCEwYBhgL/s1600/Picture8.png)

*Ques.113. Explain how you will login into any site if it is showing any authentication popup for username and password?*  
Since there will be popup for logging in, we need to use the explicit command and verify if the alert is actually present. Only if the alert is present, we need to pass the username and password credentials.  
The sample code:  
  
[](https://3.bp.blogspot.com/-URCxr3HeiC8/XEbl3NPNPLI/AAAAAAAAPiw/FDs2ON-sH-A8N2kQrdwevWc7VUKL4ZefgCLcBGAs/s1600/Picture9.png)  
*Ques.114. Explain what is Group Test in TestNG?*  
In TestNG, methods can be categorized into groups. When a particular group is being executed, all the methods in that group will be executed.  We can execute a group by parameterizing it’s name in group attribute of @Test annotation. Example: @Test(groups={“xxx”})  
  
[](https://3.bp.blogspot.com/-lsobEI5_jOY/XEbmWTK_zRI/AAAAAAAAPi4/WCm8l8csTTglZ6_jhi2KWxEqqNVaiS-1wCLcBGAs/s1600/Picture10.png)  
[](https://3.bp.blogspot.com/-muGvVbNOXzQ/XEbmkrUSEOI/AAAAAAAAPi8/IXLB2u4UP04vyJ41aiiyWgLh18FRRCNOQCLcBGAs/s1600/Picture11.png)  
  
*Ques.115. How To Run Failed Test Cases Using TestNG In Selenium WebDriver*  
By using “testng-failed.xml”  
 *Ques.116. What is Stale Element Exception? How to handle it?*  
Stale means old, decayed, no longer fresh.  
Stale Element means an old element or no longer available element.  
Assume there is an element that is found on a web page referenced as a WebElement in WebDriver. If the DOM changes then the WebElement goes stale. If we try to interact with an element which is staled then the StaleElementReferenceException is thrown.  
When this happens you will need to refresh your reference, or find the element again.  
  
*Ques.117. What are different XPath functions that you have used in your Project?*  
Contains()  
Using OR & AND  
Start-with() function  
Text()  
  
*Ques.118. What will happen in background when execute new FirefoxDriver() ?*  
Firefox binary will be triggered and Fiefox browser will open with default options.  
FirefoxDriver object is created  
  
*Ques.119. What is the below statement means and Why?WebDriver driver = new FirefoxDriver();*  
WebDriver is an interface which contain several abstract methods such as get(...), findElamentBy(...) etc.  
We simply create reference of web Driver and we can assign objects (Firefox driver, ChromeDriver, IEDriver, Andriod driver etc) to it.  
  
*Ques.120. How do you handle inner Frames and Adjacent Frames?*  
 SwitchTo frame1, SwitchTo frame2 (inner frame) work on the element and switchto default content  
Use SwitchTo frame to move the control inside frame.  
*Ques.121. How to click on an element which is not visible using selenium WebDriver?*  
We can use JavascriptExecutor to click.  
  
WebElement element = driver.findElement(By.id("gbqfd"));  
JavascriptExecutor executor = (JavascriptExecutor)driver;  
executor.executeScript("arguments[0].click();", element);   
  
  
*Ques.122. Difference between verify and assert?*  
Assert: Assert command checks if the given condition is true or false. If the condition is true, the program control will execute the next phase of testing, and if the condition is false, execution will stop and nothing will be executed.  
Verify: Verify command also checks if the given condition is true or false. It doesn't halts program execution i.e. any failure during verification would not stop the execution and all the test phases would be executed.  
  
**Ques.123. What is the use of @FindBy annotation?**  
@FindBy is used to identify element in the Page Factory approach.  
  
**Ques.124. Do you use Thread.sleep?**  
Rarely  
 **Ques.125. What are different pop-ups that you have handle in your projects?**  
JavaScript Pop  
Alert alert = driver.switchTo().alert();  
Browser Pop Ups  
Browser Profiles, Robot Class, AutoIT, Sikuli  
Native OS Pop Ups  
Browser Profiles, Robot Class, AutoIT, Sikuli

[How to Success in Job Interview](https://www.pavantestingtools.com/2018/06/how-to-success-in-job-interview.html)

**How to Success in Job Interview**

Formula:  
O = P x E x A

Where  
O = Output  
P = Potential (Talent + Education + Miscellaneous)  
E = Effort  
A = Attitude

Theories:  
• Effort and Attitude are at least as important as Potential.   
• A resume can readily tell you Potential; but the interview is a crucial indicator of Effort and Attitude; be sure you’re using the interview to look for the right human characteristics.

**Standard:**

1. Tell me about yourself, your work history and your education. Pleasant opener.Look for consistency with resume.

2. What do you perceive the plusses and minuses of your current job/position to be? Has the person analyzed their current situation thoroughly, or are they just running from a problem?

3. Give Positive Points about yourself.Blowhard lower, happy fishing…

4. Where do you see yourself in five years? WHY? Is the interviewee capable of strategic (long term) thinking? Coming up with the ‘where’ answer is step 1; but a good interviewee will also be able to tell you why.

5. What reasons do you have for wanting this job/position?

6. What do you perceive the plusses and minuses of our company, and of this job/position offer to be?Did the candidate do his/her homework in thinking through the job switch and perform adequate company research?

7. If you were to obtain this job, in what areas could you contribute immediately? Where would you need additional training? Important to gauge skillset.

8. What are you looking for in an employer? A bad response would be: “same as just stated in previous Question.”

9. Describe a time when you dealt with rapid changes.

10. What do you like about your present job, or what motivates you?

11. How do you organize your workload and why? Look for ability to prioritize.

12. What is your management style?

13. What type of management do you prefer?

14. What would be the perfect job description for you?

**Reasoning:**

1. How would you test a toaster? Look for coverage of all functional parts, matrix-based approach.

2. What is software? What is bad software? What is good software?

3. Why are manhole covers round? So they don’t fall through and injure someone like other shapes would do.

**Tough Questions:**

1. Identify at least two things that cause you stress and indicate how do you deal with them. Just a fishing question.

2. Do you consistently take pride in your work and demonstrate unwavering commitment to quality? If so, name two of your biggest accomplishments (tasks, or projects) that you completed at your last job and of which you are proudest.Did they bring samples to the interview (truly outstanding candidates will always possess a portfolio of their best work). Did they do the work, or some nebulous team of which they were but a small cog?

3. What disappointments did you have in your previous job? Why are you considering leaving? Don’t let them off easy—the fact that they even consider leaving means that at least some aspect can be improved. Force an honest answer to be made, hence the pause to return later.

4. What kind of people do you find difficult to work with? Give me a real life example. Use the opener to distract them, then right after they’re done, fire off the second question to really stress test the candidate…

5. Do you have any questions for me? They’d darned well better have prepared some questions for you.

6. Describe your last mistake. What was the situation and what did you do to rectify the problem?

7. Do other people consider you to be a true professional, good at what you do? If so, how.

8. Why do you do what you do? Leave it vague, measure response time and depth.

9. What characteristics would you like to change in yourself?What was the most useful criticism or feedback you received in your previous job/position? Ask the first question, then follow-up with the second killer to see if they were being honest. Press the second question hard.

10. Do you seek and request additional responsibility? Give me an example from your last job. A simple yes with no example is B.S. A no is a bad answer. A it depends… is a good answer.

[QA Interview Questions and Answers Part - 1](https://www.pavantestingtools.com/2018/06/qa-interview-questions-and-answers-part.html)

**1.Can you tell me about yourself?**

**Answer:** In my QA career, I have been working on various system platforms and operating systems like Windows 95, Windows 2000, Windows XP and UNIX. I have tested applications developed in Java, C++, Visual Basic and so on. I have tested Web-based applications as well as client server applications.

As a QA person, I have written Test Plans, Test Cases, attended walkthrough meetings with the Business Analysts, Project Managers, Business Managers and QA Leads. I have attended requirement review meetings and provided feedback to the Business Analysts. I have worked in different databases like Oracle and DB2, wrote SQL queries to retrieve data from the database. As far as different types of testing is concerned, I have performed Smoke Testing, Functional Testing, Backend Testing, Black Box Testing, Integration Testing, Regression Testing and UAT (User Acceptance Testing) Testing. I have participated in Load Testing and Stress Testing.

I have written defects as they are found using ClearQuest and TestDirector. Once the defects were fixed, retested them and if the passed, closed them. If the defects were not fixed, then reopened them. I have also attended the defect assessment meetings as necessary.In the meantime, a continuous interaction with developers was necessary.This is pretty much what I have been doing as a QA person.

**2. What did you do in your last project?**

**Answer:** In my last project, the application was a web-based application developed in Java platform. As a QA Person, I wrote Test Plans from the requirement documents and Use Cases. I performed Smoke Testing, Functional Testing, Backend Testing, Black Box Testing, Integration Testing, Regression Testing and UAT (User Acceptance Testing). I have participated in Load Testing and Stress Testing. I attended several walkthrough meetings for requirement reviews and provided feedback to the Business Analysts. Mostly, I was in the backend testing, which required writing SQL queries directly to the database.

Besides these, I wrote defects using ClearQuest. Once the defects were fixed, retested them and if the passed, closed them. If the defects were not fixed, then reopened them.

**3. Have you written Test Plan? What is a Test Plan? What does it include?**

**Answer:** Yes.

**What is a Test Plan?**

**Answer:** A Test Plan is a document that describes the scope, approach, resources, and schedule of intended testing activities. It identifies test items, the features to be tested, the testing tasks and who will do each task (roles and responsibilities) and any risks and its solutions.

**What does it include?**

**Answer:** A Test Plan includes Heading, Revision History, Table of Contents, Introduction, Scope, Approach, Overview, different types of testing that will be carried out, what software and hardware will be required, issues, risks, assumptions and sign off section.

**4. Have you written Test Cases?**

**Answer:** Yes.

**What is a Test Case? What does it include?**

**Answer:** A Test Case is a document that describes step-by-step process how to test the application. A Test Case includes Test Case ID, Steps Description, Expected Output, Actual Output, Pass/Fail, and Remarks. (Remember, this is NOT a part of Test Plan. It is a separate document written using Excel. In some companies, they use Rational TestManager or TestDirector. But for companies, who do not have these tools, use Excel sheet. In t he example below, it is in the Excel sheet)

**Did you use any tools to write Test Cases?**

**Answer:** Yes. I have used TestDirector (now called QualityCenter) and Rational TestManager to write Test Cases. However, in most of the companies, I used Excel sheet.

**How many Test Cases did you write in your last project?**

**Answer:** I wrote about 1100 Test Cases in my last project. (The reasonable number of Test Cases varies from 500 to thousands. The number 1100 test cases can be completed in 6-month project duration).

**What document did you refer to write the Test Cases?**

**Answer:** Requirement document. (NOTE: It can also be Use Cases, or Design Document. It depends company to company. In some company, they use Use Cases. In some companies, they use Requirement Documents and in companies, they use Design Document. However, in practical scenario, most of the companies have requirement document at least).

**5. Did you have a situation where you did not have any documents (no requirement document, no Use Cases, or no Design Document) and you had to write the Test Cases? How did you write the Test Cases in this situation?**

**Answer:** Yes. I have been to that kind of scenarios several times. There were companies where they had no documents at all. In that case, I had to discuss the application scenario and functionalities with the Business Analysts or developer. On the basis of that discussion, I prepared a document in consultation with Business Analysts and Developers and then started writing Plans and Test Cases.

**6. What you worked with Use Cases before?**

**Answer:** Yes. I have written Test Cases using Use Cases.

**Can you tell me what a Use Case is?**

**Answer:** A use case is a document that describes the user action and system response for a particular functionality.

**7. What is SDLC (Software Development Life Cycle)?**

**Answer:** SDLC (Software Development Life Cycle) is the process of developing software through business needs, analysis, design, implementation and maintenance. Software has to go through various phases before it is born which are as follows:

(i)Generating a Concept – A concept comes from the users of the software. For example, a Pizza Hut may need software to sell pizza. An Indian store may need software to sell its newly arrived movies or grocery. The owner of the company feels that he needs software that would help him in tracking his expenses and income as well as enhance the selling process. This is how the concept is generated. The owner will specifically tell the software company what kind of software he would need. In other words, he will specify his requirements.

(ii) Requirements analysis – After the owner (user) knows his requirements, then it is given to a software team (company) who will analyze the requirement and prepare requirement document that will explain every functionality that are needed by the owner. The requirement document will be the main document for developers, testers and database administrators. In other words, this is the main document that will be referred by everyone. After the requirement documents, other detailed documents many be needed. For example, the architectural design which is a blueprint for the design with the necessary specifications for the hardware, software, people and data resources.

(iii) Development: After the detailed requirement documents (some companies have design documents instead of requirement documents), the developers start writing their code (program) for their modules. On the other hand, the testers in the QA (Quality Assurance) Department start writing Test Plans (one module=1 test plan), test cases and get ready for testing.

(iv) Testing: Once the code (programs) are ready, they are compiled together and to make a build. This build is now tested by the software testers (QA Testers)

(v) Production: After testing, the application (software) goes into production (meaning, it will be handed over to the owner).

(vi) End: And one day, the owner will have say bye to the software either because the business grows and this software does not meet the demand or for some reason, the he does not need the software. That’s the end of it.

**8. What is Business Requirement Document (BRD)?**

**Answer:** It is a document that describes the details of the application functionalities which is required by the user. This document is written by the Business Analysts.

**9. What is Business Design Document?**

**Answer:** It is the document that describes the application functionalities of the user in detail. This document has the further details of the Business Requirement Document. This is a very crucial step in Software Development Life Cycle (SDLC). Sometimes the Business Requirement Document and Business Design Document can be lumped together to make only one Business Requirement Document.

**10. What is a Module?**

**Answer:** A ‘Module’ is a software component that has a specific task. It can be a ‘link’, which can go inside to its component detail. (This is NOT a very common question for the interview. This is just for your knowledge, if you don’t know what a module is.)

**11. What is walk-through meeting?**

**Answer:** Once the Business Analysts complete the requirement document, they call a meeting to explain how the functionalities work, what the process is in the designed application and other details. The Business Analysts explain the high level functionalities of the application (software) that is going to the built. The participant members in the meeting may provide feedback and various point of views are expressed. This is walk-through meeting.

**12. What is a Use Case and what does it include?**

**Answer:** A Use Case is a document that describes the user action and system response for a particular functionality. It includes cover page, Revision History, Table of Contents, Flow of Events (normal flow and alternative flow), Exceptions, Special Requirements, Pre-conditions and Post-conditions.

**13. What is Build?**

**Answer:** When each of the different modules of software is prepared, the Configuration Management Team (CMT) puts them in a single folder and it is called the ‘Build’. . (This is NOT a very common question for the interview. This is just for your knowledge, if you don’t know what a build is.)

**14. What does the Build Deployment mean?**

**Answer:** When the Build so prepared by the CMT (Configuration Management Team), it is deployed (put) to different Test Environments, it is called the Build Deployment.

**15. What is Test Strategy?**

**Answer:** A Test Strategy is a document that describes the test efforts, test configuration, testing tools to be employed, test environments, exit criteria and entry criteria for testing, what different types of testing will be carried out (for example, smoke test, regression, load test, functional test and so on) types of testing to be carried out and system requirement. The Test Manager or Lead writes it. (Remember, the Tester does NOT write Test Strategy. A Tester writes Test Plans and Test Cases)

[QA Interview Questions and Answers Part - 2](https://www.pavantestingtools.com/2018/06/qa-interview-questions-and-answers-part_1.html)

**1. Are Test Plan and Test Strategy same type of documents?**

**Answer:** No, they are different documents. A Test Plan is a document that collects and organizes test cases by functional areas and/or types of testing in a form that can be presented to the other teams and/or customer (see the definition on this page for Test Plan) where as the Test Strategy (see the definition in the above question) is the documented approach to testing. The tester prepares test Plan whereas the Manager or lead prepares the Test Strategy. Both are important pieces of Quality Assurance processes since they help communicate the test approach scope and ensure test coverage while improving the efficiency of the testing effort.

**2. What does Test Strategy include?**

**Answer:** It includes introduction, Test Objectives, Test Process, Test Methodology, Test Scope, Release Criteria for Testing (exit criteria), Test Lab configuration, resource and schedule for test activities, acceptance criteria, test environment, test tools, test priorities, test planning, executing a test pass and types of test to be performed.

**3. What are different types of software testing and define them?**

**Answer:** Different types of testing are:

1) Unit testing

2) Shakeout testing

3) Smoke testing (Ad-hoc testing)

4) Functional testing

5) Integration testing

6) Regression testing

7) System testing

8) Load testing

9) Stress testing

10) Performance testing

11) User acceptance testing

12) Black box testing

13) White box testing

14) Alpha testing

15) Beta testing

(Note: Except the Shakeout testing and Unit testing (which are respectively done by the CMT (Configuration Management Team) and Coder/Developer), all other testing are done by the QA tester.)

What is Unit testing? It is a test to check the code whether it is properly working or not as per the requirement.

**What is Shakeout testing?**

This test is basically carried out to check the networking facility, database connectivity and the integration of modules. The Configuration Management team, who prepare builds for test environments, normally does this test. They also test whether the major components of the software are not broken. This test is done BEFORE the build is deployed in the test environment. After the shakeout testing, the next step is smoke testing (which is done by the testers after the build is deployed in the test environment)

**What is smoke testing?**

This test is done when the build is just prepared (fresh build) and deployed in the test environments. This is basically an ad hoc test to check roughly to make sure the major functionalities are not broken. It is the preliminary a test carried out by the QA tester. After the smoke test, the testers perform functional testing.

**What is Functional testing?**

It is a test to check whether each and every function of that application is working as per the requirement (remember this work “as per requirement document”-you must say this in the interview). It is a major test where 80% of the tests are done. In this test, the Test Cases are executed (or run).

**What is Integration testing?**

It is a test to check whether all the modules are combined together or not and working successfully as specified in the requirement document. (Just for your information: Each developer works on different modules. When they finish their code, the configuration management team puts them together and prepares a build. We, as testers, need to make sure that these modules, which are now combined, work as per requirement document)

**What is Regression testing?**

When a new functionality is added to the software, we need to make sure that the added new functionality does not break the other parts of the application. Or when defects (bugs) are fixed, we need to make sure that the bug fix has not broken the other parts of the application. To test this, we perform a repetitive test, which is called regression test.

**What is System testing?**

When testers complete testing (The testers test the application in the test environments, meaning they test with the test data only, NOT with the real data), the application (software) has to be tested in the real environment. What it means is, since the testers test it in the test environment with the test data, we have to make sure that the application works well in the real environment with the real data. In test environment, some of the things cannot be simulated or tested. Al though the test environment is very similar to the production (real) environment, we need to make sure that we get a smooth delivery in the real system as well (As servers are different and database is different, things may not work as expected when the application is moved from test environment to production environment)

**What is Load testing?**

It is a test to check the user’s response time for number of users using any one scenario (single business process) of the same application at the same time.

**What is Performance testing?**

It is a test to check the user’s response time for number of users using multiple scenarios (multiple business process) of the same application at the same time.

(Did you notice the difference between Load Testing and Performance testing? What is it? See the highlighted bold letters)

**What is Stress testing?**

In this type of testing the application is tested against heavy load such as complex numerical values, large number of inputs, large number of queries etc. which checks for the stress/load the applications can withstand.

**What is User acceptance testing (UAT)?**

In this type of testing, the software is handed over to the user in order to find out if the software meets the user expectations and works as it is expected to. In this testing, the tester may do the testing or the clients may have their own testers (For example, banks may have their own teller employees who can test the application).

**What is Black box testing?**

It is test where a tester performs testing without looking into the code. (OR it is a testing method where the application under test is viewed as a black box and the internal behavior of the program is completely ignored. Testing occurs based upon the external specifications. Also known as behavioral testing, since only the external behavior of the program is evaluated and analyzed.)

**What is White box testing?**

It is a test where a tester looks into the code and performs the testing.

**What is Alpha testing?**

In this type of testing, the users are invited at the development center where they use the application and the developers note every particular input or action carried out by the user. Any type of abnormal behavior of the system is noted and rectified by the developers.

**What is Beta testing?**

In this type of testing, the software is distributed as a beta version to the users and users test the application at their sites. As the users explore the software, in case if any exception/defect occurs that is reported to the developers.

**4.** **What is the difference between Load Testing and Performance Testing?**

**Answer:** Basically Load, Stress and Performance Testing are the same. However, Load testing is the test to check the users’ response time of number of users of any one scenario of the application whereas Performance Testing is the test to check the user response time for multiple scenario of the same application.

**5. What was the process of QA testing in your company where you worked for the last time? (Or As far as the QA process is involved, what was the testing process in your company?)**

**Answer:** The QA testing process that was followed in my last company where I worked was as follows:

First of all the Business Requirement Document was prepared as per the client’s requirement (with the muck-up). Then on the basis of the requirement document, QA Team wrote Test Plans, Test Cases and Test Strategies. The developers started coding their modules (started programming). Once the developers finished coding, the Configuration Management Team compiled the code together and prepared a build. This Build is now deployed to different testing environments where different types of testing were performed. Once the defects were found, the testers would log the defect using the tools available (like TestDirecotor, ClearQuest and so on. For the companies who cannot afford these expensive tools, they can use Excel sheet as well). Once the defects are logged, then those defects would be discussed in the defect status meeting and would take further actions (meaning, closing, reopening, retesting of defects etc).

**6. What is Change Control?**

**Answer:** It is a document that describes the additional functionalities that are added after the Business Requirement Document is signed off. It can be updated in the old business requirement document or it can be a separate document. (For example, in the Business Requirement Document, on the login page, there are User Name and Password fields. The owner of the software wants to add, “If you do not have User Name and Password, please click here.” This is a change. But this change came after the document is signed off by the Project Managers. Now this is a change control and comes as a separate document. (It is also called Change Request, Modification Request).

**7. Have you written Change Control?**

**Answer:** Yes. There was a situation where in one page of an application in my previous project, when the user clicked “Contact” link, it would pop up a different window (new separate window). But it was NOT the way it was described in the requirement document. In the requirement document, when the user clicks “Contact” link, then it should navigate to another page (Not a separate new window. Then was it a problem? Functionality wise, it was NOT a problem, however, on all the other pages, when the user clicked “Contact” link, the system would navigate to next page (not a separate window). So, it was NOT CONSISTENT with the other functionalities on the other pages. Therefore, it was a consistency issue. I reported this as a bug. But the Project Manager asked me to write it as a Change Control (because it requires more budget to fix this issue) so that he can address this issue at a later time. So I wrote this as a Change Control. (However, it is NOT a job of a tester to write change control. It’s the business analyst’s job)

**8. What is Backend Testing?**

**Answer:** It is a test to check whether the data displayed in the GUI front-end matches with the particular data in the backend.

**9. Have you done any Backend Testing and/or if you did, how did you do it in your last project?**

**Answer:** Yes. I have done backend testing. When I was working in my last project, this was my scenario of backend testing:

I was working on Reports. It was the scenario of testing one application used in the bank, where a customer comes to a bank’s front desk, the bank teller is requested to open a Checking Account. The associate then asks for the personal information about the customer, which, are the primary data, such as: First Name, Last Name, Date of Birth, Address and Social Security Number. The associate then puts these primary data of that particular customer into the computer, which then afterwards batch-processed (normally happens in the middle of the nigh). Now, after the batch process, the information of that customer goes into the central database in the XML format. The data now from the database goes to ETL (Extract-Transform-Load). (ETL is a tool made by two companies ‘AbInitio’ and ‘Informatica’) ETL now processes the job to create a file (output file) to produce the report. The file is now displayed in the GUI Front End report with the help of Business Object (or Crystal Reports. These are tools that display data in GUI format). In the GUI Front End report, let us say, if for January, the deposit of that person was displayed as $ 900.00. Then my job was to validate whether this $900 is correct or not. I validated this data by writing SQL queries directly to the database. The data pulled from my SQL query should match to the data in the GUI front end. In other words, my SQL query should also display $900. If it matches, it is well and good. If it doesn’t, then it’s a bug. This is how I have done my Back End Testing.

**How can you be sure that the query you wrote is correct? Or how do you know that the data you pulled from the database is correct?**

**Answer:** I write SQL query based on the requirement document. In the requirement document, various conditions are given for the query. Based on those conditions, I write SQL query. Therefore, anything different from the requirement document is definitely a defect.

**10. From your resume, I see that you have been working in one place for a very short period of time. This raises me questions why. Can you explain why?**

**Answer:** As a consultant, I am hired for a certain period of time (for project duration only), normally for 6 months to 1 year. Once the project is over, I needed to move to another project. That’s why you see me in the resume jumping frequently here and there.

**11. What is done on the first day of the work?**

**Answer:** On the first day, the Manager will come to receive at the lobby. He/she will welcome you; tell where you will be sitting. The next thing will be will show you login name and password and they want to make sure that the login name and password works so that you can use your computer. Then the Manager will tell you where the documents are located in the network drive (or shared drive, or ClearCase, or Sharepoint—different companies use different software for this purpose). Once you find the documents, then you will ask them what you will be working on what are the related documents that you should read. You start reading the documents, which lasts normally one week or more.

**12. What do you do on the job every day? What is the first thing you go when you go to work on a day? (What is your routine job?)**

**Answer:** Go to work, have a cup of coffee (coffee is free in any work place), then check emails. I will check in my calendar whether there is any meeting for the day. If there is anything urgent work that needs to take care of, then I will start with that job. Otherwise, I will start what is left from yesterday on a priority basis.

(This question was asked to one of my friends while he was attending interview in one of the companies. When they asked him this question, his answer was, he said, “I start testing”. This was his wrong answer. The answer varies in which phase of testing the application is. If the application is in very beginning state-meaning that the coding has just begun, then the tester’s job will be to analyze and read the requirement documents, write test plans and write test cases. Probably attend walkthrough meeting and so on. However, the daily routine job would be, as mentioned above, check emails, read documents, attend meeting and so on. It’s not that as soon as you enter the office, you start testing)

**13. What do you do if you have any questions to ask? Who do you ask?**

**At the beginning, we all panic, what kind of questions to ask? What if they ask questions that I don’t know? Is it OK to ask questions? What do I do if I don’t know how to do the job I am assigned to? and so on.**

**Answer:** As mentioned earlier, on the first day, your Manager will give you the system (computer) (They normally call system, not computer), will tell you what the User ID and Password is, where are the QA documents on the shared drive (or Network drive) are and so on. They will definitely ask you to read a lot of documents at the beginning (And you must read read and read those documents AS MUCH AS POSSIBLE. At the beginning, allocate about 2 hours extra at home for reading these documents. This habit will put you on the top of your job). These documents are normally design specification document (DSD). Different companies call it with different names, for example, Requirement Specification Document (RSD) and so on. After reading the documents, you will be asked to write Test Plans or Test Cases (Don’t panic. The Test Plans and Test Cases templates will be give by your manager or test lead and they will tell you what to do and how to do because different companies have different formats they follow. If they don’t have one, then you can always prepare a sample from this website (see on the right column) and give it to them. You will be hero)

**Who do you ask?**

Now let’s say you did not understand something while reading documents. Who are you going to ask? Answer-Business Analysts who wrote this document. If you have any other questions that you don’t know, you will be asking that to you friend first, if he/she is not able to answer, then ask this question to the Lead (or Manager). Do not ask too many questions (some people get irritated). Therefore, it is important to read read and read. That’s the only way to succeed.

If you have any questions in TestDirector, or QTP or any other automation tools, then there is a HELP menu as well as tutorial. Please go through these, read them before you ask any questions to anyone else.

**What kind of questions should I ask in the meeting?**

Nothing. My advice is, keep your mouth shut. Just listen. This is the best way to handle the job until you are confident enough to speak and you know what you are talking about. If they ask you some questions, then reply gently, wisely.

**How to deal with your team members?**

Most probably, you will not be the only tester in the team. There will be more than you. Sometimes, dealing with you team members is frustrating, especially when you are new. They try to ignore you. They want to show themselves smart. Don’t worry. Don’t blame them. This part of the human nature. Try to cope with it. Invite them when you go for coffee (in the coffee room in your office, don’t go outside), try to share your feelings and so on. It is all how you handle your friends. It is part of your daily activities, handle it gently. This is part of the situation I have gone through, my friends have gone through. I am just sharing this with you.

**14. Have you used automation tools?**

**(Normally, when someone asks this question, we tend to think about automation functional testing tools, like WinRunner, LoadRunner, QTP (Quick Test Pro), Rational Robot, Experian and so on. But the reality is, even a Manual Tester also uses automation tools like bug tracking tools like TestDirector, ClearQuest, PVC Tracker and so on. Therefore, your answer should be Yes)**

**Answer:** Yes. I have used TestDirector and ClearQuest as defect tracking tools. (Your answer is based on whether you have used automation tools specially for functional and load testing. If you have NOT used, but read about these tools, then you may be better off saying, “I know about the tools. I was involved in some of the testing using these tools, but would need some brush up in order to work independently.” I am saying this because these tools are difficult to tackle in the interview and have to know in depth. In order to pass the interview on functional automation tools, it may not be easy unless you really know the stuff. But, since there is not much to learn in ClearQuest and TestDirector, you only have to know what different types of fields are there in the defect logging window when writing a defect.)

**15. When you log a defect using TestDirector (or ClearQuest) what fields do you see?**

**Answer:** When we log a defect, we see Defect ID (it shows later in TestDirector), Summary (where we write short description of the defect), Description (long description of the defect), Detected by (Person who found the defect, (it’s you), Severity (meaning-is the defect critical? High? Medium? Or Low?), Date, Detected in Version, Priority, Project, Status, Assigned to and so on.

[QA Interview Questions and Answers Part - 3](https://www.pavantestingtools.com/2018/06/qa-interview-questions-and-answers-part_65.html)

**1. Are you better working in a team or working alone?**

**Answer:** I am a team player. I get along with team members very well. As far as the working is concerned, I can be equally productive in team or working alone.

(Caution: Never say, I like working alone. This could lead you to not getting a job as they are always looking for people who can get along with other people.)

**2. Do you have any situations in the past where you have some arguments with your team members?**

**Answer:** No. I never had that type of situation wherever I have worked.

(Even if you had one, it’s a good idea to say “No”. This could be a red flag, which might stop you from getting the job)

**3. What do you like about a Manager? And what don’t you like?**

**Answer:** The best thing I like about a Manager is that the Manager should be able to coordinate with the other teams so that we can get the updated documents, for example, updated requirements documents right away. A Manager who can efficiently in distributes the work to the team, without being biased and easily accessible and protective to his team for the right cause. As far as “what I don’t like” is concerned, I don’t like a manager who keeps coming to desk 10 times a day to check my work even if it is just a regular work. Once the responsibility is given, the team member should be trusted and let his work done.

**4. Where do you see yourself in another 5 years?**

**Answer:** I see myself a QA Lead in another 5 years.

(You can also say “QA Manager”, but since the QA Manager is taking your interview most of the time, they sometimes feel challenged. Therefore, it might be a good idea to limit you to QA Lead)

**5. Why are you in QA?**

**Answer:** I am in QA because I like this job.

**6. Why do you like this job?**

**Answer:** I like this job, because it is process oriented. Meaning that I get an opportunity to work from analyzing the requirement documents to writing test plans, test cases, testing the application, logging defects, retesting, preparing reports and finally testing in production as well. Therefore, I am involved from the very beginning to the end of the software development life cycle (SDLC) process. I like this.

Another reason is I like to find defects. I enjoy logging defects. The more defects I find, the happier I am.

**7. How do you determine what to test in an application?**

**Answer:** First of all we have the test cases (or test scripts) that are written based on the requirement document. This pretty much covers what functionalities to test. Therefore, looking at the test cases tells us what to test in the application.

**8. If you have no documentation about the product, how do you test an application? Describe the process.**

**Answer:** Well, this is a situation where I have come across several times. Some of the companies in my previous projects did not have any documents. In this case, I went to the Business Analyst and sometimes to developers to find out how exactly the functionalities work, how to navigate from one page to another page and so on. After getting a clear vision, I write test cases based on the conversation (which is a step by step procedure to test an application) and get ready for testing.

**9. What do you do once you find a defect?**

**Answer :** Once you find a defect, this is what we need to do:

Recreate the Defect: Once you find a defect, we must try to recreate (meaning that we should be able to reproduce it) at least 3 times so that we are sure that it is a defect. Sometimes, once we find it log it without recreating, may put us in a false situation (because sometimes the application does not behave in the same way). Therefore, it is important to recreate the same defect several times.

Attach the Screen Shot (supporting document): Once we confirm that it is a defect, and then it is a good idea to attach supporting documents when we log (write) a defect. For example, screen shot, requirement document etc. For instance, let us say that instead of “Continue” button on a page, there is a typo “Contiinuee”. Now, we will make a screen shot of this page (To make screen shot, press “Print Screen” button on the keyboard, and open a Word document, and Click Edit on the Word document and “Past” it. You will see the screen now) Now, a tester needs to write defects in easy and clear language to make all the developers to understand easily.

Log the Defect: Now, the next step is, we need to log it. Depending on the company what kind of tools they are using (for example, some companies use TestDirector to log defects, some companies use Rational ClearQuest, some use PVC Tracker and so on). If the company is small and cannot afford these expensive tools, then they may simply use Excel sheet to log defects. We log the defect.

**What are the basic elements you put in a defect?**

**Answer:** Basic elements we put in a defect are: SEVERITY, PRIORITY, CREATED BY, VERSION NO, HEADER, DESCRIPTION OF THE DEFECT where we write how to recreate a defect, in what module the defect is found, Status, and so on.

**10. What is the biggest bug you have ever found?**

**Answer:** Well, there are many big defects I have found in various projects. For example, in the last project, on a page, there was a button called “More Information”. Once the user clicked that button, the system would open a new window (pop up).

We could close the new window in 3 ways:

-By clicking X at the top right corner of the page

-By clicking “Close” button on the page

-By pressing combination keys (Alt+F4) on the key board

Although the combination key (Alt+F4) was not mentioned in the test case, I just wanted to try how the application reacts when Alt+F4 is pressed. Then I pressed Alt+F4. The result was a disaster-the application crashed (broke). The application disappeared from the computer monitor. Since it was the last day of testing for us, it brought chaos in our Managers, Leads and the whole teams. Finally, the developers disabled Alt+F4 as a temporary solution and the application went into production.

**11. How do you make sure that it is quality software?**

**Answer:** There is a certain process how the quality of software is guaranteed (ensured). If is defined by the ‘exit criteria’. (What it means is, a QA Manager writes a document called Test Strategy. This Test Strategy defines the ‘exit criteria’.) Exit Criteria gives the measurement, for example, in order to confirm the quality, how many critical defects, high defects, medium defect and low defect are acceptable? These are all defined in the exit criteria. (Normally in practice, for a quality software, there should no critical defects (0 critical), no high defect (0 high), no medium defect (0 medium) and may be 1 low defect)

**12. As a QA Tester, can you tell me the situation when you felt the most proud of it?**

**Answer:** When I find the defect that normally others don’t find, then I feel very proud. For example, there were situations where I found bugs that crashed the whole system at the end of testing phase. I tried the scenarios where the scenarios were NOT mentioned in the test cases. For example, we can close the windows by clicking X on the page, with “Close” button and so on. But there is another way that you can close the window, by pressing Alt+F4 on the keyboard. Not many testers test this scenario. I have done this in my last two projects. Both the time, the application crashed which became a big issue. I felt proud.

**13. What made you to choose testing career?**

**Answer:** I am a very detailed oriented person and I like process-oriented job. The way QA process works is just the kind of work I like. For example, analyzing requirement documents, attending walk-through meetings, writing test plans, writing test cases, executing the test cases (or running the test cases) testing the application, logging defects, retesting them and so on. I think I really like the process and that’s why I chose this career.

**14. When should testing start in a project? Why?**

**Answer:** We should start testing as soon as the following things are ready:

-Test Data are ready

-Build (all the developers have coded their code and merged them together)

-Test Environment (servers, network etc) is set up and ready

-When the manager asks us to go ahead and start testing.

**15. Let us say you have a web application to test. How do you go about testing it? What is the process?**

**Answer:** First of all, I will look at the requirement documents (or design document in some companies). The requirement document will tell us what the functionalities in the application (software) are. Once I analyze the requirement documents (one module=one requirement document). After that, I will write test plans for each module (one module =one test plan). Then after the test plan is complete, I will write test cases (One module can have hundreds, even thousands test cases). Once the test cases are ready and the application is ready (or once the build is ready), then I will start testing. Before I start testing, however, I will make sure the test environments, test data and defect logging tools are in place. This is how I will go about testing an application.

[QA Interview Questions and Answers Part - 4](https://www.pavantestingtools.com/2018/06/qa-interview-questions-and-answers-part_28.html)

**1. What is a “bug?”**

**Answer :** A bug is a bug is an error, flaw, mistake, failure, or fault in a computer code (program) that prevents it from behaving as intended (e.g., producing an incorrect result). (You can also add this: When the expected results (accordingly to the requirement documents) don’t match with the actual results (while testing), then it is considered a bug)

**2. How would you ensure that you have covered 100% testing?**

**Answer:** The testing coverage is defined by exit criteria (There is exit criteria and entry criteria in the Test Strategy). For example, if the exit criteria says “The software will be acceptable to the client only if there are no critical defects, no high defects, no medium defects and only two low defects”, then all the critical, high, medium should be zero. Only 2 low defects are acceptable. Thus, 100% coverage is measured by the exit criteria. Also, 100% test cases must be executed in order to cover 100% of testing.

**3. What problems did you face in the past? How did you solve it?**

(You will be OK if you just give one of the problems below, not all of them)

**Answer:** I had many problems while testing applications in the past.

As far as I remember one of them (then describe one of them from below), this was the scenario:

(i) It was a web-based application. I was working on a module called “Transaction Summary”. There was “Submit” button on that page. After entering data in the all the fields, for example, First Name, Last Name, Social Security Number, Date of Birth and so on, I clicked the Submit button. Once I clicked Submit button, an error page displayed, “Page cannot be found…”. Since it was a critical defect, I immediately informed the Test Lead. There was a chaos in the room. All the developers, Database Administrators and Testers gathered in my cube (room). Nobody could tell exactly what was wrong with it. Finally, one smart guy checked into the database and found out that one of the files in the database was closed. The status of all the files should be in the open status. Once the status of the closed file was put in the “open” status, the application worked fine.

(ii) One of the problems was in the Login window (page). When the user enters and Login Name and Password, then Password should be encrypted. One of the Test Cases was that I needed to open database and see whether the password is encrypted or not. I found out it was not encrypted. I reported it as a bug (defect) and it was fixed in the next release (build).

(iii) Defects I have found in a project was a defect to close a window (pop up).

For example, in the last project, on a page, there was a button called “More Information”. Once the user clicked that button, the system would open a new window (pop up).We could close the new window in 3 ways:

-By clicking X at the top right corner of the page

-By clicking “Close” button on the page

-By pressing combination keys (Alt+F4) on the key board

Although the combination key (Alt+F4) was not mentioned in the test case, I just wanted to try how the application reacts when Alt+F4 is pressed. Then I pressed Alt+F4. The result was a disaster-the application crashed (broke). The application disappeared from the computer monitor. Since it was the last day of testing for us, it brought chaos in our Managers, Leads and the whole teams. Finally, the developers disabled Alt+F4 as a temporary solution and the application went into production.

(iv) Another problem was that a user would search for branch location information of a bank. The user logs in by using User Name and Password. After the log in, on the “Search Location” page, the user enters and zip code of the location he wants to find, then clicks Find button. After that the system (application) gives a number of branch locations. The user now clicks “Request Information” for one of the branches. As soon as the user clicks “Request Information” button, the application breaks (displays “Page cannot be found” error). I logged this defect as a critical defect. When the developers and database administrator looked into it, then they found out that in one of the tables, the data was not recorded. In all the tables (UserProfile table, ClientID table and SessionID table), the data should be populated with the information entered by the user. For some reason, in one of the tables, it was blank (null). Once they wrote a small code to populate data (enter data) to the table, the application started working.

(v) In my previous project, when the customer wants to upload a document, for example, a copy of a monthly statement (in Word format), on the website, the system should automatically change the Word document into .pdf format. Once the document was uploaded, I saw that the fields in the .pdf document were interchanged (misplaced). For example, the First Name displayed in the Last Name section. Date of Birth displayed in the Social Security Number field and so on. We found out that the problem was a mapping problem (remember this word). Once the mapping was correct, I tested in the new build. It was fixed.

(vi)  The most common problem that I have faced in my previous projects are the Java script errors, data connectivity, error, HTTP 500 error (This error occurs when server is down), HTTP 400 error (when file is not found) and so on.

(vii)  “Father” pop up displayed when Print/Print Preview button clicked. (This was coded by the developer to mark this coding portion  (for his/her own purpose as a mark to indicate where he/she made changes, however, forgot to remove it).  Once the developer fixed it, it still displayed the same thing (because it was in the servers memory and could not go).  Now, I had to reset memory of the server from my machine.  Therefore, what I did is, I went to the website I was testing (for example, http://mysite.app.org/My\_profile) and added reset.aspx at the end of the URL (Now the URL becomes http://mysite.app.org/My\_profile/reset.aspx and hit enter. It took me to the server memory and I selected section and submitted the query and it was cleared.  Retested again and it is now OK.

(viii)  I was testing a web application.  On one page, I clicked Save & Continue button twice (my mistake).  Once this button is clicked twice, the system displayed an error message, “Could not save the answers, please contact technical support”. (When clicked only once, the button works fine.).

Solution:  Once the user clicks the button once, the button was disabled later so that the user cannot click twice.

(ix)  I was testing a web-based application.  Once all the fields are entered on the one of the pages, we had Print Preview button.  If the user clicks this button, we were supposed see the same information in a new window in PDF format. While looking at the data in PDF file, there were some fields missing, for example, Date of Birth was missing in the PDF file.

**4. Tell me about the worst boss you’ve ever had. (Here, you should be careful not to say any negative words about the past boss. This will give a reflection that you cannot work with different nature of people. You should be able to show them that you can cope with any king of boss. Therefore, just take an idea below how the answer should be.)**

**Answer:** I can hardly think of any Manager that was really bad. But when I compare, then I remember of a Test Lead who was just made a lead from the developers team. She used to feel that she has been very proud of her position and used to boss around. Sometimes, she used to call home and check where I was and what I was doing. Or have I completed my job before leaving and so on. I think, whatever she did, was in the benefit of the company and myself in the long run which would give me more confidence in future.

**5. What do you like about QA?**

**Answer:** The best thing I like about QA is, I like the job which is more process oriented. For example, we have to work right from reading the requirement documents, providing feedback to the Business Analysts as necessary, writing test plans, test cases, execute the test cases, interaction with different developers, attend walk-through meeting and so on. I am a very detailed oriented person. When I test applications, I try to get into the depth of functionality so that I don’t miss out anything. Finally, I love logging defects.

**6. What are all the basic elements in a defect report?**

**Answer:** The basic elements in a defect report are: Defect ID, Header, Description, Defect Reported by, Date, Status, Version, Assigned to, Approved by, Module where the defect was found and so on.

**7. What is the difference between verification and validation?**

**Answer :**

Verification: Verification is a process to ensure that the software that is made, matches the original design. In other words, it checks whether the software is made according to the criteria and specification described in the requirement document. It is to check whether you built the product right as per design. It is a low level checking. (It is done in walk-through meetings generally). It checked whether it is made accordingly to the design..

Validation: Validation is a process to check whether the product design fits the client’s need. It checks whether you built the right thing. It checks whether it is designed properly.

**8. How do you know it is sufficient testing?**

**Answer:** Every company has entry and exit criteria. When we test applications, we refer to exit criteria. When we are about to finish testing, then the QA Team (QA Manager) refers to the exit criteria (exit criteria tells the level of defect that you can be comfortable with before it goes to production. For example, there should be ZERO critical defect, ZERO high level defect, ZERO medium defect, 1 Low level defect, all the test cases must be 100% executed etc). Once the exit criteria meet the requirements, then the software is considered to be sufficiently tested.

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**9. How to derive test scenarios and use cases? What are the contents and format?**

**Answer:** Test scenarios are derived from requirement documents. We follow each and every functionality (called business rules) mentioned in the requirement document. One functionality can have multiple business rules. For example, let us say in there is one requirement called “Login”. This “Login” may have various scenarios. For example, one scenario is, enter the right User ID and wrong password. The system should display an error message. Another scenario would be to enter wrong User ID and right Password. The system should display an error message. The third scenario could be to enter the right User Name and right Password. The system should allow the user to get into the system. This is how the test cases are derived from the requirement documents or from the Use Cases.

**10. What are the types of test cases that you write?**

**Answer:** We write test cases for smoke testing, integration testing, functional testing, regression testing, load testing, stress testing, system testing and so on.

**11. How to write Integration test cases?**

**Answer:** I have never written separate Test Cases Integration Testing. Since Integration Testing is a test to check whether the all the modules are integrated together or not (meaning that when the developers compile all their module and make a build, all modules should be working when they are combined together and those modules when combined, should work as expected). If they are not integrated (combined) in a nice way, then the application breaks. Basically, when we do the functional testing, the integration testing is automatically done. This is my experience.

**12. How to write Regression test cases? What are the criteria?**

**Answer:** Regression test cases are also based on the requirement documents. They are written more into detail and with every release (build), the testers need to do regression testing. The criteria for regression testing are; there should be no major defects while we do our smoke test and functional testing.

**13. Is there a format for a test case? Do you follow any methodology for numbering test cases?**

**Answer:** Yes. It depends upon the company how the company has followed the numbering of test cases. However, normally, it is just a simple numbering in most of the time But some companies may also relate this numbering to the requirement number. For example, if the requirement for Login is “REQ-LOG-001”, then we can number the test cases like REQ-LOG-001-001 and so on.

**14. What is Test Harness?**

**Answer:** (Definition from www.wikipedia.org) “In software testing, a test harness or automated test framework is a collection of software and test data configured to test a program unit by running it under varying conditions and monitor its behavior and outputs. It has two main parts: the test execution engine and the test script repository.”

**15. How to write User Acceptance Test plan & test cases?**

**Answer:** The way of writing Test Plan and Test Cases is the same in all the test phases. However, specifically for User Acceptance Testing, the testers use data nearly real data (meaning that the data is very much similar to the production data or real data).

[QA Interview Questions and Answers Part - 5](https://www.pavantestingtools.com/2018/06/qa-interview-questions-and-answers-part_20.html)

**1. What are the different matrices that you follow?**

**Answer:** There are various reports we normally prepare in QA:

Test summary Report – It is a report that has list of the total test cases, list of executed test cases, remaining test case to be executed, executed date, pass/fail

Defect Report – In this report we normally prepare a list of defect in spreadsheet e.g. defect # CQ12345 [ if you log a defect in the application called Rational ClearQuest]

Traceability Matrix [also called RTM (Requirement Traceability Matrix)] Report – the document which shows the relationship between the functionalities or the business rules and the test cases. So, with the help of Traceability Matrix we make sure that we includes all the functionalities in our test cases according to the requirement document.

**2. Explain Bug Life Cycle.**

**Answer:** I would describe this as below:

A Tester finds a defect and logs it. (But before you log it, you must try to recreate it for 3 or 4 times so that you are 100% sure that it is a bug)

The defect is now approved or disapproved by the Test Lead.

(If it is disapproved, then the test lead will come to you ask for more details and you have explain to him why it is a bug)

After the Test Lead approves the bug, it is now assigned to a development Team Lead (or Development Manager). He/she now assigns that bug to the concerned developer. The developer now looks into the bug and fixes it. Once the fix is ready, there will be another build ready to test. The tester now tests the defect. It the defect is fixed, then the tester closes the defect, if not then the test will reopen it and same cycle starts.

**3. What will you do if developer does not accept the bug?**

**Answer:** If the developer does not accept the defect, then he will reject it. Once it is rejected, then it comes back to the tester. Now, the tester will ask for clarification with the developer why the defect is rejected. Since everything is based on the requirement documents, both tester and developer will have to look at the requirement document, validate it and then reopen it if necessary or close.

**4. What are the different tests that can be done for Client Server Application and Web-based Application. Give details.**

**Answer:** For both client server and web based applications, the testing is the same except one thing: We test web based applications in different browsers, for example, Internet Explorer (will test in different versions like IE 5.0, IE 6.0, IE 7.0), Firefox, Safari (for Mac) and so on where as for client server, we don’t need to test in the browsers.

**5. What is an inspection?**

**Answer:** An inspection is a formal meeting, more formalized than a walkthrough and typically consists of 3-10 people including a moderator, reader (the author of whatever is being reviewed) and a recorder (to make notes in the document). The subject of the inspection is typically a document, such as a requirements document or a test plan. The purpose of an inspection is to find problems and see what is missing, not to fix anything. The result of the meeting should be documented in a written report. Attendees should prepare for this type of meeting by reading through the document, before the meeting starts; most problems are found during this preparation. Preparation for inspections is difficult, but is one of the most cost-effective methods of ensuring quality, since bug prevention is more cost effective than bug detection.

**6. Give me five common problems that occur during software development.**

**Answer:** Poorly written requirements, unrealistic schedules, inadequate testing, adding new features after development is underway and poor communication. Requirements are poorly written when requirements are unclear, incomplete, too general, or not testable; therefore there will be problems. The schedule is unrealistic if too much work is crammed in too little time.

Software testing is inadequate if none knows whether or not the software is any good until customers complain or the system crashes. It’s extremely common that new features are added after development is underway.

Miscommunication either means the developers don’t know what is needed, or customers have unrealistic expectations and therefore problems are guaranteed

**7. What is the role of documentation in QA?**

**Answer:** Documentation plays a critical role in QA. QA practices should be documented, so that they are repeatable. Specifications, designs, business rules, inspection reports, configurations, code changes, test plans, test cases, bug reports, user manuals should all be documented. Ideally, there should be a system for easily finding and obtaining of documents and determining what document will have a particular piece of information. Use documentation change management, if possible.

**8. What if the software is so buggy it can’t be tested at all?**

**Answer:** In this situation the best bet is to have test engineers go through the process of reporting whatever bugs or problems initially show up, with the focus being on critical bugs. Since this type of problem can severely affect schedules and indicates deeper problems in the software development process, such as insufficient unit testing, insufficient integration testing, poor design, improper build or release procedures, managers should be notified and provided with some documentation as evidence of the problem.

**9. How do you know when to stop testing?**

**Answer:** This can be difficult to determine. Many modern software applications are so complex and run in such an interdependent environment, that complete testing can never be done. Common factors in deciding when to stop are…

Deadlines, e.g. release deadlines, testing deadlines;

Test cases completed with certain percentage passed;

Test budget has been depleted;

Coverage of code, functionality, or requirements reaches a specified point;

Bug rate falls below a certain level; or

Beta or alpha testing period ends.

**10. What if there isn’t enough time for thorough testing?**

**Answer:** Since it’s rarely possible to test every possible aspect of an application, every possible combination of events, every dependency, or everything that could go wrong, risk analysis is appropriate to most software development projects. Use risk analysis to determine where testing should be focused. This requires judgment skills, common sense and experience. The checklist should include answers to the following questions:

Which functionality is most important to the project’s intended purpose?

Which functionality is most visible to the user?

Which functionality has the largest safety impact?

Which functionality has the largest financial impact on users?

Which aspects of the application are most important to the customer?

Which aspects of the application can be tested early in the development cycle?

Which parts of the code are most complex and thus most subject to errors?

Which parts of the application were developed in rush or panic mode?

Which aspects of similar/related previous projects caused problems?

Which aspects of similar/related previous projects had large maintenance expenses?

Which parts of the requirements and design are unclear or poorly thought out?

What do the developers think are the highest-risk aspects of the application?

What kinds of problems would cause the worst publicity?

What kinds of problems would cause the most customer service complaints?

What kinds of tests could easily cover multiple functionalities?

Which tests will have the best high-risk-coverage to time-required ratio?

**11. What can be done if requirements are changing continuously?**

**Answer:** Work with management early on to understand how requirements might change, so that alternate test plans and strategies can be worked out in advance. It is helpful if the application’s initial design allows for some adaptability, so that later changes do not require redoing the application from scratch. Additionally, try to… • Ensure the code is well commented and well documented; this makes changes easier for the developers.

Use rapid prototyping whenever possible; this will help customers feel sure of their requirements and minimize changes.

In the project’s initial schedule, allow for some extra time to commensurate with probable changes.

Move new requirements to a ‘Phase 2′ version of an application and use the original requirements for the ‘Phase 1′ version.

Negotiate to allow only easily implemented new requirements into the project; move more difficult, new requirements into future versions of the application.

Ensure customers and management understand scheduling impacts, inherent risks and costs of significant requirements changes. Then let management or the customers decide if the changes are warranted; after all, that’s their job.

Balance the effort put into setting up automated testing with the expected effort required to redo them to deal with changes.

Design some flexibility into automated test scripts;

Focus initial automated testing on application aspects that are most likely to remain unchanged;

Devote appropriate effort to risk analysis of changes, in order to minimize regression-testing needs;

Design some flexibility into test cases; this is not easily done; the best bet is to minimize the detail in the test cases, or set up only higher-level generic-type test plans;

Focus less on detailed test plans and test cases and more on ad-hoc testing with an understanding of the added risk this entails.

**12. What if the application has functionality that wasn’t in the requirements?**

**Answer:** It may take serious effort to determine if an application has significant unexpected or hidden functionality, which it would indicate deeper problems in the software development process. If the functionality isn’t necessary to the purpose of the application, it should be removed, as it may have unknown impacts or dependencies that were not taken into account by the designer or the customer.

If not removed, design information will be needed to determine added testing needs or regression testing needs. Management should be made aware of any significant added risks as a result of the unexpected functionality. If the functionality only affects areas, such as minor improvements in the user interface, it may not be a significant risk.

**13. How can software QA processes be implemented without stifling productivity?**

**Answer:** Implement QA processes slowly over time. Use consensus to reach agreement on processes and adjust and experiment as an organization grows and matures. Productivity will be improved instead of stifled. Problem prevention will lessen the need for problem detection. Panics and burnout will decrease and there will be improved focus and less wasted effort. At the same time, attempts should be made to keep processes simple and efficient, minimize paperwork, promote computer-based processes and automated tracking and reporting, minimize time required in meetings and promote training as part of the QA process. However, no one, especially talented technical types, like bureaucracy and in the short run things may slow down a bit. A typical scenario would be that more days of planning and development will be needed, but less time will be required for late-night bug fixing and calming of irate customers.

**14. What is parallel/audit testing?**

**Answer:** Parallel/audit testing is testing where the user reconciles the output of the new system to the output of the current system to verify the new system performs the operations correctly. Let us say, for example, the currently software is in the mainframe system which calculates the interest rate. The company wants to change this mainframe system to web-based application. While testing the new web based application, we need to verify that the web-based application calculates the same interest rate. This is parallel testing.

**15. What is system testing?**

**Answer:** System testing is black box testing, performed by the Test Team, and at the start of the system testing the complete system is configured in a controlled environment. The purpose of system testing is to validate an application’s accuracy and completeness in performing the functions as designed. System testing simulates real life scenarios that occur in a “simulated real life” test environment and test all functions of the system that are required in real life. System testing is deemed complete when actual results and expected results are either in line or differences are explainable or acceptable, based on client input.

Upon completion of integration testing, system testing is started. Before system testing, all unit and integration test results are reviewed by Software QA to ensure all problems have been resolved. For a higher level of testing it is important to understand unresolved problems that originate at unit and integration test levels. You CAN learn system testing, with little or no outside help. Get CAN get free information. Click on a link!

[QA Interview Questions and Answers Part - 6](https://www.pavantestingtools.com/2018/06/qa-interview-questions-and-answers-part_78.html)

**1. What is end-to-end testing?**

**Answer:** Similar to system testing, the \*macro\* end of the test scale is testing a complete application in a situation that mimics real world use, such as interacting with a database, using network communication, or interacting with other hardware, application, or system.

**2. What is security/penetration testing?**

**Answer:** Security/penetration testing is testing how well the system is protected against unauthorized internal or external access, or willful damage. This type of testing usually requires sophisticated testing techniques.

**3. What is recovery/error testing?**

**Answer:** Recovery/error testing is testing how well a system recovers from crashes, hardware failures, or other catastrophic problems.

**4. What is compatibility testing?**

**Answer:** Compatibility testing is testing how well software performs in a particular hardware, software, operating system, or network environment.

**5. What is comparison testing?**

**Answer:** Comparison testing is testing that compares software weaknesses and strengths to those of competitors’ products.

**6. What is acceptance testing?**

**Answer:** Acceptance testing is black box testing that gives the client/customer/project manager the opportunity to verify the system functionality and usability prior to the system being released to production. The acceptance test is the responsibility of the client/customer or project manager, however, it is conducted with the full support of the project team. The test team also works with the client/customer/project manager to develop the acceptance criteria.

**7. What is a Test/QA Team Lead?**

**Answer:** The Test/QA Team Lead coordinates the testing activity, communicates testing status to management and manages the test team.

**8. What is software testing methodology?**

**Answer:** One software testing methodology is the use a three step process of…  
1. Creating a test strategy;  
2. Creating a test plan/design; and  
3. Executing tests. This methodology can be used and molded to your organization’s needs. Rob Davis believes that using this methodology is important in the development and in ongoing maintenance of his customers’ applications.

**9. What is the general testing process?**

**Answer:** The general testing process is the creation of a test strategy (which sometimes includes the creation of test cases), creation of a test plan/design (which usually includes test cases and test procedures) and the execution of tests.

**10. How do you create a test strategy?**

**Answer:** The test strategy is a formal description of how a software product will be tested. A test strategy is developed for all levels of testing, as required. The test team analyzes the requirements, writes the test strategy and reviews the plan with the project team. The test plan may include test cases, conditions, the test environment, a list of related tasks, pass/fail criteria and risk assessment. Inputs for this process:

A description of the required hardware and software components, including test tools. This information comes from the test environment, including test tool data.

A description of roles and responsibilities of the resources required for the test and schedule constraints. This information comes from man-hours and schedules.

Testing methodology. This is based on known standards.

Functional and technical requirements of the application. This information comes from requirements, change request, technical and functional design documents.

Requirements that the system cannot provide, e.g. system limitations. Outputs for this process:

An approved and signed off test strategy document, test plan, including test cases.

Testing issues requiring resolution. Usually this requires additional negotiation at the project management level.

**11. How do you create a test plan/design?**

**Answer:** Test scenarios and/or cases are prepared by reviewing functional requirements of the release and preparing logical groups of functions that can be further broken into test procedures. Test procedures define test conditions, data to be used for testing and expected results, including database updates, file outputs, report results. Generally speaking…  
Test cases and scenarios are designed to represent both typical and unusual situations that may occur in the application.  
Test engineers define unit test requirements and unit test cases. Test engineers also execute unit test cases.  
It is the test team that, with assistance of developers and clients, develops test cases and scenarios for integration and system testing.  
Test scenarios are executed through the use of test procedures or scripts.  
Test procedures or scripts define a series of steps necessary to perform one or more test scenarios.  
Test procedures or scripts include the specific data that will be used for testing the process or transaction.  
Test procedures or scripts may cover multiple test scenarios.  
Test scripts are mapped back to the requirements and traceability matrices are used to ensure each test is within scope.  
Test data is captured and base lined, prior to testing. This data serves as the foundation for unit and system testing and used to exercise system functionality in a controlled environment.  
Some output data is also base-lined for future comparison. Base-lined data is used to support future application maintenance via regression testing.  
A pretest meeting is held to assess the readiness of the application and the environment and data to be tested. A test readiness document is created to indicate the status of the entrance criteria of the release.  
Inputs for this process:  
Approved Test Strategy Document.  
Test tools, or automated test tools, if applicable.  
Previously developed scripts, if applicable.  
Test documentation problems uncovered as a result of testing.  
A good understanding of software complexity and module path coverage, derived from general and detailed design documents, e.g. software design document, source code and software complexity data.  
Outputs for this process:  
Approved documents of test scenarios, test cases, test conditions and test data.  
Reports of software design issues, given to software developers for correction.

**12. How do you execute tests?**

**Answer:** Execution of tests is completed by following the test documents in a methodical manner. As each test procedure is performed, an entry is recorded in a test execution log to note the execution of the procedure and whether or not the test procedure uncovered any defects. Checkpoint meetings are held throughout the execution phase. Checkpoint meetings are held daily, if required, to address and discuss testing issues, status and activities. The output from the execution of test procedures is known as test results. Test results are evaluated by test engineers to determine whether the expected results have been obtained. All discrepancies/anomalies are logged and discussed with the software team lead, hardware test lead, programmers, software engineers and documented for further investigation and resolution. Every company has a different process for logging and reporting bugs/defects uncovered during testing. A pass/fail criteria is used to determine the severity of a problem, and results are recorded in a test summary report. The severity of a problem, found during system testing, is defined in accordance to the customer’s risk assessment and recorded in their selected tracking tool. Proposed fixes are delivered to the testing environment, based on the severity of the problem. Fixes are regression tested and flawless fixes are migrated to a new baseline. Following completion of the test, members of the test team prepare a summary report. The summary report is reviewed by the Project Manager, Software QA Manager and/or Test Team Lead.  
After a particular level of testing has been certified, it is the responsibility of the Configuration Manager to coordinate the migration of the release software components to the next test level, as documented in the Configuration Management Plan. The software is only migrated to the production environment after the Project Manager’s formal acceptance.

**13. What testing approaches can you tell me about?**

**Answer:**  Each of the followings represents a different testing approach:

Black box testing

White box testing

Unit testing

Incremental testing

Integration testing

Functional testing

System testing

End-to-end testing

Sanity testing

Regression testing

Acceptance testing

Load testing

Performance testing

Usability testing

Install/uninstall testing

Recovery testing

Security testing

Compatibility testing

Exploratory testing

ad-hoc testing

User acceptance testing

Comparison testing

Alpha testing

Beta testing

Mutation testing

**14. How do you divide the application into different sections to create scripts?**

**Answer:** First of all, the application is divided in different parts when a business analyst writes the requirement document (or Use Cases or Design Document), he/she writes EACH requirement document for EACH module. Let us say, if there are 12 different modules in an application that a business analyst has written the requirements for, then a tester would write the test cases for each module, which means in 12 different sections. This is the standard practice. There might be scenarios where you might have to break down scripts into sub-categories. For example, if a tester is writing a script for Login Page, he/she might write one for positive and negative testing and another sub-set of test cases would be for error message when the wrong information is entered. In short, the test cases are divided according to the modules.  
(The following questions were asked to Padma in one of her interviews very recently)

**15. What is your goal?**

(This question is asked to check how ambitious you are as far as your career is concerned, whether you like the job you are doing and so on. Therefore, no matter what, you should stick to your QA job at this point and say that you love this so much and your goal is something similar to the one below)  
**Answer:** My goal is to be QA Lead (or QA Manager) in near future.

[QA Interview Questions and Answers Part - 7](https://www.pavantestingtools.com/2018/06/qa-interview-questions-and-answers-part_13.html)

**1. What are you expecting from our company?**

**Answer:** My expectation from you company would be I will have more challenges and new things to learn and whatever the skills I have to contribute, hopefully, I will be able to contribute if they are in any way helpful to enhance productivity of the company.

**2. What did you learn from your previous companies?**

**Answer:** I learned a lot from the previous companies wherever I have worked. Wherever I have worked, I found out the there is always something to learn. Different companies have different ways of working. The environment and technology always differ from one company to another company. I have never found one company’s environment matching with another company. For example, if one company is using documents called requirement documents, then the other company might be using Use Cases and some companies might be using Design Document and so on. Therefore, in my experience, there are always new things to learn in every company and we can always contribute these thing in the next company if they help to be more productive.

**3. What do you want to be in next 2 years?**

**Answer:** I want to be QA Lead in another two years.

**4. Why QA Lead? Why not something else?**

**Answer:** QA is the only thing I love doing it. I love this job and want to progress in this sector. I want to know how to manage QA process, how to handle different jobs and so on. Since the next step is the QA Lead, that would preferably be one I will targeting for.

**5. Why do you want to work for this company?**

**Answer:** (This is a tricky question. They want to know what really interests you and you have to be careful when you answer this question. You must admire the line of that company. For example, if you are being interviewed by a pharmaceutical company, then tell them that you are always interested in the medical applications and the better part of your company is that it has exciting products that I am really curious to learn. That’s why I would feel really great if I am given the opportunity to work in your company)

**6. Did you get any compliments from your previous employers? What were those situations?**

**Answer**: Yes. I did. There were many occasions where I had compliments. For example, I was testing an application going a little bit off my test cases. After I finished executing my test cases, I always think in a way what a real user would possibly click in various parts of the application. So I was just clicking back and forth and at one specific scenario, the application simply broke and displayed an error message. That scenario was not in the test cases. The manager really appreciated me and thanked for finding this kind of critical defect. Answer: Yes. I did. There were many occasions where I had compliments. For example, I was testing an application going a little bit off my test cases. After I finished executing my test cases, I always think in a way what a real user would possibly click in various parts of the application. So I was just clicking back and forth and at one specific scenario, the application simply broke and displayed an error message. That scenario was not in the test cases. The manager really appreciated me and thanked for finding this kind of critical defect.

**7. What are your strengths?**

**Answer:** I am a very detailed oriented person. I have the sense of urgency. I can prioritize my job according to the deadline. I am very much dedicated towards my job. I am honest. I have the skills and expertise in QA process. These are some of my strengths.

**8. What is your weakness?**

**Answer:** I think my weakness is that whenever I am given some responsibilities and there is a deadline for it, I work day and night, 7 days a week. This is probably bad for my family life, but I can’t sleep unless I am done with my assignments.  
(Note: You should think of your weakness where because of your weakness (like the one above), still the employer benefits. DON’T SAY anything negative thing, like “I cannot work long hours, it is hard for me pick up things, it is difficult for me to understand requirement documents etc)

**9. What is your salary requirement?**

**Answer:** $70k (negotiable), or ($35 per hour)

**10. Please provide information (an example) of your experience testing Linux and UNIX environments (including type of system tested, how tested, actual commands and steps used for test) Testing applications using Linux and UNIX.**

**Answer:** I have tested applications using UNIX. For every backend testing I have done in the past, I have used UNIX platform while performing backend testing. For example, when the data is fed into the system in the front end, that data goes to the database after the batch processing. From the database, the data is now sent to the ETL system (in XML format) for data manipulation as per our need (ETL is a software tool of Ab Initio company which is used to manipulate data in the data warehouse). In the ETL system, we manipulate those data according to our need), for example, it could be income statement of the company, balance sheet, monthly reports, and so on. In order to produce income statement, we need to run a job in ETL. To run this job, we use UNIX. In the same way, different types of jobs are created for each need (creating balance sheet is another job, creating reports is next job etc) then I had to run different jobs in the ETL system. Once we run the job, the running job finally creates an output file which is now validated by us tester. This output file can be in text format or GUI format. Thus, this is the scenario where I had to use UNIX. (I have used Linux much, however, since UNIX and Linux are the same thing, I should have no problem in using Linux)

Some of the commands I used while testing using UNIX are;  
Ls –l ———>to check the file list  
Pwd———-> to see which directory I am in  
Cd ———–>change the directory  
Cd .. ———>change the directory one level up  
Mkdir ———>make a directory  
Rmdir ———>Delete the directory  
setenv name v ——>Set environment  
kill% ——–>Kill the running job  
vi ———>editor Used to write scripts  
more——-> to see the contents page by page  
cat —–>list contents of the file  
chmod ——–>change permission  
cp ——–>copy  
rm —–>delete a file

**11. How do you do risk assessment? (This question was asked to Mona in her interview)**

**Answer:** (This is what Mona answered): The risks by understanding the infrastructure of the application, hard drive and system capabilities etc. Also added “Risk and Mitigation Strategy” column within the test plan. The major risk for the company was system getting crashed upon receiving several hits by the users . Company did not set any metrics at the development phase as to what it can handle. I told him that i noted mitigation strategy to deal with each known risk within the test plan.

**12. What is SQL and how is it used?**

**Answer:** The following are the some of the things that a tester has to know (but may not be asked in the interview)What is a cookie? (You must know how to clean cookies)  
A small text file of information that certain Web sites attach to a user’s hard drive while the user is browsing the Web site. A Cookie can contain information such as user ID, user preferences, archive shopping cart information, etc. Cookies can contain Personally Identifiable Information.

**13. Does a tester have to know about cookie?**

**Answer:** Yes. A tester has to know HOW TO CLEAN cookies (Does not have to know the definition).

**14. Why do we need to clean cookies?**

**Answer:** A tester can clean cookies by opening Internet Explorer browser and Firefox browser (whatever you are using). We need to clean cookies BECAUSE:  
When we get a new build, we must clean cookies. (Remember, once the developers fix the defects, the configuration team makes a build and this process continues until the product (application) is ready to handover to the customer). If we don’t clean cookies, then there is a possibility that we may get the same error which was already fixed by the developer. Why? Because the error is sitting inyour computer hard drive and the computer feels easy to get the same information from the hard drive rather than going to the server and pulling new thing for the same thing. For example, let us say, when you were testing a page, there was a button called “OK”. The client decided that “OK” is NOT the right button here, therefore, that button name was changed from “OK” to “Continue”. Accordingly, you wrote a defect saying that “OK” button should be changed to “Continue” button. Now, this defect is fixed (the developer changed the “OK” button to “Continue”). Now, you started testing, there is a possibility that you might see “OK” button again. Why? Because you DID NOT clean your cookies.   
Therefore, you must clean your cookies before you starting testing a new build.

**15. How to clean cookies?**

**Answer:** Cookies are cleaned in the browsers like IE (Internet Explorer), Firefox, Safari (for MAC and windows both), Netscape and so on.   
However, the mostly used (90%) browser is IE (Internet Explorer)  
Here is how you clean cookies in IE (Internet Explorer):  
1. Open IE (Internet Explorer)  
2. On the menu, click Tools–>Internet Options–>Click Delete button (It is in General Tab)  
(You will see different buttons now, for example, Delete Files, Delete Cookies, Delete History, Delete Forms, Delete Passwords,  
Delete All).  
3. Click Delete All button.  
Now the cookies are cleaned in IE.  
Here is how you can clean cookies in Fire Fox:  
1. Open Firefox Brower.  
2. Click Tools.  
3. Click Error Console.  
4. Click Clear.  
Now the cookies are cleaned in Firefox.

[Scrolling Web Pages using Selenium WebDriver](https://www.pavantestingtools.com/2017/11/scroll-web-page-down-or-up-using.html)

There are 3 different ways to Scroll Web Pages.  
  
1.Scroll page by proving pixel number.  
2. Scroll page till we find a web element on the page  
3. Scroll page till bottom of the page

To scroll web page using Selenium, we can use **JavaScriptExecutor** interface that helps to execute JavaScript methods through Selenium Webdriver.

**Syntax:**  
window.scrollBy(xnum, ynum)

**Parameters:**

**xnum** is a *Number*

Required. How many pixels to scroll by, along the x-axis (horizontal). Positive values will scroll to the right, while negative values will scroll to the left

**ynum** is a *Number*

Required. How many pixels to scroll by, along the y-axis (vertical). Positive values will scroll down, while negative values scroll up

**Return Value:**No return value

**Examples:**

**Scroll page by proving pixel number**

  js.executeScript("window.scrollBy(0,500)");

**Scroll page till we find a web element on the page**

  js.executeScript("arguments[0].scrollIntoView();",Element );

**Scroll page till bottom of the page**

  js.executeScript("window.scrollTo(0, document.body.scrollHeight)");

**Test Script**

import org.openqa.selenium.By;

import org.openqa.selenium.JavascriptExecutor;

import org.openqa.selenium.WebDriver;

import org.openqa.selenium.WebElement;

import org.openqa.selenium.chrome.ChromeDriver;

public class Scrolling {

public static void main(String[] args) {

System.setProperty("webdriver.chrome.driver", "C://Drivers/chromedriver\_win32/chromedriver.exe");

WebDriver driver = new ChromeDriver();

driver.get("https://www.countries-ofthe-world.com/flags-of-the-world.html");

driver.manage().window().maximize(); // maximum browser window

JavascriptExecutor js = (JavascriptExecutor) driver;

// 1. scrolling by using pixel

js.executeScript("window.scrollBy(0,1000)", "");

// 2. scrolling page till we find element

WebElement flag = driver

.findElement(By.xpath("//\*[@id='content']/div[2]/div[2]/table[1]/tbody/tr[86]/td[1]/img"));

js.executeScript("arguments[0].scrollIntoView();", flag);

// 3. scroll page till bottom

js.executeScript("window.scrollTo(0,document.body.scrollHeight)");

}

}

[How To Find Broken Links Using Selenium WebDriver](https://www.pavantestingtools.com/2017/11/how-to-find-broken-links-using-selenium.html)

One of the key test case is to find broken links on a webpage. Due to existence of broken links, your website reputation gets damaged and there will be a negative impact on your business. It’s mandatory to find and fix all the broken links before release. If a link is not working, we face a message as 404 Page Not Found.

Let’s see some of the HTTP status codes.

200 – Valid Link

404 – Link not found

400 – Bad request

401 – Unauthorized

500 – Internal Error

Consider a test case to test all the links in the home page of “http://newtours.demoaut.com"

Below code fetches all the links of a given website (i.e., http://newtours.demoaut.com) using ***WebDriver***commands and reads the status of each *href* link with the help of ***HttpURLConnection*** class.

**Example:**

import java.io.IOException;  
import java.net.HttpURLConnection;  
import java.net.URL;  
import java.util.List;  
import java.util.concurrent.TimeUnit;  
import org.openqa.selenium.By;  
import org.openqa.selenium.WebDriver;  
import org.openqa.selenium.WebElement;  
import org.openqa.selenium.chrome.ChromeDriver;  
  
public class BrokenLinks {  
 public static void main(String[] args) throws InterruptedException, IOException {  
  
 // Instantiating FirefoxDriver  
 System.setProperty("webdriver.chrome.driver", "C://Drivers/chromedriver\_win32/chromedriver.exe");  
 WebDriver driver = new ChromeDriver();  
  
 // Maximize the browser  
 driver.manage().window().maximize();  
  
 // Implicit wait for 10 seconds  
 driver.manage().timeouts().implicitlyWait(10, TimeUnit.SECONDS);  
  
 // To launch pavantestingtools.com  
 driver.get("http://newtours.demoaut.com/");  
  
 // Wait for 5 seconds  
 Thread.sleep(5000);  
  
 // Used tagName method to collect the list of items with tagName "a"  
 // findElements - to find all the elements with in the current page. It  
 // returns a list of all webelements or an empty list if nothing matches  
 List links = driver.findElements(By.tagName("a"));  
  
 // To print the total number of links  
 System.out.println("Total links are " + links.size());  
  
 // used for loop to  
 for (int i = 0; i < links.size(); i++) {  
 WebElement element = links.get(i);  
 // By using "href" attribute, we could get the url of the requried  
 // link  
 String url = element.getAttribute("href");  
  
 URL link = new URL(url);  
 // Create a connection using URL object (i.e., link)  
 HttpURLConnection httpConn = (HttpURLConnection) link.openConnection();  
 // Set the timeout for 2 seconds  
 httpConn.setConnectTimeout(2000);  
 // connect using connect method  
 httpConn.connect();  
 // use getResponseCode() to get the response code.  
 if (httpConn.getResponseCode() >= 400) {  
 System.out.println(url + " - " + "is Broken Link");  
 } else {  
 System.out.println(url + " - " + "is valid Link");  
 }  
 }  
 }  
}

[How To Resize Browser Window Using Selenium WebDriver](https://www.pavantestingtools.com/2017/11/how-to-resize-browser-window-using.html)

To resize browser window to particular dimensions, we use ‘Dimension’ class to resize the browser window.

The below code opens the pavantestingtools.com blog and then set the browser window size to 480\*620 .

import org.openqa.selenium.Dimension;  
import org.openqa.selenium.WebDriver;  
import org.openqa.selenium.firefox.FirefoxDriver;  
  
public class ResizeBrowser {  
  
 public static void main(String args[]) {  
 System.setProperty("webdriver.gecko.driver", "C://Drivers//geckodriver.exe");  
 WebDriver driver = new FirefoxDriver();  
 driver.navigate().to("http://www.pavantestingtools.com");  
 System.out.println(driver.manage().window().getSize());  
 // Create object of Dimensions class  
 Dimension d = new Dimension(480, 620);  
 // Resize the current window to the given dimension  
 driver.manage().window().setSize(d);  
 System.out.println(driver.manage().window().getSize());  
 }  
}

[ETL Design Process & Best Practices](https://www.pavantestingtools.com/2017/08/etl-design-process-best-practices.html)

Introduction

ETL stands for Extract Transform and Load. Typical an ETL tool is used to extract huge volumes of data from various sources and transform the data dependi­ng on business needs and load into a different destination. In the modern business world the data has been stored in multiple locations and in many incompatible formats. The business data might be stored in different formats such as Excel, plain text, comma separated, XML and in individual databases of various business systems used etc. Handling all this business information efficiently is a great challenge and the ETL tool plays an important role in solving this problem.

Extract, Transform and Load

There are three steps involved in an ETL process

***Extract***– The first step in the ETL process is extracting the data from various sources. The source is usually flat file, XML, any RDBMS etc…

***Transform***– Once the data has been extracted the next step is to transform the data into a desired structure. The data transformation step may include filtering unwanted data, sorting, aggregating, joining data, data cleaning, data validation based on the business need.

***Load***– The last step involves the transformed data being loaded into a destination target, which might be a database or a data warehouse.

There are many challenges involved in designing an ETL solution. Following some best practices would ensure a successful design and implementation of the ETL solution.

Analyzing Source Data

This is the first step of the ETL development. It is always wiser to spend more time on understanding the different sources and types during the requirement gathering and analyzing phase. Understand what kind of data and volume of data we are going to process.

Mapping of each column source and destination must be decided.

Data types of source and destination needs to be considered.

Identify complex task in your project and find the solution

Use Staging table for analysis then you can move in the actual table

Fixing Data Issues

Users are frequently facing data issues in the source files. It will be a pain to identify the exact issue. Hence it is important that there should be a strategy to identify the error and fix them for the next run.

Add data validation task and if there’s any issue you can move them in a separate table/file.

Communicate to source Partner experts to fix such issues if it is repeated.

Add autocorrect task (lookup) if any known issues such as spell mistake, invalid date, email id etc.

Validation

As part of the ETL solution, validation and testing are very important to ensure the ETL solution is working as per the requirement. You can create multiple test cases and apply them to validate. Execute the same test cases periodically with new sources and update them if anything is missed.

Validate all business logic before loading it into actual table/file.

Create negative scenario test cases to validate the ETL process

Test with huge volume data in order to rule out any performance issues.

Keep your test cases update to date.

Ensure the configured emails are received by the respective end users.

Optimizing the ETL Solution

After you have completed the basic functionality of your ETL solution you should optimize it for memory consumption and performance of the ETL solution as a whole. Basic database performance techniques can be applied. Make the runtime of each ETL step as short as possible. Perform the Performance testing in different environments and for different sizes of data.

Ensure that the Hardware is capable to handle the ETL.

Drop indexes while loading and re-create them after load

Disable all triggers in the destination table and handle them in another step.

Use parallel process wherever possible.

Capture each task running time and compare them periodically.

Disable check and foreign key constraint to load faster.

Error Handling, Logging and Alerting

Identify a best error handling mechanism for your ETL solution and a Logging system. The error handling mechanism should capture the ETL project name, task name, error number, error description. Logging should be saved in a table or file about each step of execution time, success/failure and error description. This information will be helpful to analyze the issue and fix them quickly.

Log all errors in a file/table for your reference

Ignore errors that do not have an impact on the business logic but do store/log those errors. If the error has business logic impacts, stop the ETL process and fix the issue.

Have an alerting mechanism in place. Send Error message as an Email to the end user and support team.

Point of Failure Recovery

There is always a possibility of unexpected failure that could eventually happen. A typical ETL solution will have many data sources that sometime might run into few dozens or hundreds and there should always be a way to identify the state of the ETL process at the time when a failure occurs. Enable point of failure recovery during the large amount of data load. It helps to start the process again from where it got failed.

Scheduling, Auditing & Monitoring ETL Jobs

The last step of ETL project is scheduling it in jobs, auditing and monitoring to ensure that the ETL jobs are done as per what was decided.

Schedule the ETL job in non-business hours.

Decide who should receive the success or failure message.

User mail ID should be configured in a file/table for easy use.

[BDD and ATDD – Exploring the Differences](https://www.pavantestingtools.com/2017/07/bdd-and-atdd-exploring-differences.html)

It is a good idea to explore Behavior Driven Development and Acceptance Test Driven Development methods. This post will help you understand how are these two development strategies different from TDD and each other.

**The Basics**

*Behavior Driven Development* is a variation of TDD methodology, where in the main focus is on behavioral specifications of the product or application.  When BDD is adapted in a project, the technical nitty-gritty aspects of the requirements and implementation are outlined in a business-oriented language.

*Acceptance Test Driven Development*is a methodology that focuses on the overall collaboration between different stakeholders in a project. It encourages the whole team of developers, QA and business analysts to define the acceptance criteria of an application prior to commencing it’s development.

**The Differences**

Though the above definitions provide us with a brief understanding of these methodologies, their differences need more exploration.

While TDD is about writing tests to satisfy system requirements as outlined in the BRD, BDD encourages developers to write tests such that they reflect the behavioral expectations from the system of the stakeholders, and not just the functional aspects.  BDD uses Ubiquitous language that can be understood by the developers and stakeholders.

ATDD works on the similar lines with subtle differences. In ATDD, the tests are written together with/by developers, testers and customers. Instead of writing up a test case, here, an executable specification is created that can later be run to test the code.

**Benefits of BDD**

The tests, and consequently, the code focus on the behavior of a feature thus making customers happy and content.

BDD helps developers concentrate on designing robust solutions.

Technical language is given a rest to pave way for better communication and understanding between various parties involved in a project.

BDD tools such as Cucumber and SpecFlow can be used to generate test scripts from the written test cases.

**Benefits of ATDD**

One can create executable specification in line with the requirement the can be refined and run at a later date.

Testing is moved to the beginning of the cycle thus reducing defects and bug fixing effort as project progresses.

Testers, developers and business analysts can work together to better understand what is required from the system.

The focus is on the ‘What’ and not the ‘How’ thus making it easier to meet customers’ requirements.

[Selenium Common Exceptions](https://www.pavantestingtools.com/2017/07/selenium-common-exceptions.html)

When you work with Selenium you willencounter many exceptions. Solving of those exceptions would be sometimes very tricky but If you read the exception the answer to solving is in the meaning of Exception name. We will be going through some most commonly used Exception in Selenium.

NoSuchAttributeException find\_element\_by\_\* can’t find the element.

NoSuchElementException find\_element\_by\_\* can’t find the element.

InvalidSelectorException Thrown when the selector which is used to find an element does not return a WebElement. Currently, this only happens when the selector is an XPath expression is used which is either syntactically invalid (i.e. it is not an XPath expression) or the expression does not select WebElements.

ElementNotVisibleException Thrown to indicate that although an element is present on the DOM, it is not visible, and so is not able to be interacted with.

RemoteDriverServerException

NoSuchWindowException

ElementNotSelectableException

NoSuchFrameException

WebDriverException

UnexpectedTagNameException Thrown when a support class did not get an expected web element

UnableToSetCookieException Thrown when a driver fails to set a cookie.

MoveTargetOutOfBoundsException Indicates that the target provided to the actions move() method is invalid.

InvalidSwitchToTargetException The frame or window target to be switched doesn’t exist.

InvalidElementStateException

InvalidCookieDomainException Thrown when attempting to add a cookie under a different domain than the current URL

ImeNotAvailableException Indicates that IME support is not available. This exception is thrown for every IME-related method call if IME support is not available on the machine.

ImeActivationFailedException Indicates that activating an IME engine has failed.

ErrorInResponseException An error has occurred on the server side.

TimeoutException Thrown when a command does not complete in enough time.

StaleElementReferenceException Indicates that a reference to an element is now “stale” — the element no longer appears on the DOM of the page.

[How to Conduct Database Regression Testing?](https://www.pavantestingtools.com/2017/06/how-to-perform-database-regression.html)

**Why Test a Database?**

Just as developers are human and prone to errors, database containing mission critical information and lines of codes on which applications are built is also vulnerable to errors and requires regular maintenance and updating from time to time. Organizations use several applications day in and day out that work on database which gets altered depending on the requirements. The best way to ensure the functioning of these applications is to test them on a regular basis for the new features and changes made in the database. This is what Regression Testing is all about.

**What is Regression Testing of Database?**

Database regression testing refers to performing regression testing of the database for any new changes and updates made in the database to keep its integrity intact even after modifications in it.

Steps to database regression testing:

**Step 1: Decide What to Test in Database Regression Testing?**

When it comes to performing regression testing of a database, it is never pre-defined as to which part or kind of database gets updated that requires retesting. The updates keep on occurring in various areas of database and testers need to target those updates to get the most out of their efforts. Generally, database testing comprises of following:

Incoming data values,

Outgoing data values (generated for raw queries),

Database elements (tables, procedures)

Metadata for web applications

Data load that’s somewhat we call “load testing”

While performing regression testing of database, if you are adopting an approach of either **Black-box testing or White-box testing**, your contents for testing would be something like this

Black-box Testing at the Interface

O/R mappings (including the metadata)

Incoming data values

Outgoing data values (from queries, stored functions, views ...)

Stored Procedures & Functions

White/Clear-Box Testing Internally Within the Database

Database Schema (tables, procedures, etc.)

Triggers

View Constraints

View definitions

Referential integrity (RI) rules

Default values for a column

Data invariants involving several columns

Step 2: Decide When to Test Database for Regression Testing?

When you change something in the existing database or application that runs on the database to refactor it or add new functionality, you need to ensure that you have not broken anything. This requires you to perform regression testing to either fix the errors or roll back to the changes made in the database. Hence, database regression testing is generally done after introducing changes in the database to check the behavior of the modified code. It requires hundreds of new tests to retest in order to check and rectify the newly written code as well as integration with other systems or applications.

If you are working in an agile environment, you need to take the Test-First Approach or Test-First Development (TFD). In this approach of regression testing, you need to prepare test codes parallel to development in order to test the business logics implemented in the database as well as forms, data validation rules, referential integrity, etc. in the database which works like a cycle as mentioned below

Add a Test

Run Your Tests

Update the codes or make changes

Run Your Tests Again

Step 3: Decide How to Perform Regression Testing of Database?

This is the most important question that comes to the testers’ mind while performing regression testing of the database. Regression testing can be performed both in manual and automated manner.

A common practice in agile team is that testers have their own “sandboxes” to work. A sandbox is basically a technical environment that isolates untested codes form production repository.You can opt for either of them depending on the size of the tests and database.

In my opinion, automated regression testing is more beneficial since it allows testers to test and manage a large number of databases without manual intervention. In other words, it allows you to perform other tasks while the testing automation tool continues to do its job in the background and sends the report of bugs if any.

Automated regression testing of database seems more easy and convenient and adds to the testers’ productivity saving a huge amount of time along with imparting following benefits

Entire database regression testing process gets automated

Reduces testing efforts by 50 to 75%

Testing is done parallel to development

Extensive test coverage can be achieved

There are several software testing tools that takes care of regression testing. These tools help in getting the testing team up with the database regression testing requirements in no time overcoming several challenges they face in manual testing.

[Informatica Tasks](https://www.pavantestingtools.com/2017/05/informatica-tasks.html)

The below are major workflow tasks available in *Informatica power center tool*.

Session

It allows to select the mappings and order can be of execution can be set. Also for running mappings instructions will be captured. It is a reusable task in a workflow.

Email

It will trigger an email notification during execution. The parameters are email username, subject, and text.

It will be used when a job fails or any duplicate data identified.

Command

It is used to run shell commands. To copy a file, delete, running SQL commands from an SQL file can be done from here using a shell script.

Control

It can stop the execution of workflow in case of something went wrong or any deviation notified from decision task.

Decision

It will notify as yes or no based on given condition, followed by positive or negative flow will be executed.

Timer

It makes the workflow, wait for a specific time before going to next command.

[Dynamic Pages, Window Alerts, Pop-Ups](https://www.pavantestingtools.com/2017/05/dynamic-pages-window-alerts-pop-ups.html)

**Is Selenium able to handle dynamic AJAX elements?**

Yes

No

Cant Say

**Ans:** 1

**How to use xpath for dynamic elements?**

Identify the pattern and modify xpath pattern

Directly use the xpath?

Both 1 and 2

None of the above

**Ans:** 1

**Selenium can handle Javascript alerts.**

TRUE

FALSE

**Ans:** 1

**Is Regular expression helps to identify dynamic elements?**

Yes

No

Not very compatible

**Ans:** 3

**How to check if any check box is checked or not?**

**driver**.findElement(**By**.id(<>).Selected()

**driver**.findElement(**By**.id(<>).isSelected()

**driver**.findElement(**By**.id(<>).isChecked()

All of the above

**Ans:** 2

**Can Selenium handle Alerts or Pop ups windows?**

Yes

No

**Ans:** 1

**What is getWindowHandle method?**

Method will help to handle parent window

Method will help to handle of opened windows other than parent

Only handles alert

None of the above

**Ans:** 2

**How to handle alert using selenium?**

**driver**.switchto.popup()

**driver**.switchto

**driver**.switchto.alert()

None of the above

**Ans:** 3

**What is Iterator?**

Iterator enables you to cycle through a collection, obtaining or removing elements

It basically starts at the beginning of a collection

When you want to know which things are in a certain collection, you iterate over the collection, which is just another term for going through all elements. This is what an Iterator does

All of the above

**Ans:** 4

**After the popup actions, how to switch the driver back to the parent window?**

**browser**.switchTo().window(**parentWindowHandle**);

**browser**.switchTo().alert();

Both 1 & 2

None of the above

**Ans:** 1

[ETL Tool Selection Process](https://www.pavantestingtools.com/2017/05/etl-tool-selection-process.html)

Selecting a tool is an organizational level decision since it will be the base for all future *data integration* works. Hence huge amount of analysis and time need to be invested before selecting a tool.

Below are few factors to be considered for tool comparisons,

Handling different type of sources

The tool must have the features to select the source type as a database or flat file. Within the database, it must offer to connect different relational databases. Also within the flat file, it must have the option to select a text file, excel or XML file etc.

Performance

Performance is one of the key factors which decide the best product in the current market across all industries. The tool must offer good performance in all extraction, transformations and loading components.

Usability

The user interface and job hierarchy maintenance should be very user-friendly since cannot be afforded a tool which does not have organized properly.  Selecting different components and linking should not take additional efforts. The tool must have job execution monitor to view running status with appropriate details and log files which will make testers job easier. Job flows need to be displayed as pictorial diagrams which will make easy for a user to understand.

Maintenance

It will be accounted as part of long-term benefit since nowadays the maintenance cost is increasing equal to the development cost.

The tool should be designed such a way that it gives requires maintenance effort.

Features

The tool must offer separate components for every transformation which would be easy for building and debugging. Also, it should have provisions to run the java code, run a package, and run shell scripts.

Data quality

The efficiency of the tool will be decided by the quality of data outcome. All the components must deliver 100% quality.

Support

The necessary support should be provided at the right time with proper resolution within the defined turnaround time. In case, of urgency on call support need to be given.

Cost

Affordability of the tool also plays a major role. The tool must offer the cost in affordable rate for the longer period.

Version control

The tool must give provision to maintain the versioning or can be integrated with version control tool to avoid rework.

[ETL tools in data warehouse](https://www.pavantestingtools.com/2017/05/etl-tools-in-data-warehouse.html)

There are multiple tools available in the market for ETL process. Tools are developed with different technologies and offering more features for a smooth end to end data integration. Here are few ETL tools,

**Informatica Power center**

One of the major tool in worldwide. Majorly this tool is using for ETL, data masking, and data quality.It has four major components,

Repository manager – to add repository and managing folders

Designer – creating mappings

Workflow manager – creating workflow with task and mappings

Workflow monitor – workflow run status tracker

Talend Open Studio

One of the **open source tool** for data integration (ETL) which has been developed in JAVA. Widely this tool is used for ETL, Data migration, and big data.

IBM Datastage

It has four major components,

Manager – to manage the repository

Designer – developing job

Director – job scheduling, job running, and monitoring

Administrator – creating users and managing projects/folders

SQL Server Integration Services (SSIS)

SQL server offers this tool for data integration with wide features of extract, transform and load.

**Ab-initio**

**Oracle Data Integrator**

**SAS – Data Integration Studio**

**Business Object Data Integrator**

**Clover ETL**

**Pentaho Data Integration**

[ETL job development steps in Informatica](https://www.pavantestingtools.com/2017/05/etl-job-development-steps-in-informatica.html)

Open Informatica power center designer

Add a repository

Click on “Repository -> Add”

Enter a repository and username

Click on ok

Connect to a repository

Right click on created repository

Click on connect

Click on Add under “Connection Settings” section

Enter value for “Domain name”, “Gateway Host” and “Gateway port”

Click on Ok

Select the security domain

Enter password

Click on connect

Connect to a folder

Right click on folder which you want to work

Click on Open

Creating “Source Analyzer”

Click on “Source Analyzer” icon

Click on Sources from toolbar and select “Import from Database” or “Import from file”

Select “data source”

Enter username, schema, and password

Click on connect

You can see the list of tables under “Select Tables” section

Select a table

Click on ok

Creating “Target Designer”

Click on “Target Designer” icon

Click on Targets from toolbar and select “Import from Database”

Select “data source”

Enter username, schema, and password

Click on connect

You can see the list of tables under “Select Tables” section

Select a table

Click on ok

Creating Mappings

Click on “Mapping Designer” icon

Click on Mappings from toolbar and select “Create”

Enter mapping name and click ok

Drag and drop the created Source Analyzer and Target Designer

Click on Transformation from toolbar and select “Create”

Select type of transformation

Enter the name for transformation

Select the columns from source and drag into transformation component

Double click on transformation

Creating Workflow

Click on “Workflow Manager” icon

Connect to the repository

Right click on folder and select Open

Click on “task” from toolbar and select create

Select the task type as “Session”

Enter session name

Click on Ok

Select the created mapping and click ok

Double click on Session

Click on Mapping tab

Select the source table

Set source database connections under “connections” section

Select the target table

Set target database connections under “connections” section

Link the Start task and session task

Running Workflow

In workflow Designer section, right click on workflow and select “Start workflow”

Monitoring Workflow

“Workflow monitor” will be opened automatically when we start a workflow

The execution status will be displayed

Double click on the session

Session information including Source/Target statistics will be displayed

[Partitioning in Informatica](https://www.pavantestingtools.com/2017/05/partitioning-in-informatica.html)

Partitioning is a concept of creating parallel threads and processing the data distribution technique. It will be used when the volume of data is huge which directly impact the data load and other transformation progress.

Database and ETL tools are offering this partition concept to improvise the job execution time for high volume data tables.

Below are the types of partitioning available in Informatica power center tool,

Pass Through

The pipeline will be created for data load and data count would be mapped to each pipeline. The data count once assigned, the data will be processed through that pipeline only.

We can use this type when we don’t want to increase the number of partitioning.

Database partitioning

ETL tool will read the portioning applied at the database level and will apply the same logic to distribute the data over partitions.

We can use this type when proper partitioning applied at the database level.

Key range

The start range and end range of data to be mentioned, based on data range data will be distributed.

We can use this key range when we are sure about data range and it won’t change in future. Also, the same key range partitioning is applied in the target database.

For example, age between 0-25, 26-50, 51-75 and 75-125.

Round robin

The tool itself will split and distribute the data evenly to partitions based on the number of records.

We can use this round robin when we are not sure about data volume and do not require to group the data.

Hash Auto key

The data will be distributed based on group by column. Need to make sure that before applying partition the data has been grouped properly.

We can use this auto key when data grouping is in place before partitioning step.

Has user key

The group by column needs to be specified manually and [tool](http://www.wowetltesting.com/etl-tools-list/) will distribute data based on group by column.

We can use this user key when we are data grouping.

[Transformation Rules](https://www.pavantestingtools.com/2017/05/transformation-rules.html)

The transformation term describes a manual intervention which is required to modify the data into required format after extracting the source data.

Active Transformation

The output record count of the transformation **may or may not equal** to input record count.

For example, when we apply filter transformation for age column with the condition of age between 25 and 40. In this case, the data will come out which satisfies this condition, hence the outcome count cannot be predicted.

Passive Transformation

The output record count of the transformation is **equal** to input record count.

For example, when we apply expression transformation to concatenate first name and last name columns, in this case, the data will come out even though the columns do not have values.

Connected Transformation

A transformation which is being **linked** with other transformation or target component is called connected.

Unconnected Transformation

A transformation which is **not being linked** with any other transformation or target component is called unconnected.

List of transformations based on Informatica power center tool,

**Joiner**

It’s an active transformation. It joins 2 or more sources along with join condition. The data will be returned if it satisfies the join condition else data will be rejected.

**Filter**

It’s an active transformation. A column can be selected as a filter with a condition. The data will be returned if it satisfies the filter condition else data will be rejected.

**Expression**

It’s a passive transformation. An expression can be mentioned like concatenation or replacement for NULL values. The expression will be applied to a specific column and returned.

**Sorter**

It’s an active transformation. The sorting column can be selected along with the order to be sorted either ascending or descending. Based on the column and order the rows will be sorted.

**Aggregator**

It’s an active transformation. An aggregate function can be applied to a measure such as Max, Avg, Max, count and Min etc.

**Router**

It’s an active transformation. The routing condition can be mentioned and the data will be routed/divided based on condition, different functionality will be applied on divided data.

For example, a source table has active\_flag column which contains values as YES or NO. The requirement would be loaded the data directly for active\_flag=YES else update is\_active=D then load.

**Union**

It’s an active transformation. The two or more sources can be merged with this transformation.

**Lookup**

It’s an active transformation. The lookup table and condition to be mentioned, if condition satisfies the required column value of lookup table will be returned.

**Rank**

The rank number will be generated based on given Grouping column and order.

**Normalizer**

It’s an active transformation. It converts the normal flat file into relational database data format.

**Sequence Generator**

It’s a passive transformation. It generates a sequence number for the specified column. Mostly it will be used for *creating a surrogate key*.

**Stored Procedure**

It’s an active transformation.  A stored procedure can be invoked during workflow run.

**Source Qualifier**

It’s a passive transformation. It converts the data types into Informatica specific data types.

**Transaction Control**

It’s an active transformation. It controls the commit and rollback of transactions.

**Java Transformation**

It’s an active transformation. Java code will be invoked during workflow run.

[Types of data load in ETL](https://www.pavantestingtools.com/2017/05/types-of-data-load-in-etl.html)

There are two major types of data load available based on the load process.

1.Full Load (Bulk Load)

The data loading process when we do it at very first time. It can be referred as Bulk load or Fresh load.

The job extracts entire volume of data from a source table or file and loading into truncated target table after applying transformations logics.

In most of the case, it could be a one time job run after then changes alone will be captured as part of an incremental load. But again based on business need, it will be scheduled to run.

 2. Incremental load (Refresh load)

The modified data alone will be updated in target followed by full load. The changes will be captured by comparing created or modified date against last run date of the job.

The modified data alone extracted from the source, the job will look for changes  in the source table against job run table, if change exists then data will be extracted and that data alone will be updated in the target without impacting the existing data.

If no changes are available then the ETL job will send a notification with no change available between source and stage/target message.

[Extract Transform Load](https://www.pavantestingtools.com/2017/05/extract-transform-load.html)

ETL (extract, transform, and load) is the process of extracting data from the source, transforming into required format and loading into the target database.

**Extract**

Extraction is the process of selecting/fetching data from source table or source file. As we know that the data will be coming from different types of sources (heterogeneous source) to data warehouse database. In that case, the extraction refers all type of source formats.The few source formats include a relational database, flat file, excel file and XML file.

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There are three types of extraction based on business requirements,

Extracting entire table or file data

Extracting only the part of data with applying filter condition

Extracting data only which have undergone modifications for incremental load

**Transform**

We cannot consume the transaction data’s as such, there will be manual interventions required to tweak the data for doing analysis and reporting. We need to modify the data based on how we want to see them in analysis view or report. The manual intervention on extracted data is called transformation.

Every business requirement will be called as transformation rule. It plays a vital role in improving the data quality by performing aggregations, filter, data cleaning, surrogate key generation and developing referential integrity.

Load

Loading the transformed form of data into the target database, the target could be operational data store (ODS) or data mart or data warehouse database. This would be the final step in ETL process.

There are two types of load full load and incremental load.

The big **challenge** in this stage is **handling the volume of data**, directly it affects the job performance. But the ETL tools are offering a provision to overcome this situation by using partitioning concept.

[Data masking](https://www.pavantestingtools.com/2017/05/data-masking.html)

**What does data masking mean?**

Organizations never want to disclose highly confidential information into all users. All sensitive data will be restricted to access in all environments other than production. The process of masking/hiding/encrypting sensitive data is called data masking.

**Data masking Techniques:**

Below are few usual ways or techniques of doing data masking,

Replacing subset of data with dummy characters (ex: aaa)

Replacing subset of data with dummy numbers (ex: 1111)

Replacing subset of data with dummy random numbers (ex: 1576)

Replacing subset of data with dummy special characters (ex: xxx)

Shuffling the characters or numbers

The masking will be achieved by using data masking tools or SQL functions based on requirement and data integration process.

Below are few organizations which would provide data masking feature,

Informatica

IBM

Oracle

Camouflage software

Normally the data format needs to be maintained to validate the data consistency and integrity Sometimes it might require unmasking the data to enable in production or for defect analysis. In that case, the mapping of masked data and original data will be stored in a flat file or table, so that we can perform unmasking.

The example attributes which would require masking,

            Email id, SSN, Account detail, Credit card number, mobile number and address etc.

Example for masking process,

Email id before masking – abcd13456@aaa.com

Email id after masking –xxxx13456@aaa.com

[OLAP vs OLTP](https://www.pavantestingtools.com/2017/05/olap-vs-oltp.html)

|  |  |
| --- | --- |
| **Transaction Database** | **Data warehouse database** |
| Dedicated database available for specific subject area or business application | Integrated from different business applications |
| It does not keep  history | It keeps history of data for analyzing past performance |
| It allows user to perform the below DML operations (Select/Insert/Update/Delete) | It allows only Select for end users |
| The main purpose is for using day to day transactions | Purpose is for analysis and reporting |
| Data volume will be less | Data volume is huge |
| Data stored in normalized format | Data stored in de-normalized format |

[Data Cleansing (data scrubbing)](https://www.pavantestingtools.com/2017/05/data-cleansing-data-scrubbing.html)

Data cleansing is a process of removing irrelevant and redundant data, and correcting the incorrect and incomplete data. It is also called as data cleaning or data scrubbing.

All organizations are growing drastically with huge competitions, they take business decisions based on their past performance data and future projection. Always better decision can be made through right and consistent data.

But all the source systems do not have data with expected accuracy level. We need to do amendments in data to achieve the accuracy level which would lead to taking better decisions.

**Irrelevant** – deleting data which are not required for business or not needed anymore

**Redundant** – deleting the duplicate data

**Incorrect** – updating incorrect values with correct value

**Incomplete** – updating incomplete values with full information

All data cleansing can be achieved by using transformation components in ETL tools or executing SQL procedure or simple queries in staging area.

[Data Retention – Archiving or Purging](https://www.pavantestingtools.com/2017/05/data-retention-archiving-or-purging.html)

What does data retention mean?

Data retention means defining how long the data need to be available in the database.

Why data retention policy is required?

**Performance** will be impacted due to increase of data

The **cost** will be high if database accumulates data

The old record **may not be useful** for end user over a certain period of time

What is purging?

It means deleting data from a database which crosses the defined retention time.

 What is archiving?

Archiving means moving the data which crosses the defined retention time to another database (archival database).

 What to select Archiving or Purging?

If the old records won’t be required at any point of time then purging will be applied, else the data will be archived.

**Example:**

A retail shop maintains a data warehouse where all the sales data will be loaded at the month level, as business is growing day by day still  more data will be getting loaded.

The shop has been running for the past 10 years now the data warehouse database size has got increased tremendously.

Also, the shop management says they do not want to view the report at **month level for 10-year-old data**. Hence they are planning to remove the data older than 10 years.

At the same time, they want to keep the data at year level instead of month level.

So the requirement would be, **roll up all month data’s into year level for data older than 10 years and delete the month level data**.

[Operational data store (ODS)](https://www.pavantestingtools.com/2017/05/operational-data-store-ods.html)

What is an Operational data store (ODS)?

It is a database which has integrated data from different business or sources with different rules. The data cleansing process applied also. It gets data from the transactional database directly or through staging area.

It will have a limited period of history data, hardly 30 to 90 days of data.

Why does ODS is required?

It will be used for operational monitoring and processing, and for creating simple analysis reports. The performance of processing will be faster since it has only less volume of data compare to data-mart.

Difference between data warehouse and ODS:

|  |  |  |
| --- | --- | --- |
| **Factor** | **ODS** | **Data mart or data warehouse** |
| Period | It will have limited period of data (30 to 90 days) | It stores history of data |
| Purpose | Operational processing | Forecasting and decision-making |
| Query complexity | SQL query complexity will be less | Query complexity will be high |
| Stage in architecture | It will be built before data warehouse | ODS data will be moved into data warehouse |

Operational data store vs OLTP (Online Transactional Processing):

|  |  |  |
| --- | --- | --- |
| **Factor** | **ODS** | **OLTP** |
| Period | It will have limited period of data (30 to 90 days) | It has only current data |
| Purpose | Operational processing | For regular online transactions |
| Data | Integrated from different business lines | Only for specific business |
| Normalization | Normalized or de-normalized | Normalized to avoid data redundancy |

Operational data store vs Staging database:

|  |  |  |
| --- | --- | --- |
| **Factor** | **ODS** | **Staging** |
| Period | It will have limited period of data (30 to 90 days) | Based on type of load it stores incremental data or full volume of data |
| Purpose | Operational processing | Temporary data storage and for doing data cleansing and other calculations |
| Data | Integrated from different business lines | Based on business need, normally the each business line would have dedicated staging |

[Factless fact table](https://www.pavantestingtools.com/2017/05/factless-fact-table.html)

What is a factless fact table?

When a fact table does not have any fact is called factless fact table. It has only foreign keys of dimension tables.

How will it be useful?

It can be used to view a report of whether any event has occurred or not instead of any data aggregation.

Example:

The below example illustrate about a conference booking information. Three dimension references are linked in fact table “Booking detail”.

When you generate a report, we can search whether a particular conference room is available or not for a specific day.

The report will give the information of particular conference room is available for the selected day or not.

# [Fact Table Types in Data warehousing](https://www.pavantestingtools.com/2017/05/fact-table-types-in-data-warehousing.html)

As we know fact table is for storing a fact or measure, based on the type of data, the level of rollup/granular and the frequency of data loading there is four fact types table. Based on the business need the type of fact table will be selected.

#### 1. Transactional

The fact table will contain data’s in very detail level without any rollup/aggregation the way how transactional database stores.

For example, retail shop invoice table, every line item will be loaded into fact table as a single row.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Invoice\_no** | **Quantity** | **Item\_no** | **Price** | **Total** |
| 1001 | 2 | 103 | 4.6 | 9.2 |
| 1001 | 4 | 276 | 23 | 92 |
| 1001 | 3 | 768 | 508 | 1524 |
| 1001 | 12 | 106 | 13 | 156 |

Here the quantity and total facts can be rolled up at different dimensions. It would be the most common type of fact where you perform analysis from multiple dimensions views.

#### 2. Accumulating

Accumulating refers storing multiple entries for a single record to track the changes throughout the workflow.

For example, placing an order in online eCommerce application, the order will go through multiple workflow levels. Every workflow change will be loaded into fact table as a single record.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Invoice\_no | Item\_no | Quantity | Amount | Status | Updated\_at |  |
| 1001 | 1346 | 2 | 500 | Order placed | 6/11/2014 |  |
| 1001 | 1346 | 2 | 500 | Confirmed | 6/11/2014 |  |
| 1001 | 1346 | 2 | 500 | Shipping completed | 6/13/2014 |  |
| 1001 | 1346 | 2 | 500 | Delivered | 6/15/2014 |  |

It will give the track of the record when the order has been placed and when you have received the order.

#### 3. Periodic snapshot

The data will be extracted and loaded for a particular period of a time. It describes what would be the state of the record in that specific period.

For example, consider a banking system which loads below three measures into a fact table for every third of the month for analysis.

The credit card total credit limit

Available credit limit

Total outstanding amount

|  |  |  |  |
| --- | --- | --- | --- |
| Creditcard\_no | Total\_credit | Available\_credit | Total\_outstanding |
| \*\*\*\*\*\*\*\*\*1234 | 100000 | 100000 | 0 |
| \*\*\*\*\*\*\*\*\*1234 | 100000 | 56000 | 44000 |
| \*\*\*\*\*\*\*\*\*1234 | 100000 | 34000 | 66000 |
| \*\*\*\*\*\*\*\*\*1234 | 100000 | 1360 | 98640 |

With this fact, we cannot do roll up or sum on all above three facts. Hence the periodic snapshot fact table will store only semi-additive or nonadditive fact.

# [Different types of fact in data warehousing](https://www.pavantestingtools.com/2017/05/different-types-of-fact-in-data.html)

A fact table can have multiple facts and can have a reference with multiple dimensions. Ultimately the objective of fact is for doing aggregations to view the data in different dimensions.

There are three fact types categorized based on the level of sum up/roll up by each dimension of a fact table.

#### Additive Fact:

An additive fact is a fact which can be summed up by all dimensions in a fact table.

In below example the fact table contains Quantity, Price and Total are facts. **Quantity** and **Total** can be rolled up by all 3 dimensions (location, month and product).

#### Semi-Additive Fact:

A fact which can be summed up by only a few dimensions in a fact table is called Semi-additive fact.

In below example illustrates that the purchase fact table has three facts  (Purchase\_qantity, Total\_amount, and Stock\_quantity).

The measure **Stock\_quantity** shows how much stock still available including the purchased quantity.

It does not require to see Stock\_quantity for a specific month, instead, we can see the Stock\_quantity for a location for a specific product.

#### NonAdditive Fact:

A fact which cannot be summed up by any of the dimension in the fact table is called nonadditive fact.

In below star schema shows that  three facts (Quantity, Price and Total) exist in Sales fact table.

There is no use in rolling up the **price** measure by all 3 dimensions (location, month and product).

Whereas it can be useful to view a report of variation in price value across location for a period for a product.

# [Confirmed dimension in data warehouse](https://www.pavantestingtools.com/2017/05/confirmed-dimension-in-data-warehouse.html)

### What is a Confirmed dimension?

As we know that, a dimension table stores non-quantifying data. Dimensions will be used as a viewpoint in the analysis process. A data warehouse database contains integrated fact and dimension tables for different business lines.

In some cases based on business need, a dimension can be referred in multiple fact tables of different business lines. This type of dimension is called confirmed dimension.

Sometimes, two dimension tables have the same structure and with the same data. In that case, both dimensions are called as confirmed dimensions.

#### Advantages of having this dimension:

##### **Only one data load**

Data load happens only for one dimension table. It is not required to load the same data into different databases/data marts.

##### **Data consistency**

It keeps the same data across all business lines. If any changes happen all no need worry about by individual business line users.

##### **Data redundancy**

As we are keeping data in a single, centralized table, the duplicate data won’t be available.

##### **Memory consumption**

If we keep the same data in individual tables for every business line, it consumes huge memory. But the process of using confirmed dimension table reduces the memory consumption also.

##### Examples for this type dimension:

In the banking sector, typically the data warehouse database contains all three major business lines such as Saving, Credit and Loan accounts.

For every data analysis, customer information is required. The bank stores all customer data in a single table called “customer” dimension.

This “customer” dimension reference to fact tables of Saving, Credit and Loan account data marts. So that all three data mart reports point the same dimension for customer details.

Date dimension is an another example. Date dimension contains day, month and year along with a surrogate key.

All business area fact tables can have the reference with this dimension wherever calendar related report requires.

# [Degenerate dimension with example in data warehouse](https://www.pavantestingtools.com/2017/05/degenerate-dimension-with-example-in.html)

### What is a Degenerated dimension?

Degenerated dimension is a dimension table which is being derived from fact table columns.

In a case, a fact table contains more than one Boolean column. Group all Boolean columns into a single table along with the surrogate key. This new dimension table is called degenerated dimension.

We can call this as a junk dimension since it has only Boolean columns

### Structure of  the table:

Typically it has surrogate key and other columns,

Surrogate key

Column1

.

.

ColumnN

#### Advantages of having dimension type:

As we are grouping all Boolean data’s into a single table most of the data’s would be reusable only. Hence the data space usage will be very less.

#### Example:

Consider a schema which contains a fact table called “Amount” and it has two Boolean columns “Is\_veg” and “Is\_domestic”.

Based on the junk dimension concept we can remove these two Boolean columns from the amount fact table and can be created a new dimension with the name Flag dimension.

For maintaining the referential integrity a surrogate key will be created in Flag dimension and the reference key will be linked with Amount fact table.

If the schema type is **star schema,** then the new Flag dimension reference directly mapped to the fact table. The mapping would be,

For **snowflake** schema type, Flag dimension reference will be mapped to another dimension (product dimension).

# [Junk Dimension in data warehouse](https://www.pavantestingtools.com/2017/05/junk-dimension-in-data-warehouse.html)

#### What is a Junk dimension?

When a dimension has only Boolean columns except the primary or surrogate key is called junk dimension. It can be derived from dimension or fact table.

Consider a dimension table contains more than one Boolean column. All Boolean columns will be grouped into a single table along with the surrogate key.

#### Structure of Junk dimension:

Typically it has a surrogate key and Boolean columns.

Surrogate key

Boolean column1

.                       .

.                       .

Boolean columnN

#### Steps to form Junk dimension:

1. Identify the Boolean attributes in a fact or dimension table
2. Create new dimension table for above-identified attribute column along with surrogate key
3. Remove the columns from fact or dimension table
4. Create a reference key in the fact table for this new dimension
5. Develop ETL jobs to load

#### Advantage of this Junk dimension:

The main advantage of this dimension is the data memory consumption is very less because of storing unique Boolean combinations.

##### Example:

Consider a schema contains a dimension called “Product”. It has two Boolean columns “Is\_veg” and “Is\_domestic”.

Based on junk dimension concept we can remove these two Boolean columns from the product dimension and create a new dimension with these two Boolean columns. Name the table as Flag dimension.

Create a surrogate key to keeping it for referential integrity in Flag dimension.

Create a reference key in Product dimension or Amount fact table. If the schema type is **star schema,** then the mapping would be

For **snowflake** schema type, connect the flag dimension with product dimension by foreign key reference.

# [Rapidly Changing Dimension (RCD)](https://www.pavantestingtools.com/2017/05/rapidly-changing-dimension-rcd.html)

#### What is a Rapidly changing dimension (RCD) or Fast growing dimension?

The Rapidly changing dimension (RCD) is a dimension which has attributes where values will be getting changed often.

#### How to handle the RCD type table?

We have three major types of solutions to handle the slowly changing dimensions (SCD). By creating mini dimension the rapidly changing dimension can be handled.

##### Structure of Junk dimension:

Typically it has a surrogate key and rapidly changing columns.

Surrogate key

column1

.

.                       .

ColumnN

**Steps to form a Mini dimension:**

1. Identify the rapidly changing attributes
2. Create new dimension table for above-identified attribute column along with surrogate key
3. Remove the columns from parent dimension
4. Create a reference key in the fact table for this mini dimension
5. Develop ETL jobs to load

##### Advantage of having this mini dimension:

The main advantage of this dimension is the data changes can be loaded as part fact table itself. No need of worrying about capturing changes in dimension level.

##### Example:

For example, employee table has a field for appraisal rating attribute where the value changes very often.

Now the employee dimension is a fast growing dimension, as said it will be handled by creating mini-dimension.

A new dimension will be created with rating column along with the surrogate key. The possible default values will be inserted/loaded into this dimension.

The rating column will be removed from Employee dimension. The surrogate key will be linked with Salary fact table.

# [Slowly Changing Dimension Types-SCD Type1 Type2 Type3](https://www.pavantestingtools.com/2017/05/slowly-changing-dimension-types-scd.html)

# What is a slowly changing dimension (SCD)?

### It is a dimension where the attribute values are getting changed slowly over a certain period of time.

### Ways of handling slowly changing dimension:

### There are 3 major ways are available to handle the data load process for an SCD type dimension when any modification happens in the source system.

### 1. SCD Type 1

### -Modifications will be done on the same record

### -Here no history of changes will be maintained

### 2. SCD Type 2

### -An existing record will be marked as expired with is\_active flag or Expired\_date column

### -This type allows tracking the history of changes

### 3. SCD Type 3

### -A new value will be tracked as a column

### -Here no history of changes will be maintained

#### Example scenario:

### The below employee table stores the city information about where the employee is currently working/living. The employee location will change in slow pace only.

### SCD-Slowly changing dimension SCD-example scenario

### Employee 101 is moving Bangalore to Chennai.

###### Update:

### After a certain period of time John is moving to Delhi. To track this change in the dimension table, we have below options.

### Type 1 – Update the record same

### SCD-Slowly changing dimension SCD-types-1

### Type 2 – New record will be inserted with is\_active=1, old record is\_active=0

### SCD-Slowly changing dimension SCD-types-2

### Type 2 – New record will be inserted with Expired\_date=NULL, old record Expired\_date= SYSDATE or SYSDATE-1

### Type 3 – New column will be added and tracked the both old and new value

### SCD-Slowly changing dimension SCD-types-3

###### Delete scenario:

### After a certain period of time, John is resigned from the company. To track this change in the dimension table, we have below options.

### Type 1 – Record will be deleted

### Type 2 – The record will be expired by setting is\_active=0

### Type 2 – The record will be expired by setting expired\_date= SYSDATE or SYSDATE-1

### Type 3 – All the values will be set to NULL

##### Advantages and Disadvantages of each SCD Type:

### SCD Type1

### Advantages -> No additional memory is required

### Disadvantage -> We cannot trace back to the history of modifications

### SCD Type2

### Advantages -> You can trace back to the history

### Disadvantages -> The memory is getting consumed since keeping old records

### SCD Type3

### Advantages -> You can trace back to the history

### Disadvantages -> The memory is getting consumed since adding new columns. We cannot add columns to keep every time changes, there is a limitation in number of changes keeping

##### Key Factors to choose SCD type

|  |  |
| --- | --- |
| **Factor** | **SCD Type** |
| I don’t want to keep the old records | Type1 |
| I want to keep old records but not ready of adding additional columns | Type2 |
| I want to keep old records irrespective of number of changes | Type3 |
| I am more concern about memory size | Type1 |
| I am not worrying about memory size | Type2/Type3 |

# [Surrogate Key in data warehouse](https://www.pavantestingtools.com/2017/05/surrogate-key-in-data-warehouse.html)

In most of the table, the  primary key will be loaded from source schema, but some source table might not have a primary key in such has by using sequence generator the primary key will be created, such keys are called Surrogate key.

#### Surrogate key vs primary key:

In terms of usage, there is no difference between these two types of keys. Both differ in the way of loading primary key loaded from the source table, whereas surrogate key loaded by the sequence generator.

##### When does it require?

###### Moving data from multiple locations

A retail store is running in multiple locations and maintains the dedicated database with the same application for every location. In that case, all locations would have same primary key values. The data cannot be integrated without any intervention, in this case, surrogate key created for smooth data load.

###### No primary key in source table

Sometimes the source table does not have any primary key it may not be required for a single database or application, but when integrating from different sources the same table data might be loaded from the different one. In that case, surrogate key created to avoid the duplication.

###### New table creation

A table is derived as part of data warehouse development, for example, month table which is not available in the source where the date is captured in date column in a table itself. Month table would have month and year, a surrogate key is required to reference this in the fact table.

# [Dimensional data modelling approach](https://www.pavantestingtools.com/2017/05/dimensional-data-modelling-approach.html)

[](https://2.bp.blogspot.com/-B6_Ii2OEiGQ/XCCaPTJKU4I/AAAAAAAAPEY/U4pclb8rSMEIFD3_wyAA-9oX-SrZo9nSACLcBGAs/s1600/Programs%2Bfor%2BSelenium%25284%2529.png)

Data modeling is the process of building a database to meet the business requirement. The dimensional approach is one of the data modeling approaches to establishing a data mart or data warehouse database.

There are two types of schema building and it will be selected based on advantages and disadvantages between these two.

* 1. Star Schema
  2. Snowflake schema

##### **Star Schema:**

This type schema contains the fact table in center position. As we know that fact table contains a reference to dimension tables.

Then the fact table will be surrounded by dimension tables with foreign key reference. The dimension table will not have a reference with any other dimension.

Because of this, whole structure looks like a star, this type of schema is called star schema.

##### **Snowflake Schema**

This type also contains a fact table in center position. The fact table has a reference to dimension tables.

The dimension table will have a reference to another dimension.

The data will be stored in the more normalized form.

Because of this, whole structure looks like a snow spread on the earth, it’s called Snowflake schema.

In below example, the Project dimension having a reference with Role  dimension.

##### **Difference Between Star Schema and Snowflake schema:**

|  |  |  |
| --- | --- | --- |
| **Feature** | **Star Schema** | **Snowflake schema** |
| Performance | As there is no relationship between dimensions to other dimensions the performance will be high. | Due to multiple links between dimensions the performance will be low. |
| Query complexity | The number of joins will be less which makes query complexity low | The number of joins will be more which makes query complexity high |
| Database size | Consider the Project dimension mentioned in above example it has Role column where the Role name value will be stored against for each project in case of start schema, the size of the table will be high | The role information is separately stored in a table and the reference will be linked in Project dimension, it reduces the table size |
| Normalization | Data will be stored in de-normalized format in dimension table | Data will be stored in more normalized format in dimension tables |

##### **How to Select Schema Type:**

1. These are the deciding factors to select the schema type if you worry about the **size** of the database, then go ahead with snowflake which gives normalized approach.
2. Same time if you look for more **performance** then start with Star schema approach.

# [Data modelling concepts in data warehousing](https://www.pavantestingtools.com/2017/05/data-modelling-concepts-in-data.html)

[](https://2.bp.blogspot.com/-HkpcNJAY8Kw/XCCassnHemI/AAAAAAAAPEg/_4WD_BrD1SMSmDvV3WKnQP07EfYOtopBwCLcBGAs/s1600/Programs%2Bfor%2BSelenium%25285%2529.png)

There are four major types of data modelling concepts are available.

##### Conceptual data model

This data model type would be starting point of building a database when knowing only business object or entity level information which is required for business. It just has the list of objects and linking between objects.

Conceptual Data Model

For example, when a retail shop wants to build a data mart, at first level they don’t have information about fields and referential integrity information. The lists of objects required are location, category and sales.

The relationship between these three entities as mentioned in the image.

##### Logical data model

This type of data model contains,

1. List of attributes will be captured for all entities
2. Primary key will be defined for all entities
3. Reference key will be defined between entities

Logical Data Model

##### Physical data model

A physical data model contains,

1. Tables with primary key
2. Tables will be linked with foreign key
3. All columns will have data type and length

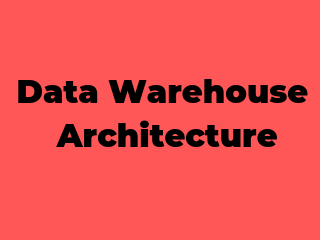
Physical Data Model

##### Dimensional data model

There are two types of schema building approach based on the concept of dimension and fact table,

1. Star schema
2. Snow flake schema

# [Data warehouse Architecture](https://www.pavantestingtools.com/2017/05/data-warehouse-architecture.html)

[](https://4.bp.blogspot.com/-JL0fm2bUZ_Y/XCI-SG8kYdI/AAAAAAAAPEs/spSejuZ5PNMaydBjyv_3oIDhk5tqJWfGQCLcBGAs/s1600/Programs%2Bfor%2BSelenium%25286%2529.png)

**Data warehouse architecture**

A typical data warehouse architecture has different layers of Source, Staging, Data warehouse database and Business intelligence. Various activities happen in each layer.

[What is the necessary of having a data warehouse?](http://www.wowetltesting.com/why-data-warehouse/)

DWH Architecture With Datamart

#### What is a Data mart?

Data Mart is for the specific subject area like Finance, HR or Project. Only the specific peoples whoever part of the subject area will get access to view the reports from the data mart. It will be built on top of data warehouse database.

##### **Data warehouse and data mart:**

DWH Architecture With Datamart

##### **Need for Data mart:**

1. The data warehouse database contains integrated data for all business lines, for example, a banking data warehouse contains data for all saving, credit and loan accounts databases.
2. The reporting access level will be given to a person who has authority or needs to see the comparison of data for all three types of accounts.
3. Meanwhile, a loan account branch manager does not require to see the saving and credit card details, he wants to see only the past performance of loan account alone.
4. In that case for his analysis, we need to apply data level security to protect saving and credit information’s data warehouse.
5. At the same time, the number of end users across three accounts will access the same data warehouse, it will end up in poor performance.
6. To avoid these issues, the separate database will be built on top of data warehouse, named as the data mart. The access will be given for respective business line resources not for everyone.

##### **Source systems:**

The source schema and table will be identified and data extraction process would happen with appropriate extraction rules.

##### **Why is Staging Database required?**

1. To reduce the complexity of Job (It will be more complex when we move directly from Source to Target)
2. To avoid the source database update.
3. To perform any calculations.
4. To perform data cleansing process as per business need.
5. When the data has been corrupted in Target after the load, we can delete the corrupted data in Target database after that we can just load the unloaded/deleted data alone into Target from staging database.

##### **Data warehouse Database:**

The data from staging database will be loaded through ETL jobs along with different business rules.

# [Why data warehouse?](https://www.pavantestingtools.com/2017/05/why-data-warehouse.html)

[](https://4.bp.blogspot.com/-CnQTcBPaLIA/XCI-6JPm5HI/AAAAAAAAPE0/fBHkvo6AsBQ_vBl1dKTfotcjhAv7M7BpgCLcBGAs/s1600/Programs%2Bfor%2BSelenium%25287%2529.png)

Normally every organisation will have dedicated databases for every business line. And it keeps only current data in order to offer better performance in production environment.

In this internet world, every organization is trying to retain their customers which are necessary to sustain and grow in the current market. It’s a very big challenge to find and promote the right product to the right customer at the right time and currently, most of the companies are still struggling to implement this.

It can be possible only if we have the integrated and history of data in a single place for analysis since the analysis need to be done from different dimensions (customer, product, and geography) view to arriving the decisions.

An example of a quarterly analysis reports with integrated data from different location databases for a retail store.

#### A data warehouse,

1. Maintains history of data
2. Contains Integrated data (data from multiple business lines)
3. Contains Heterogeneous data (data from different source formats)
4. Contains Aggregated data
5. Allows only select to restrict data manipulation
6. Stores data in de-normalized format

#### Example:

Let’s take an example of a bank which maintains dedicated databases to store the data for Saving account , credit account, and loan account.

The bank is planning to launch a new product. The management team as come up with a strategy to promote this product to our existing customers. Also, it will be purely based on past performance on all three saving, credit and loan account sections.

The management wants to do more analysis on credit card utilization and settlement history, loan availing and repayment history in a single report.

This will be possible if all three data in a single database (data warehouse) and the historical data for every customer. Hence this data warehouse database can feed the data to analysis or reporting tool which gives good analysis information to make decisions.

## Definition of a data warehouse

##### **Subject-Oriented**

* DWH database contains data for the specific subjects where we could analyse the data from different subjects

##### **Integrated**

* Integrated from different business line databases

**Time-variant**

* A transactional database will contain only current data, but DWH database contains history of data

**Non-volatile**

##### **The CRUD operations allowed in transactional database, but in DWH database won’t allow making changes to maintain the historical data**

# [Difference between findElement() and findElements()](https://www.pavantestingtools.com/2017/03/difference-between-findelement-and.html)

[](https://2.bp.blogspot.com/-MC-I8jSUZjw/XCJA-pxnC6I/AAAAAAAAPFQ/IKvZM7kBBoMtYpvQfdnETOA6NT2xuGSgQCLcBGAs/s1600/Programs%2Bfor%2BSelenium%252810%2529.png)

In this post, we will learn the difference between findElement() and findElements(). These are the important methods  which are used for finding elements on the WebPage.

### Usage of findElement():

This is used to find the WebElement  like Button, checkbox,radio button etc. on the page.The different locator (id,name,xpath etc.) are used within it to find the elements.

**Syntax:**

driver.findElement(By.xpath(“XPATH expression”));  
driver.findElement(By.id(“Id of element”));  
driver.findElement(By.name(“name of element”));

As an example, we will try to locate the ‘Google search’button on the Google page. We will use its name attribute as it is unique(shown in the figure below).



We use **‘isDisplayed()’** method, which returns true value if it finds the element else false. We are printing true or false result in the console by using **‘System.out.println’.**



|  |  |
| --- | --- |
| 1  2  3  4  5  6  7  8  9  10  11 | public class ExampleFindElement {  private static WebDriver driver;  public static void main(String[] args) throws InterruptedException {    driver = new FirefoxDriver();    driver.manage().window().maximize();  driver.get("http://google.com");  System.out.println(driver.findElement(By.name("btnK")).isDisplayed());  }  } |

**Output:** true

### Usage of findElements():

The method fincElements() returns a list of WebElements on the page. We can work over that list according to our need.

Suppose, we need to count the no. of links on the Google Page. As we know link is represented by tag ‘a’ in html. So, we will use the method ‘tagName’ to count the total no. of links.

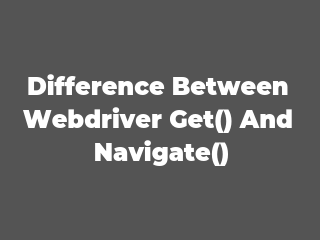


|  |  |
| --- | --- |
| 1  2  3  4  5  6  7  8  9  10  11  12  13 | public class ExampleFindElements {  private static WebDriver driver;  public static void main(String[] args) throws InterruptedException {    driver = new FirefoxDriver();    driver.manage().window().maximize();  driver.get("http://google.com");  List totalLinks = driver.findElements(By.tagName("a"));    System.out.println("Total links : "+totalLinks.size()); // total links  }  } |

Total links : 46

You might be surprised after seeing the output 46, but when we look at google page , it does not seem to have 46 links. You don't need to worry about that , there are some hidden links which are not visible to us but selenium can detect them. That’s why it has returned count as 46.

# [Difference between Webdriver get() and navigate()](https://www.pavantestingtools.com/2017/03/difference-between-webdriver-get-and.html)

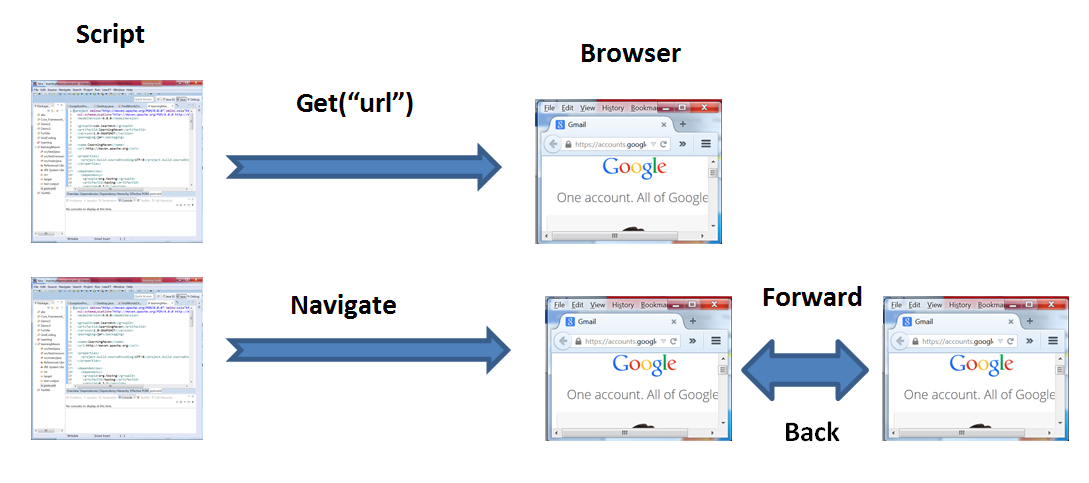
[](https://2.bp.blogspot.com/-306XvPZMAMY/XCJB7CJmWkI/AAAAAAAAPFc/RviwtZG5y8UQ0sAm-yPMIXAGE19xlsPkACLcBGAs/s1600/Programs%2Bfor%2BSelenium%252811%2529.png)

In this post,we will see the difference between Webdriver get() and navigate().

We will use Firefox browser in our demos. The same methods will work for all other browsers.

There are 2 ways, you can open the application in the browser.

1. get() method
2. navigate() method



### 1. get() method:

After opening the browser, we need to use the below method to open any particular application. This methods requires the URL of the application.

**driver.get(“URL of the application”);**



URL should start with Http: instead of WWW. If URL starts with ‘WWW’, then selenium does not open it.  
e.g. Valid is **http://www.gmail.com**  
Invalid is **www.gmail.com**

**Code for using get method to open Gmail application:**



|  |  |
| --- | --- |
| 1  2  3  4  5  6  7  8  9  10  11 | import org.openqa.selenium.WebDriver;  import org.openqa.selenium.firefox.FirefoxDriver;  public class OpenBrowsers {  private static WebDriver driver;  public static void main(String[] args) {    driver = new FirefoxDriver();  driver.get("http://www.gmail.com");  }  } |

**2. navigate() method:**

This is another method which can be used to open the application.

**driver.navigate().to(“URL of application”);**

**Code for using navigate function to open application:**



|  |  |
| --- | --- |
| 1  2  3  4  5  6  7  8  9  10  11  12 | import org.openqa.selenium.WebDriver;  import org.openqa.selenium.firefox.FirefoxDriver;  public class OpenBrowsers {  private static WebDriver driver;  public static void main(String[] args) {    driver = new FirefoxDriver();  driver.navigate().to("http://www.gmail.com");  }  } |

**What is the difference between get() method and navigate() method?**

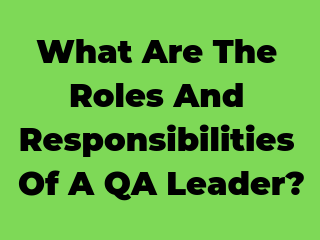
The difference is that if you use navigate, it allows you to go forth and back into history of the browser,refresh the browser etc. It is not possible if using get() method.

**driver.navigate().back();** // Perform backward function of browser

**driver.navigate().forward();**  // Perform forward function of browser

**driver.navigate().refresh();** //refresh the browser

# [What Are The Roles And Responsibilities Of A QA Leader?](https://www.pavantestingtools.com/2017/03/what-are-roles-and-responsibilities-of.html)

[](https://3.bp.blogspot.com/-2qldpLcfHzs/XCJCX8degSI/AAAAAAAAPFk/r6v8tILzW1sta0xxr2K-QgPSkLKq0VQtwCLcBGAs/s1600/Programs%2Bfor%2BSelenium%252812%2529.png)

The **QA leader** is one who is like a co-captain of the ship who shares an equal responsibility for getting software out to the customers with high quality, on schedule and matching the expectations.

As a QA lead, there are multiple roles and responsibilities which need to be taken care of. The **functional role of QA lead** is to lead the quality assurance department of any industry. In today’s world quality is the backbone of any commercial successful product which directly implies that the quality assurance team in any industry play a very significant role.

A QA leader has to have several feathers in his cap and play different roles in today’s challenging times.

He has to ensure that his team of  QA engineers are on the right track all the way in the project, resolving conflicts across team, review the schedules and plans, mitigation of the risks, checking quality in phases, update management , build a challenging and motivation environment.

# Roles And Responsibility Of QA Leader:

## Defining Quality Metrics

1. Defining quality standards and metrics for the current project/product.
2. Working with all stake holders to ensure that the quality metrics is reviewed, closed and agreed upon.
3. Make the QA team aware of the Quality matrix and resolve all the queries.
4. Create a list of milestones and checkpoints and set measureable criteria’s to check the quality on timely basis.

## Defining Testing Strategies

1. Defining processes for test plan and several phases of testing cycle.
2. Planning and scheduling several milestones and tasks like alpha and beta testing.
3. Ensuring all development tasks meet quality criteria through test planning, test execution, quality assurance and issue tracking.
4. Work closely on the deadlines of the project
5. Ensure the team is focusing on automation along with manual testing.
6. Keep raising the bar and standards of all the quality processes with every project.
7. Set processes for test plan reviews and ensure that that test plans get reviewed by all stakeholders.
8. Push team continuously to innovate.
9. Review test strategies and see that all the various kinds of testing like unit, functional, performance, stress, acceptance etc. are getting covered.

## Leadership

1. Set Quality standards for the teams in various new testing technologies in the industry. This may include finding new strategies for automation testing and day to day work processes like agile and scrum.
2. Building up a team and choosing right number and skill set of resources.
3. Assign various tasks to the engineers as per strength of individual.
4. Setting up goals and objectives for QA managers
5. Motivating team and taking informative quick decisions.
6. Finding and arranging behavioral , functional, non-functional training needs  for the team
7. Coordinate activities which enforce quality improvements
8. Resolving conflicts among team members.
9. Maintaining cordial relationships between cross functional teams like development, configuration management, program management, product managers etc.
10. Negotiating with upper management with influential skills to buy in the ideas.
11. Ensure that the highly motivated environment is creating in the team.
12. Ensure that Rewards are given for each achievement in the team.

## Reporting

1. Reviewing status reports from team managers and taking appropriate actions accordingly.
2. Should be focal point of contact for the QA team for all the escalations related to testing and Quality assurance.
3. Sending crisp and clear status to the higher management.
4. Creating and defining risks contingencies and plans.
5. Seeking feedback from management when and wherever necessary.

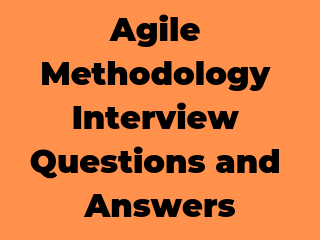
## Managing Risks

1. Understanding and defining areas to calculate the overall risk to the project.
2. Creating strategies to mitigate those risks and take necessary measures to control the risks.
3. Awareness to all the stake holders for the various risks
4. Create backup plans for all the testing strategies.
5. Have team meetings at appropriate time to understand & review the current risks and motivate team to resolve the same.

## Process improvements

1. Ensure that the several testing and validation processes are improved continuously.
2. Motivate team to improve the efficiency so that the time saved can be used in different work areas.
3. Challenge the team continuously to move towards automation for all daily works
4. Publish the improvements to all the stakeholders and depict the improvements using data points.
5. Create quarterly milestones for yearly improvement projects and set deadlines for the team to complete them.
6. Work with the development team to ensure that the quality engineers get apt support like automation hooks or debug builds where ever and whenever possible.
7. Ensure several quality improvement tools like code coverage, memory leaks are part of the development cycle, in case of conflicts resolve via upper management.

# [Agile Methodology Interview Questions and Answers](https://www.pavantestingtools.com/2016/11/agile-methodology-interview-questions.html)

[](https://4.bp.blogspot.com/-MprKUOCSzhI/XCMXkA5j-DI/AAAAAAAAPG4/K2OU6wXWMK0o7i8zroor3rh2sRBoSi9mQCLcBGAs/s1600/Programs%2Bfor%2BSelenium%252820%2529.png)

**Q#1. What is Agile Testing?  
Ans.** Agile Testing is a practice that a QA follows in a dynamic environment where testing requirements keep changing according to the customer needs. It is done parallel to the development activity where testing team receives frequent small codes from the development team for testing.

**Q#2. What is the difference between burn-up and burn-down chart?**

**Ans.** Burn-up and burn-down charts are used to keep track the progress of the project.

**Burn-up** charts represent **how much work has been completed** in any project whereas **Burn-down** chart represents the **remaining work in a project**.

[](https://3.bp.blogspot.com/-Ng1GawFEKfE/WEK5ZjmeMpI/AAAAAAAAK6U/94qwD7t7tN8je8q_rFyF1RM7_5TS1xlVACLcB/s1600/Agile%2BScrum.png)

**Q#3. Define the roles in Scrum?**

**Ans.** There are mainly three roles that a Scrum team have:

1. **Project Owner** – who has the responsibility of managing product backlog. Works with end users and customers and provide proper requirement to the team to build the proper product.
2. **Scrum Master** – who works with scrum team to make sure each sprint gets complete on time. Scrum master ensure proper work flow to the team.
3. **Scrum Team** – Each member in the team should be self-organized, dedicated and responsible for high quality of the work.

**Q#4. What is Product backlog & Sprint Backlog?**

**Ans.** **Product backlog** is maintained by the project owner which contains every feature and requirement of the product.

**Sprint backlog** can be treated as subset of product backlog which contains features and requirements related to that particular sprint only.

**Q#5. Explain Velocity in Agile?**

**Ans.** Velocity is a metric that is calculated by addition of all efforts estimates associated with user stories completed in a iteration. It predicts how much work Agile can complete in a sprint and how much time will require to complete a project.

**Q#6. Explain the difference between traditional Waterfall model and Agile testing?**

**Ans.**Agile testing is done parallel to the development activity whereas in traditional waterfall model testing is done at the end of the development.

As done in parallel, agile testing is done on small features whereas in waterfall model testing is done on whole application.

**Q#7. Explain Pair Programming and its benefits?**

**Ans.** Pair programming is a technique in which two programmer works as team in which one programmer writes code and other one reviews that code. They both can switch their roles.

Benefits:

1. Improved code quality: As second partner reviews the code simultaneously, it reduces the chances of mistake.
2. Knowledge transfer is easy: One experience partner can teach other partner about the techniques and codes.

**Q#8. What is re-factoring?**

**Ans.** Modification of the code without changing its functionality to improve the performance is called re-factoring.

**Q#9. Explain the Iterative and Incremental Development in Agile?**

**Ans. Iterative Development:**Software is developed and delivered to customer and based on the feedback again developed in cycles or release and sprints. Say in Release 1 software is developed in 5 sprints and delivered to customer. Now customer wants some changes, then development team plan for 2nd release which can be completed in some sprints and so on.

**Incremental Development:**Software is development in parts or increments. In each increment a portion of the complete requirement is delivered.

**Q#10. How do you deal when requirements change frequently?**

**Ans.** This question is to test the analytical capability of the candidate. Answer can be-

Work with PO to understand the exact requirement to update test cases. Also understand the risk in changing the requirement. Apart from this one should be able to write generic test plan and test cases. Don’t go for the automation until requirements are finalized.

# [ETL Interview Questions](https://www.pavantestingtools.com/2016/11/etl-interview-questions.html)

[](https://2.bp.blogspot.com/-8AKX1hTDy0Q/XCMYPR6aUAI/AAAAAAAAPHA/lJZ90V9McworG41E5aPrOxMRe3rqg5cYACLcBGAs/s1600/Programs%2Bfor%2BSelenium%252821%2529.png)

**What is ETL?**

***Extract*** – Extracting the data from source system  
***Transform*** – Transforming or modifying the data into format what business required  
***Load*** – Loading into target database

**Explain about your current project?**

Here explain about your current project with clear ***ETL process***, practice before getting into an interview room.  
Start with what is the ***objective***of the project whether building a data mart or warehouse or ODS.  
Then, explain how many ***source systems***are there and do you have ***staging***environment or not.  
Then, tell about the ***ETL tool*** you are using. Stop it here.

[](https://4.bp.blogspot.com/-aXiO53afSOQ/WEK6IBbYEmI/AAAAAAAAK6Y/VBVdfgCedcspA8DzRw4ZyL8H0lGZwkR_wCLcB/s1600/FAQS-White-letters-with-Red-Border.jpg)

**What are the transformation types?**

**Active Transformation**

The output record count of the transformation ***may or may not equal*** to input record count.

For example, when we apply filter transformation for age column with the condition of age between 25 and 40. In this case, the data will come out which satisfies this condition, hence the outcome count cannot be predicted.

**Passive Transformation**

The output record count of the transformation is ***equal to input*** record count.

For example, when we apply expression transformation to concatenate first name and last name columns, in this case, the data will come out even though the columns do not have values.

**Connected Transformation**

A transformation which is being linked with other transformation or target component is called connected.

**Unconnected Transformation**

A transformation which is not being linked with any other transformation or target component is called unconnected.

**What are the types of load?**

**Full Load** (Initial Load or Bulk Load or Fresh Load) –

The data loading process when we do it at very first time. It can be referred as Bulk load or Fresh load.

The job extracts entire volume of data from source table or file and loading into truncated target table after applying transformations logics

**Incremental Load** (Refresh Load or Daily Load or Change Data Capture) –

The modified data alone will be updated in target followed by full load. The changes will be captured by comparing created or modified date against last run date of the job.

The modified data alone extracted from the source, the job will look for changes  in the source table against job run table, if change exists then data will be extracted and that data alone will be updated in the target without impacting the existing data.

**Name some ETL tools**

Informatica Power center  
Talend Open Studio  
IBM Datastage  
SQL Server Integration Services (SSIS)  
Ab-initio  
Oracle Data Integrator  
SAS – Data Integration Studio  
SAP – Business Object Integrator  
Clover ETL  
Pentaho Data Integration

**Explain the scenarios for testing source to a staging table.**

– Verify the table structure of staging table (columns, data type, length, constraints, index)

-Verify the successful workflow (ETL job) run

-Verify the data count between source and staging table

-Verify the data comparison between source table and staging table

-Verify the duplicate data checking, duplicate data should not be loaded into staging table

-Verify the excess trailing space trimmed for all Varchar data type columns

-Verify the job consistency by performing subsequent run

-Verify the job failure runs behavior

-Verify the job re-run success scenario after failure correction

-Verify the job run with bad data (NULL values, exceeding precisions, lookup or reference data not exists)

-Verify the job performance timing

**How do you ensure that all source table data’s are loaded into target table?**

-Using SET operator **MINUS** – if both source and target tables are in the same database server.

-Using macro – both source table and target table data will be copied into an excel and compared with macro

-Using Automation tools – tool will fetch data and compares internally with own algorithm

-Using utility tools – develop an automation utility tool using Java or any scripting language along with database drivers

**Give an example for Low severity and High priority defect.**

-There is a requirement where email notification needs to be triggered in case of job failure

-There is a deviation found during testing that the email notification has been received but the number of records count in the content is not matching

–**Low severity –**since it does not affect any functionality

–**High priority** – since the wrong data count shows the wrong picture to the management team

**What are the components of Informatica?**

One of the major tool in worldwide. Majorly this tool is using for **ETL, data masking, and data quality**.

It has four major components,

1. **Repository manager** – to add repository and managing folders
2. **Designer** – creating mappings
3. **Workflow manager** – creating workflow with task and mappings
4. **Workflow monitor** – workflow run status tracker

**What are tasks available in Informatica?**

The below are major tasks available in Informatica power center tool.  
1.Session  
2.Email  
3.Command  
4.Control  
5.Decision  
6.Timer

**Database testing vs ETL testing**

***ETL Testing*** – Making sure that the data from source to target is being loaded properly or not along with the business transformation rules.

***Database Testing*** – Testing whether the data is being stored properly in the database when we do some operations from the front end or back end along with testing of procedures, functions, and triggers. Testing whether the data is being retrieved properly in UI.

**What is partitioning?**

Portioning is a concept of ***running with parallel threads*** by distributing records. It will be used when the volume of data is huge which directly impact the data load and other transformation progress.  
Database and ETL tools are offering this partition concept to improvise the job execution time for high volume data tables.  
Below are the types of partitioning available in Informatica power center tool,  
1.Pass Through  
2.Database partitioning  
3.Key range  
4.Round robin  
5.Hash Auto key  
6.Has user key

**What are the responsibilities of an ETL tester?**

* Understanding Requirement
* Estimating
* Planning
* Test case preparation
* Test execution
* Giving Sign off

**What does a mapping document contain?**

A mapping document contains,

1. **Columns** mapping between source and target
2. **Data type** and **length** for all columns of source and target
3. **Transformation logic** for each column
4. **ETL job** or **workflow** information
5. **Input parameter** file information

**What kind of defects can expect?**

* Table structure issue
* Index unable to drop issue
* Index is not created after job run
* Data issue in source table
* Data count mismatch between source and target
* Data not matching between source and target
* Duplicate data loaded issue
* Trim and NULL issue
* Data precision issue
* Date format issue
* Business transformation rules issue
* Subsequent job run not working properly
* Running job with bad data does not kick off the bad data’s properly
* Rollback is not happening in case of job failure
* Performance issue
* Log file and content issue
* Mail notification and content issue

**1000 records are in the source table, but only 900 records are loaded into the target table. How do you find the missing 100 records?**

-Using SET operator **MINUS** – if both source and target tables are in the same database server.

-Using **Excel** macro – both source table and target table data will be copied into an excel and compared with macro

-Using **Automation tool** – tool will fetch data and compares internally with own algorithm

-Using **Utility tool** – develop an automation utility tool using Java or any scripting language along with database drivers

**Can you give few test cases to test the incremental load table?**

–***Insert***few records and validate the data after job run

*–****Update*****non-primary** column values and validate the data after job run

–**Update primary column** values and  validate the data after job run

*–****Delete***few records and validate the data after job run

–**Insert/update** few records to create duplicate entries and validate the data after job run

–**Update with bad data** – NULL values, blank spaces, lookup data missing

**How do you compare a flat file and database table?**

-Manual **Sampling** method – manually compared in sampling basis

-Using **Excel** macro – flat file data and target table data will be copied into an excel and compared with macro

-Using **Automation tool** – tool will fetch data and compares internally with own algorithm

-Using **Utility tool** – develop an automation utility tool using Java or any scripting language along with database drivers

# [ETL Testing – data warehouse testing questions and Answers](https://www.pavantestingtools.com/2016/11/etl-testing-data-warehouse-testing.html)

[](https://1.bp.blogspot.com/-C0ttQDJlE3Q/XCMY-adhCnI/AAAAAAAAPHI/P_jv9kUavMoe1rFY1FG1YiUp83Eh7PdTQCLcBGAs/s1600/Programs%2Bfor%2BSelenium.png)

**What is a data warehouse?**

A data warehouse is a database which,  
1.Maintains ***history***of data  
2.Contains ***Integrated***data (data from multiple business lines)  
3.Contains ***Heterogeneous***data (data from different source formats)  
4.Contains ***Aggregated***data  
5.Allows only select to restrict ***data manipulation***  
6.Data will be stored in ***de-normalized***format

Definition of a data warehouse:  
1. Subject-oriented  
2. Integrated  
3. Non-volatile  
4. Time-Variant

Main Usage of a data warehouse:  
1. Data Analysis  
2. Decision Makings  
3. Planning or Forecasting

**What is a dimension?**

A**Dimension** table is a table where it contains only **non-quantifying data** and category of information which are key for analysis. A dimension table contains **primary key and non-quantifying columns.** If the primary key does not exist in source table then ***surrogate key*** would exist.

**What are the types of dimension?**

Based on ***what type of data it stores*** there is two major types dimension table,  
1.Confirmed dimension  
2.Junk dimension  
Based on ***where it’s being derived*** there is one dimension category,  
3.Degenerated dimension  
Based on ***how frequently the data*** in the dimension can be divided into 2 types,  
4.Rapidly Changing Dimension (RCD)  
5.Slowly Changing Dimension (SCD)

**What is a fact and what are the types of fact?**

A fact is a column or attribute which can be ***quantifiable or measurable*** and will be used as key analysis factor. We can call it as a ***measure***.

**Types of Fact:**

1. Additive  
2. Semi-additive  
3. Non-additive

**What does a fact table contain?**

A table which contains ***facts*** is called fact table. Typically a fact table has ***facts and foreign keys*** of dimension tables.

**Fact table structure:**

Foriegn\_key1  
Forign\_keyN  
Fact1  
FactN

**What are the types of a fact table?**

**Transactional**

The fact table will contain data’s in ***very detail level*** without any rollup/aggregation the way how transactional database stores.

**Accumulating**

Accumulating refers storing ***multiple entries*** for a single record to track the changes throughout the workflow.

**Periodic snapshot**

The data will be extracted and loaded for a ***particular period*** of a time. It describes what would be the state of the record in that specific period.

**Factless fact table**

When a fact table ***does not have any fact*** is called Factless fact table. It has only foreign keys of dimension tables.

**Why staging table is required?**

1. To reduce the **complexity of Job** (It will be more complex when we move directly from Source to Target)
2. To avoid the **source database update.**
3. To perform any **calculations**.
4. To perform data cleansing process as per business need.
5. When the data has been **corrupted** in Target after the load, we can delete the corrupted data in Target database after that we can just load the unloaded/deleted data alone into Target from staging database.

**What is a surrogate key?**

In most of the table, the  primary key will be loaded from source schema, but some source table might not have a primary key in such has by using **sequence generator** the primary key will be created, such keys are called Surrogate key.

In terms of usage, there is no difference between these two types of keys. Both differ in the way of loading primary key loaded from the source table, whereas surrogate key loaded by the sequence generator.

**OLTP**vs**DW database**

|  |  |
| --- | --- |
| **OLTP** | **DW** |
| Dedicated database available for specific subject area or business application | Integrated from different business applications |
| It does not keep  history | It keeps history of data for analyzing past performance |
| It allows user to perform the below DML operations (Select, Insert, Update,Delete) | It allows only Select for end users |
| The main purpose is for using day to day transactions | Purpose is for analysis and reporting |
| Data volume will be less | Data volume is huge |
| Data stored in normalized format | Data stored in de-normalized format |

**Explain about star schemaOperational Data Store (ODS)**vs**Staging database**

|  |  |
| --- | --- |
| **ODS** | **Staging** |
| It will have limited period of data (30 to 90 days) | Based on type of load it stores incremental data or full volume of data |
| Operational processing | Temporary data storage and for doing data cleansing and other calculations |
| Integrated from different business lines | Based on business need, normally the each business line would have dedicated staging |

This type schema contains the ***fact table in center position.*** As we know that fact table contains a ***reference***to dimension tables. Then the fact table will be surrounded by dimension tables with foreign key reference. The dimension table ***will not have a reference*** with any other dimension.

**Explain about snowflake schema**

This type also contains a fact table in center position. The fact table has a reference to dimension tables. The dimension table ***will have a reference***to another dimension. The data will be stored in the more normalized form.

**What is the difference between star and snowflake?**

|  |  |
| --- | --- |
| **Star** | **Snowflake** |
| As there is no relationship between dimensions to other dimensions the performance will be high. | Due to multiple links between dimensions the performance will be low. |
| The number of joins will be less which makes query complexity low | The number of joins will be more which makes query complexity high |
| Consider the Project dimension mentioned in above example it has Role column where the Role name value will be stored against for each project in case of start schema, the size of the table will be high | The role information is separately stored in a table and the reference will be linked in Project dimension, it reduces the table size |
| Data will be stored in de-normalized format in dimension table | Data will be stored in more normalized format in dimension tables |

**What is data cleansing?**

Data cleansing is a process of ***removing irrelevant and redundant data, and correcting the incorrect and incomplete data***. It is also called as data cleaning or ***data scrubbing***. All organizations are growing drastically with huge competitions, they take business decisions based on their past performance data and future projection

**What is data masking?**

What does data masking mean? Organizations never want to disclose ***highly confidential information***into all users. All sensitive data will be restricted to access in all environments other than production. The process of ***masking/hiding/encrypting sensitive data*** is called data masking.

**Why Data mart?**

1. The **data warehouse** database contains **integrated data** for all business lines, for example, a banking data warehouse contains data for all saving, credit and loan accounts databases.
2. The reporting access level will be given to a person who has authority or needs to see the comparison of data for all three types of accounts.
3. Meanwhile, a loan account branch manager does not require to see the saving and credit card details, he wants to see only the past performance of loan account alone.
4. In that case for his analysis, we need to apply data level security to protect saving and credit information’s data warehouse.
5. At the same time, the number of end users across three accounts will access the same data warehouse, it will end up in poor performance.
6. To avoid these issues, the separate database will be built on top of data warehouse, named as the data mart. The access will be given for respective business line resources not for everyone.

**What is data purging and archiving?**

Data purging means ***deleting data***from a database which crosses the defined retention time.

Archiving means ***moving***the data which crosses the defined retention time to another database (archival database).

**What are the types of SCD?**

**SCD Type 1**

-Modifications will be done on the **same record**  
-Here ***no history***of changes will be maintained

**SCD Type 2**

-An existing record will be marked as **expired** with is\_active flag or Expired\_date column  
-This type allows tracking the ***history of changes***

**SCD Type 3**

-A new value will be tracked as a ***column***  
-Here ***history***of changes will be maintained

**What type of schema and SCD type used in your project?**

In my current project, we are using type2 to keep the history of changes.

# [ETL TESTING FAQ'S](https://www.pavantestingtools.com/2016/11/etl-testing-faqs.html)

[](https://2.bp.blogspot.com/-1shIctqpNkQ/XCMZX3Ir1II/AAAAAAAAPHQ/mHzOmgWh8ZA-Uj-VUnnWSVxv3fE1-a8wgCLcBGAs/s1600/Programs%2Bfor%2BSelenium%25281%2529.png)

**1. What do you understand by an ETL?**

ETL stands for Extract, Transform, and Load. It is an important concept in Data Warehousing systems. **Extraction** stands for extracting data from different data sources such as transactional systems or applications. **Transformation** stands for applying the conversion rules on data so that it becomes suitable for analytical reporting. The **loading** process involves moving the data into the target system, normally a data warehouse.

**2. Explain the 3-layer architecture of an ETL cycle.**

The three layers involved in an ETL cycle are −

* **Staging Layer** − The staging layer is used to store the data extracted from different source data systems.
* **Data Integration Layer** − The integration layer transforms the data from the staging layer and moves the data to a database, where the data is arranged into hierarchical groups, often called **dimensions**, and into facts and aggregate facts. The combination of facts and dimensions tables in a DW system is called a **schema**.
* **Access Layer** − The access layer is used by end-users to retrieve the data for analytical reporting.
* [](https://2.bp.blogspot.com/-qVPWsHAh3Mg/WCr-N6soHpI/AAAAAAAAK5E/hrM7V3Jf2Y0fd31L1v-M6YErjZmsOwBIACLcB/s1600/17-ETL-Tools-cannot-vanish%25E2%2580%25A6-They-are-Irreplaceable2.jpg)

**3. What is the difference between and ETL and BI tools?**

An ETL tool is used to extract data from different data sources, transform the data, and load it into a DW system. In contrast, a BI tool is used to generate interactive and adhoc reports for end-users, dashboard for senior management, data visualizations for monthly, quarterly, and annual board meetings.

Most common ETL tools include − SAP BO Data Services (BODS), Informatica, Microsoft – SSIS, Oracle Data Integrator ODI, Talend Open Studio, Clover ETL Open source, etc.

Most common BI tools include − SAP Business Objects, SAP Lumira, IBM Cognos, JasperSoft, Microsoft BI Platform, Tableau, Oracle Business Intelligence Enterprise Edition, etc.

**4. What are the popular ETL tools available in the market?**

The popular ETL tools available in the market are −

* Informatica − Power Center
* IBM − Websphere DataStage (Formerly known as Ascential DataStage)
* SAP − Business Objects Data Services BODS
* IBM − Cognos Data Manager (Formerly known as Cognos Decision Stream)
* Microsoft − SQL Server Integration Services SSIS
* Oracle − Data Integrator ODI (Formerly known as Sunopsis Data Conductor)
* SAS − Data Integration Studio
* Oracle − Warehouse Builder
* ABInitio
* Open source Clover ETL

**5. Why do we need a staging area in an ETL process?**

Staging area is an intermediate area that sits between data sources and data warehouse/data marts systems. Staging areas can be designed to provide many benefits, but the primary motivations for their use are to increase efficiency of ETL processes, ensure data integrity, and support data quality operations.

**6. What is the difference between data warehousing and data mining?**

Data warehousing is a broader concept as compared to data mining. Data mining involves extracting hidden information from data and interpret it for future predictions. In contrast data warehousing includes operations such as analytical reporting to generate detailed reports and ad-hoc reports, information processing to generate interactive dashboards and charts.

**7. What are the structural differences between an OLTP and OLAP system?**

OLTP stands for Online Transactional Processing system which is commonly a relational database and is used to manage day-to-day transactions.

OLAP stands for Online Analytical Processing system which is commonly a multidimensional system and is also called data warehouse.

**8. What is a Dimension table and how is it different from a Fact table?**

Suppose a company sells its products to customers. Every sale is a fact that takes place within the company and the fact table is used to record these facts. Each fact table stores the primary keys to join the fact table to dimension tables and measures/facts.

**Example** − Fact\_Units

|  |  |  |  |
| --- | --- | --- | --- |
| **Cust\_ID** | **Prod\_Id** | **Time\_Id** | **No. of units sold** |
| 101 | 24 | 1 | 25 |
| 102 | 25 | 2 | 15 |
| 103 | 26 | 3 | 30 |

A dimension table stores attributes or dimensions that describe the objects in a fact table. It is a set of companion tables to a fact table.

**Example** − Dim\_Customer

|  |  |  |
| --- | --- | --- |
| **Cust\_id** | **Cust\_Name** | **Gender** |
| 101 | Jason | M |
| 102 | Anna | F |

**9. What is a Data Mart?**

A data mart is a simple form of data warehouse and it is focused on a single functional area. It usually gets data only from a few sources.

**Example** − In an organization, data marts may exists for Finance, Marketing, Human Resource, and other individual departments which store data related to their specific functions.

**10. What is an Aggregate function? Name a few common aggregate functions.**

Aggregate functions are used to group multiple rows of a single column to form a more significant measurement. They are also used for performance optimization when we save aggregated tables in data warehouse.

Common Aggregate functions are −

|  |  |
| --- | --- |
| MIN | returns the smallest value in a given column |
| MAX | returns the largest value in a given column |
| SUM | returns the sum of the numeric values in a given column |
| AVG | returns the average value of a given column |
| COUNT | returns the total number of values in a given column |
| COUNT(\*) | returns the number of rows in a table |

**Example**

SELECT AVG(salary)

FROM employee

WHERE title = 'developer';

**11. Explain the difference between DDL, DML, and DCL statements.**

Data Definition Language (DDL) statements are used to define the database structure or schema.

**Examples** −

* **CREATE** − to create objects in a database
* **ALTER** − alters the structure of a database

Data Manipulation Language (DML) statements are used for manipulate data within database.

**Examples** −

* **SELECT** − retrieves data from the a database
* **INSERT** − inserts data into a table
* **UPDATE** − updates existing data within a table
* **DELETE** − deletes all records from a table, the space for the records remain

Data Control Language (DCL) statements are used to control access on database objects.

**Examples** −

* **GRANT** − gives user's access privileges to database
* **REVOKE** − withdraws access privileges given with the GRANT command

**12. What is an Operator in SQL? Explain common operator types.**

Operators are used to specify conditions in an SQL statement and to serve as conjunctions for multiple conditions in a statement. The common operator types are −

* Arithmetic Operators
* Comparison/Relational Operators
* Logical Operators
* Set Operators
* Operators used to negate conditions

**13. What are the common set operators in SQL?**

The common set operators in SQL are −

* UNION
* UNION ALL
* INTERSECT
* MINUS

**14. What is the difference between Minus and Intersect? What is their use in ETL testing?**

Intersect operation is used to combine two SELECT statements, but it only returns the records which are common from both SELECT statements. In case of Intersect, the number of columns and datatype must be same. MySQL does not support INTERSECT operator. An Intersect query looks as follows −

select \* from First

INTERSECT

select \* from second

Minus operation combines result of two Select statements and return only those result which belongs to first set of result. A Minus query looks as follows −

select \* from First

MINUS

select \* from second

If you perform source minus target and target minus source, and if the minus query returns a value, then it should be considered as a case of mismatching rows.

If the minus query returns a value and the count intersect is less than the source count or the target table, then the source and target tables contain duplicate rows.

**15. Explain ‘Group-by’ and ‘Having’ clause with an example.**

**Group-by** clause is used with **select** statement to collect similar type of data. **HAVING** is very similar to **WHERE** except the statements within it are of an aggregate nature.

**Syntax** −

SELECT dept\_no, count ( 1 ) FROM employee GROUP BY dept\_no;

SELECT dept\_no, count ( 1 ) FROM employee GROUP BY dept\_no HAVING COUNT( 1 ) > 1;

**Example** − Employee table

|  |  |
| --- | --- |
| **Country** | **Salary** |
| India | 3000 |
| US | 2500 |
| India | 500 |
| US | 1500 |

**Group by Country**

|  |  |
| --- | --- |
| **Country** | **Salary** |
| India | 3000 |
| India | 500 |
| US | 2500 |
| US | 1500 |

**16. What do you understand by ETL Testing?**

ETL Testing is done before data is moved into a production Data Warehouse system. It is sometimes also called as Table Balancing or production reconciliation.

The main objective of ETL testing is to identify and mitigate data defects and general errors that occur prior to processing of data for analytical reporting.

**17. How ETL Testing is different from database testing?**

The following table captures the key features of Database and ETL testing and their comparison −

|  |  |  |
| --- | --- | --- |
| **Function** | **Database Testing** | **ETL Testing** |
| Primary Goal | Data validation and Integration | Data Extraction, Transform and Loading for BI Reporting |
| Applicable System | Transactional system where business flow occurs | System containing historical data and not in business flow environment |
| Common Tools in market | QTP, Selenium, etc. | QuerySurge, Informatica, etc. |
| Business Need | It is used to integrate data from multiple applications, Severe impact. | It is used for Analytical Reporting, information and forecasting. |
| Modeling | ER method | Multidimensional |
| Database Type | It is normally used in OLTP systems | It is applied to OLAP systems |
| Data Type | Normalized data with more joins | De-normalized data with less joins, more indexes and Aggregations. |

**18. What are the different ETL Testing categories as per their function?**

ETL testing can be divided into the following categories based on their function −

* **Source to Target Count Testing** − It involves matching of count of records in source and target system.
* **Source to Target Data Testing** − It involves data validation between source and target system. It also involves data integration and threshold value check and Duplicate data check in target system.
* **Data Mapping or Transformation Testing** − It confirms the mapping of objects in source and target system. It also involves checking functionality of data in target system.
* **End-User Testing** − It involves generating reports for end users to verify if data in reports are as per expectation. It involves finding deviation in reports and cross check the data in target system for report validation.
* **Retesting** − It involves fixing the bugs and defects in data in target system and running the reports again for data validation.
* **System Integration Testing** − It involves testing all the individual systems, and later combine the result to find if there is any deviation.

**19. Explain the key challenges that you face while performing ETL Testing.**

* Data loss during the ETL process.
* Incorrect, incomplete or duplicate data.
* DW system contains historical data so data volume is too large and really complex to perform ETL testing in target system.
* ETL testers are normally not provided with access to see job schedules in ETL tool. They hardly have access on BI Reporting tools to see final layout of reports and data inside the reports.
* Tough to generate and build test cases as data volume is too high and complex.
* ETL testers normally doesn’t have an idea of end user report requirements and business flow of the information.
* ETL testing involves various complex SQL concepts for data validation in target system.
* Sometimes testers are not provided with source to target mapping information.
* Unstable testing environment results delay in development and testing the process.

**20. What are your responsibilities as an ETL Tester?**

The key responsibilities of an ETL tester include −

* Verifying the tables in the source system − Count check, Data type check, keys are not missing, duplicate data.
* Applying the transformation logic before loading the data: Data threshold validation, surrogate ky check, etc.
* Data Loading from the Staging area to the target system: Aggregate values and calculated measures, key fields are not missing, Count Check in target table, BI report validation, etc.
* Testing of ETL tool and its components, Test cases − Create, design and execute test plans, test cases, Test ETL tool and its function, Test DW system, etc.

**21. What do you understand by the term ‘transformation’?**

A transformation is a set of rules which generates, modifies, or passes data. Transformation can be of two types − Active and Passive.

**22. What do you understand by Active and Passive Transformations?**

In an active transformation, the number of rows that is created as output can be changed once a transformation has occurred. This does not happen during a passive transformation. The information passes through the same number given to it as input.

**23. What is Partitioning? Explain different types of partitioning.**

Partitioning is when you divide the area of data store in parts. It is normally done to improve the performance of transactions.

If your DW system is huge in size, it will take time to locate the data. Partitioning of storage space allows you to find and analyze the data easier and faster.

Parting can be of two types − round-robin partitioning and Hash partitioning.

**24. What is the difference between round-robin partitioning and Hash partitioning?**

In round-robin partitioning, data is evenly distributed among all the partitions so the number of rows in each partition is relatively same. Hash partitioning is when the server uses a hash function in order to create partition keys to group the data.

**25. Explain the terms − mapplet, session, mapping, workflow − in an ETL process?**

* A Mapplet defines the Transformation rules.
* Sessions are defined to instruct the data when it is moved from source to target system.
* A Workflow is a set of instructions that instructs the server on task execution.
* Mapping is the movement of data from the source to the destination.

**26. What is lookup transformation and when is it used?**

Lookup transformation allows you to access data from relational tables which are not defined in mapping documents. It allows you to update slowly changing dimension tables to determine whether the records already exist in the target or not.

**27. What is a surrogate key in a database?**

A Surrogate key is something having sequence-generated numbers with no meaning, and just to identify the row uniquely. It is not visible to users or application. It is also called as Candidate key.

**28. What is the difference between surrogate key and primary key?**

A Surrogate key has sequence-generated numbers with no meaning. It is meant to identify the rows uniquely.

A Primary key is used to identify the rows uniquely. It is visible to users and can be changed as per requirement.

**29. If there are thousands of records in the source system, how do you ensure that all the records are loaded to the target in a timely manner?**

In such cases, you can apply the checksum method. You can start by checking the number of records in the source and the target systems. Select the sums and compare the information.

**30. What do you understand by Threshold value validation Testing? Explain with an example.**

In this testing, a tester validates the range of data. All the threshold values in the target system are to be checked to ensure they are as per the expected result.

**Example** − Age attribute shouldn’t have a value greater than 100. In Date column DD/MM/YY, month field shouldn’t have a value greater than 12.

**31. Write an SQL statement to perform Duplicate Data check Testing.**

Select Cust\_Id, Cust\_NAME, Quantity, COUNT (\*)

FROM Customer GROUP BY Cust\_Id, Cust\_NAME, Quantity HAVING COUNT (\*) >1;

**32. How does duplicate data appear in a target system?**

When no primary key is defined, then duplicate values may appear.

Data duplication may also arise due to incorrect mapping, and manual errors while transferring data from source to target system.

**33. What is Regression testing?**

Regression testing is when we make changes to data transformation and aggregation rules to add a new functionality and help the tester to find new errors. The bugs that appear in data which comes in Regression testing are called Regression.

**34. Name the three approaches that can be followed for system integration.**

The three approaches are − top-down, bottom-up, and hybrid.

**34. What are the common ETL Testing scenarios?**

The most common ETL testing scenarios are −

* Structure validation
* Validating Mapping document
* Validate Constraints
* Data Consistency check
* Data Completeness Validation
* Data Correctness Validation
* Data Transform validation
* Data Quality Validation
* Null Validation
* Duplicate Validation
* Date Validation check
* Full Data Validation using minus query
* Other Test Scenarios
* Data Cleaning

**35. What is data purging?**

Data purging is a process of deleting data from a data warehouse. It removes junk data like rows with null values or extra spaces.

**36. What do you understand by a cosmetic bug in ETL testing?**

Cosmetic bug is related to the GUI of an application. It can be related to font style, font size, colors, alignment, spelling mistakes, navigation, etc.

**37. What do you call the testing bug that comes while performing threshold validation testing?**

It is called Boundary Value Analysis related bug.

**38. I have 50 records in my source system but I want to load only 5 records to the target for each run. How can I achieve this?**

You can do it by creating a mapping variable and a filtered transformation. You might need to generate a sequence in order to have the specifically sorted record you require.

**39. Name a few checks that can be performed to achieve ETL Testing Data accuracy.**

**Value comparison** − It involves comparing the data in the source and the target systems with minimum or no transformation. It can be done using various ETL Testing tools such as Source Qualifier Transformation in Informatica.

Critical data columns can be checked by comparing distinct values in source and target systems.

**40. Which SQL statements can be used to perform Data completeness validation?**

You can use Minus and Intersect statements to perform data completeness validation. When you perform source minus target and target minus source and the minus query returns a value, then it is a sign of mismatching rows.

If the minus query returns a value and the count intersect is less than the source count or the target table, then duplicate rows exist.

**41. What is the difference between shortcut and reusable transformation?**

**Shortcut Transformation** is a reference to an object that is available in a shared folder. These references are commonly used for various sources and targets which are to be shared between different projects or environments.

In the Repository Manager, a shortcut is created by assigning ‘Shared’ status. Later, objects can be dragged from this folder to another folder. This process allows a single point of control for the object and multiple projects do not have all import sources and targets into their local folders.

**Reusable Transformation** is local to a folder. **Example** − Reusable sequence generator for allocating warehouse Customer ids. It is useful to load customer details from multiple source systems and allocating unique ids to each new source-key.

**42. What is Self-Join?**

When you join a single table to itself, it is called Self-Join.

**43. What do you understand by Normalization?**

Database normalization is the process of organizing the attributes and tables of a relational database to minimize data redundancy.

Normalization involves decomposing a table into less redundant (and smaller) tables but without losing information.

**44. What do you understand by fact-less fact table?**

A fact-less fact table is a fact table that does not have any measures. It is essentially an intersection of dimensions. There are two types of fact-less tables: One is for capturing an event, and the other is for describing conditions.

**45. What is a slowly changing dimension and what are its types?**

Slowly Changing Dimensions refer to the changing value of an attribute over time. SCDs are of three types − Type 1, Type 2, and Type 3.

**46. User A is already logged into the application and User B is trying to login, but the system is not allowing. Which type of bug is it?**

**a** − Race Condition bug

**b** − Calculation bug

**c** − Hardware bug

**d** − Load Condition bug

**Answer** − d

**47. Which testing type is used to check the data type and length of attributes in ETL transformation?**

**a** − Production Validation Testing

**b** − Data Accuracy Testing

**c** − Metadata Testing

**d** − Data Transformation testing

**Answer** − c

**48. Which of the following statements is/are not true on the Referential join?**

**a** − It is only used when referential integrity between both tables is guaranteed.

**b** − It is only used if a filter is set on the right side table

**c** − It is considered as optimized Inner join.

**d** − It is only executed when fields from both the tables are requested

**Answer** − b

**49. Which file contains information about configuration of dataset in ETL system?**

**a** − Data File

**b** − Configuration File

**c** − Descriptor File

**d** − Control File

**Answer** − c

**50. Which bug type in ETL testing doesn’t allow you to enter valid values?**

**a** − Load Condition bugs

**b** − Calculation bugs

**c** − Race condition bug

**d** − Input/ Output bug

**Answer** − d

# [SQL Interview Questions & Answers](https://www.pavantestingtools.com/2016/11/sql-interview-questions-answers.html)

[](https://1.bp.blogspot.com/-k1LXXasKkZ8/XCMalIv6uUI/AAAAAAAAPHk/f5eMbFbOkxciCepMc01uuftoAUSHjrxpQCLcBGAs/s1600/Programs%2Bfor%2BSelenium%25283%2529.png)

**Q. What is SQL?**  
   
Structured Query Language, an ANSI (American National Standards Institute) standard language for accessing databases.  
  
Using SQL we can Access Oracle, Sybase, DB2, SQL Server, MySQL, DB/400 and other Database Management Systems  
  
**Q. When SQL was appeared?**  
  
Structured Query Language was first appeared by IBM in 1974and it is Free Software(any body can use with free of cost).  
  
**Q. Who should learn SQL?**  
  
• Database Developers  
  
• Database Testers  
  
• Database Administrators  
  
 **Q. What are the Usages of SQL?**  
  
•    Creating new databases  
•    Creating new tables in a database  
•    Inserting records in a database  
•    Updating records in a database  
•    Deleting records from a database  
•    Retrieving data from a database  
•    Executing queries against a database  
•    Creating stored procedures in a database  
•    Creating views in a database  
•    Setting permissions on tables, procedures, and views  
Etc…  
 **Q) What are important SQL Language Elements?**  
  
**Identifiers:** Names of Database objects such as tables, views, columns, and databases etc...  
  
**Data Types:** Define the type of data that is contained by a column.   
  
**Constants:** Symbols that represent specific data types.  
  
**Operators:** Perform Arithmetic, Comparison, and Logical Operations.  
  
**Functions:** Built-in Functions to perform specific operations.  
  
**Clauses:** Constituent components of statements and queries.   
  
**Expressions:** Produce either scalar values, or tables consisting of columns and rows of data.  
  
**Queries:** Retrieve the data based on specific criteria. This is an important element of SQL.  
**Statements:**  
  
**Q. What is SQL Process?**  
  
When we are executing an SQL command for any RDBMS, the system determines the best way to carry out our request and SQL engine figures out how to interpret the task.  
There are various components included in the process. These components are Query Dispatcher, Optimization engines, Classic Query Engine and SQL query engine etc. Classic query engine handles all non-SQL queries but SQL query engine won't handle logical files.  
  
**Q. Is SQL supports Programming?**  
   
No, SQL doesn’t have Conditional and Loop statements, using SQL Commands we can access databases.  
  
**Q. What are the sub sets of SQL?**  
   
•    Data Definition Language  
•    Data Manipulation Language  
•    Data Control Language  
 **Q. What is Data Definition Language?**  
   
Data Definition Language (DDL) allows us to create, alter, and delete database objects such as schemas, tables, views, sequences, catalogs, indexes, and aliases.  
  
**Q. What is Data Manipulation Language?**  
   
DML is a language which enables users to access and manipulate data.   
  
Data Manipulation Language is used to Perform below Operations:  
•    Insertion of data into the database   
•    Retrieval of data from the database   
•    Updating data in the database   
•    Deletion of data in the database  
 **Q. What is Data Control Language?**   
Data Control Language (DCL) allows us to control access to the database. 'DCL' commands include-   
'GRANT' to allow specific users to perform specified tasks   
'REVOKE' to cancel previously denied or granted permissions  
 **Q. What is Database?**  
A database is a systematic collection of data, Databases support storage and manipulation of data, and Databases make data management easy.  
  
**Q. What is Table?**  
  
A Table in a Relational Database is a predefined format of rows and columns that define an entity.   
Each column contains a different type of attribute and each row corresponds to a single record.   
Each table is provided with a name.   
  
**Q. What is DBMS?**  
  
> A database management system, or DBMS, is software designed to assist in maintaining and utilizing large collection of data.   
  
> The alternative to using a DBMS is to store the data in files and write application-specific code to manage it.  
  
Using a DBMS to manage data has many advantages like:  
  
•    Data independence  
•    Efficient data access  
•    Data integrity and security  
•    Data administration  
•    Concurrent access and data recovery   
  
**Q. What is MS Access?**   
MS Access was launched in 1992 by Microsoft Corporation as part of MS Office.  
Microsoft Access is entry-level database management software. It is not only an inexpensive but also powerful database for small-scale projects.  
MS Access uses the Jet database engine which utilizes a specific SQL language dialect (sometimes referred to as Jet SQL).  
MS Access comes with the professional edition of MS Office package. MS Access is user friendly database management system.  
  
**Q. What is Oracle?**Oracle is a relational database management system developed by 'Oracle Corporation and launched in 1977.Oracle supports all major Operating systems includes, MS Windows. NetWare, UnixWare, OS/2 and most UNIX flavors.  
 **Q. What is MS SQL Server?**  
MS SQL Server is a Relational Database Management System developed by Microsoft Inc. Its primary query languages are T-SQL and ANSI SQL.  
  
**Q. What is Sybase?**Sybase is a computer software company , their primary product is Sybase DBMS, which is a relational database management system based upon structured query language.  
  
**Q. What is MySQL?**   
MySQL is open source Database Management System, developed by Swedish company MySQL AB.   
MySQL Supports many different platforms including Microsoft Windows, the major Linux distributions, UNIX, and Mac OS X.  
MySQL has free and paid versions, depending on its usage (non-commercial/commercial) and features. MySQL comes with a very fast, multi-threaded, multi-user, and robust SQL database server.  
  
**Q. What is DB2?**  
  
DB2 is the short name used for DATABASE 2. It is relational database product developed by IBM. in 1983  
  
**Q. What is DB/400?**It is one of the flavors of IBM DB2  
  
**Q. What are the categories of operators available in SQL?**   
•    Arithmetic operators  
•    Comparison operators  
•    Logical operators  
**Q. What are Arithmetic operators in SQL?**

|  |  |
| --- | --- |
| **Operator** | **Description** |
| + (Addition ) | Adds values |
| - (Subtraction) | Subtracts Right side value from Left side value |
| \* (Multiplication) | Multiplies values on either side of the operator |
| / (Division) | Divides left hand operand by right hand operand |
| % (Modulus) | Divides left hand operand by right hand operand and returns remainder |

**Q. What are Comparison operators in SQL?**  
  
For example x = 1, y= 2  
  
**Operator    Example**  
=             (x = y) is False  
!=            (x != y) is True.   
<>           (x <> y) is true.   
>             (x > y) is False  
<             (x < y) is True          
>=           (x >= y) is False  
<=           (x <= y) is True  
!<            (x !< y) is False  
!>            (x !> y) is True.   
  
Note: Comparison Operators return Logical Results  
 **Q. What are Logical operators in SQL?**  
  
**Operator    Description   
--------        -----------**  
**NOT**           Returns TRUE if the following condition is FALSE. Returns FALSE if  it is TRUE.    
**AND**           Returns TRUE if both component conditions are TRUE. Returns FALSE if either is FALSE   
**OR**          Returns TRUE if either component condition is TRUE. Returns FALSE if both are FALSE.  
  
**Q. What is a Data Relationship and What are they?**Database Relationship is the connection between the tables in a database. There are 4 types of relationships, and they are:•    One to One Relationship•    One to Many Relationship•    Many to One Relationship•    Many to Many Relationship  
  
**Q. What are Important Data Types in SQL?**

|  |  |
| --- | --- |
| **Data Type** | **Syntax** |
| character | char(x) |
| integer | integer |
| numeric | numeric(p,s) |
| decimal | decimal(p,s) |
| float | float(p) |
| date | date |
| time | time |
| character varying | varchar2(x) |
| bit | bit(x) |
| real | real |
| smallint | smallint |

**Q. How to Create a Database?**  
  
The SQL CREATE DATABASE statement is used to create new SQL database.  
  
Syntax:  
  
**CREATE DATABASE DatabaseName;**  
  
Example:   
  
SQL> CREATE DATABASE TestData;  
  
**Q. How to delete a Database?**  
  
Using DROP DATABASE statement we can delete any existing Database  
  
Syntax:  
  
**DROP DATABASE DatabaseName;**  
  
Example:  
  
SQL> DROP DATABASE TestData;  
  
**Q. How to Select a Database?**  
  
USE statement is used to select any existing database in SQL  
  
Syntax:  
  
**USE DatabaseName;**  
  
Example:  
  
SQL> USE TestData;  
  
**Q. How to view all existing Databases list?**  
  
**SQL> SHOW DATABASES;**  
 **Q. How to create a Table?**  
  
CREATE TABLE table\_name(  
   column1 datatype,  
   column2 datatype,  
   column3 datatype,  
   .....  
   columnN datatype,  
   PRIMARY KEY( one or more columns )  
);  
  
**Q. How to delete a Table?**  
  
Using Drop Table we can delete a Table  
  
Syntax:  
  
DROP TABLE table\_name;  
  
**Q. How to add new record into a Table?**  
  
Using INSERT INTO statement, we can insert new rows  
  
Syntax:  
  
INSERT INTO TABLE\_NAME (column1, column2, column3,...columnN)  
VALUES (value1, value2, value3,...valueN)  
  
**Q. How to fetch data from a Database Table?**  
   
Using SELECT Statement, we can fetch data from a Database Table  
  
Syntax:  
  
SELECT column1, column2, columnN FROM table\_name;  
  
Or  
  
SELECT \* FROM table\_name;  
  
**Q. Explain about IN Operator?**  
  
The IN operator implements comparison to a list of values, that is, it tests whether a value matches any value in a list of values. IN comparisons have the following general format:  
value-1 [NOT] IN ( value-2 [, value-3] ... )  
This comparison tests if value-1 matches value-2 or matches value-3, and so on. It is equivalent to the following logical predicate:  
value-1 = value-2 [ OR value-1 = value-3 ] ...  
  
**Q. Explain about FROM Clause in SQL?**  
  
The FROM clause always follows the SELECT clause. It lists the tables accessed by the query. For example,  
SELECT \* FROM s  
When the From List contains multiple tables, commas separate the table names. For example,  
SELECT sp.\*, city  
FROM sp, s  
WHERE sp.sno=s.sno  
When the From List has multiple tables, they must be joined together.  
 **Q. What is the parameter substitution symbol used with INSERT INTO command?**  
  
The parameter substitution symbol used with INSERT INTO command is &.  
  
**Q. What are the various uses of database triggers?**  
  
Database triggers can be used to enforce business rules, to maintain derived values and perform value-based auditing.   
  
**Q. What is a event handler in sql?**  
  
An event handler is a routine that is written to respond to a particular event.  
  
**Q. What are two methods of retrieving SQL?**  
  
The two methods of retrieving SQL are   
1-Select  
2-using Cursor.  
  
**Q. What is a synonym? How is it used?**  
  
A synonym is used to reference a table or view by another name. The other name can then be written in the application code pointing to test tables in the development stage and to production entities when the code is migrated. The synonym is linked to the AUTHID that created it.   
  
**Q. What is referential integrity?**  
   
Referential integrity refers to the consistency that must be maintained between primary and foreign keys, i.e. every foreign key value must have a corresponding primary key value.  
  
**Q. Explain the EXPLAIN statement?**  
   
The explain statement provides information about the optimizer's choice of access path of the SQL.  
 **Q. How is the SUBSTR keyword used in SQL?**  
   
SUBSTR is used for string manipulation with column name, first position and string length used as arguments. E.g. SUBSTR (NAME, 1 3) refers to the first three characters in the column NAME.  
  
**Q. What is the difference between group by and order by?**  
   
Group by controls the presentation of the rows, order by controls the presentation of the columns for the results of the SELECT statement.  
  
**Q. What is a subselect? Is it different from a nested select?**  
   
A subselect is a select which works in conjunction with another select. A nested select is a kind of subselect where the inner select passes to the where criteria for the outer select.  
  
**Q. What is the use of CASCADE CONSTRAINTS?**  
   
When this clause is used with the DROP command, a parent table can be dropped even when a child table exists.  
  
**Q. How do you prevent output from coming to the screen?**  
   
The SET option TERMOUT controls output to the screen. Setting TERMOUT OFF turns off screen output. This option can be shortened to TERM.  
   
**Q. Can Primary key is a Foreign Key on the same table?**  
  
Yes, Primary key is a Foreign Key on the same table.  
  
**Q. How do you execute a host operating system command from within SQL?**  
   
By use of the exclamation point “!” (in UNIX and some other OS) or the HOST (HO) command.  
  
**Q. What is a Cartesian product?**  
   
A Cartesian product is the result of an unrestricted join of two or more tables. The result set of a three table Cartesian product will have x \* y \* z number of rows where x, y, z correspond to the number of rows in each table involved in the join.  
 **Q. How can variables be passed to a SQL routine?**  
   
By use of the & symbol. For passing in variables the numbers 1-8 can be used (&1, &2,...,&8) to pass the values after the command into the SQL PLUS session. To be prompted for a specific variable, place the ampersanded variable in the code itself: “select \* from dba\_tables where owner=&owner\_name;” . Use of double ampersands tells SQLPLUS to resubstitute the value for each subsequent use of the variable, a single ampersand will cause a reprompt for the value unless an ACCEPT statement is used to get the value from the user.  
  
**Q. What command is used to get back the privileges offered by the GRANT command?**  
   
Revoke command is used to get back the privileges offered by the GRANT command.  
  
**Q. What are the advantages of procedures?**  
  
Advantages of procedures:  
  
• Loaded once and used many times.  
• Performance better coz all SQL statements are sent in one go from the application to the database.  
• Security (no object privileges are given directly).  
• Invoker's rights possible.  
• Data integrity, productivity.  
  
**Q. What is Parsing?**  
   
Parsing checks syntax, checks privileges, and allocating Private SQL Area.  
  
**Q. What is Cursor?**  
  
Name or handle to a private SQL area where Oracle parses and fetches query results.  
  
**Q) Is SQL supports Conditional and Loop Statements?**  
  
No Basically SQL is a Command based Language, not a procedural  language, but it has Operators and built-in Functions.

**1) What are most important DDL Commands in SQL?**

CREATE TABLE - creates a new database table  
ALTER TABLE - alters (changes) a database table  
DROP TABLE - deletes a database table  
CREATE INDEX - creates an index (search key)  
DROP INDEX - deletes an index

**2) What are the Operators used in SELECT statements?**

= Equal  
  
<> or != Not equal  
  
> Greater than  
  
< Less than  
  
>= Greater than or equal  
  
<= Less than or equal  
  
BETWEEN Between an inclusive range LIKE Search for a pattern  
  
  
**3) How to  INSERT Values into Tables?**  
  
INSERT INTO table\_name VALUES (value1, value2,....)  
  
INSERT INTO table\_name (column1, column2,...) VALUES (value1, value2,....)  
  
**4) How to Update a Column Name?**  
  
UPDATE table\_name SET column\_name = new\_value WHERE column\_name = some\_value

**5) How to Delete Columns, Rows?**

Delete a particular column:  
  
DELETE FROM table\_name WHERE column\_name = some\_value  
  
Delete All Rows:  
  
DELETE FROM table\_name or DELETE \* FROM table\_name

**6) Give an usage for BETWEEN ... AND?**

SELECT column\_name FROM table\_name WHERE column\_name BETWEEN value1 AND value2 The values can be numbers, text, or dates.

**7) What is the use of CASCADE CONSTRAINTS?**

When this clause is used with the DROP command, a parent table can be dropped even when a child table exists.

**8) Why does the following command give a compilation error?**

DROP TABLE &TABLE NAME;  
  
Variable names should start with an alphabet. Here the table name starts with an '&' symbol.

**9) Which system tables contain information on privileges granted and privileges obtained?**

USER\_TAB\_PRIVS\_MADE, USER\_TAB\_PRIVS\_RECD 

**10) Which system table contains information on constraints on all the tables created?obtained?**

USER\_CONSTRAINTS. 

**11) State true or false. EXISTS, SOME, ANY are operators in SQL?**

True.

**12) What does the following query do?**

SELECT SAL + NVL(COMM,0) FROM EMP;?  
  
This displays the total salary of all employees. The null values in the commission column will be replaced by 0 and added to salary.

**13) What is the advantage of specifying WITH GRANT OPTION in the GRANT command?**

The privilege receiver can further grant the privileges he/she has obtained from the owner to any other user.

**14) Which command executes the contents of a specified file?**

START or @. 

**15) Which command displays the SQL command in the SQL buffer, and then executes it?**

RUN. 

**16) What command is used to get back the privileges offered by the GRANT command?**

REVOKE. 

**17) Which date function is used to find the difference between two dates?**

MONTHS\_BETWEEN. 

**18) What operator performs pattern matching?**

LIKE operator. 

**19) What is the use of the DROP option in the ALTER TABLE command?**

It is used to drop constraints specified on the table. 

**20) What operator tests column for the absence of data?**

IS NULL operator. 

**21) What are the privileges that can be granted on a table by a user to others?**

Insert, update, delete, select, references, index, execute, alter, all. 

**22) Which function is used to find the largest integer less than or equal to a specific value?**

FLOOR. 

**23) Which is the subset of SQL commands used to manipulate Oracle Database structures, including tables?**

Data Definition Language (DDL).

**24) What is the use of DESC in SQL?**

DESC has two purposes. It is used to describe a schema as well as to retrieve rows from table in descending order.  
  
Explanation :  
  
The query SELECT \* FROM EMP ORDER BY ENAME DESC will display the output sorted on ENAME in descending order.

**25) What command is used to create a table by copying the structure of another table?**

CREATE TABLE .. AS SELECTcommand  
  
Explanation:  
  
To copy only the structure, the WHERE clause of the SELECT command should contain a FALSE statement as in the following.  
  
CREATE TABLE NEWTABLE AS SELECT \* FROM EXISTINGTABLE WHERE 1=2;  
  
If the WHERE condition is true, then all the rows or rows satisfying the condition will be copied to the new table.

**26) What is the output of the following query SELECT TRUNC(1234.5678,-2) FROM DUAL;?**

1200. 

**27) What are the wildcards used for pattern matching.?**

\_ for single character substitution  
% for multi-character substitution.

**28) What's an SQL injection?**

SQL Injection is when form data contains an SQL escape sequence and injects a new SQL query to be run.

**29) What is difference between TRUNCATE & DELETE?**

TRUNCATE commits after deleting entire table i.e., cannot be rolled back. Database triggers do not fire on TRUNCATE  
  
DELETE allows the filtered deletion. Deleted records can be rolled back or committed. Database triggers fire on DELETE.

**30) What is a join? Explain the different types of joins?**

Join is a query, which retrieves related columns or rows from multiple tables.  
  
  
Self Join - Joining the table with itself.  
  
Equi Join - Joining two tables by equating two common columns. Non-Equi Join - Joining two tables by equating two common columns.  
  
Outer Join - Joining two tables in such a way that query can also retrieve rows that do not have corresponding join value in the other table.

**31) What is the sub-query?**

Sub-query is a query whose return values are used in filtering conditions of the main query.

**32) What is correlated sub-query?**

Correlated sub-query is a sub-query, which has reference to the main query.

**33) Explain CONNECT BY PRIOR?**

Retrieves rows in hierarchical order eg. select empno, ename from emp where. 

**34) Difference between SUBSTR and INSTR?**

INSTR (String1, String2 (n, (m)),   
  
INSTR returns the position of the m-th occurrence of the string 2 in string1. The search begins from nth position of string1.   
  
SUBSTR (String1 n, m)   
  
SUBSTR returns a character string of size m in string1, starting from n-th position of string1. 

**35) Explain UNION, MINUS, UNION ALL and INTERSECT?**

INTERSECT - returns all distinct rows selected by both queries.  
  
MINUS - returns all distinct rows selected by the first query but not by the second.  
  
UNION - returns all distinct rows selected by either query  
  
UNION ALL - returns all rows selected by either query,including all duplicates.

**36) What is ROWID?**

ROWID is a pseudo column attached to each row of a table. It is 18 characters long, blockno, rownumber are the components of ROWID.

**37) What is the fastest way of accessing a row in a table?**

Using ROWID. CONSTRAINTS 

**38) What is an integrity constraint?**

Integrity constraint is a rule that restricts values to a column in a table.

**39) What is referential integrity constraint?**

Maintaining data integrity through a set of rules that restrict the values of one or more columns of the tables based on the values of primary key or unique key of the referenced table.

# [ORACLE IMPORTANT QUERIES-PART2](https://www.pavantestingtools.com/2016/11/oracle-important-queries-part2.html)

**1.**     **Get duplicate rows from the table:**

Select empno, count (\*) from EMP group by empno having count (\*)>1;

**2.**     **Remove duplicates in the table:**

Delete from EMP where rowid not in (select max (rowid) from EMP group by empno);

**3.**     **Below query transpose columns into rows.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **No** | **Add1** | **Add2** |
| abc | 100 | Hyd | bang |
| xyz | 200 | Mysore | pune |

Select name, no, add1 from A

UNION

Select name, no, add2 from A;

**4.**     **Below query transpose rows into columns.**

select

emp\_id,

max(decode(row\_id,0,address))as address1,

max(decode(row\_id,1,address)) as address2,

max(decode(row\_id,2,address)) as address3

from (select emp\_id,address,mod(rownum,3) row\_id from temp order by emp\_id )

group by emp\_id

**Other query:**

select

emp\_id,

max(decode(rank\_id,1,address)) as add1,

max(decode(rank\_id,2,address)) as add2,

max(decode(rank\_id,3,address))as add3

from

(select emp\_id,address,rank() over (partition by emp\_id order by emp\_id,address )rank\_id from temp )

group by

emp\_id

**5.**     **Rank query:**

Select empno, ename, sal, r from (select empno, ename, sal, rank () over (order by sal desc) r from EMP);

**6.**     **Dense rank query:**

The DENSE\_RANK function works acts like the RANK function except that it assigns consecutive ranks:

Select empno, ename, Sal, from (select empno, ename, sal, dense\_rank () over (order by sal desc) r from emp);

**7.**     **Top 5 salaries by using rank:**

Select empno, ename, sal,r from (select empno,ename,sal,dense\_rank() over (order by sal desc) r from emp) where r<=5;

Or

**Select \* from (select \* from EMP order by sal desc) where rownum<=5;**

**8.**     **2 nd highest Sal:**

Select empno, ename, sal, r from (select empno, ename, sal, dense\_rank () over (order by sal desc) r from EMP) where r=2;

**9.**     **Top sal:**

Select \* from EMP where sal= (select max (sal) from EMP);

**10.**                        **How to display alternative rows in a table?**

          SQL> select \*from emp where (rowid, 0) in (select rowid,mod(rownum,2) from emp);

**11.**                        **Hierarchical queries**

Starting at the root, walk from the top down, and eliminate employee Higgins in the result, but

process the child rows.

SELECT department\_id, employee\_id, last\_name, job\_id, salary

FROM employees

WHERE last\_name! = ’Higgins’

**START WITH** manager\_id  IS NULL

**CONNECT BY PRIOR** employee\_id = menagerie;

# [ORACLE IMPORTANT QUERIES-PART1](https://www.pavantestingtools.com/2016/11/oracle-important-queries-part1.html)

**1)   To find the nth row of a table**

SQL> Select \*from emp where rowid = (select max(rowid) from emp where rownum <= 4);

Or

   SQL> Select \*from emp where rownum <= 4 minus select \*from emp where rownum <= 3;

**2)   To find duplicate rows**

SQL> Select \*from emp where rowid in (select max(rowid) from emp group by empno,

         ename, mgr, job, hiredate, comm, deptno, sal);

Or

 SQL> Select empno,ename,sal,job,hiredate,comm , count(\*) from emp group by

         empno,ename,sal,job,hiredate,comm  having count(\*) >=1; 

**3)   To delete duplicate rows**

      SQL> Delete emp where rowid in (select max(rowid) from emp group by

              empno,ename,mgr,job,hiredate,sal,comm,deptno);

**4)   To find the count of duplicate rows**

      SQL> Select ename, count(\*) from emp group by ename having count(\*) >= 1;

**5)   How to display alternative rows in a table?**

          SQL> select \*from emp where (rowid,0) in (select rowid,mod(rownum,2) from emp);

**6)   Getting employee details of each department who is drawing maximum sal?**

       SQL> select \*from emp where (deptno,sal) in

               ( select deptno,max(sal)  from emp group by deptno);

**7)   How to get number of employees in each department  , in which department is having more than 2500 employees?**

       SQL> Select deptno,count(\*) from emp group by  deptno having count(\*) >2500;

**9) To reset the time to the beginning of the day**

                  SQL> Select to\_char(trunc(sysdate),’dd-mon-yyyy hh:mi:ss am’) from dual;

**10) To find nth maximum sal**

  SQL> Select \*from emp where sal in (select max(sal) from (select \*from emp order by sal)

          where rownum <= 5);

# [Handling Authentication Window with WebDriver (In Firefox, Chrome and IE)](https://www.pavantestingtools.com/2016/11/handling-authentication-window-with.html)

When you are working in a test environment, Stage or Pre Production, there are cases where you may need to work with applications which are secured with Authentication (Basic Auth).

When ever you enter the URL, it will prompt you to enter the User name and the password and It will not allow to perform any further operations until you provide username and password. And this Authentication pop-up is not a JavaScript pop-up, it is a Browser dialog window which selenium cannot handle simply using sendKeys method which we do for normal JavaScript pop-ups..

To work with Basic Authentication pop-up (which is a browser dialogue window), you just need to send the user name and password along with the application URL.

**Syntax:**

driver.**get**("[http://admin:admin@yoururl.com"](http://admin:admin@yoururl.com/));

### Check out the example below to execute in Firefox browser:

@Test

public void testBasicAuth\_Firefox() {

WebDriver driver = new FirefoxDriver();

driver.manage().window().maximize();

driver.get("[http://admin:admin@yoururl.com"](http://admin:admin@yoururl.com/));

//To check if we have landed in the correct place

String text = driver.findElement(By.className("home")).getText();

Assert.assertTrue(text.contains("Welcome"), "Basic Authentication failed");

}

### Check out the example below to work with Chrome browser:

@Test

public void testBasicAuth\_Chrome() {

System.setProperty("webdriver.chrome.driver", "G:/Jars/chromedriver.exe");

WebDriver driver = new ChromeDriver();

driver.manage().window().maximize();

driver.get("[http://admin:admin@yoururl.com"](http://admin:admin@yoururl.com/));

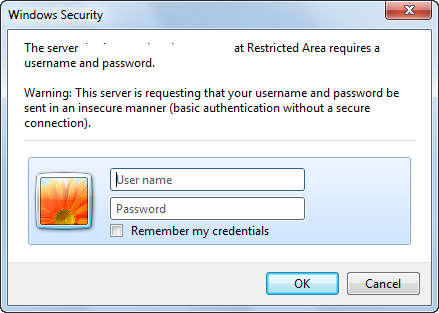
//To check if we have landed in the correct place

String text = driver.findElement(By.className("home")).getText();

Assert.assertTrue(text.contains("Welcome"), "Basic Authentication failed");

}

The best way to make it work with IE is using AutoIt tool. If not, you may need to change the stuff in registry, To change for the current user, you need to edit in 'HKEY\_CURRENT\_USER...' and if you want to do that for all users, you can set the value of register keys as 'HKEY\_LOCAL\_MACHINE...' etc.

Once you open the URL in IE it will look like the below screen shot: -  


### Check out the example to work with IE using AutoIt tool.

First create AutoIt script as below and save it as basicauth.au3

; To **pass** user name **and** password

WinWaitActive("Windows Security")

Send("admin")

Send("{TAB}")

Send("admin")

Send("{ENTER}")

After creating the above AutoIT script, compile the script and take the location of the script exe file. Now the selenium code should look like below :

@Test

public void testBasicAuth\_IE() {

DesiredCapabilities caps = DesiredCapabilities.internetExplorer();

caps.setCapability(InternetExplorerDriver.INITIAL\_BROWSER\_URL, "");

System.setProperty("webdriver.ie.driver", "G:/Jars/IEDriverServer.exe");

        WebDriver driver=new InternetExplorerDriver(caps);

driver.manage().window().maximize();

driver.get("[http://yoururl.com"](http://yoururl.com/));

try {

Runtime.getRuntime().exec("G:/basicauth.exe");

} catch (Exception e) {

e.printStackTrace();

}

}

# [How to delete Cookies in Selenium Webdriver](https://www.pavantestingtools.com/2016/11/how-to-delete-cookies-in-selenium.html)

[](https://1.bp.blogspot.com/-OaW_3crdKUw/XCMf8ZSu_nI/AAAAAAAAPIk/d50AwBMlU6ARH9IEBfapLINKI6OZr24AQCLcBGAs/s1600/Programs%2Bfor%2BSelenium%252810%2529.png)

**Delete Cookie**  
**Delete Cookie with Name**  
**Delete All Cookies**

User can delete a cookie from the browser's "cookie jar". The domain of the cookie will be ignored.

User can delete the named cookie from the current domain. This is equivalent to setting the named cookie's expiry date to sometime in the past.

User can also delete all the cookies for the current domain using driver.manage().deleteAllCookies();

Example:

Deleting the specific cookie with cookie name "--utmb"

@Test

public void deleteCookieNamedExample()

{

driver= new FirefoxDriver();

String URL="[http://www.flipkart.com";](http://www.flipkart.com/)

driver.navigate().to(URL);

driver.manage().deleteCookieNamed("\_\_utmb");

}

Deleting all the cookies of the domain

@Test

public void deleteAllCookiesExample()

{

driver= new FirefoxDriver();

String URL="[http://www.flipcart.com";](http://www.flipcart.com/)

driver.navigate().to(URL);

driver.manage().deleteAllCookies();

}

# [How to add cookie with Selenium Webdriver](https://www.pavantestingtools.com/2016/11/how-to-add-cookie-with-selenium.html)

[](https://4.bp.blogspot.com/-IsnIhw00FT8/XCMpj0NlvtI/AAAAAAAAPI4/MAkfBuMSp2QKBiJd84-YDclGfVFbzq2cACLcBGAs/s1600/Programs%2Bfor%2BSelenium%252812%2529.png)

Using webdriver we can easily pass the cookie to the domain. In order to pass cookie, we should use a method named "addCookie(cookie)"

**Method Name: addCookie(Cookie cookie)**  
Syntax:driver.manage().addCookie(arg0);  
Purpose: To add a specific cookie into cookies. If the cookie's domain name is left blank, it is assumed that the cookie is meant for the domain of the current document.  
Parameters: cookie - The name and value of the cookie to be add.

Example:

@Test

public void addCookie()

{

driver= new FirefoxDriver();

String URL="[http://flipkart.com/";](http://flipkart.com/)

driver.navigate().to(URL);

                //we should pass name and value for cookie as parameters

                // In this example we are passing, name=mycookie and value=123456789123

Cookie name = new Cookie("mycookie", "123456789123");

driver.manage().addCookie(name);

                // After adding the cookie we will check that by displaying all the cookies.

Set cookiesList =  driver.manage().getCookies();

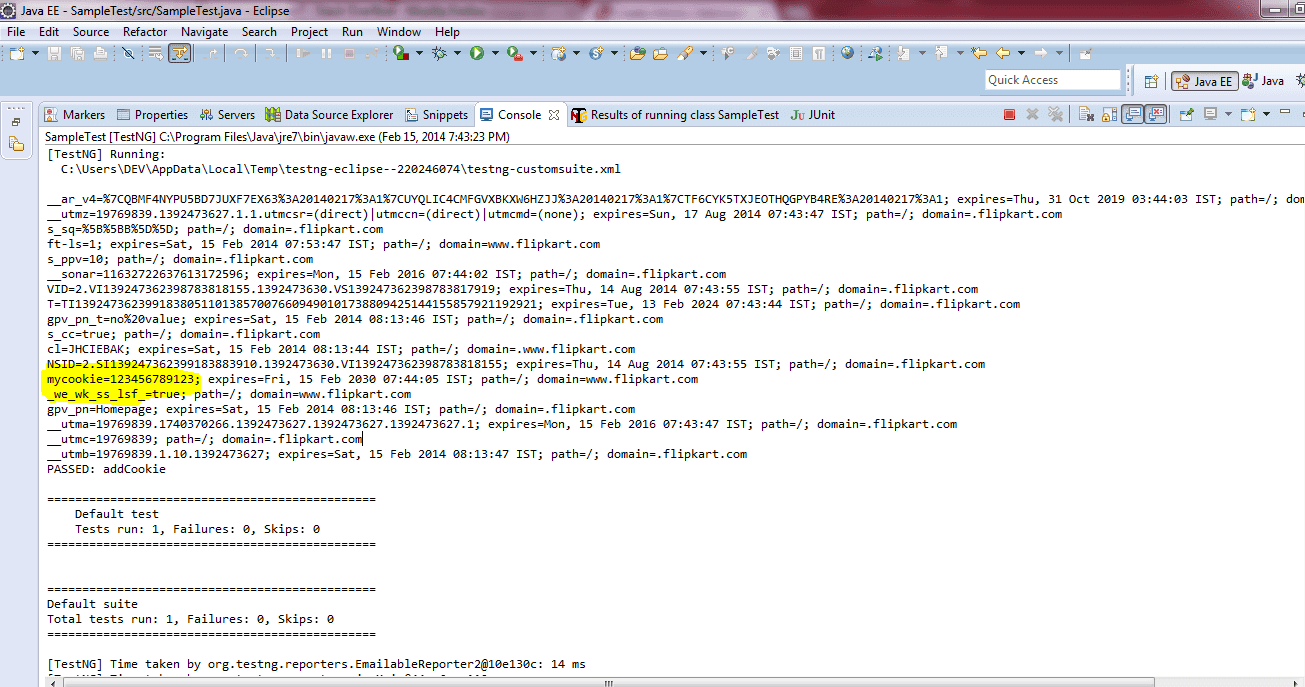
for(Cookie getcookies :cookiesList) {

    System.out.println(getcookies );

}

}

The output looks like below. We can see the added cookie along with the other cookies of the domain.



[Email This](https://www.blogger.com/share-post.g?blogID=196205546010114473&postID=7329961767534898452&target=email)[BlogThis!](https://www.blogger.com/share-post.g?blogID=196205546010114473&postID=7329961767534898452&target=blog)[Share to Twitter](https://www.blogger.com/share-post.g?blogID=196205546010114473&postID=7329961767534898452&target=twitter)[Share to Facebook](https://www.blogger.com/share-post.g?blogID=196205546010114473&postID=7329961767534898452&target=facebook)

# [How to handle javascript alerts, confirmation and prompts?](https://www.pavantestingtools.com/2016/11/how-to-handle-javascript-alerts.html)

[](https://1.bp.blogspot.com/-9rkYikgQ5CM/XCMqX7GCZ5I/AAAAAAAAPJE/T-to9C5oX14h6P20ygVKV9VuAy_TYBNbwCLcBGAs/s1600/Programs%2Bfor%2BSelenium%252813%2529.png)

Generally JavaScript popups are generated by web application and hence they can be easily controlled by the browser.

Webdriver offers the ability to cope with javascript alerts using Alerts API

// Get a handle to the open alert, prompt or confirmation  
**Alert alert = driver.switchTo().alert();**

Alert is an interface. There below are the methods that are used

//Will Click on OK button.  
**alert.accept();**

// Will click on Cancel button.  
**alert.dismiss()**

//will get the text which is present on th Alert.  
**alert.getText();**

//Will pass the text to the prompt popup  
**alert.sendkeys();**

//Is used to Authenticate by passing the credentials  
alert.authenticateUsing(Credentials credentials)

## Working with Alerts using Selenium Webdriver:

The below is the sample code for alerts, please copy and make an html file and pass it to the webdriver.

<**html**>

<**head**>

<**title**>Selenium Easy Alerts Sample </**title**>

</**head**>

<**body**>

<**h2**>Alert Box Example</**h2**>

<**fieldset**>

<**legend**>Alert Box</**legend**><**p**>Click the button to display an alert box.</**p**>

<**button** onclick="alertFunction()">Click on me</**button**>

<**script**>

**function** **alertFunction**()

{

alert("I am an example for alert box!");

}

</**script**>

</**fieldset**>

</**body**>

</**html**>

The below program will demonstrate you working on Alerts popup using above html file.

**import** org.openqa.selenium.Alert;

**import** org.openqa.selenium.By;

**import** org.openqa.selenium.WebDriver;

**import** org.openqa.selenium.firefox.FirefoxDriver;

**import** org.testng.annotations.Test;

**public** **class** **PopupsHandling** {

WebDriver driver=**new** FirefoxDriver();

@Test

**public** **void** **ExampleForAlert**() **throws** InterruptedException

{

driver.manage().window().maximize();

driver.get("file:///C:/path/alerts.html");

Thread.sleep(2000);

driver.findElement(By.xpath("//button[@onclick='alertFunction()']")).click();

Alert alert=driver.switchTo().alert();

System.out.println(alert.getText());

alert.accept();

}

}

## Working with Confirmation Popups

The below is the sample code for confirmation Popup, please copy and make an html file and pass it to the webdriver as below.

<**html**>

<**head**>

<**title**>Selenium Easy Confirm popup Sample </**title**>

</**head**>

<**body**>

<**h2**>Confirm Box Example</**h2**>

<**fieldset**>

<**legend**>Confirm Box</**legend**>

<**p**>Click the button to display a confirm box.</**p**>

<**button** onclick="confirmFunction()">Click on me</**button**>

<**p** id="confirmdemo"></**p**>

<**script**>

**function** **confirmFunction**()

{

**var** cb;

**var** c=confirm("I am an Example for Confirm Box.\n Press any button!");

**if** (c==true)

  {

  cb="You Clicked on OK!";

  }

**else**

  {

  cb="You Clicked on Cancel!";

  }

document.getElementById("confirmdemo").innerHTML=cb;

}

</**script**>

</**fieldset**>

</**body**>

</**html**>

The below program will demonstrate you working on Confirmation popup using above html file.

**import** org.openqa.selenium.Alert;

**import** org.openqa.selenium.By;

**import** org.openqa.selenium.WebDriver;

**import** org.openqa.selenium.firefox.FirefoxDriver;

**import** org.testng.annotations.Test;

**public** **class** **PopupsHandling** {

WebDriver driver=**new** FirefoxDriver();

@Test

**public** **void** **ExampleForConfirmBox**() **throws** InterruptedException

{

driver.manage().window().maximize();

driver.get("file:///C:/path/confirmation.html");

Thread.sleep(2000);

driver.findElement(By.xpath("//button[@onclick='confirmFunction()']")).click();

Alert alert=driver.switchTo().alert();

System.out.println(alert.getText());

alert.dismiss();

}

}

## Working with Prompt Popups.

In prompt, you can enter the text using webdriver sendkeys("text..")

The below is the sample code for prompt popup, please copy and make an html file and pass it to the webdriver as below.

<**html**>

<**head**>

<**title**>Selenium Easy Prompt popup Sample </**title**>

</**head**>

<**body**>

<**h2**>Prompt Box Example</**h2**>

<**fieldset**>

<**legend**>Prompt Box</**legend**>

<**p**>Click the button to demonstrate the prompt box.</**p**>

<**button** onclick="promptFunction()">Click on me</**button**>

<**p** id="promptdemo"></**p**>

<**script**>

**function** **promptFunction**()

{

**var** x;

**var** person=prompt("Please enter your name","Your name");

**if** (person!=null)

  {

  x="Hello " + person + "! Welcome to Selenium Easy..";

  document.getElementById("promptdemo").innerHTML=x;

  }

}

</**script**>

</**fieldset**>

</**body**>

</**html**>

The below program will demonstrate you working on prompt popup using above html file.

**import** org.openqa.selenium.Alert;

**import** org.openqa.selenium.By;

**import** org.openqa.selenium.WebDriver;

**import** org.openqa.selenium.firefox.FirefoxDriver;

**import** org.testng.annotations.Test;

**public** **class** **PopupsHandling** {

WebDriver driver=**new** FirefoxDriver();

@Test

**public** **void** **ExampleForPromptBox**() **throws** InterruptedException

{

driver.manage().window().maximize();

driver.get("file:///C:/path/prompt.html");

Thread.sleep(2000);

driver.findElement(By.xpath("//button[@onclick='promptFunction()']")).click();

Alert alert=driver.switchTo().alert();

driver.switchTo().alert().sendKeys("Helllo");

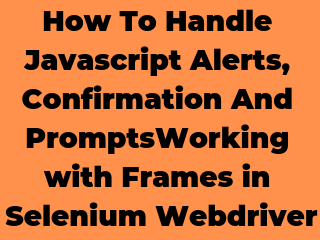
alert.accept();

System.out.println(alert.getText());

}

}

# [Working with Frames in Selenium Webdriver](https://www.pavantestingtools.com/2016/11/working-with-frames-in-selenium.html)

[](https://2.bp.blogspot.com/-F6PadhCscAE/XCXOKQrH0nI/AAAAAAAAPJc/8W6t_UkLMOUkRsxvL3uIkLZjBMEV1Mn2wCLcBGAs/s1600/Programs%2Bfor%2BSelenium%252814%2529.png)

What is iFrame? An iFrame (Inline Frame) is an HTML document embedded inside the current HTML document on a website. iFrame HTML element is used to insert content from another source, such as an advertisement, into a Web page. A Web designer can change an iFrame's content without making them reload the complete website. A website can have multiple frames on a single page. And a frame can also have inner frames (Frame in side a Frame)

---------------------------------------

| | |

| | |

| Frame 1 | |

| | |

| | |

|--------------| |

| | Frame 3 |

| | |

| | |

| | |

| Frame 2 | |

| | |

| | |

| | |

| | |

--------------------------------------------

In Selenium to work with iFrames, we have different ways to handle frame depending on the need. Please look at the below ways of handling frames

**driver.switchTo().frame(int arg0);**

Select a frame by its (zero-based) index. That is, if a page has multiple frames (more than 1), the first frame would be at index "0", the second at index "1" and so on.  
Once the frame is selected or navigated , all subsequent calls on the WebDriver interface are made to that frame. i.e the driver focus will be now on the frame. What ever operations we try to perform on pages will not work and throws element not found as we navigated / switched to Frame.

*Parameters: Index - (zero-based) index*  
*Returns: driver focused on the given frame (current frame)*  
*Throws: NoSuchFrameException - If the frame is not found.*

*Example: if iframe id=webklipper-publisher-widget-container-frame*, it can be written as driver.switchTo().frame("webklipper-publisher-widget-container-frame"); Below is the code snippet to work with switchToFrame using frame id.

**public** **void** **switchToFrame**(**int** frame) {

**try** {

driver.switchTo().frame(frame);

System.**out**.println("Navigated to frame with id " + frame);

} **catch** (NoSuchFrameException e) {

System.**out**.println("Unable to locate frame with id " + frame

+ e.getStackTrace());

} **catch** (Exception e) {

System.**out**.println("Unable to navigate to frame with id " + frame

+ e.getStackTrace());

}

}

**driver.switchTo().frame(String arg0);**

Select a frame by its name or ID. Frames located by matching name attributes are always given precedence over those matched by ID.  
*Parameters: name Or Id - the name of the frame or the id of the frame element.*  
*Returns: driver focused on the given frame (current frame)*  
*Throws: NoSuchFrameException - If the frame is not found*

Below is the example code snippet using frame name.

public void switchToFrame(String frame) {

try {

driver.switchTo().frame(frame);

System.out.println("Navigated to frame with name " + frame);

} catch (NoSuchFrameException e) {

System.out.println("Unable to locate frame with id " + frame

+ e.getStackTrace());

} catch (Exception e) {

System.out.println("Unable to navigate to frame with id " + frame

+ e.getStackTrace());

}

}

**driver.switchTo().frame(WebElement frameElement);**

Select a frame using its previously located WebElement.  
*Parameters: frameElement - The frame element to switch to.*  
*Returns: driver focused on the given frame (current frame).*  
*Throws: NoSuchFrameException - If the given element is neither an iframe nor a frame element. And StaleElementReferenceException - If the WebElement has gone stale.*

Below is the example code to send an Element to the and switch.

**public** **void** **switchToFrame**(WebElement frameElement) {

**try** {

**if** (isElementPresent(frameElement)) {

driver.switchTo().frame(frameElement);

System.**out**.println("Navigated to frame with element "+ frameElement);

} **else** {

System.**out**.println("Unable to navigate to frame with element "+ frameElement);

}

} **catch** (NoSuchFrameException e) {

System.**out**.println("Unable to locate frame with element " + frameElement + e.getStackTrace());

} **catch** (StaleElementReferenceException e) {

System.**out**.println("Element with " + frameElement + "is not attached to the page document" + e.getStackTrace());

} **catch** (Exception e) {

System.**out**.println("Unable to navigate to frame with element " + frameElement + e.getStackTrace());

}

}

Some times when there are multiple Frames (Frame in side a frame), we need to first switch to the parent frame and then we need to switch to the child frame. below is the code snippet to work with multiple frames.

public void switchToFrame(String ParentFrame, String ChildFrame) {

try {

driver.switchTo().frame(ParentFrame).switchTo().frame(ChildFrame);

System.out.println("Navigated to innerframe with id " + ChildFrame

+ "which is present on frame with id" + ParentFrame);

} catch (NoSuchFrameException e) {

System.out.println("Unable to locate frame with id " + ParentFrame

+ " or " + ChildFrame + e.getStackTrace());

} catch (Exception e) {

System.out.println("Unable to navigate to innerframe with id "

+ ChildFrame + "which is present on frame with id"

+ ParentFrame + e.getStackTrace());

}

}

After working with the frames, main important is to come back to the web page. if we don't switch back to the default page, driver will throw an exception. Below is the code snippet to switch back to the default content.

public void switchtoDefaultFrame() {

try {

driver.switchTo().defaultContent();

System.out.println("Navigated back to webpage from frame");

} catch (Exception e) {

System.out

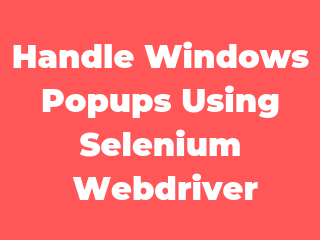
.println("unable to navigate back to main webpage from frame"

+ e.getStackTrace());

}

}

# [Handle windows popups using Selenium Webdriver](https://www.pavantestingtools.com/2016/11/handle-windows-popups-using-selenium.html)

[](https://1.bp.blogspot.com/-HG3cMe2bwlw/XCXOvrK4wuI/AAAAAAAAPJk/ddtiDewVWi0marAkznVn83V9qIvB6yLkgCLcBGAs/s1600/Programs%2Bfor%2BSelenium%252815%2529.png)

There are many cases, where a application displays multiple windows when you open a website. Those are may be advertisements or may be a kind of information showing on popup windows. We can handle multiple windows using Windows Handlers in selenium webdriver.

**Step 1:** After opening the website, we need to get the main window handle by using driver.getWindowHandle();  
The window handle will be in a form of lengthy alpha numeric  
**Step 2:** We now need to get all the window handles by using driver.getWindowHandles();  
**Step 3:** We will compare all the window handles with the main Window handles and perform the operation the window which we need.

Click here to view Performing operations on multiple windows using reusable methods.  
The below example shows how to handle multiple windows and close all the child windows which are not need. We need to compare the main window handle to all the other window handles and close them.

**package** com.pack;

**import** java.util.Set;

**import** org.openqa.selenium.WebDriver;

**import** org.openqa.selenium.firefox.FirefoxDriver;

**import** org.testng.Assert;

**import** org.testng.annotations.Test;

**public** **class** **WindowExamples** {

**static** WebDriver driver;

@Test

**public** **void** **test\_CloseAllWindowsExceptMainWindow**() {

driver = **new** FirefoxDriver();

*// It will open Naukri website with multiple windows*

driver.get("[http://www.naukri.com/"](http://www.naukri.com/));

*// To get the main window handle*

String windowTitle= getCurrentWindowTitle();

String mainWindow = getMainWindowHandle(driver);

Assert.assertTrue(closeAllOtherWindows(mainWindow));

Assert.assertTrue(windowTitle.contains("Jobs - Recruitment"), "Main window title is not matching");

}

**public** String **getMainWindowHandle**(WebDriver driver) {

**return** driver.getWindowHandle();

}

**public** String **getCurrentWindowTitle**() {

String windowTitle = driver.getTitle();

**return** windowTitle;

}

*//To close all the other windows except the main window.*

**public** **static** **boolean** **closeAllOtherWindows**(String openWindowHandle) {

Set allWindowHandles = driver.getWindowHandles();

**for** (String currentWindowHandle : allWindowHandles) {

**if** (!currentWindowHandle.equals(openWindowHandle)) {

driver.switchTo().window(currentWindowHandle);

driver.close();

}

}

driver.switchTo().window(openWindowHandle);

**if** (driver.getWindowHandles().size() == 1)

**return** **true**;

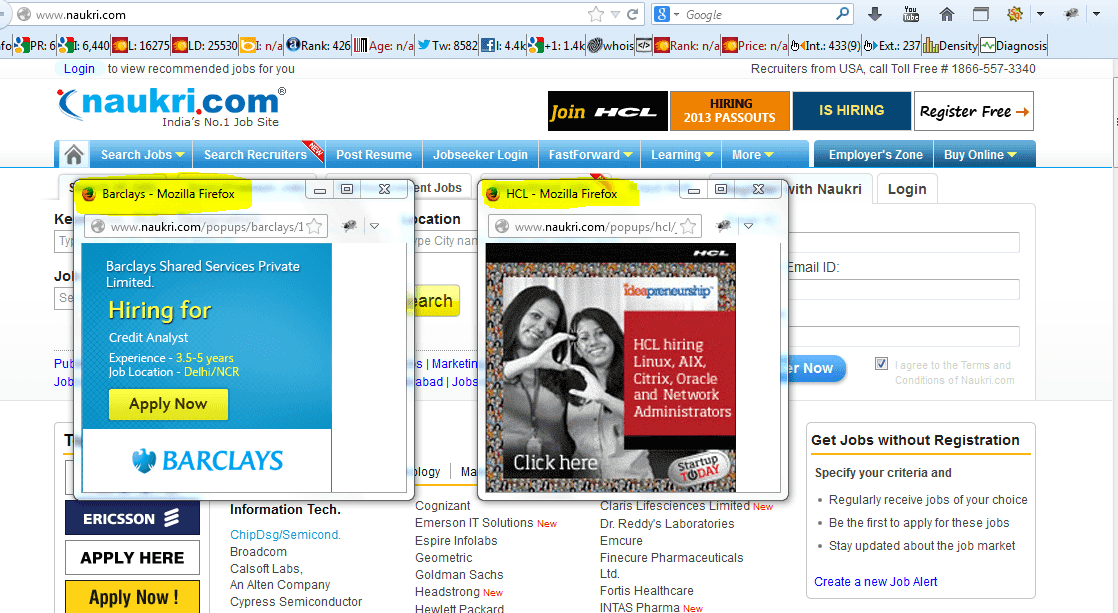
**else**

**return** **false**;

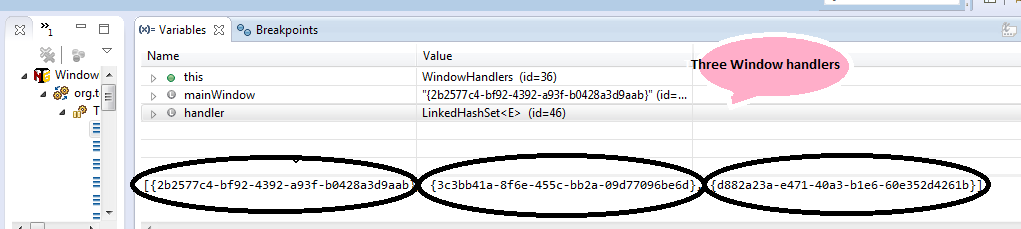
}

}

The below image will show you the multiple windows that open in the application. It has now open total of three windows (One is main window and other two are child windows)

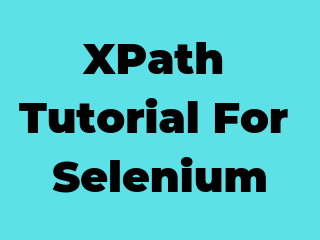


The below image will show the multiple window handlers for child windows and main window. We will have all the window handles in one set and we use each of them to compare and perform operation on the required window.



**The below is the output of the program:**  
{2b2577c4-bf92-4392-a93f-b0428a3d9aab}  
Naukri.com – Jobs – Jobs in India – Recruitment – Job Search – Employment – Job Vacancies  
it is the main window  
Naukri.com – Jobs – Jobs in India – Recruitment – Job Search – Employment – Job Vacancies  
Barclays  
Naukri.com – Jobs – Jobs in India – Recruitment – Job Search – Employment – Job Vacancies  
HCL  
Naukri.com – Jobs – Jobs in India – Recruitment – Job Search – Employment – Job Vacancies

# [XPath tutorial for Selenium](https://www.pavantestingtools.com/2016/11/xpath-tutorial-for-selenium.html)

[](https://3.bp.blogspot.com/-HWtfBtT6WnA/XCXQWgotWZI/AAAAAAAAPJw/fIR4qrtFI1MYax_KHwkSn1mG4qpT7QVSQCLcBGAs/s1600/Programs%2Bfor%2BSelenium%252816%2529.png)

XPath is designed to allow the navigation of XML documents,with the purpose of selecting individual elements, attributes, or some other part of an XML document for specific processing.

What is XML?  
The Extensible Markup Language (XML) is the context in which the XML Path Language, XPath, exists.

XML provides a standard syntax for the markup of data and documents.

XML documents contain one or more elements. If an element contains content,whether other elements or text, then it must have a start tag and an end tag. The text contained between the start tag and the end tag is the element’s content.

*//Start tag*

Element content goes here.*//Element Content*

*//End Tag*

An element may have one or more attributes, which will provide additional information  
about the element type or its content.  
  
Below is the sample XML:

<**Catalog**>

<**Book**>

<**Title**>XML Tutorial</**Title**>

<**Author**>Selenium Easy</**Author**>

</**Book**>

</**Catalog**>

It can also be written as:

<**Catalog**>

<**Book** Title="XML Tutorial" Author="Selenium Easy">

</**Book**>

</**Catalog**>

XPath can be viewed as a way to navigate round XML documents. Thus XPath has similarities to a set of street directions.

When you need to search for a address, you should know what is your starting point to reach your destination.

In XPath the starting point is called the context node.

**Absolute XPath**  
Absolute XPath starts with the root node or a forward slash (/).  
The advantage of using absolute is, it identifies the element very fast.  
Disadvantage here is, if any thing goes wrong or some other tag added in between, then this path will no longer works.

**Example:**  
If the Path we defined as  
1. html/head/body/table/tbody/tr/th

If there is a tag that has added between body and table as below  
2. html/head/body/form/table/tbody/tr/th

The first path will not work as 'form' tag added in between

**Relative Xpath**  
A relative xpath is one where the path starts from the node of your choise - it doesn't need to start from the root node.

It starts with Double forward slash(//)

**Syntax:**  
//table/tbody/tr/th

Advantage of using relative xpath is, you don't need to mention the long xpath, you can start from the middle or in between.

Disadvantage here is, it will take more time in identifying the element as we specify the partial path not (exact path).

If there are multiple elements for the same path, it will select the first element that is identified

**XPath Axes :**

XPath has a total of 13 different axes, which we will look at in this section. An XPath axis tells the XPath processor which “direction” to head in as it navigates around the hierarchical tree of nodes.

|  |  |
| --- | --- |
| **Xpath axis Name** | **Description** |
| self | Which contains only the context node |
| ancestor | contains the ancestors of the context node, that is, the parent of the context node, its parent, etc., if it has one. |
| ancestor-or-self | contains the context node and its ancestors |
| attribute | contains all the attribute nodes, if any, of the context node |
| child | contains the children of the context node |
| descendant | contains the children of the context node, the children of those children, etc. |
| descendant-or-self | contains the context node and its descendants |
| following | contains all nodes which occur after the context node, in document order |
| following-sibling | Selects all siblings after the current node |
| namespace | contains all the namespace nodes, if any, of the context node |
| parent | Contains the parent of the context node if it has one |
| preceding | contains all nodes which occur before the context node, in document order |
| preceding-sibling | contains the preceding siblings of the context node |

The below are the Axes that are very useful  
**1. Child Axes**  
The child axis defines the children of the context node.  
Child::\*  
**Syntax:**

*//child::table*

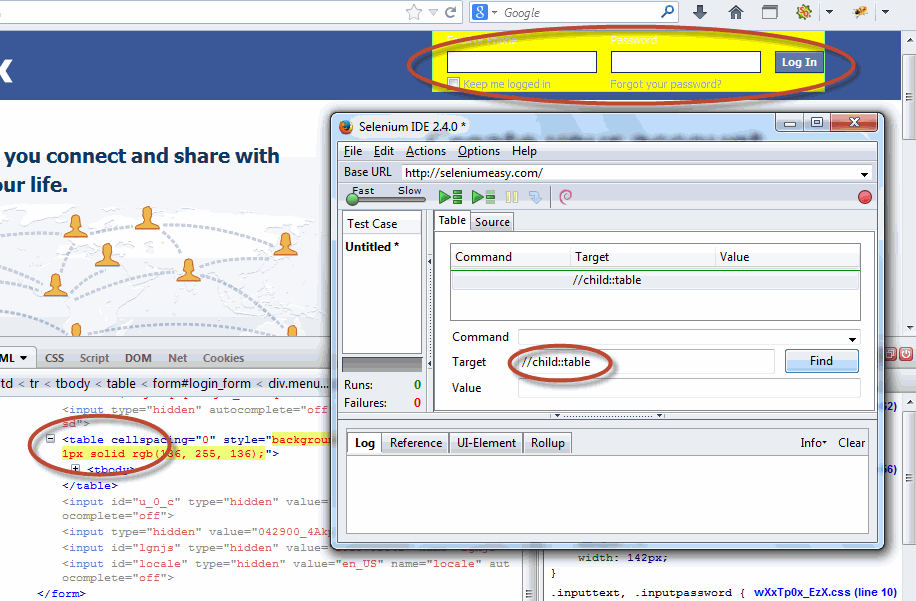
The first location step selects the child element node of the root node, which represents the element root

element in the source document.

The child axis is the default axis, so it need not be explicitly expressed in the abbreviated.

It can be simply re-written as:  
//table/tbody

//child::\*/child::td[position()>1]  
The position ( ) function, evaluates the context position of the context node within the context size. The position ( ) function is applied to the selected nodes in document order. It will select the second td in a table

It will select all the nodes that are Child nodes of table.  
Please find the below screen shot for example.  


**2. Parent Axes**  
The parent axis contains only a maximum of one node. The parent node may be either the root node or an element node.  
The root node has no parent; therefore, when the context node is the root node, the parent axis is empty. For all other element nodes the parent axis contains one node.

Syntax:

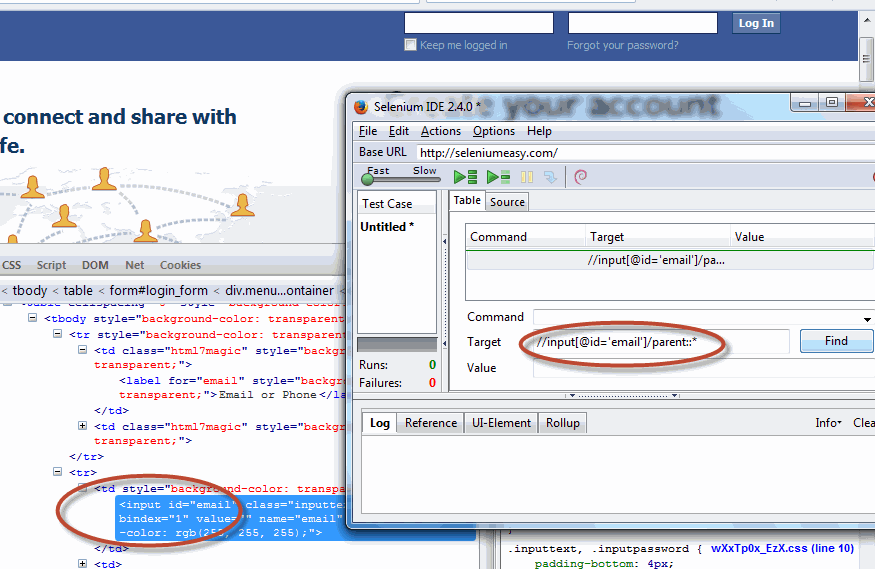
parent::node()

The below example will selects the parent node **of** the input tag **of** Id='email'.

Ex: //input[@id='email']/parent::\*

the above can also be re-written as

//input[@id='email']/..

Below is the image that shows you to identify using above example.  


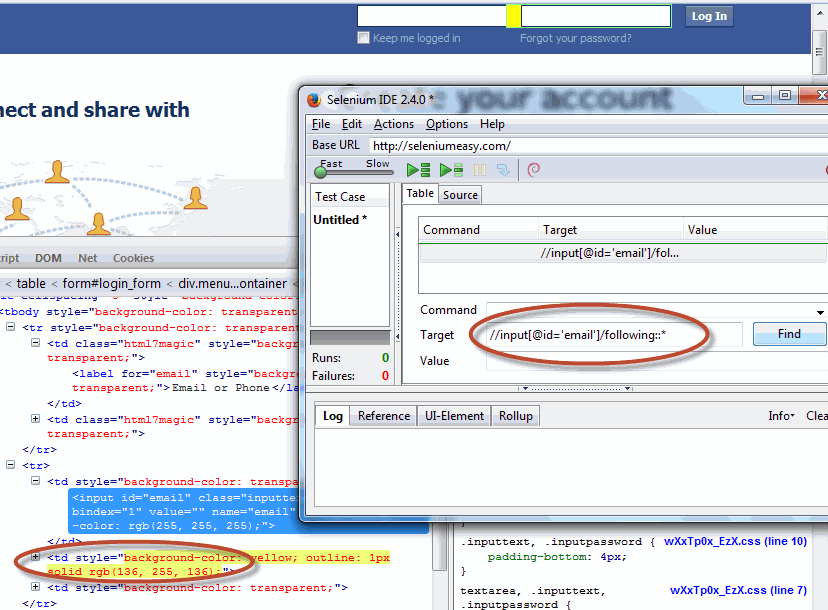
**3. Following Axes**  
“Following axis contains all nodes in the same document as the context node that are after the context node in document order.

**Syntax:**

The below syntax selects the immediate node following the specified node input[@id='email']

//input[@id='email']/following::\*

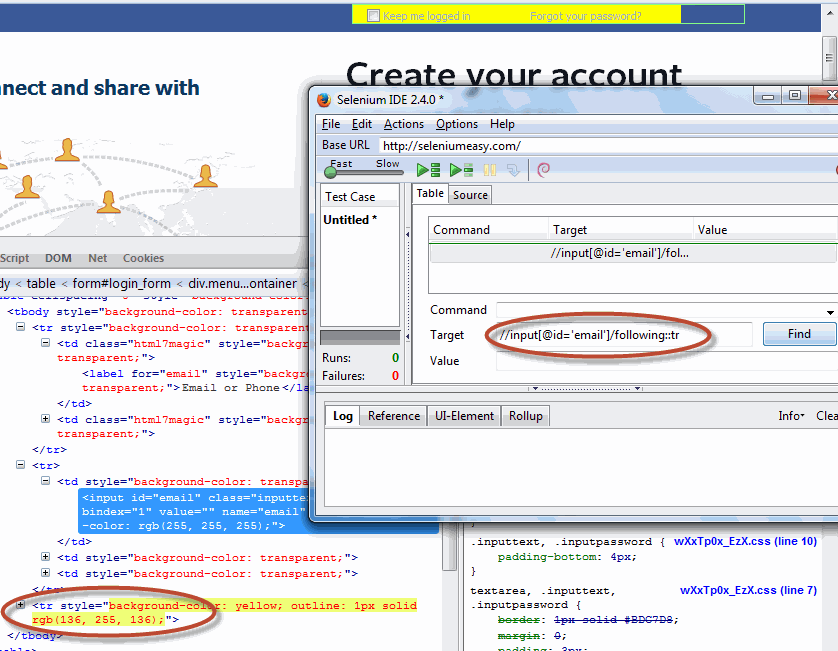
Below is the image that shows you to identify using above example.  
It will identify the immediate node which start after the current node.



The below syntax selects the immediate node of tag 'tr' with the specified node input[@id='email']

//input[@id='email']/following::**tr**

Below is the image that shows you to identify using above example.  
It will identify the immediate node which start after the current node.

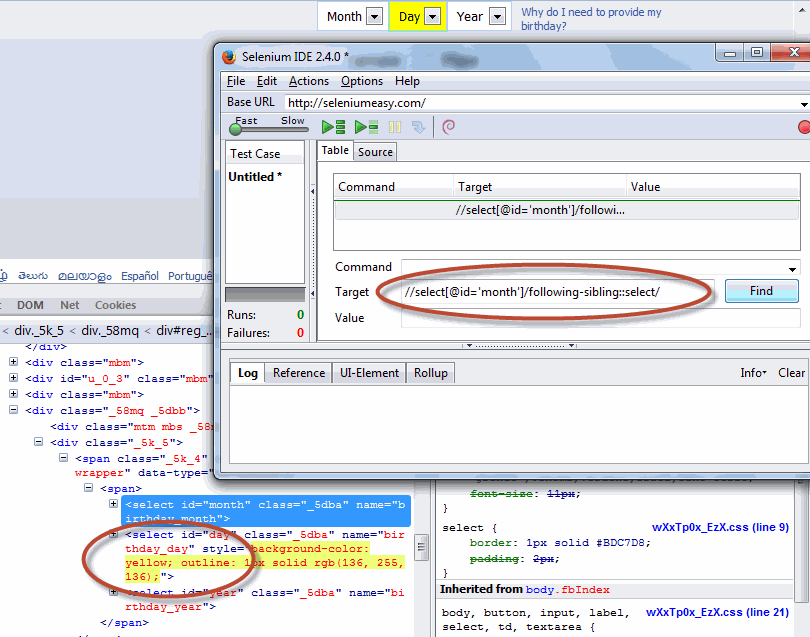


**4. Following Sibling Axes**

The following-sibling axis selects those nodes that are siblings of the context node (that  
is, the context node and its sibling nodes share a parent node) and which occur later in  
document order than the context node.

**Syntax:**  
//select[@id='month']/following-sibling::\*  
//select[@id='month']/following-sibling::select/

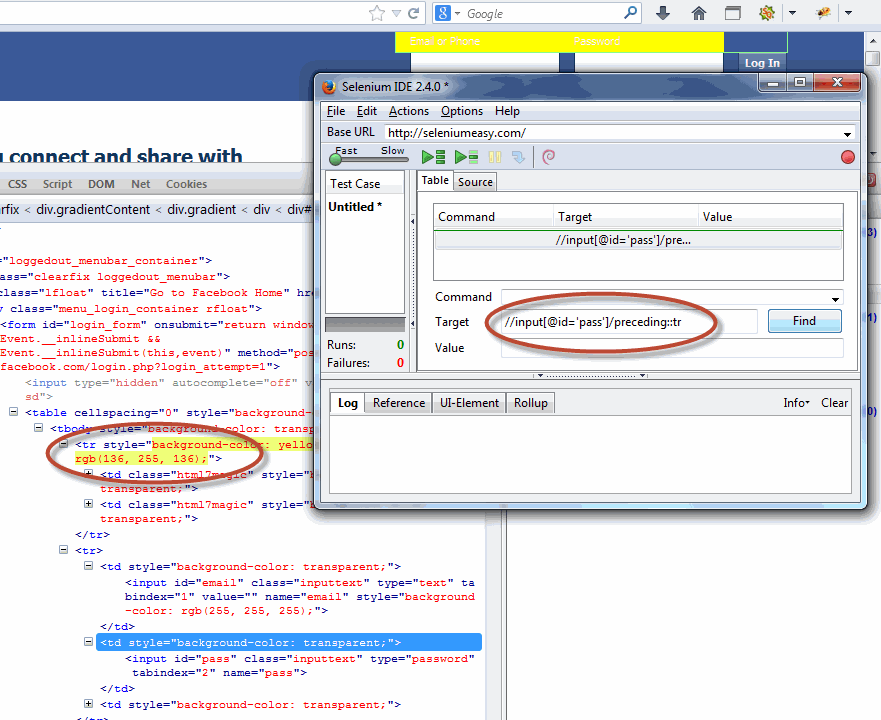
Please check the below image for the above syntax executed



**5. Preceding Axes**  
The preceding axis contains all nodes in the same document as the context node that are before the context node in document order.

**Syntax:**  
//input[@id='pass']/preceding::tr

Below screen shot shows how the preceding axes selects nodes that appear before the current node in the document, except ancestors, attribute nodes and namespace .



**6. Preceding Sibling Axes**

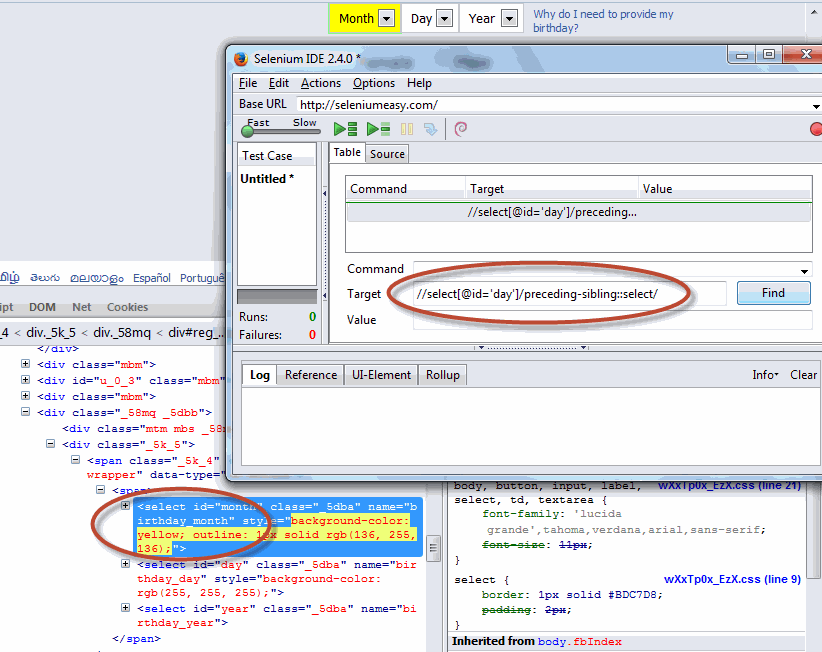
The preceding-sibling axis selects those nodes which are siblings of the context node (that is, the context node and its sibling nodes share a parent node) and which occur earlier in document order than the context node.

**Syntax:**

//**select**[@id='day']/preceding-sibling::**select**/

//select[@id='day']/preceding-sibling::\*

The below image shows how the preceding sibling axes selects siblings before the current node



# [How to run webdriver in IE browser?](https://www.pavantestingtools.com/2016/11/how-to-run-webdriver-in-ie-browser.html)

[](https://1.bp.blogspot.com/-q9dQA3tcT64/XCXQ-mWbQrI/AAAAAAAAPJ4/R5p2zTLqNaot85Bztlu3uwoTcj4CaktfwCLcBGAs/s1600/Programs%2Bfor%2BSelenium%252817%2529.png)

To run selenium webdriver in IE browser, we need [InternetExplorerDriver](https://code.google.com/p/selenium/wiki/InternetExplorerDriver) which is a standalone server which implements [WebDriver's wire protocol.](https://code.google.com/p/selenium/wiki/JsonWireProtocol)

First of all, download latest version of IEDriver server for webdriver. You can download latest version server from [Download InternetExplorerEDriver](http://docs.seleniumhq.org/download/)

Note: Choose the IEdriver server based on your working environment as there are two different zip files for both 32 and 64 bit IE . Recommended 32bit IEDriver which is less prone to errors when compared with 64bit driver.

Save the downloaded file to your local machine.

In you code you need to set the system property for IE driver as

System.setProperty("webdriver.ie.driver", "pathofchromedriver\\IEDriverServer.exe");

Please find the below example program for running webdriver in IE browser. It has a test method which will validate google home page title once when the browser is opened.

**package** com.test;

**import** org.openqa.selenium.WebDriver;

**import** org.openqa.selenium.ie.InternetExplorerDriver;

**import** org.testng.Assert;

**import** org.testng.annotations.AfterClass;

**import** org.testng.annotations.BeforeClass;

**import** org.testng.annotations.Test;

**public** **class** **TestIEBrowser** {

**static** String driverPath = "IE driver path";

**public** WebDriver driver;

@BeforeClass

**public** **void** **setUp**() {

System.out.println("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*");

System.out.println("launching IE browser");

System.setProperty("webdriver.ie.driver", driverPath+"IEDriverServer.exe");

driver = **new** InternetExplorerDriver();

driver.manage().window().maximize();

}

@Test

**public** **void** **testGooglePageTitleInIEBrowser**() {

driver.navigate().to("[http://www.google.com"](https://www.google.com/));

String strPageTitle = driver.getTitle();

System.out.println("Page title: - "+strPageTitle);

Assert.assertTrue(strPageTitle.equalsIgnoreCase("Google"), "Page title doesn't match");

}

@AfterClass

**public** **void** **tearDown**() {

**if**(driver!=**null**) {

System.out.println("Closing IE browser");

driver.quit();

}

}

}

As we all know, InternetExplorerDriver works only with Windows system and the execution speed is slow Comparatively to other browsers.

However when working with InternetExplorerDriver there are some issues with mouse events when the browser window does not have focus, and attempting to hover over elements.

Your test scripts may work fine with Firefox and Chrome browsers which are intelligent enough find the elements in the DOM, but Internet Explorer is slow because of which you will end up with an exception.

To avoid issues when executing scripts with Internet explorer, try to use 'Css selectors' which will minimize your issues.

### When ever working with Internet explorer browser for Selenium webdriver, the below are the common issues that you may come across.

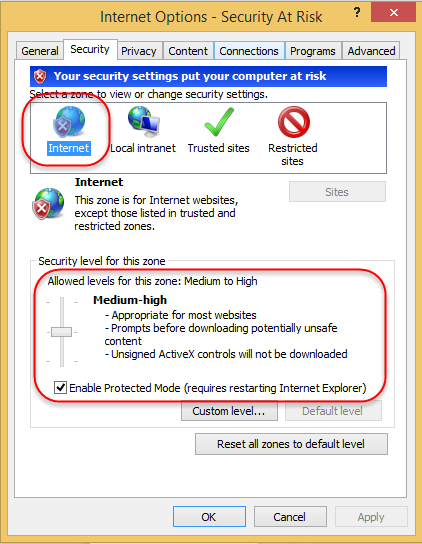
**1. If see issue some thing like 'Unexpected error launching Internet Explorer' below, You have to set 'Enable protected mode' option in all levels with same value.**

org.openqa.selenium.remote.SessionNotFoundException: Unexpected error launching Internet Explorer. Protected Mode settings are not the same for all zones. Enable Protected Mode must be **set** **to** the same **value** (enabled **or** disabled) **for** **all** zones. (WARNING: The server did **not** provide **any** stacktrace information)

Command duration **or** timeout: 516 milliseconds

**Please follow below steps to set:**

1. Open Internet Explorer browser--> Select Internet Options from Tools menu  
2. Select Security Tab --> Select Enable Protected Mode option -- > Check the default Zone level for 'Internet'. If you look at the screen shot below, security level for this zone is selected as 'Allowed level for this zone : Medium to High.' and 'Enable Protected Mode' option is Checked.



Now you need to make sure that, for the other Zones, such as 'Local Internet' and 'Trusted sites' is also selected as ABOVE. You may don't need to do anything with 'Restricted Site' option. We can leave the option as is and by default 'Enable Protected Mode' option will be Checked.

Now after changing the settings, please click on 'Apply' and 'Ok' button.

There is also an other alternative for setting the protected mode using desired capabilities as below: -

DesiredCapabilities capabilities = DesiredCapabilities.internetExplorer();

capabilities.setCapability(InternetExplorerDriver.INTRODUCE\_FLAKINESS\_BY\_IGNORING\_SECURITY\_DOMAINS,true);

But how ever, the first option is advised and it is not that hard to set internet explorer browser settings.

2. Make sure that the IE browser zoom level is set to 100% so that the native mouse events can be set to the correct coordinates.

3. It may be silly one, But make sure you provide correct path when setting the property of Internet explorer driver.

# [How to Run Webdriver in chrome browser?](https://www.pavantestingtools.com/2016/11/how-to-run-webdriver-in-chrome-browser.html)

[](https://1.bp.blogspot.com/-f9I25tWM1lA/XCXRiei7zBI/AAAAAAAAPKA/3EjoCy0MWcQvCoEvtwAHgrHK_B_7aqRlwCLcBGAs/s1600/Programs%2Bfor%2BSelenium.png)

Normally to run webdriver, we just need a browser and a selenium server jar file. Selenium by-default supports Mozilla Firefox browser. Then the next question come to your mind is How to run webdriver in other browsers.

Selenium supports to run webdriver in other browsers by just adding an .exe path of the driver server for the individual browsers.

Now to run selenium webdriver in Chrome browser, we need to take the help of [ChromeDriver](https://sites.google.com/a/chromium.org/chromedriver/home) which is a separate executable that selenium webdriver uses to control chrome. ChromeDriver is supported by the Chromium team, ChromeDriver is a standalone server which implements [WebDriver's wire protocol](https://code.google.com/p/selenium/wiki/JsonWireProtocol) for Chromium.

First of all, download latest version of ChromeDriver server for webdriver. You can download latest version of ChromeDriver server from [Download Chrome Server](https://sites.google.com/a/chromium.org/chromedriver/downloads)

Note: Choose the chromedriver based on your working environment. If you are working on windows environment, you need to click on "Chromedriver\_win32.zip".  
Save the downloaded file to your local machine.

In your code you need to set the property for chrome driver, specify its location via the webdriver.chrome.driver as below  
System.setProperty("webdriver.chrome.driver", "pathofchromedriver\\chromedriver.exe");

If you dint set the path / or if you give the wrong path, then you will be seeing below error immediately once you start your script  
**Error: The path to the driver executable must be set by the webdriver.chrome.driver system property**

Please find the below example program using java. After writing the below code, execute it to run your test in chrome browser which will first open chrome browser and validate Google Home Page Title.

**package** com.test;

**import** org.openqa.selenium.WebDriver;

**import** org.openqa.selenium.chrome.ChromeDriver;

**import** org.testng.Assert;

**import** org.testng.annotations.AfterClass;

**import** org.testng.annotations.BeforeClass;

**import** org.testng.annotations.Test;

**public** **class** **TestChromeBrowser** {

**static** String driverPath = "path to chrome driver";

**public** WebDriver driver;

@BeforeClass

**public** **void** **setUp**() {

System.out.println("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*");

System.out.println("launching chrome browser");

System.setProperty("webdriver.chrome.driver", driverPath+"chromedriver.exe");

driver = **new** ChromeDriver();

driver.manage().window().maximize();

}

@Test

**public** **void** **testGooglePageTitleInIEBrowser**() {

driver.navigate().to("[http://www.google.com"](https://www.google.com/));

String strPageTitle = driver.getTitle();

System.out.println("Page title: - "+strPageTitle);

Assert.assertTrue(strPageTitle.equalsIgnoreCase("Google"), "Page title doesn't match");

}

@AfterClass

**public** **void** **tearDown**() {

**if**(driver!=**null**) {

System.out.println("Closing chrome browser");

driver.quit();

}

}

}

As many of them keep asking about a message which displays when your start execution with chrome driver like **"starting chromedriver on port xxxxx only local connections are allowed"**

This message is just for an information only. It is telling you is that "chromedriver" executable will only accept connections from the local machine.

As most driver implementations ( let it be Chrome driver / IE driver ) creates an HTTP server, and the language bindings (Java / Python / . etc.) use a [JsonWireProtocol](https://code.google.com/p/selenium/wiki/JsonWireProtocol) to communicate with the driver, and automate the browser.

Naturally, since the HTTP server is simply listening on an open port for HTTP requests generated by the language bindings, **connections to the HTTP server started by the language bindings are restricted to only be allowed to come from other processes on the same host.**

# [How to Run Webdriver in chrome browser?](https://www.pavantestingtools.com/2016/11/how-to-run-webdriver-in-chrome-browser.html)

[](https://1.bp.blogspot.com/-f9I25tWM1lA/XCXRiei7zBI/AAAAAAAAPKA/3EjoCy0MWcQvCoEvtwAHgrHK_B_7aqRlwCLcBGAs/s1600/Programs%2Bfor%2BSelenium.png)

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**import** org.testng.annotations.BeforeClass;

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Assert.assertTrue(strPageTitle.equalsIgnoreCase("Google"), "Page title doesn't match");

}

@AfterClass

**public** **void** **tearDown**() {

**if**(driver!=**null**) {

System.out.println("Closing chrome browser");

driver.quit();

}

}

}

As many of them keep asking about a message which displays when your start execution with chrome driver like **"starting chromedriver on port xxxxx only local connections are allowed"**

This message is just for an information only. It is telling you is that "chromedriver" executable will only accept connections from the local machine.

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Naturally, since the HTTP server is simply listening on an open port for HTTP requests generated by the language bindings, **connections to the HTTP server started by the language bindings are restricted to only be allowed to come from other processes on the same host.**

# [Basic HTML concepts required for Selenium](https://www.pavantestingtools.com/2016/11/basic-html-concepts-required-for.html)

[](https://2.bp.blogspot.com/-aYpEHEJAIlc/XCXSGJC4A5I/AAAAAAAAPKQ/gtvZKe_309IxBdN_fb2mf61tdsRXesAuQCLcBGAs/s1600/Programs%2Bfor%2BSelenium%25281%2529.png)

What is HTML?

As you know [HTML Hyper Text Markup Language](https://en.wikipedia.org/wiki/HTML) used for describing web pages. Each tag represents a document content. HTML contains tags with angle brackets like and plain text. There are two tags one is start tag and second tag is end tag. Every tag should end with a forward slash before the tag name.

Syntax:

<**tagname**>content here</**tagname**>

<**html**>

<**head**></**head**>

<**body**>

<**h1**>My First H1 Heading</**h1**>

<**p**>My first paragraph content goes here</**p**>

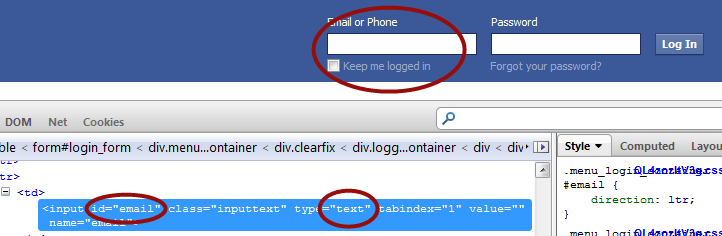
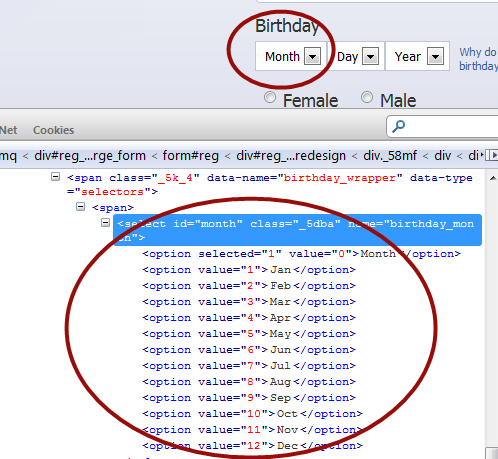
</**body**>

</**html**>

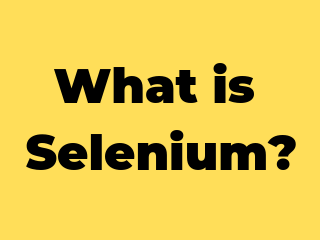
HTML tags determine to display the content to display on the web browser. The current version (At the time of writing) of HTML is version 5.  
Now coming to our selenium, we generally see the below elements / attributes in any of the simple web page.

* Text-box
* Text-area
* link
* radio-buttons
* check-box
* drop-down / list-box
* table, Etc....

We can divide the elements in three ways:  
1. Single Elements  
2. Group Elements  
3. Customized Elements

For **Single elements**, we can easily find out an locator to work with selenium. We can locate by ID or by Link or by Link Text.  
  
  
  
  
  
For **Group elements**, we should try to prefer name as identifier along with a combination of value or index property.  
  
  


# [What is Selenium?](https://www.pavantestingtools.com/2016/11/what-is-selenium.html)

[](https://3.bp.blogspot.com/-ZmYrPCGr1qQ/XCXSfT1TIlI/AAAAAAAAPKc/zx2e6PT-C4kUaao7tA0hVgD260OU1NCzQCLcBGAs/s1600/Programs%2Bfor%2BSelenium%25282%2529.png)

## [Selenium](http://docs.seleniumhq.org/) is a web Automation tool which can used to perform testing ONLY on Web Applications not Desktop based applications.

There are others tool which can be used to automate both web applications and windows applications like [QTP (Quick Test Professional)](http://www8.hp.com/in/en/software-solutions/unified-functional-automated-testing/) . As every one aware that QTP is Licensed Tool AND Selenium is Open source tool, download it configure it and enjoy.

This is the main reason why most of the companies choose Selenium whenever they want to automate Web applications

It has the below components:  
[Selenium IDE](https://www.blogger.com/null): Which is a firefox plug-in which deals with and playback mechanism. User can create simple scripts and export to selenium RC or Webdriver.

[Selenium RC](http://docs.seleniumhq.org/projects/remote-control/): Is a tool which allows to automate web application using any of the programming language that supports.

[Selenium Webdriver:](http://docs.seleniumhq.org/projects/webdriver/)  
It makes direct calls to the browser using each browser's native support for automation.  
Webdriver was developed to better support dynamic web pages like Ajax where elements of a page may change without the page itself being reloaded.

[Selenium Grid](http://docs.seleniumhq.org/projects/grid/):  
Is a server that allows tests to use web browser instances running on remote machines.

There are others tool which can be used to automate both web applications and windows applications like QTP (Quick Test Professional) . As every one aware that QTP is Licensed Tool AND Selenium is Open source tool, download it configure it and enjoy.

This is the main reason why most of the companies choose Selenium tool whenever they want to automate Web applications

As a beginner, if you want to learn selenium, it is not that difficult, you just start using Selenium IDE which is a firefox plug-in, used to record and play the script. This is just for practice, and you can learn how the commands that are used to run the script in IDE.

But remember IDE itself is not enough for effective test case writing / scripting. Because it doesn't support looping concepts and and you cannot customize it for your needs.

At this point of time, you can start using Webdriver with the programming language that you are comfortable with.

We prefer Java as it is from long time in the industry and there are many online forums which provides support to Webdriver with Java.

## How and where to download selenium?

It is very simple to download selenium. We need to download a jar file from [Selenium Downloads](http://docs.seleniumhq.org/download/). In the downloads page, you will find the name as Selenium server, where you will have a link to download the latest version of selenium.

And at Selenium Client & Webdriver Language Bindings, You need to choose the language that you are going to use to write the selenium scripts. The current version of selenium is 2.39.0 ( At the time of writing).

Be sure you specify the most current version as there will be some enhancements and fixes will be added/appended. You can also refer to change log document for reference.

the downloaded file name will be selenium-server-standalone

## Prerequisites to learn selenium?

Before jumping into selenium, user should be aware of basic java concepts and HTML concepts which will help the selenium developer to create effective scripts.

HTML knowledge: User should have knowledge in basics of HTML tags like text-box, text-area box, radio buttons check-boxes and the tags for these elements etc.  
we will discuss in detail in HTML introduction

Java knowledge for Selenium: User need to have minimum knowledge in the below concepts:

* Static and Non Static Variables
* Control statements
* Operators
* Objects and Classes
* Return Types
* OOPS concepts (Inheritance, Overriding)
* Strings
* Constructors
* Arrays
* Exception Handling
* Packages

If the user is really strong in the above concepts, he/she can play with selenium with minimum effort.

A user without these concepts also can start scripting, but need to work hard to write effective test scripts using selenium.

# [Skills Required for Software Tester](https://www.pavantestingtools.com/2016/10/skills-required-for-software-tester.html)

[](https://4.bp.blogspot.com/-AQt8YbI8Rk8/XDME7W8dNJI/AAAAAAAAPRY/2lGROMkJbHAIxjwzaqZwZZn5LPZVFxNHACLcBGAs/s1600/Programs%2Bfor%2BSelenium%25284%2529.png)

**Important Activities in IT (Information Technology) Industry:**   
  
• Project Management  
• Business Analysis   
• Software Development (Front-end and Back-end)   
• Software Testing (Manual Testing and Automated Testing)    
• Technical Support (Network Administration/System Administration)   
• DBA (Database Administration)  
 • Software Maintenance  
  
**If you want to choose software testing as your career then you need to familiar with the following concepts.**  
  
**I) Communication Skills**  
   
• Customer Communication.  
• Team Communication  
• Presentation Skills  
• Writing Skills  
  
**II) Computer Fundamentals**  
   
• Knowledge on Computer Operating Systems (MS Windows, UNIX, Macintosh etc...)  
• knowledge on Mobile device operating systems - Optional  
• Documentation skills ((MS Office, Star office(optional)).  
• Knowledge on Software Environments (Stand-alone, Intranet, Internet and Extranet).  
  
**III) Manual Testing Knowledge**  
   
• Software Project life cycle  
• Ability to analyze Functional and Non-functional requirements  
• Test Levels (Unit, Integration, System and Acceptance Testing)  
• Test Types (Functional and Non-Functional Testing)  
• Test Planning  
• Test Design Techniques (Equivalence Partitioning, Boundary value Analysis, Decision Table testing, State transition testing etc...)  
• Test Design (Test Scenarios, Test Case and Test Data)  
• Test Execution (Sanity, Comprehensive and Regression Testing. Defect Reporting & Tracking)  
• Maintenance of Testing resources  
• Ability to track changes  
  
**IV) Database knowledge**   
  
• Database objects  
• Create new databases  
• Create new tables in a database  
• Insert records in a database  
• Update records in a database  
• Delete records from a database  
• Retrieve data from a database  
• Execute queries against a database  
• Data Integrity  
• Data Comparisons  
• Data backup and Recovery etc...  
  
**V) Programming knowledge**   
  
• Comments  
• Data Types  
• Modifiers  
• Variables  
• Operators  
• Conditional Statements  
• Loop Statements  
• Input and Output operations  
• Built-in Functions / Methods  
• User defined Functions / Methods  
• Working with Files  
• Working with Databases  
• Regular Expressions  
• Exception handling  
• OOPS concepts (Abstraction, Polymorphism, Inheritance, Encapsulation)  
  
  
**VI) Test Tools knowledge**  
   
• UFT or Selenium or both UFT and Selenium for Functional and Regression Testing.  
• LoadRunner or any other Performance test tool knowledge for PerformanceTest Automation.  
  
**a) UFT (QTP)**   
  
• UFT Tool fundamentals  
• VBScripting  
• Creating Tests using either Object Repository or Descriptive programming.  
• Enhancing Tests using Tool features like Checkpoints, Output values, Data Table etc...  
• Enhancing Tests using VBScript features like Flow Control statements, Functions and Automation objects etc...  
• Parametrization, synchronization.  
• Creating Test Batches.  
• Debugging & Running Tests  
• Analyzing Test Results  
• Reporting Defects and Tracking Defects.  
• Regression Testing  
• Maintenance of Automation Resources.  
  
**b) Selenium**  
• Selenium IDE, Selenium WebDriver and Selenium Grid Fundamentals  
• Java Programming (Core Java)  
• Create Test Cases  
• Enhance Test Cases  
• Run Test Cases - Batch Testing, Data Driven Testing, Parallel Test execution.  
• Cross Browser Testing.  
• Analyzing Test Results  
• Reporting and Tracking Defects (Defects Management)  
• Regression Testing  
• Maintenance of Automation Resources.  
  
**VII) Domain knowledge**  
   
• BFSI (Banking Financial Services and Insurance)  
• ERP (Enterprise Resource Planning)  
• Telecom  
• Healthcare  
• Ecommerce  
• Retail Market etc...  
  
**Note:**  
  
• Defect management using Bugzilla or any other tool is essential.  
• Knowledge on Performance Testing using LoadRunner or any other tool is an added advantage.  
• Test Management (Defect Management is part of Test Management) using ALM or any other tool is an added advantage.

# [Continuous integration with Jenkins](https://www.pavantestingtools.com/2016/10/continuous-integration-with-jenkins.html)

[](https://4.bp.blogspot.com/-ikAX37-59HA/XDMF3YWxYMI/AAAAAAAAPRs/PtrpqGySsJsfL43NVqh9ll2JIeICOpsCQCLcBGAs/s1600/Programs%2Bfor%2BSelenium%25287%2529.png)

**Using the Jenkins build server**

*Continuous integration* is a process in which all development work is integrated as early as possible. The resulting artifacts are automatically created and tested. This process should identify errors as very early in the process.

*Jenkins* is one open source tool to perform continuous integration and build automation. The basic functionality of Jenkins is to execute a predefined list of steps. The trigger for this execution can be time or event based. For example, every 20 minutes or after a new commit in a Git repository.

The list of steps can, for example, include:

* perform a software build with Apache Maven or Gradle
* Run a shell script
* Archive the build result
* Afterwards start the integration tests

Jenkins also monitors the execution of the steps and allows to stop the process if one of the steps fails. Jenkins can also send out notification about the build success or failure.

Jenkins can be extended by additional plug-ins, e.g., for building and testing Android applications or to support the Git version control system.

## Installation of Jenkins

Jenkins can be started via the command line or can run in a web application server. Under Linux you can also install Jenkins as a system service.

For most platforms you have native packages, see the [Jenkins Homepage](https://jenkins.io/).

If you installed Jenkins locally, you find it running under the following URL: <http://localhost:8080/>

### Installing of the Jenkins server on Ubuntu

Jenkins provides Debian/Ubuntu packages which install Jenkins and register Jenkins as start service. See the [Install Jenkins on Ubuntu description](https://wiki.jenkins-ci.org/display/JENKINS/Installing+Jenkins+on+Ubuntu) The Linux installation creates a */etc/init.d/jenkins* script which starts Jenkins automatically at boot time.

Jenkins stores all the settings, logs and build artifacts in its home directory. The default installation directory is*/var/lib/jenkins* under Ubuntu.

### Using the .WAR file of Jenkins

Download the *jenkins.war* file from [Jenkins Homepage](https://jenkins.io/). From this file you can start Jenkins directly via the command line with java -jar jenkins\*.war.

If you start it locally, you find it running under the following URL: [http:="" localhost:8080="" "="" class="bare" style="box-sizing: border-box; background: transparent; color: rgb(33, 86, 165); line-height: inherit;">http://localhost:8080/">http://localhost:8080/](http://localhost:8080/)]

To run it in your Tomcat server, put the .WAR file into the *webapps* directory. If you start Tomcat, your Jenkins installation will be available under <http://localhost:8080/jenkins>.

|  |  |
| --- | --- |
|  | If the jenkins.war is deployed in your *webapps* directory, but cannot be started and the tomcat manager says *﻿FAIL - Application at context path /jenkins could not be started* , you may need to grant the permissons for ﻿JENKINS\_HOME.  ﻿sudo mkdir .jenkins  ﻿sudo  chown tomcat7:nogroup .jenkins  ---  This makes the .jenkins folder writable and Jenkins can use it. |

## Configure Jenkins

### Configuration the JDK location

Before using Jenkins to build Java applications, you need to configure the location or it where your JDK installation is. Select *Manage Jenkins* and afterwards *Configure System*.

Enter the correct path to your JDK, Apache Ant and Maven and press the btn:[Save] button below. Jenkins can also install these for your automatically.

### Secure Jenkins

It is recommended to secure Jenkins. *Manage Jenkins* and then *Configure Global Security*. Select the *Enable security* flag. The easiest way is to use Jenkins own user database. Create at least the user "Anonymous" with read access. Also create entries for the users you want to add in the next step.

On the login page, select *Create an account* to create the users you just gave access.

Go to\_Manage Jenkins\_, *Manage and Assign Roles* and then *Assign Roles* to grant the newly created user additional access rights.

Navigate to *Manage Roles* to define access restrictions in detail. *Pattern* is a regex value of the job name. The following grants unregistered users read-only access to your build jobs that start with the C-MASTER or M-MASTER prefix and only those.

### Generate ssh key for Jenkins user

If you want to access a private Git repo, for example at Github, you need to generate an ssh key-pair. Create a SSH key with the following command.

sudo -u jenkins ssh-keygen

## Jenkins management

### Plug-in management

Jenkins can be extended via additional plug-ins with more functionality. You can configure your plug-ins via the menu:Manage Jenkins[Manager Plugins] link.

To install plugins in Jenkins select use the menu:Manage Jenkins[Manager Plugins] link and search for the plugin you want to install. Select it from the list and select to install it and restart Jenkins.

The following table is a summary of commonly used plug-ins.

| ***Table 1. Table Jenkins plug-ins*** | | |
| --- | --- | --- |
| **Plug-in name** | **Description** | **URL** |
| Git Plugin | This plugin allows use of Git as a build SCM. | <https://wiki.jenkins-ci.org/display/JENKINS/Git+Plugin> |
| Xvnc plugin | This plugin allows projects to run xvnc during a build. This allows for example to run tests which requires a display to run on a virtual display. To use this plug-in you need to connect once to your vncserver on the command line to provide a password. Use for example the following commands.  [source,java] ---- # install vncserver apt-get install vnc4server  # switch to jenkins user sudo su jenkins  # connect to vncserver which creates the password vncserver :10 ---- | wiki.jenkins-ci.org/display/JENKINS/Xvnc+Plugin |
| Gradle Plugin | This plugin allows to run Gradle builds, e.g., as required for Android, via Jenkins. | <https://wiki.jenkins-ci.org/display/JENKINS/Gradle+Plugin> |
| Maven Plugin | This plugin allows to run Maven builds. | <https://wiki.jenkins-ci.org/display/JENKINS/Maven+Project+Plugin> |
| GitHub plugin | This plugin integrates Jenkins with Github projects. | <https://wiki.jenkins-ci.org/display/JENKINS/Github+Plugin> |
| Publish Over SSH Plugin | This plugin allows to publish build artifacts via ssh | <https://wiki.jenkins-ci.org/display/JENKINS/Publish+Over+SSH+Plugin> |
| Workspace Cleanup Plugin | This plugin allows to delete the workspace before the build or when a build is finished and artifacts saved. | <https://wiki.jenkins-ci.org/display/JENKINS/Workspace+Cleanup+Plugin> |
| Github Pull Request Builder | This plugin allows to build Github Pull Requests | <https://wiki.jenkins-ci.org/display/JENKINS/GitHub+pull+request+builder+plugin> |

### Restart your Jenkins

You can manually restart Jenkins by adding restart as URL parameter.

## Support for the Git version control systems

Jenkins supports the Git version control system via a plugin. Select the menu:Manage Jenkins[Manager Plugins] link. Here you have to install the *Git Plugin*.

To clone a Git repostory via Jenkins you need to enter the email and user name for your Jenkins system. For this switch into your job directory and run the git config command.

# Need to configure the Git email and user for the Jenkins job

# switch to the job directory

cd /var/lib/jenkins/jobs/Android/workspace

# setup name and email

sudo git config user.name "jenkins"

sudo git config user.email "test@gmail.com"

## Setting up a Jenkins job

The build of a project is handled via *jobs* in Jenkins. Select *New Item* from the menu

Afterwards enter a name for the job and select *Freestyle Job*. Press *OK*.

The next page allows you to configure your job. If you for example using Git, enter the URL to the Git repository. If the repository is not public, you may also need to configure the credentials.

Specify when and how your build should be triggered. The following example polls the Git repository every 15 min. It triggers a build, if something has changed in the repo.

I typically delete the workspace before a build to avoid any side-effect. In the *Build* section you can add a build step, e.g., a Maven build.

Press *Save* to finish the job definition. Press \_Build Now \_ on the job page to validate the job works as expected.

After a while the job should go to green or blue (depending on your configuration), if successful. Click on the job and afterwards on *Console Output* to see the log file. Here you can analyse build errors.

## Jenkins backup and copying files

Jenkins stores all the settings, logs and build artifacts in its home directory. For example, in */var/lib/jenkins* under the default install location of Ubuntu.

To create a backup of your Jenkins setup, just copy this directory.

The *jobs* directory contains the individual jobs configured in the Jenkins install. You can move a job from one Jenkins installation to another by copying the corresponding job directory. You can also copy a job directory to clone a job or rename the directory.

Click btn:[reload config] button in the Jenkins web user interface to force Jenkins to reload configuration from the disk.

See the following link for details: <https://wiki.jenkins-ci.org/display/JENKINS/Administering+Jenkins>

### Managing Jenkins with Git

Jenkins supports the <https://wiki.jenkins-ci.org/display/JENKINS/SCM+Sync+configuration+plugin> plug-in which allows you to store every change in a Git repo.

It is also possible to manually maintain the Jenkins configuration in a Git repo.

# [Slowly Changing Dimensions (SCD)](https://www.pavantestingtools.com/2016/09/slowly-changing-dimensions-scd.html)

[](https://1.bp.blogspot.com/-6bsHSIJw_Kc/XDMGOpJ6zUI/AAAAAAAAPR0/21IbZQTvkhU446YjmINrUxXdXwYRboqjACLcBGAs/s1600/Programs%2Bfor%2BSelenium%25288%2529.png)

The "Slowly Changing Dimension" problem is a common one particular to data warehousing. In a nutshell, this applies to cases where the attribute for a record varies over time. We give an example below:

Christina is a customer with ABC Inc. She first lived in Chicago, Illinois. So, the original entry in the customer lookup table has the following record:

|  |  |  |
| --- | --- | --- |
| **Customer Key** | **Name** | **State** |
| **1001** | **Christina** | **Illinois** |

At a later date, she moved to Los Angeles, California on January, 2003. How should ABC Inc. now modify its customer table to reflect this change? This is the "Slowly Changing Dimension" problem.

There are in general three ways to solve this type of problem, and they are categorized as follows:

**Slowly Changing Dimension Type 1**: The new record replaces the original record. No trace of the old record exists.

          In Type 1 Slowly Changing Dimension, the new information simply overwrites the original information. In other words, no history is kept.

In our example, recall we originally have the following table:

|  |  |  |
| --- | --- | --- |
| **Customer Key** | **Name** | **State** |
| **1001** | **Christina** | **Illinois** |

After Christina moved from Illinois to California, the new information replaces the new record, and we have the following table:

|  |  |  |
| --- | --- | --- |
| **Customer Key** | **Name** | **State** |
| **1001** | **Christina** | **California** |

**Advantages:**

- This is the easiest way to handle the Slowly Changing Dimension problem, since there is no need to keep track of the old information.

**Disadvantages:**

- All history is lost. By applying this methodology, it is not possible to trace back in history. For example, in this case, the company would not be able to know that Christina lived in Illinois before.

**Usage:**

About 50% of the time.

**When to use Type 1:**

Type 1 slowly changing dimension should be used when it is not necessary for the data warehouse to keep track of historical changes.

**Slowly Changing Dimension Type 2**: A new record is added into the customer dimension table. Therefore, the customer is treated essentially as two people.

In Type 2 Slowly Changing Dimension, a new record is added to the table to represent the new information. Therefore, both the original and the new record will be present. The newe record gets its own primary key.

In our example, recall we originally have the following table:

|  |  |  |
| --- | --- | --- |
| **Customer Key** | **Name** | **State** |
| **1001** | **Christina** | **Illinois** |

After Christina moved from Illinois to California, we add the new information as a new row into the table:

|  |  |  |
| --- | --- | --- |
| **Customer Key** | **Name** | **State** |
| **1001** | **Christina** | **Illinois** |
| **1005** | **Christina** | **California** |

**Advantages:**

- This allows us to accurately keep all historical information.

**Disadvantages:**

- This will cause the size of the table to grow fast. In cases where the number of rows for the table is very high to start with, storage and performance can become a concern.

- This necessarily complicates the ETL process.

**Usage:**

About 50% of the time.

**When to use Type 2:**

Type 2 slowly changing dimension should be used when it is necessary for the data warehouse to track historical changes.

**Slowly Changing Dimension Type 3**: The original record is modified to reflect the change.

In Type 3 Slowly Changing Dimension, there will be two columns to indicate the particular attribute of interest, one indicating the original value, and one indicating the current value. There will also be a column that indicates when the current value becomes active.

In our example, recall we originally have the following table:

|  |  |  |
| --- | --- | --- |
| **Customer Key** | **Name** | **State** |
| **1001** | **Christina** | **Illinois** |

To accommodate Type 3 Slowly Changing Dimension, we will now have the following columns:

* Customer Key
* Name
* Original State
* Current State
* Effective Date

After Christina moved from Illinois to California, the original information gets updated, and we have the following table (assuming the effective date of change is January 15, 2003):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Customer Key** | **Name** | **Original State** | **Current State** | **Effective Date** |
| **1001** | **Christina** | **Illinois** | **California** | **15-JAN-2003** |

**Advantages:**

- This does not increase the size of the table, since new information is updated.

- This allows us to keep some part of history.

**Disadvantages:**

- Type 3 will not be able to keep all history where an attribute is changed more than once. For example, if Christina later moves to Texas on December 15, 2003, the California information will be lost.

**Usage:**

Type 3 is rarely used in actual practice.

**When to use Type 3:**

Type III slowly changing dimension should only be used when it is necessary for the data warehouse to track historical changes, and when such changes will only occur for a finite number of time.

# [Dimensional Data Mode](https://www.pavantestingtools.com/2016/09/dimensional-data-mode.html)

[](https://4.bp.blogspot.com/-hNJXN0a2qdo/XDMGxpcsGzI/AAAAAAAAPSA/QcaHHwRRlsw5-dGUWHwxGdvba6gDDsYEwCLcBGAs/s1600/Programs%2Bfor%2BSelenium%25289%2529.png)

Dimensional data model is most often used in data warehousing systems. This is different from the 3rd normal form, commonly used for transactional (OLTP) type systems. As you can imagine, the same data would then be stored differently in a dimensional model than in a 3rd normal form model.

To understand dimensional data modeling, let's define some of the terms commonly used in this type of modeling:

**Dimension**: A category of information. For example, the time dimension.

**Attribute**: A unique level within a dimension. For example, Month is an attribute in the Time Dimension.

**Hierarchy**: The specification of levels that represents relationship between different attributes within a dimension. For example, one possible hierarchy in the Time dimension is Year → Quarter → Month → Day.

**Fact Table**: A fact table is a table that contains the measures of interest. For example, sales amount would be such a measure. This measure is stored in the fact table with the appropriate granularity. For example, it can be sales amount by store by day. In this case, the fact table would contain three columns: A date column, a store column, and a sales amount column.

**Lookup Table**: The lookup table provides the detailed information about the attributes. For example, the lookup table for the Quarter attribute would include a list of all of the quarters available in the data warehouse. Each row (each quarter) may have several fields, one for the unique ID that identifies the quarter, and one or more additional fields that specifies how that particular quarter is represented on a report (for example, first quarter of 2001 may be represented as "Q1 2001" or "2001 Q1").

A dimensional model includes fact tables and lookup tables. Fact tables connect to one or more lookup tables, but fact tables do not have direct relationships to one another. Dimensions and hierarchies are represented by lookup tables. Attributes are the non-key columns in the lookup tables.

In designing data models for data warehouses / data marts, the most commonly used schema types are Star Schema and Snowflake Schema.

Whether one uses a star or a snowflake largely depends on personal preference and business needs. Personally, I am partial to snowflakes, *when there is a business case to analyze the information at that particular level*.

# [What Is OLAP](https://www.pavantestingtools.com/2016/09/what-is-olap.html)

[](https://3.bp.blogspot.com/-4ZILD6L5kCQ/XDRZamb1LrI/AAAAAAAAPSc/LKMGMoDENk4Ypa6HDpjVeeTUp7zjLq5RgCLcBGAs/s1600/Programs%2Bfor%2BSelenium%252812%2529.png)

OLAP stands for On-Line Analytical Processing. The first attempt to provide a definition to OLAP was by Dr. Codd, who proposed 12 rules for OLAP. Later, it was discovered that this particular white paper was sponsored by one of the OLAP tool vendors, thus causing it to lose objectivity. The OLAP Report has proposed the FASMI test, ***F***ast ***A***nalysis of ***S***hared ***M***ultidimensional ***I***nformation. For a more detailed description of both Dr. Codd's rules and the FASMI test, please visit The OLAP Report.

                 For people on the business side, the key feature out of the above list is "Multidimensional." In other words,  the ability to analyze metrics in different dimensions such as time, geography, gender, product, etc. For example, a sale for the company is up. What region is most responsible for this increase? Which store in this region is most responsible for the increase? What particular product category or categories contributed the most to the increase? Answering these types of questions in order means that you are performing an OLAP analysis.

Depending on the underlying technology used, OLAP can be broadly divided into two different camps: MOLAP and ROLAP. A discussion of the different OLAP types can be found in the MOLAP, ROLAP, and HOLAP section.

# [Data Integrity](https://www.pavantestingtools.com/2016/09/data-integrity.html)

[](https://4.bp.blogspot.com/-ouA1bIDjVJU/XDRgbQqz-yI/AAAAAAAAPSo/LQ_-WV74hgIW4tMrXBH_5H8gvJs_1iThQCLcBGAs/s1600/Programs%2Bfor%2BSelenium%252813%2529.png)

 Data integrity refers to the validity of data, meaning data is consistent and correct. In the data warehousing field, we frequently hear the term, "Garbage In, Garbage Out." If there is no data integrity in the data warehouse, any resulting report and analysis will not be useful.

 In a data warehouse or a data mart, there are three areas of where data integrity needs to be enforced: 

**Database level**

We can enforce data integrity at the database level. Common ways of enforcing data integrity include:

**Referential integrity**

The relationship between the primary key of one table and the foreign key of another table must always be maintained. For example, a primary key cannot be deleted if there is still a foreign key that refers to this primary key.

**Primary key / Unique constraint**

Primary keys and the UNIQUE constraint are used to make sure every row in a table can be uniquely identified.

**Not NULL vs NULL-able**

For columns identified as NOT NULL, they may not have a NULL value.

**Valid Values**

Only allowed values are permitted in the database. For example, if a column can only have positive integers, a value of '-1' cannot be allowed.

**ETL process**

For each step of the ETL process, data integrity checks should be put in place to ensure that source data is the same as the data in the destination. Most common checks include record counts or record sums.

**Access level**

We need to ensure that data is not altered by any unauthorized means either during the ETL process or in the data warehouse. To do this, there needs to be safeguards against unauthorized access to data (including physical access to the servers), as well as logging of all data access history. Data integrity can only ensured if there is no unauthorized access to the data.

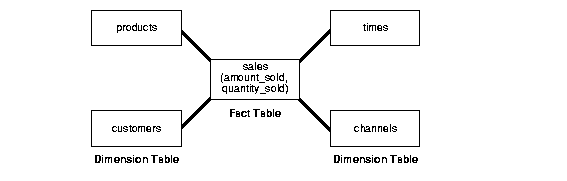
# [Data Warehouse Schemas](https://www.pavantestingtools.com/2016/09/data-warehouse-schemas.html)

[](https://1.bp.blogspot.com/-Ukidi-XX6bI/XDRiwdLHiOI/AAAAAAAAPS0/cfcOvH8FKpYL_r-RYyo-J56eXs4j45ybgCLcBGAs/s1600/Programs%2Bfor%2BSelenium%252814%2529.png)

A schema is a collection of database objects, including tables, views, indexes, and synonyms. You can arrange schema objects in the schema models designed for data warehousing in a variety of ways.

##### **Star Schemas :**

The **star schema** (also called *star-join schema*, *data cube*, or *multi-dimensional schema*) is the simplest style of data warehouse schema. The star schema consists of one or more fact tables referencing any number of dimension tables



The facts that the data warehouse helps analyze are classified along different dimensions:

* **The *fact table*** holds the main data. It includes a large amount of aggregated data, such as price and units sold. There may be multiple fact tables in a star schema.
* ***Dimension tables*,** which are usually smaller than fact tables, include the attributes that describe the facts. Often this is a separate table for each dimension. Dimension tables can be joined to the fact table(s) as needed.

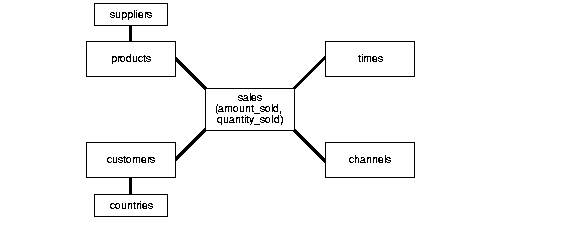
Dimension tables have a simple primary key, while fact tables have a set of foreign keys which make up a compound primary key consisting of a combination of relevant dimension keys.

**Advantages :**

* Provide a direct and intuitive mapping between the business entities being analyzed by end users and the schema design.
* Provide highly optimized performance for typical star queries.
* Are widely supported by a large number of business intelligence tools, which may anticipate or even require that the data-warehouse schema contain dimension tables

**Snow Flake Schemas :** The snowflake schema is represented by centralized fact tables which are connected to multiple dimensions. In the snowflake schema, dimensions are normalized into multiple related tables, whereas the star schema's dimensions are denormalized with each dimension represented by a single table.

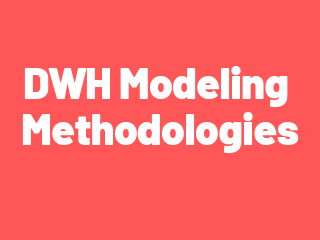
          Snowflake schemas are often better with more sophisticated query tools that isolate users from the raw table structures and for environments having numerous queries with complex criteria.



**Advantages :**

* Some OLAP multidimensional database modeling tools that use dimensional data marts as data sources are optimized for snowflake schemas.
* A snowflake schema can sometimes reflect the way in which users think about data. Users may prefer to generate queries using a star schema in some cases, although this may or may not be reflected in the underlying organization of the database.
* A multidimensional view is sometimes added to an existing transactional database to aid reporting. In this case, the tables which describe the dimensions will already exist and will typically be normalized. A snowflake schema will therefore be easier to implement.
* If a dimension is very sparse (i.e. most of the possible values for the dimension have no data) and/or a dimension has a very long list of attributes which may be used in a query, the dimension table may occupy a significant proportion of the database and snowflaking may be appropriate.

# [DWH Modeling Methodologies](https://www.pavantestingtools.com/2016/09/dwh-modeling-methodologies.html)

[](https://2.bp.blogspot.com/-PhwPTf2J6h8/XDRnde05LrI/AAAAAAAAPTQ/CmSXWl65cFgQtFV_ltWpQp11Av1qZqr9ACLcBGAs/s1600/Programs%2Bfor%2BSelenium%25283%2529.png)

**Conformed facts**

In addition to conformed dimensions, you need conformed facts. Conforming a fact really amounts to standardizing the definitions of terms across individual marts. Often, different divisions or departments use the same term in different ways. Does “revenue” refer to “gross revenue” or “adjusted revenue”? Does “units shipped” refer to *cases* of items or individual items?

Make certain your design team develops, early on, a uniform enterprise taxonomy—and enforce it.

**Conformed dimensions**

Conformed dimensions can be used to analyze facts from two or more data marts. Suppose you have a “shipping” data mart (telling you what you’ve shipped to whom and when) and a “sales” data mart (telling you who has purchased what and when). Both marts require a “customer” dimension and a “time” dimension. If they’re the *same*dimension, then you have *conforming* dimensions, allowing you to extract and manipulate facts relating to a particular customer from both marts, answering questions such as whether late shipments have affected sales to that customer.

Suppose now that you add a “marketing” data mart to help you analyze product promotions. Again, with conformed customer and time dimensions, you’re able to analyze the effects of a particular product promotion on sales. (Analyzing facts from more than one fact table in this way is termed “drilling across.” My previous article,“Thinking dimensionally aids business intelligence design and use,” explains the function of facts and dimensions.)

As this example shows, the very same conformed dimensions—in this case, time and customer dimensions—have meaning in the context of three *independentlydeveloped*data marts. These dimensions become enterprise property and can be used later in other marts as you evolve the enterprise data warehouse.

**Semi Additive Facts**

A semi additive fact is one where the measure can either have only a subset of aggregations applied to it, it you can count the measures but not sum them, or the measures are only additive over a subset of the dimensions.

Using our "daily\_balances" fact above would be a good example of a semi additive fact. The daily balances can be aggregated by customer if the customer has multiple accounts to give the customrs daily balance, however the balances could not be aggregated over time as adding last weeks balance onto this weeks balance would result in a nonsensical figure.

Non Additive Facts

A non additive fact is one where the measure is non aggregable over any dimensions. These are commonly where percentages have been calculated and stored in the fact. Another example could be a profit margin on a sale, there is this figure other than at an individual sale level.

**Additive Facts**

A fully additive fact is one where the measures can be aggregated.

For example our Sales fact above would be fully additive as you can aggregate the sales amout over time, by product, by region or by salesman and still get the correct answer.

**Transaction Grain**

This is the most common type of fact. You would declare the grain of the fact, ie the level of detail and then this is what would be stored. For example you may have a sales\_order fact, every time a new sales order a new row would be created in the fact table. alternatively you may have a "monthly\_sales" fact. At the end of every month you would aggregate up all the sales that happened in that month and record the single total value.

**Snapshot Facts**

The snapshot fact contains a reflection of the state of an entity at a given point in time. A classic example of this would be a "daily\_balance" fact in a banking system. This would, on a daily basis record the balance of each account, it would NOT list the individual transactions that happened on the account.

**Factless Facts**

A factless fact is where the fact does not store an actual numerical measure, the mere existance of a fact record indicates that an event has happened that you wish to track. The classic example of this would be an "Attendance" fact. If you had dimensions to record date, scheduled\_course, instructor and delegate then you could create a fact table that held the permutations of these dimensions. From this you could evaluate the number of courses you run, the number of delegates, the number of courses by instructor etc.

I would never simply leave a factess fact as a bare collection of foreign key columns I would always add a dummy measure column which would be set to 1 which you would then sum.

**Accumulating Fact Table**

An accumulating fact table is where all of the dimensional attributes are not available at the time of creation and the dimensions that are linked to a fact table change over time. The most common implementation of this is in the recording of dates against facts.

Take a "Sales" fact, typical dates you may be intersted in when tracking an individual sale is maybe, order\_date, ship\_date, delivery\_date and payment\_date. These would not all be available when the fact is first created. Over time the fact record would accumulatemore relationships with the dimensions as the relevant date milestones were passed for the sale.

**The differences between a logical data model and physical data model**

**Logical vs Physical Data Modeling**

|  |  |
| --- | --- |
| **Logical Data Model** | **Physical Data Model** |
| Represents business information and defines business rules | Represents the physical implementation of the model in a database. |
| Entity | Table |
| Attribute | Column |
| Primary Key | Primary Key Constraint |
| Alternate Key | Unique Constraint or Unique Index |
| Inversion Key Entry | Non Unique Index |
| Rule | Check Constraint, Default Value |
| Relationship | Foreign Key |
| Definition | Comment |

**Physical Data Modeling**

Features of physical data model include:

·         Specification all tables and columns.

·         Foreign keys are used to identify relationships between tables.

·         Demoralization may occur based on user requirements.

·         Physical considerations may cause the physical data model to be quite different from the logical data model.

At this level, the data modeler will specify how the logical data model will be realized in the database schema.

The steps for physical data model design are as follows:

1.        Convert entities into tables.

2.        Convert relationships into foreign keys.

3.        Convert attributes into columns.

4.        http://www.learndatamodeling.com/dm\_standard.htm

5.        Modeling is an efficient and effective way to represent the organization’s needs; It provides information in a graphical way to the members of an organization to understand and communicate the business rules and processes. Business Modeling and Data Modeling are the two important types of modeling.

**Logical Data Model**

Features of logical data model include:

·         Includes all entities and relationships among them.

·         All attributes for each entity are specified.

·         The primary key for each entity specified.

·         Foreign keys (keys identifying the relationship between different entities) are specified.

·         Normalization occurs at this level.

At this level, the data modeler attempts to describe the data in as much detail as possible, without regard to how they will be physically implemented in the database.

In data warehousing, it is common for the conceptual data model and the logical data model to be combined into a single step (deliverable).

The steps for designing the logical data model are as follows:

1.        Identify all entities.

2.        Specify primary keys for all entities.

3.        Find the relationships between different entities.

4.        Find all attributes for each entity.

5.        Resolve many-to-many relationships.

6.        Normalization.

**Conceptual Data Model**

Features of conceptual data model include:

·         Includes the important entities and the relationships among them.

·         No attribute is specified.

·         No primary key is specified.

At this level, the data modeler attempts to identify the highest-level relationships among the different entities.

**What is Data modeling?**

There are three levels of data modeling. They are conceptual, logical, and physical. This section will explain the difference among the three, the order with which each one is created, and how to go from one level to the other.

**What is De Generated Dimension?**

An item that is in the fact table but is stripped off of its description, because the description belongs in dimension table, is referred to as Degenerated Dimension.  Since it looks like dimension, but is really in fact table and has been degenerated of its description, hence is called degenerated dimension.

**What is Junk Dimension?**

A "junk" dimension is a collection of random transactional codes, flags and/or text attributes that are unrelated to any particular dimension. The junk dimension is simply a structure that provides a convenient place to store the junk attributes. A good example would be a trade fact in a company that brokers equity trades.

When you consolidate lots of small dimensions and instead of having 100s of small dimensions, that will have few records in them, cluttering your database with these mini ‘identifier’ tables, all records from all these small dimension tables are loaded into ONE dimension table and we call this dimension table Junk dimension table.  (Since we are storing all the junk in this one table) For example: a company might have handful of manufacture plants, handful of order types, and so on, so forth, and we can consolidate them in one dimension table called junked dimension table

It’s a dimension table which is used to keep junk attributes

**What is Conformed Dimension?**

Conformed Dimensions (CD): these dimensions are something that is built once in your model and can be reused multiple times with different fact tables.

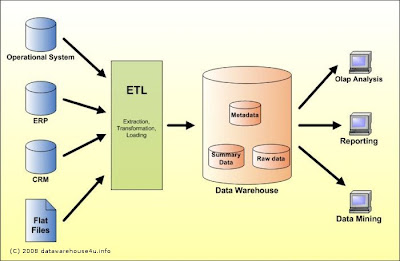
For example, consider a model containing multiple fact tables, representing different data marts.  Now look for a dimension that is common to these facts tables.  In this example let’s consider that the product dimension is common and hence can be reused by creating short cuts and joining the different fact tables.Some of the examples are time dimension, customer dimensions, product dimension.

# [What is Data Warehouse?](https://www.pavantestingtools.com/2016/09/what-is-data-warehouse.html)

[](https://4.bp.blogspot.com/-9JvmxdzPtT4/XDRm6AcsqkI/AAAAAAAAPTI/wsZi7SKQ0AQRPfUo6H2fa_Gk3B93ipLaQCLcBGAs/s1600/Programs%2Bfor%2BSelenium%25282%2529.png)

In computing, a **data warehouse** (**DW** or **DWH**) is a database used for reporting and analysis. The data stored in the warehouse are uploaded from the operational systems (such as marketing, sales etc., shown in the figure to the right). The data may pass through an operational data store for additional operations before they are used in the DW for reporting.

The typical ETL-based data warehouse uses staging, integration, and access layers to house its key functions. The staging layer or staging database stores raw data extracted from each of the disparate source data systems. The integration layer integrates the disparate data sets by transforming the data from the staging layer often storing this transformed data in an operational data store (ODS) database. The integrated data is then moved to yet another database, often called the data warehouse database, where the data is arranged into hierarchical groups often called dimensions and into facts and aggregate facts. The combination of facts and dimensions is sometimes called a star schema. The access layer helps users retrieve data.



A data warehouse constructed from integrated data source systems does not require ETL, staging databases, or operational data store databases. The integrated data source systems may be considered to be a part of a distributed operational data store layer. Data federation methods or data virtualization methods may be used to access the distributed integrated source data systems to consolidate and aggregate data directly into the data warehouse database tables. Unlike the ETL-based data warehouse, the integrated source data systems and the data warehouse are all integrated since there is no transformation of dimensional or reference data. This integrated data warehouse architecture supports the drill down from the aggregate data of the data warehouse to the transactional data of the integrated source data systems.

Data warehouses can be subdivided into data marts. Data marts store subsets of data from a warehouse.

This definition of the data warehouse focuses on data storage. The main source of the data is cleaned, transformed, cataloged and made available for use by managers and other business professionals for data mining, online analytical processing, market research and decision support (Marakas & O'Brien 2009). However, the means to retrieve and analyze data, to extract, transform and load data, and to manage the data dictionary are also considered essential components of a data warehousing system. Many references to data warehousing use this broader context. Thus, an expanded definition for data warehousing includes business intelligence tools, tools to extract, transform and load data into the repository, and tools to manage and retrieve metadata.

# [Business Intelligence and Data Warehousing](https://www.pavantestingtools.com/2016/09/business-intelligence-and-data.html)

[](https://1.bp.blogspot.com/-B-GTpc--Iyw/XDmXh1kuueI/AAAAAAAAPXo/ymvGaWEOmSEmD_hKTl0kxmz6vlL2_6e2ACLcBGAs/s1600/Programs%2Bfor%2BSelenium%25282%2529.png)

#### What is Business Intelligence?

Business Intelligence is the set of processes, technologies, and tools that help an organization to transform raw data into meaningful and useful information for business analysis (Identifying business needs and determining solutions to business problems).

#### What is the need for Business Intelligence?

Below are some of the major benefits of Business Intelligence in any Organization.

·        **Get deeper insights in business operations**, Identifying new opportunities and implementing an effective strategy based on insights can provide businesses with a competitive market advantage and long-term stability

·        Business Intelligence Provides **historical, current and predictive views** of business operations.

·        **Sales and marketing** – Understanding the profitability of customer segments and answers to valuable questions like,

o   Which customers should an organization target?

o   Which are my most profitable campaigns per region?

o   What is the most profitable source of sales leads and how has that changed over time?

·        **Improve Productivity and efficiency**

·        **Informed decision making**

·        **Improve Customer Service and satisfaction**

·        **Streamline budgeting and planning**

·        **Financial decisions based on results for important questions like**

o   What is the full cost of new products?

o   How are forecasts trending against the annual plan?

o   What are the current trends in cash flow, accounts payable and accounts receivable and how do they compare with plan?

·        **Overall business performance tracking based on**

o   What are the most important risk factors impacting the company’s ability to meet annual profit goals?

o   Should we expand internationally and, if so, which geographic areas should we first target?

**Common Functions of Business Intelligence are**

·        Reporting

·        OLAP (Online Analytical Processing)

·        Data Mining

·        Process mining

·        Complex event processing

·        Business performance management

·        Text mining, predictive analytics and prescriptive analytics.

#### Stages of BI

Below are the five stages of Big data Business Intelligence in any organization.

·        **Data Sourcing** – Defining the data to be loaded into the system. Usually BI applications gathers data from a data warehouse (Data marts, OLTP or OLAP).

·        **ETL (Extract Transform Load)** – Extracting the source data and transforming per business rules and loading into the Data Warehouses.

·        **Data Warehousing** – Storing transformed data into various Data warehouses types and making it available for business analysis.

·        **Data Analysis** – Applying various techniques like data mining, text mining, Process mining to identify trends and patterns in business operations.

·        **Decision Making** – Based on the reports, dashboards and alerts from previous stage, making valuable business decisions and bench marking future growth.

# Data Warehousing

##### **What is Data Warehousing?**

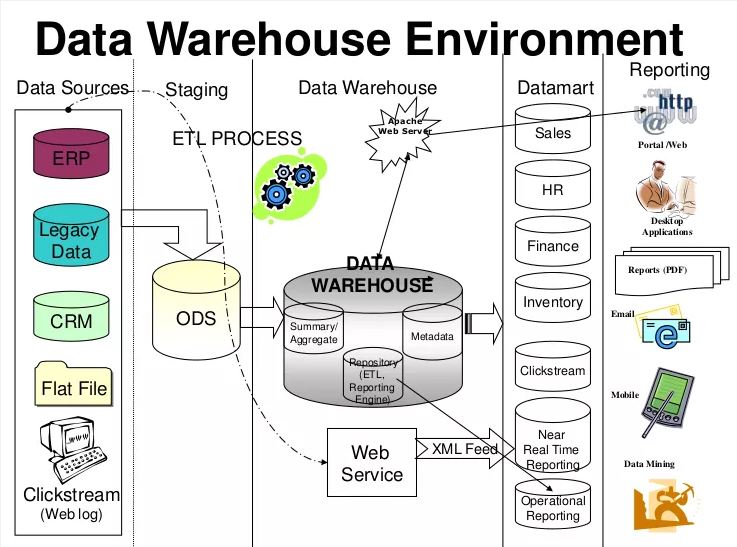
The process of extracting and transforming internal and external data into useful business information and loading it into a central database so that it can be explored by business users across the company is known as Data warehousing.

##### What is a Data Warehouse?

A data warehouse is a relational database that is designed for query and analysis. Enterprise Data warehouses store current and historical data and are used for creating trending reports for business management like annual and quarterly comparison reports.

###### Business Intelligence and Data warehousing architecture

Below is the typical **Business Intelligence and Data warehousing platform architecture.**

[](https://2.bp.blogspot.com/-zb5Ke2XfSeY/V9DLu9J735I/AAAAAAAAKTA/dGaqE4RtriE2DvQnL62s-Psk6qyzd0QJACLcB/s1600/Pic1.JPG)

**Data Warehouse(DW or DWH) Types**

·        **Data Marts –**As shown in the above architecture,a data mart is a simple form of a data warehouse that is focused on a single functional area, like sales, finance or marketing.

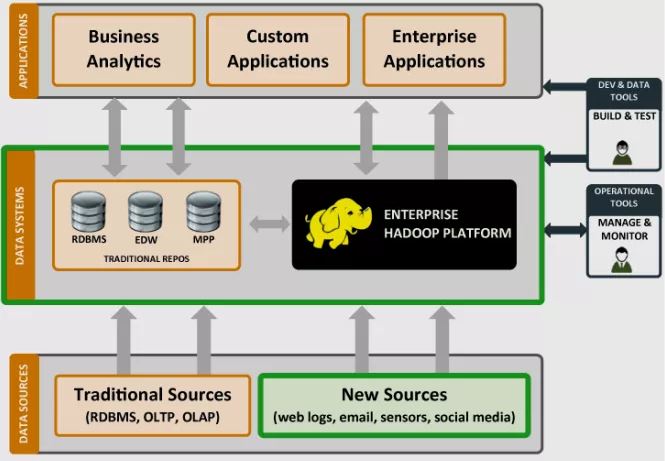
·        **Online Analytical Processing (OLAP)** – OLAP databases store aggregated, historical data in multi-dimensional schemas. OLAP systems typically have data latency of a few hours, as opposed to data marts, where latency is expected to be closer to one day. Mainly used for Reporting and allows complex analytical and ad-hoc queries

·        **Online Transaction Processing (OLTP)** – OLTP systems support online transactions like INSERT, SELECT, UPDATE, DELETE within fraction of seconds. OLTP is mainly aimed at fast response, simplicity and efficiency but not for reporting purpose.

Below is the high level comparison chart between data warehouse types.

|  |  |  |  |
| --- | --- | --- | --- |
| **Function** | **OLTP** | **OLAP** | **Data Marts** |
| **Operation** | INSERT, UPDATE, SELECT | Complex Queries | Report Generation |
| **Latency** | Within Seconds | Within Hours | Within Days |
| **Analytical** **Requirements** | Low | High | Medium |
| **Age of Data** | Current | Historical, current and projected | Historical and Current |
| **Business Events** | React | Predict | Anticipate |

But to handle Big data, the above regular data marts are not capable and Hadoop (HDFS, Hive, HBase) plays the role of OLAP data ware house type in typical Big data Business Analysis using Hadoop. Below is the Hadoop Perspective of the Data warehousing architecture.

[](https://1.bp.blogspot.com/-BToT-7JUQUA/V9DMBalI3DI/AAAAAAAAKTE/RyfFad2d-Ys7X4Ck-xIwikFq4BkpAQU0ACLcB/s1600/Pic2.JPG)

# [Testing E-commerce Websites](https://www.pavantestingtools.com/2016/09/testing-e-commerce-websites.html)

[](https://4.bp.blogspot.com/-UNvL8cDpG1k/XDw8j3_coVI/AAAAAAAAPZ0/j6_HQWyNJIYd4R659V0oN769ogsXrToCQCLcBGAs/s1600/Programs%2Bfor%2BSelenium%25281%2529.png)

Testing E-commerce Websites requires knowledge of web testing techniques and the e-commerce domain.

Most E-commerce Websites share a general common theme and structure, e.g:

* Homepage
* Search Results Page
* Product Details Page
* Order Form Page
* Order Confirmation Page
* Login Form Page and Accounts Pages

Of course there are many other pages on a typical e-commerce website, but the main core user journey would entail touching the above pages and that’s where testing e-commerce websites should focus on: **The Checkout Journey.**

These “front-end” pages most likely communicate with “back-end” web services, such as Product Search Service, Content Service, Booking Engine, Payment Services, Accounts Services, etc. Therefore, it is important when testing e-commerce websites that we test individual services in isolation as well as integrated as a whole system.

A typical **user journey flow** would start at homepage, or a product landing page, searching for a product, reviewing the product, adding product(s) to the shopping cart, fill in order details and payment details and submitting the order.

## Ideas for Testing E-commerce Websites

We have already discussed **tips and guidelines for testing web applications** and common test methods and test techniques for web application testing which are also applicable to testing e-commerce websites.

In this article, we examine some common test cases which are specific for testing e-commerce websites. The ideas presented here are some generic high-level test cases which are applicable to most e-commerce websites, and you can use this guide to get started with testing e-commerce websites.

### Testing Shopping Cart

Shopping carts are one of the main features of an e-commerce website and thus form the center piece of testing e-commerce websites. It allows for customers to select and store multiple items in the cart and purchase them all at once.

Nowadays, shopping carts have become “intelligent” in a sense that they remember what items you store in them so you can retrieve them at a later date or even from another device.

In most cases, cookies are used to store cart data or if the user has an active account and is logged in, a session id can be stored against the user in the database. Either way, there are some key test cases which should be part of testing a shopping cart.

**Add one item to the cart** – the cart should be updated with the item with correct name, image and price.

**Increase the quantity of item from the cart** – the price should be updated to reflect he correct figure.

**Add the same item multiple times** – there should be one item in the cart, but the quantity should reflect the number of additions and the total price should reflect the sum of the price of each item.

**Add multiple items of different types** – For each item added, we should see a corresponding name, image and price and total price of all items.

**Remove some items from the cart** – the cart should update showing the existing items in the cart, total price should reflect the new sum.

**Remove all items from the cart** – cart balance should be zero, no items should be displayed in the cart.

**Click on an item in the cart** – we should be able to see more information about the product we just clicked either as a popup or redirecting to product page.

**Add item(s) to the cart, close the browser and reopen the same site** – ideally the cart should still hold your items. N.B this particularly depends on the requirements on how the cart should behave.

**Coupons** – need to check that the price of the cart is discounted when we apply a coupon and not discounted when we apply an invalid or expired coupon.

### Search Form, Sorting, Filtering, Pagination

The search form is usually present on multiple pages to allow users to search for products wherever they are on the site. Therefore, it is important that the search feature is tested from applicable pages.

Most probably the code for the search module is reused in multiple pages or templates, or it could be part of the header section which is displayed across the whole site. If this is case, the behavior of the search feature should be the same wherever it occurs and running all test cases on all pages is a waste of exercise.

Testing e-commerce websites wouldn’t be fun without testing the most feature rich page on the site, the Search Results Page.

When we search for a product, we get redirected to the Search Results Page (SRP) with all the relevant items we searched for. There are many things to check for and many features to test, but the three features that are of most important and relevant specifically to SRP are sorting, filtering and pagination.

**Relevant products** – check that the products displayed are related to what was searched for.

**Product information** – the products should display an image, name, price and maybe customer ratings and number of reviews.

**Number of products per page** – check that the number of products per page matches the requirement.

**Pagination** – check that all items in next page is different to the previous page, i.e. no duplicates

**Sorting** – there could be four to five options to select from a drop-down menu. Sorting is usually single-select, i.e. you can sort by one parameter only.

**Sorting and Pagination** – when there are products in multiple pages, when you sort by a parameter, the sort order should remain as you paginate, or more products loaded (if it is an Ajax load)

**Filtering** – unlike sort option, filter options are multi-select, that is you can filter by multiple parameters. It is a good idea to explore single filters and multi-filter options.

**Filtering and Pagination** – Again, this is important, when we filter in one page, ideally as we paginate we would want the filter to be applied throughout.

**Sorting and Filtering** – an important test case is mixing the sorting and filtering options together, e.g. filter by price and then sort by price high-to-low, or other way round. Whilst the individual features on their own might work correctly, when combined with another feature, the functionality of one or both features might break, so it is essential that we check the results when combining filtering with sorting.

**Sorting, Filtering and Pagination** – this is checking that when both sort and filter have been applied, they remain as we paginate or more products are loaded.

### Create Account and Login

Some e-commerce websites allows you to purchase an item as a guest, i.e. without the need to create an account, and then an optional step to create an account when an order is placed.

When an account is created, the user can login at any stage during a purchasing journey. It is important that we test all these variations along the user journey when testing e-commerce websites.

**Purchase an item as a guest** – If the site permits, test that you can purchase an item without having to create an account.

**Existing and new accounts** – purchase an item with an existing account and with a newly created account.

**Create account and login before purchase** – this is to test that the item you purchase gets added and connected to the correct account. Also you should not be prompted to login again once you have already been logged in.

**Login redirects** – check the behavior of login feature on different pages. Some sites redirect the user back to the same page where they clicked the login link and some sites redirect the user to the accounts pages. This should be tested thoroughly.

**Login session** – when you login check that you stay logged in as you browse products. Also you need to test the behavior when the user doesn’t interact with the site for some time. Will the session expire after a period of time? Make sure the user has actually been logged out after the session times out.

**Login and Logout** – when you are logged in, logout and make sure you are logged out and that you cannot access any of the accounts pages.

### Payments

Payments are an essential part of testing e-commerce websites. After all this is what allows users to purchase for their items without the need to call a number to place their order.

**Payment types** – Different payment types should all be tested, e.g. Credit Card, Paypal, Bank Transfers, Instalments, etc

**Card Details Storage** – does the site store customer’s credit card details? If so are they securely stored? Is it **PCI compliant**?

### Post Purchase Test

When we place an order, there are many actions that users can do related to their purchase. Testing the post purchase functionality is also an important aspect of testing e-commerce websites. These could be:

* Cancel the order or change the quantity of the order.
* Review your recent order and history of purchased items.
* Changes to the account, such as billing address, shipping address, change password, change profile information such as name, email address and even deleting an account.

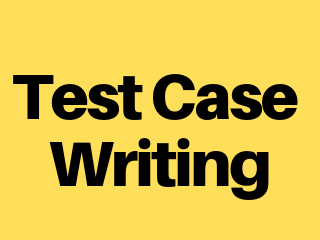
No doubt that testing e-commerce websites is challenging and requires a lot of skill. This article is just the tip of the iceberg of all the relevant test cases that can be executed when testing e-commerce websites and it can be used as a starting point.

There are a lot more functionalities to be tested as part of testing e-commerce websites such as:

* Product carousels and recommended products.
* Correct display of information on the Product Details Page which is usually content heavy.
* Database of product – how is the data modified after an item is purchased?
* Warehouse System – how is the warehouse or third-party gets notified when an order is placed?
* Contacting the customer, confirmation emails, contents of the email, returns, complaints, etc…

What’s most important when testing e-commerce websites is to make sure that each feature has correctly implemented its requirements.

# [Test Case Writing](https://www.pavantestingtools.com/2011/01/test-case-writing_20.html)

[](https://4.bp.blogspot.com/-ldHu52pGtBk/XFf8EAKmbgI/AAAAAAAAP9M/4GUfyoXtMssbAWBLIN9zO_1nXWrcmaVuwCLcBGAs/s1600/Programs%2Bfor%2BSelenium%252816%2529.png)

**1) How do we write test cases without documents or knowing the requirements?**

We can go to adopt a testing technique called Exploratory Testing. According to James Bach exploratory testing is defined as "an interactive process of concurrent product exploration, test design, and test execution."

**2) What are the test cases for one Rupees Coin Box (Telephone box)?**

Positive test cases:

TC1: Pick up the Handset

Expected: Should display the message “Insert one rupee coin"

TC2: Insert the coin

Expected: Should display the message “Dial the Number"

TC3: When you get a busy tone, hang-up the receiver

Expected: The inserted one rupee coin comes out of the exit door.

TC4: Finish off the conversation and hang-up the receiver

Expected: The inserted coin should not come out.

TC5: During the conversation, in case of a local call, (assume the duration is of 60 sec), when 45 as are completed

Expected: It should prompt you to insert another coin to continue by giving beeps.

TC6: In the above scenario, if another coin is inserted

Expected: 60 sec will be added to the counter.

TC7: In the TC5 scenario, if you don't insert one more coin.

Expected: The call gets ended.

TC8: Pick up the receiver. Insert appropriate one rupee coin; Dial the number after hearing the ring tone. Assume it got connected and you are getting the ring tone. Immediately you end up the call.

Expected: The inserted one rupee coin comes out of the exit door.

**3) Explain about Use Cases?**

In software engineering, a Use Case is,

1. A technique for capturing the potential requirements of a new system or software change.

2. Each use case provides one or more scenarios that convey how the system should interact with the end user or another system to achieve a specific business goal.

3. Use cases typically avoid technical jargon, preferring instead the language of the end user or domain expert.

4. Use cases are often co-authored by software developers and end users.

**5) Write test cases for Cell phone.**

1) Check whether Battery is inserted into mobile properly

2) Check Switch on/Switch off of the Mobile

3) Insert the SIM into the phone n check

4) Add one user with name and phone number in Address book

5) Check the Incoming call

6) Check the outgoing call

7) Send/receive messages for that mobile

8) Check all the numbers/Characters on the phone working fine by clicking on them.

9) Remove the user from phone book and check removed properly with name and phone number

10) Check whether Network working fine.

**6) Test cases for coffee machine?**

1. Plug the power cable and press the on button. The indicator bulb should glow indicating the machine is on.

2. Whether there are three different buttons Red, Blue and Green.

3. Whether Red indicated Coffee.

4. Whether Blue indicated Tea.

5. Whether Green indicated Milk.

6. Whether each button produces the correct out put (Coffee, Tea or Milk).

7. Whether the desired out put is hot or not (Coffee, Tea or Milk).

8. Whether the quantity is exceeding the specified the limit of a cup.

9. Whether the power is off (including the power indicator) when pressed the off button.

10. Verify the Output without Coffee Mix, Milk, Tea Mix in the machine

**7) What are Test cases for date field validation? (Third party Calendar controls/date pickers will have a text box attached with a button/icon beside it)**

You can consider the following test cases for a calendar control.

1. Ensure that calendar window is displayed and active, when the calendar is invoked by pressing the calendar icon. (Once we faced an issue, the calendar window is in minimized state when we invoked the calendar.)

2. Ensure that calendar date is defaulted to system date.

3. Ensure that when a date is selected in the calendar (double click, or some other method), the selected  date  is displayed in the text box.

They may be many other cases, if the text box is editable or not, purpose of the date field used etc.

**8) What can be the possible test cases for the Computer Mouse?**

1. To check the mouse company

2. Whether it is a PS/2, USB or serial port mouse or cordless mouse

3. It should be plugged to all the ports of different manufacturers

4. It should be platform independent.

5. Right clicking on the mouse should open the context window.

6. Double clicking on any folder should open up the file

7. Should be able to scroll up and down using the scroll button on the mouse.

8. Should be able to change the functionality of the right and left mouse by changing the settings.

9. Should be able to point to the scrollbar and then drag up and down.

10. Should always point to the right place, where it is intended to point.

**9) What are GUI test cases?**

GUI test cases are designed to conduct Usability Testing to verify User Friendliness of the given application with respect to look & feel, spell mistakes, the alignment & total objects availability and their access with input devices.

**10) What is the difference between positive and negative test cases ?**

Positive Testing = (Not showing error when not supposed to) + (Showing error when supposed to) So if either of the situations in parentheses happens you have a positive test in terms of its result - not what the test was hoping to find. The application did what it was supposed to do. Here user tends to put all positive values according to requirements.

Negative Testing = (Showing error when not supposed to) + (Not showing error when supposed to)(Usually these situations crop up during boundary testing or cause-effect testing.) Here if either of the situations in parentheses happens you have a negative test in terms of its result - again, not what the test was hoping to find. The application did what it was not supposed to do. User tends to put negative values, which may crash the application.

For example in Registration Form, for Name field, user should be allowed to enter only alphabets. Here for Positive Testing, tester will enter only alphabets and application should run properly and should accept only alphabets. For Negative Testing, in the same case user tries to enter numbers, special characters and if the case is executed successfully, negative testing is successful.

**11) Write Test case on Yahoo Mail Page after login.**

**Testcase1:** To verify that when we click mail button whether it list all the compose and check mail etc options or not

Description: click on the mail button

Expected result: Clicking of the mail button lists all the options check mail and compose etc

**Testcase2:** To verify that when we click check mail option in the mail list whether it takes you to inbox page or not

Description: click on check mail option

Expected result: check mail option opens the inbox page

**Testcase3:** To verify that when you click the inbox whether it displays u r received mails or not

Description: click the inbox button

Expected result: It lists all the mails u received in the inbox

**Testcase4:** To verify when u click the compose option in the mail button whether it takes u to compose page where u can compose and send mails

Description: click on the compose option in the mail button

Expected result: it takes u to compose page

**Testcase5:** To verify that after writing message when you click on ‘Send’ whether mail is sent to the address where you specified

Description: give mail id for which you want to send the message in the ‘To’ field and write the message in compose box and click on send button

Expected result: it sending the mail to the mail id which u are given in the TO field

**Testcase6:** To verify if you give wrong id whether it gives failure notice or not

Description: Give wrong mail id in compose page in the ‘To’ field and see what happens

Expected result: In your inbox one failure notice will come

Like this you can write any no of test cases on yahoo mail page

**12) What is defect leakage?**

Defect Leakage is also referred to as 'Defect Seepage. Defect Seepage is 'How many defects related to one particular phase is not getting captured in the same phase.

For Example: requirements related defects should be captured in Requirements review. Not in unit testing or system testing.

**13) Which of the following statements about generating test cases is false?**

(a) Test cases may contain multiple valid test conditions

(b) Test cases may contain multiple invalid test conditions

(c) Test cases may contain both valid and invalid test conditions

(d) Test cases may contain more than one step

(e) Test cases should contain expected results

**Ans:** No Statement is False

**14) What is VSS? Explain?**

VSS: VSS stands for Visual Source Safe. It is a configuration management tool. It is a virtual library of computer files.

Users can read any of the files in the library at any time, but in order to change them, they must first check the file out. They are then allowed to modify the file and finally check it back in. Only after they check the file in are their changes made available to other users.

Configuration Management:

Definition #1: The process of identifying and defining the configuration items in a software system, controlling the release, versioning and change of these items though out the software system life cycle, recording and reporting the status of configuration items and change requests, and verifying the completeness and correctness of configuration items.

Definition #2: The tracking and control of software development. SCM systems typically offer version control and team programming features. SCM is an acronym for software configuration management, and relates to configuration management (CM).

Configuration Management Tool: A software product providing automatic support for Change, Configuration or versions control.

**15) What is SDLC and briefly discuss the stages in SDLC?**

SDLC or software development life cycle is the whole process of developing software, beginning from Requirement gathering to maintenance. Broadly, the different stages of SDLC can be illustrated as these,

Gathering information, Analyze, Designing, Coding, Testing, Implementation and Maintenance.

Where each stage has a well defined procedure so that the developed software meets the customer or clients requirements in the best and most cost effective manner, without erring on the quality of the product.

**16) Write a test case for telephone?**

Test case for telephone: 1. To check connectivity of telephone line or cable 2.To check dial tone of the phone 3. To check the keypads while you dial any valid number on the phone 4. To check ring tone with its volume levels 5.To check voice of both sides (from and to) of the phone 6. To check the display monitor of the phone. 7.To check redial option whether it’s functioning or not 8. To check loudspeaker whether it is functioning or not any missing above then you can add any more test cases

**17) Design the test cases on sending of the emails?**

For testing sending an email you can write test cases for.

1) Performance: By using connections from different ISP's i.e. the speed.

2) If your email id is POP compliant, then check if you can sent it using email clients.

3) If you email can be sent using an attachment.

4) Maximum attachment limit.

5) Maximum mail size.

6) Sending to valid / invalid id's if mail is received / bounced back respectively.

**18) What can be the various test cases for a pen?**

a) To check the pen type

b) To check the pen cap is present or not

c) To check the pen ink is filled or not

d) To check the pen writing or not

e) To check the ink color i.e black or blue

f) To check the pen color

g) To check weather the pen is used to write all types of papers or not

h) To check the ink capacity of the pen

i) To check the pen product by fiber or plastic.

**19) Give test case for withdraw module in banking project.**

Step1: when the balance in the account is nil, try to withdraw some amount (amount>0) should display msg as " insufficient funds in acc"

Step 2: when the account has some balance amount, try to withdraw amount(amount>balance amount in account), should display "insufficient funds in acc"

Step 3: when the account has some balance amount, enter a amount (amount<=balance amount), should withdrawn correct amount from account.

Step 4: when the account has some balance amount, enter the amount as 0, should display msg as withdrawal amount should be > 0 and should be in multiple of hundreds( varies depending on reqs docs).

In the case of Minimum balance mandatory in the Account:

Step 5: When the account has balance amount, try to withdraw whole amount , should display msg as " Minimum balance should be maintained".

Step 6: When the account has balance amount=minimum balance, try to withdraw any amount , should display msg as " Minimum balance should be maintained".

**20) How to write test case of Login window where user name is editable to only upto 8 alpha characters?**

1. Enter User Name and press LOGIN Button. User Name= COES. Should Display Warning Message Box "Please Enter User name and Password"

2.Enter Password and press LOGIN Button. Password= COES. Should Display Warning Message Box "Please Enter User name and Password”

3. Enter user Name and Password and press LOGIN Button. "USER = COES AND Password = XYZ" (Wrong user name & password). Should Display Warning Message Box "Please Enter User name and Password"

4. Enter user Name and Password and press LOGIN Button. "USER ="" "" AND Password = "" """(Blank values). Should Display Warning Message Box "Please Enter User name and Password"

5. Enter User Name and Password and press LOGIN Button. "USER = COES AND Password = COES" (Correct user name & password). Should navigate to next page.

6. Enter User Name and Password and press LOGIN Button "USER = ADMIN AND Password = ADMIN" (Correct user name & password). Should navigate to Maintenance page.

**21) How will we prepare test cases?**

Test cases are prepared on the basis of Requirement documents. Each company follows their own format.

The test cases are 3 types.

1.GUI Test cases

a. Availability b. Alignment C. Look and Feel d. Spell checking

2.Positive test cases

3.Negative test cases

**22) What is the Traceability matrix? What is its use?**

Traceability Matrix is a document that provides cross-reference between Requirements/ Use Cases with Test Cases and Bugs. This document establishes the Traceability between the requirements and test cases executed in the system testing. It also provides a reference to the specific requirement with reference to a particular bug.

**23) How will you check that your test cases covered all the requirements?**

By using, Traceability matrix. Traceability matrix means the matrix showing the relationship b/w the requirements & test cases.

**24) For a triangle (sum of two sides is greater than or equal to the third side), what is the minimal number of test cases required?**

The answer is 3

1.Measure all sides of the triangle.

2.Add the minimum and second highest length of the triangle and store the result as Res.

3.Compare the Res with the largest side of the triangle.

**Responsibilities of a tester:**

- Understand project requirements.  
- Prepare Update the Test case document for testing of the application from all aspects.  
- Prepare the test setup.  
- Deploy the build in the required setup.  
- Conduct the Testing including Sanity and functional Execute the Test cases.  
-Update the Test Result document.  
- Attend the Regular client calls.  
- Log / File the defects in Defect tracking tool / Bug Report.  
- Verify defects.  
- Discuss doubts/queries with Development Team / Client.  
- Conduct internal trainings on various products.

# [High Seviority-Low Priority & Low Seviority and High Priority](https://www.pavantestingtools.com/2010/12/high-seviority-low-priority-low.html)

[](https://4.bp.blogspot.com/-DTH0zDHsPcI/XFlOOLaRYvI/AAAAAAAAQA4/dbnxWowJEyopuyRSadCdAsIn3mPA6wHIACLcBGAs/s1600/Programs%2Bfor%2BSelenium%252810%2529.png)

**Severity:** Means impact on the application..,  
  
**Priority:** Means Importance in terms of both application and client  
  
**High severity and low priority.**  
When the application has critical problem and it has to be solved after a month then we can say it as high severity and low priority.  
  
**low severity and high priority**  
When the application has trivial problem ie (less affected) and it has to be solved within a day then we can say it as low seviority and high priority  
  
  
**Example:1**  
**Requirement:** Assume that Login page consists of User Name and Password.Crietria is that the Password as to expire in every 30 days and new password has to be assigned.and old one should no longer exist.  
  
**For High Severity and low Priority**  
Application accpets the New password after very expiry of 30 days..Now the Application still accpets the Old password and the new password for the same account.  
Hence this High severity and Low priority .Since the deviates the criteria ie Old password still works.  
  
**For High Priority and low Severity**  
Application behaves such that it doesn’t allow to change every 30 dyas.It still works with same old password.  
hence deviates from the clients requirements and doesn’t affect the application hence it is termed as High Priority and low severity

# [Software Testing Metrics](https://www.pavantestingtools.com/2010/12/software-testing-metrics.html)

[](https://3.bp.blogspot.com/-JQSdYewgUrE/XFlPOqWTSmI/AAAAAAAAQBE/cCYtZ5re3A4vRzyrzLvBG2yXp0Xa2RFDwCLcBGAs/s1600/Programs%2Bfor%2BSelenium%25282%2529.png)

**Measurement:**Quantifying the quality of an Application  
  
**Metric:**It is the combination of measurements  
  
**Some important testing metrics:**  
  
1)Schedule variance=(Actual time taken-planed time)/planed time\*100  
  
2)Effort variance=(Actual effort-Planned Effort)/Planned effort \* 100  
  
3)Test Case coverage =(Total Test Cases – Requirements that cannot mapped to test cases)/Total Test cases \* 100  
  
4)Customer Satisfaction= number of complaints/Period of time  
  
5)Test Case effectiveness = The extent to which test cases are able to find defect.  
  
6) Time to find a defect = The effort required to find a defect  
  
7) Defect Severity = business impact= effect on the end user  
  
8)Test Coverage = To which test case covers the products complete functionality.  
  
9)Defect Severity index = An index representing the average of the severity of the defect.  
  
10)Time to Solve a Defect = Effort Required to resolve the a defect  
  
11)No Of Defect = The Total number of defects found in time  
  
12)Defects/KLOC = The number of defects per 1000 lines of code  
  
13)Defect severity = The severity level of a defect indicates the potential business impact for the end user.  
(business impact = effect on the end user)  
  
14) Time to find the defect= The effort required to find a defect.  
  
15)Time to solve a defect =Effort required to resolve a defect (diagnosis and correction)  
  
16)Test coverage =Defined as the extent to which testing covers the product’s complete functionality.  
  
17) Test case effectiveness = The extent to which test cases are able to find defects.  
  
18) Defect Age=Fixed date-Reported date  
  
  
19)Defect Density=Number of defects in the module.  
  
20) Defect cost= Cost to analyze the defect + Cost to fix it+ Cost of failures already incurred due to it.  
  
21) Bug clearance Ratio =The ratio between valid & Invalid bugs  
  
22) DRE (Defect Removal Efficiency)=A / A+B  
A- Defects found by testing team (Fixed Defects)  
B- Defects found by customers (Missed Defects)

# [Software Testing Process](https://www.pavantestingtools.com/2010/12/software-testing-process.html)

[](https://2.bp.blogspot.com/-5Ds9GCOZl08/XFlQiKQIXwI/AAAAAAAAQBQ/mHHNYCd4hDc4K8H-KzSlZ4XZUXw2LsfeACLcBGAs/s1600/Programs%2Bfor%2BSelenium%25283%2529.png)

**I) Test Planning**  
  
(Primary Role: Test Lead/Team Lead)  
  
  
**Input:/Reference:**  
  
a) Requirements specification  
b) Test Strategy  
c) Project plan  
d) Use cases/design docs/Prototype screen  
e) Process Guidelines docs  
  
  
**Templates:**  
  
- Review Report  
- Test Plan  
  
  
**Roles:**  
  
Test Lead/team Lead: Test Planning  
Test Engineers: Contribution to Test plan  
BA: Clarifications on Requirements  
  
  
**Tasks:**  
  
a) Understanding & Analyzing the Requirements  
b) Test Strategy Implementation  
c) Test Estimations (Time, Resources-Environmental, Human, Budget)  
d) Risk Analysis  
f) Team formation  
g) Configuration management plan  
h) Test Plan Documentation  
i) Test Environment set-up defining  
  
  
  
**Output:**  
  
- Test Plan Document  
  
  
**II) Test design:**  
  
  
**Input:/Reference:**  
  
a) Requirements specification  
b) Test Plan  
d) Use cases/design docs/Prototype screen  
e) Process Guidelines docs  
  
  
**Templates:**  
  
- Test Scenarios  
- Test case  
- Test data  
  
  
**Roles:**  
  
Test Engineers: Test case documentation  
Test Lead/team Lead: Guidance, monitoring & Control  
BA: Clarifications on Requirements  
  
  
**Tasks:**  
  
a) Creating Test scenarios  
b) Test case documentation  
c) Test data collection  
  
  
**Output:**  
  
- Test case Documents  
- Test Data  
  
  
**3) Test Execution:**  
  
  
**Input:/Reference:**  
  
a) Requirements specification  
b) Test Plan  
c) Test Case docs  
d) Test data  
e) Test Environment  
  
  
**Templates:**  
  
- Defect Report  
- Test Report  
  
  
**Roles:**  
  
Test engineers: Test execution  
Test Lead: Guidance, monitoring & Control  
BA: Clarifications on Requirements  
System Administrator/Network Administration: Test Environment set-up  
  
  
**Tasks:**  
  
a) Forming Test Batches  
b) Verifying Test Environment set-up  
c) Test Execution  
d) Test reporting  
e) Defect Reporting  
f) Regression Testing  
  
  
**Output:**  
  
- Test Reports  
- Opened/Closed Defect Reports  
  
  
**4) Test Closure**  
  
  
**Input:/Reference:**  
  
- Requirements  
- Test Plan  
- Test Reports  
- Opened/Closed Defect Reports  
  
  
**Templates:**  
  
- Test Summary Report  
  
  
**Roles:**  
  
Test Lead: decide when to stop testing & Creating Test summary Report  
Testers: Contribution  
  
  
**Tasks:**  
  
a) Evaluating Exit criteria  
b) Collecting all facts from Testing activities  
c) Sending Test deliverables to the Customer  
d) Improvement suggestions for future projects  
  
  
**Output:**  
  
- Test Summary Report  
- Test Deliverables (Test Plan, Test scenarios, Test cases, Test Data, Test Reports, Opened/Closed defect Reports, Test Summary Report)

# [Quality Standards ( ISO,CMM & Six Sigma)](https://www.pavantestingtools.com/2010/12/quality-standards-isocmm-six-sigma.html)

[](https://3.bp.blogspot.com/-juy9IMzSN_E/XFvF0LlBP_I/AAAAAAAAQBc/9R4l5H4LBjQ0XX1P299Oy25yGrr0zLuvQCLcBGAs/s1600/Programs%2Bfor%2BSelenium.png)

1) ISO (International Organization for Standardization)

2) SEI-CMM/CMMI (Capability Maturity Model)

3) Six Sigma

**ISO (International Organization for Standardization) :**

ISO 9001:2000: ISO is generic Model, Applicable for all types of originations, contains 20 clauses, certification audit is like an examination ,result is the certification is pass or fail.

It is based on the “PDCA Cycle” and the “8 Quality management Principles”

PDCA (Plan Do Check Act):

- Define a plan (DEFINE)

- Execute the plan (IMPLEMENT)

- Check the results (CHECK)

- Take the necessary action (CORRECT)

**Eight Quality Management principles in ISO Standard**

1. Customer Focus

2. Leadership

3. Involvement of people

4. Process Approach

5. System Approach to Management.

6. Continual Improvement.

7. Factual Approach to Decision making

8. Mutually Beneficial Supplier Relationship

**CMM/CMMI**

1) CMM Certification is given to only IT based companies.

2) CMM Certification is given based on the process followed by the company.

3) If the company developed system software then it will get CMMI Certification.

4) CMM/CMMI Certification is given in different levels or stages.

5) CMM/CMMI is called staged Model.

6) Each Level has several KPA’s (Key Process Areas).

**Six Sigma**

1) Six Sigma Certification is given to any type of company.

2) Six Sigma Certification is given based on Quality produced by the company.

3) According to Six Sigma Certification for 1 Million transactions 3.4 defects are acceptable.

# [Testing Terminology](https://www.pavantestingtools.com/2010/12/testing-terminology.html)

[](https://1.bp.blogspot.com/-jKMx7geaBcw/XFvGQNAkDWI/AAAAAAAAQBk/Aee7PCEnWbocshYcNNlWdJyW7xT3rJ5vQCLcBGAs/s1600/Programs%2Bfor%2BSelenium%25281%2529.png)

**Black box testing**- not based on any knowledge of internal design or code. Tests are based on requirements and functionality.

**White box testing**- based on knowledge of the internal logic of an application's code. Tests are based on coverage of code statements, branches, paths, conditions.

**Unit testing** - the most 'micro' scale of testing; to test particular functions or code modules. Typically done by the programmer and not by testers, as it requires detailed knowledge of the internal program design and code. Not always easily done unless the application has a well-designed architecture with tight code, may require developing test driver modules or test harnesses.

**Incremental integration testing** - continuous testing of an application as new functionality is added; requires that various aspects of an application's functionality be independent enough to work separately before all parts of the program are completed, or that test drivers be developed as needed; done by programmers or by testers.

**Integration testing** - testing of combined parts of an application to determine if they function together correctly. The 'parts' can be code modules, individual applications, client and server applications on a network, etc. This type of testing is especially relevant to client/server and distributed systems.

**Functional testing** – Black box type testing geared to functional requirements of an application; this type of testing should be done by testers. This doesn't mean that the programmers shouldn't check that their code works before releasing it (which of course applies to any stage of testing.)

**System testing**- Black box type testing that is based on overall requirements specifications; covers all combined parts of a system.

**end-to-end testing** - similar to system testing; the 'macro' end of the test scale; involves testing of a complete application environment in a situation that mimics real-world use, such as interacting with a database, using network communications, or interacting with other hardware, applications, or systems if appropriate.

**Sanity testing**- typically an initial testing effort to determine if a new software version is performing well enough to accept it for a major testing effort. For example, if the new software is crashing systems every 5 minutes, bogging down systems to a crawl, or destroying databases, the software may not be in a 'sane' enough condition to warrant further testing in its current state.

**Regression testing**- re-testing after fixes or modifications of the software or its environment. It can be difficult to determine how much re-testing is needed, especially near the end of the development cycle. Automated testing tools can be especially useful for this type of testing.

**Acceptance testing** - final testing based on specifications of the end-user or customer, or based on use by end-users/customers over some limited period of time.

**Load testing**- testing an application under heavy loads, such as testing of a web site under a range of loads to determine at what point the system's response time degrades or fails.

**Stress testing** - term often used interchangeably with 'load' and 'performance' testing. Also used to describe such tests as system functional testing while under unusually heavy loads, heavy repetition of certain actions or inputs, input of large numerical values, large complex queries to a database system, etc.

**Performance testing** - term often used interchangeably with 'stress' and 'load' testing. Ideally 'performance' testing (and any other 'type' of testing) is defined in requirements documentation or QA or Test Plans.

**Usability testing** - testing for 'user-friendliness'. Clearly this is subjective, and will depend on the targeted end-user or customer. User interviews, surveys, video recording of user sessions, and other techniques can be used. Programmers and testers are usually not appropriate as usability testers.

**Install/uninstall testing** - testing of full, partial, or upgrade install/uninstall processes.

**Recovery testing**- testing how well a system recovers from crashes, hardware failures, or other catastrophic problems.

**Security testing** - testing how well the system protects against unauthorized internal or external access, willful damage, etc; may require sophisticated testing techniques.

**Compatibility testing** - testing how well software performs in a particular hardware/software/operating system/network/etc. environment.

**Exploratory testing** - often taken to mean a creative, informal software test that is not based on formal test plans or test cases; testers may be learning the software as they test it.

**Ad-hoc testing** - similar to exploratory testing, but often taken to mean that the testers have significant understanding of the software before testing it.

**User acceptance testing** - determining if software is satisfactory to an end-user or customer.

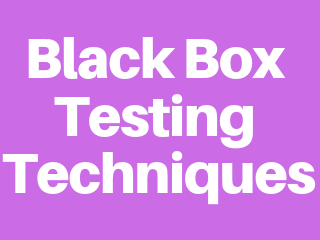
**Comparison testing**- comparing software weaknesses and strengths to competing products.

**Alpha testing** - testing of an application when development is nearing completion; minor design changes may still be made as a result of such testing. Typically done by end-users or others, not by programmers or testers.

**Beta testing** - testing when development and testing are essentially completed and final bugs and problems need to be found before final release. Typically done by end-users or others, not by programmers or testers.

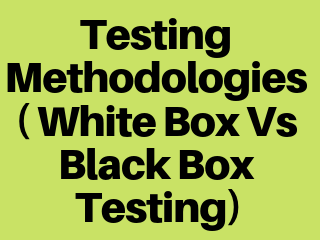
**Mutation testing** - a method for determining if a set of test data or test cases is useful, by deliberately introducing various code changes ('bugs') and retesting with the original test data/cases to determine if the 'bugs' are detected. Proper implementation requires large computational resources.

# [Black Box Testing Techniques](https://www.pavantestingtools.com/2010/12/black-box-testing-techniques.html)

[](https://3.bp.blogspot.com/-Ee_30r_yNvs/XFvG4ikREgI/AAAAAAAAQBw/AgtIsaD_S3IY-vIMje2WH5mOF6Q47L08gCLcBGAs/s1600/Programs%2Bfor%2BSelenium%25282%2529.png)

1) User Interface Testing  
2) Functional Testing  
3) Non Functional Testing  
4) User support Testing  
  
**User Interface Testing:**  
  
During this testing test engineers validates user interface of the application as following aspects:  
1) Look & Feel  
2) Easy to use  
3) Navigations & shortcut keys  
  
  
**Functional Testing:**  
  
1) Object properties coverage  
2) Input domain Testing  
3) Database testing/Backend coverage  
4) Error Handling  
5) Calculations/Manipulations coverage  
6) Links Existence & Links Execution  
7) Cookies & Sessions  
  
**Non Functional Testing:**  
  
1) Performance Testing  
2) Security Testing  
3) Authentication  
4) Access Control  
5) Recovery Testing  
6) Compatibility Testing  
7) Configuration Testing  
8) Installation Testing  
9) Sanitation Testing  
  
**User Support testig:**  
During this testing test engineers validates whether the application provides help or not.  
This is also called as context sensitive help.

# [Testing Methodologies ( White Box Vs Black Box Testing)](https://www.pavantestingtools.com/2010/12/testing-methodologies-white-box-vs.html)

[](https://4.bp.blogspot.com/-kDoaEXQ_uf8/XFvHjYfVCII/AAAAAAAAQB4/tZcWxRdIZqQHaZ8BBIZ4TvcySGtfHx3CQCLcBGAs/s1600/Programs%2Bfor%2BSelenium%25283%2529.png)

**White Box Testing**  
  
In this testing we test internal logic of the program.  
To conduct this testing we should aware of programming .  
Ex: Unit Testing  
  
**Black Box Testing**  
Without knowing internal logic of the program,we test over all functionality of the application whether it is working according to client requirement or not.  
  
Ex: System Testing  
  
**Grey Box Testing**  
It is the both combination of white box and black box testing.  
Ex:Database Testing

**RTM: Opencart**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| Project Name | OpenCart (Frontend) |  |  |
| Client | OpenCart |  |  |
| Reference Document | FRS |  |  |
| Created By | Pavan |  |  |
| Creation Date | DD-MM-YYYY |  |  |
| Approval Date | DD-MM-YYYY |  |  |
|  |  |  |  |
|  |  |  |  |
| **Requirement ID** | **Test Scenario ID** | **Test Scenario Description** | **Tes Case ID'S** |
| 1.1 | TS\_001 | Validate the working of Register Account functionality | TC\_RF\_001 TC\_RF\_002 TC\_RF\_003 TC\_RF\_004 TC\_RF\_005 TC\_RF\_006 TC\_RF\_007 TC\_RF\_008 TC\_RF\_009 TC\_RF\_010 TC\_RF\_011 TC\_RF\_012 TC\_RF\_013 TC\_RF\_014 TC\_RF\_015 TC\_RF\_016 TC\_RF\_017 TC\_RF\_018 TC\_RF\_019 TC\_RF\_020 TC\_RF\_021 TC\_RF\_022 TC\_RF\_023 TC\_RF\_024 TC\_RF\_025 TC\_RF\_026 TC\_RF\_027 |
| 1.2 | TS\_002 | Validate the working of Login functionality | TC\_LF\_001 TC\_LF\_002 TC\_LF\_003 TC\_LF\_004 TC\_LF\_005 TC\_LF\_006 TC\_LF\_007 TC\_LF\_008 TC\_LF\_009 TC\_LF\_010 TC\_LF\_011 TC\_LF\_012 TC\_LF\_013 TC\_LF\_014 TC\_LF\_015 TC\_LF\_016 TC\_LF\_017 TC\_LF\_018 TC\_LF\_019 TC\_LF\_020 TC\_LF\_021 TC\_LF\_022 TC\_LF\_023 |

**Test Scenarios:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
| Project Name | OpenCart (Frontend) | |  |  |
| Client | OpenCart | |  |  |
| Reference Document | FRS | |  |  |
| Created By | Pavan | |  |  |
| Creation Date | DD-MM-YYYY | |  |  |
| Approval Date | DD-MM-YYYY | |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| **Test Scenario ID** | **Reference** | **Test Scenario Description** | **Priority** | **Number of Test Cases** |
| TS\_001 | FRS | Validate the working of Register Account functionality | P0 | 27 |
| TS\_002 | FRS | Validate the working of Login functionality | P0 | 23 |
| TS\_003 | FRS | Validate the working of Logout functionality | P0 | 11 |
| TS\_004 | FRS | Validate the working of Forgot Password functionality | P2 | 25 |
| TS\_005 | FRS | Validate the working of Search functionality | P1 | 22 |
| TS\_006 | FRS | Validate the working of Product Compare functionality | P4 | 24 |
| TS\_007 | FRS | Validate the Product Display Page functionality for the different types of Products | P1 | 37 |
| TS\_008 | FRS | Validate the working of 'Add to Cart' functionality | P1 | 09 |
| TS\_009 | FRS | Validate the working of 'Wish List' functionality | P4 | 21 |
| TS\_010 | FRS | Validate the working of 'Shopping Cart' functionality | P1 | 33 |
| TS\_011 | FRS | Validate the working of Home Page functionality | P2 | 10 |
| TS\_012 | FRS | Validate the working of Checkout functionality | P1 | 20 |
| TS\_013 | FRS | Validate the My Account functionality | P2 | 9 |
| TS\_014 | FRS | Validate the working of My Account > Account Information functionality | P3 | 13 |
| TS\_015 | FRS | Validate the working of My Account > 'Change Password' functionality | P3 | 13 |
| TS\_016 | FRS | Validate the working of My Account > 'Address Book' functionality | P3 | 21 |
| TS\_017 | FRS | Validate the working of My Orders > 'Order History' functionality | P3 | 12 |
| TS\_018 | FRS | Validate the working of My Orders > 'Order Information' functionality | P3 | 8 |
| TS\_019 | FRS | Validate the working of My Orders > 'Product Returns' functionality | P3 | 11 |
| TS\_020 | FRS | Validate the working of My Orders > 'Downloads' functionality | P3 | 13 |
| TS\_021 | FRS | Validate the working of My Orders > 'Reward Points' functionality | P3 | 10 |
| TS\_022 | FRS | Validate the working of My Orders > 'Returned Requests' functionality | P3 | 17 |
| TS\_023 | FRS | Validate the working of My Orders > 'Your Transactions' functionality | P3 | 11 |
| TS\_024 | FRS | Validate the working of My Orders > 'Recurring Payments' functionality | P3 | 9 |
| TS\_025 | FRS | Validate the working of 'Affiliate' functionality | P4 | 29 |
| TS\_026 | FRS | Validate the working of 'Newsletter' functionality | P4 | 13 |
| TS\_027 | FRS | Validate the working of 'Contact Us' page functionality | P4 | 13 |
| TS\_028 | FRS | Validate the working of 'Gift Certificate' page functionality | P4 | 11 |
| TS\_029 | FRS | Validate the working of 'Speal Offers' page functionality | P4 | 16 |
| TS\_030 | FRS | Validate the working of 'Header' options, 'Menu' options and 'Footer' options | P4 | 22 |
| TS\_031 | FRS | Validate the complete Application functionality for different currencies | P2 | 3 |

**Test cases for Register: Refer Pavan onlinetraing**

[Manual Testing Materials ~ SDET - QA Automation Blog (pavantestingtools.com)](https://www.pavantestingtools.com/p/manual-testing-project.html):[**OpenCartProject Documents**](https://drive.google.com/drive/folders/1nBs25k9jTb06qrV-5fTC75gtPOR6uW4V?usp=sharing)

**::Sample User Stories**

**As a Customer**

**I want to Login to my account using card and PIN code**

**So that I can perform the transactions.**

**Acceptance Criteria –**

**• System must validate the card and pin code**

**• In case Customer enters wrong Pin code three times then the system locks the card.**

**2. As a Customer**

**I want to to check the balance of my bank account**

**So that I can perform transactions.**

**Acceptance Criteria –**

**• Customer needs to be logged in before checking balance.**

**• Balances is displayed.**

**3. As a Customer**

**I want to to deposit cash in my bank account through ATM**

**So that I may save my time and perform transactions later.**

**Acceptance Criteria –**

**• Customer needs to be logged in before depositing cash.**

**• System should verify the amount of cash deposited by checking with the user.**

**• If the user doesn’t agree then the system ejects back the cash.**

**• If Ok the account balance is updated and displayed.**

**4. As a Customer**

**I want to to deposit check in my bank account through ATM**

**So that I may save my time and perform transactions later.**

**Acceptance Criteria –**

**• Customer needs to be logged in before depositing check.**

**• System should verify the amount written on the deposited check by asking the user.**

**• If the user doesn’t agree then the system ejects back the check.**

**• If Ok the account balance is updated and displayed.**

**5. As a Customer**

**I want to withdraw cash from my bank account through ATM**

**So that I may save my time.**

**Acceptance Criteria –**

**• Customer needs to be logged in before withdrawing cash.**

**• System checks to see if the request amount exceeds the balance**

**• If so the system displays the balance and asks the user to enter a new amount.**

**• If amount entered is less than the account balance cash is dispensed and the new**

**balance is displayed.**

**6. As a Customer**

**I want to transfer money from my account to another bank account through ATM**

**So that I may save my time.**

**Acceptance Criteria –**

**• Customer needs to be logged in before transferring amount.**

**• System should check the receivers account number and validate it prior to performing**

**the transactions.**

**• If Ok the local account balance is updated and displayed.**

**• System should update both accounts concurrently.**

**7. As a Customer**

**I want to logout from my bank account through ATM**

**So that I may end up my ATM session.**

**Acceptance Criteria –**

**• System asks user if the user wants session report and receipt for the entire session.**

**• If yes then the receipt is dispensed**

**• User is logged off from the account**

## ****Software Testing Real Time Interview Questions****

##### **1. What are the key challenges of software testing that you faced in your career?**

Following are some challenges of software testing that I faced in my career:

i) Unstable Application Under Test.

ii) Time constraints.

iii) Understanding and Analyzing the requirements.

iv) Changing Requirements.

v) Lack of Domain knowledge and business user perspective understanding.

vi) Prioritizing Test cases

vii) Lack of skilled team members.

viii) Selecting Test Cases for Regression testing.

ix) Lack of resources and training.

x) Test Environment issues.

##### **2. How you derived Test Cases?**

That depends on project, sometimes we derived Test cases from requirements and sometimes from use cases.

##### **3. How many Test cases did you write for last project?**

Nearly 170 Test cases.

##### **4. How much time is required to write a Test case?**

That depends on complexity of the functionality.

##### **5. How many defects did you detect in your last project?**

I executed nearly 150 Test cases, in which some 22 defects were raised including 3 showstoppers.

##### **6. Did you face any problems during defect reporting and tracking?**

Yes, Developers rejected 2 or 3 valid defects.

##### **7. Did you create RTM (Requirements Traceability Matrix) document in your project?**

I only updated the RTM document.

##### **8. Did you involve in Test Environment setup?**

Yes, I involved in verifying Test Lab setup along with other team members.

##### **9. Did you perform any Live testing?**

Yes, In my current project we used live data for some test cases.

##### **10. What is the difference between Front End Testing and Back End testing?**

Front End Testing is performed on the Graphical User Interface (GUI), whereas Back End Testing involves databases testing.

We conduct Database Testing using SQL Queries.

Database Testing is a subset of Functional Testing.

##### **11. What is the difference between System Testing and Functional Testing?**

System Testing is a Test Level

Functional Testing is a Test Type that can be performed in all levels of Testing (Unit Testing, Integration Testing, system Testing and Acceptance Testing).

##### **12. What is the difference between Performance Testing and Load Testing?**

Load Testing, Stress Testing, Spike Testing and Endurance Testing all are subsets of performance Testing.

##### **13. What are the Test types that you performed in your Software Testing career?**

Functionality Testing

Security Testing

Usability Testing

Compatibility Testing

Installation Testing etc…

##### **14. What are the Test deliverables?**

What documentation we produce during testing all come under Test deliverables.

Test Plan

Test Scenarios

Test Cases

Opened and Closed Defect Reports

Test metrics reports

Test summary Report etc…

##### **15. Did you involve in Test plan documentation?**

Yes, I was involved in Test plan documentation in the last project, identified Features to be Tested, Entry criteria, Exit criteria.

##### **16. What is Exhaustive Testing?**

Exhaustive Testing – testing with all possible inputs and pre-conditions and it is impractical, so we use Test design techniques to reduce the size of Input and Output domains.

##### **17. What are the important phases in the Formal Software test process or Software test life cycle?**

i. Requirement Analysis  
ii. Test Planning  
iii. Test Design & Development  
iv. Test Environment Setup  
v. Test Execution  
vi. Test Cycle Closure

##### **18. What are the important tasks in the Test Planning phase?**

Important tasks in the Test planning phase are:

i) Understanding and Analyzing the Requirements  
ii) Risk Analysis  
iii) Test Strategy Implementation  
iv) Test Estimations (Scope, Time, Resources, Budget, etc…)  
v) Team Formation  
vi) Test Plan Documentation  
vii) Configuration Management Planning  
viii) Traceability Matrix documentation  
ix) Define Test Environment Setup

##### **19. What are important tasks in the Test Design phase?**

i) Understanding Requirements  
ii) Generate Test Scenarios  
iii) Test Case Documentation  
iv) Test Data Collection

##### **20. What are the Test design techniques that you used?**

I used Black box Test Design Techniques,

i) Equivalence Class Partitioning

ii) Boundary Value Analysis

iii) Decision Tables

iv) State Transition Testing etc…

##### **21. How you communicate with Developers to resolve issues?**

That depends on Company and sometimes depends on Project, in my current project I am communicating with Developers via our Test Lead.

##### **22. What is Configuration Management? Did you any Configuration Management Tool in your Testing career?**

Storing and Organizing all configurable items is called Configuration Management, It is not only for Testing Team but also for all Stakeholders of the Project.

It is very important for the Development than Testing Team, I used VSS Tool for Configuration Management in my last project.

##### **23. You told Configurable items, What are Configurable items in Software Test Process?**

What Software & Hardware we use and What Documents (Test Plan, Test Cases, defect Reports, Test Summary Report etc…) we produce during Testing all are come under Configurable items.

##### **24. When we choose Informal Testing?**

Whenever we don’t have proper documentation (Requirements etc…) and sufficient Time then we choose Informal Testing. Using Experienced based Techniques (Ex: Error Guessing, Exploratory Testing etc…) we conduct Testing.

##### **25. What are the important Test Types that can be applied for Web Applications?**

Test Types that applied for Web Applications are,

i) Functionality Testing  
ii) Security Testing  
iii) Compatibility Testing (OS Compatibility and Browser Compatibility)  
iv) Navigation Testing  
v) Database Testing  
vi) Reliability Testing  
vii) Usability Testing  
viii) Recovery Testing  
ix) Performance Testing Etc…

##### **26. Do You have experience in Database Testing?**

Yes, I conducted Database Testing Manually using SQL Commands,

I Tested the following Database operations during Database Testing,

i) Data Manipulations (Add / Edit / Delete Records)  
ii) Data Integrity  
ii) Data Retrievals  
iii) Data Comparisons etc…

##### **27. Have you written a Test Strategy?**

I know what is a Test strategy and its purpose but I never got a chance to write a Test Strategy document.

##### **28. What is a Test Strategy and what does it include?**

It is a document that captures the approach on how we go about testing the product and achieve the goals. It is normally derived from the Business Requirement Specification (BRS). Documents like Test Plan are prepared by keeping this document as a base.

##### **29. Have you written Test Plan?**

Yes, I wrote the Test plan for my current project.

##### **30. What are the various tools you have used in the Testing process?**

The tools which I have used during the testing process are as follows.

Test Management Tools: JIRA, ALM/Quality Center

Test Case Management Tools: TestCaseLab

Defect Tracking Tools: Bugzilla, Mantis

Automation Tools: UFT, Selenium, JMeter

Etc,

## ****Selenium Real Time Interview Questions****

##### **1. What are the Selenium Tools, and Testing frameworks that you are using in your Current Project?**

We are using,

• Selenium WebDriver for Creating Test Cases.

• Java Programming for Enhancing Test cases.

• TestNG Testing Framework for Grouping Test cases, executing Test batches, and generating Test reports.

Also used,

• Firebug and Firepath for inspecting elements.

• IE Browser driver, Chrome browser driver for Cross Browser testing.

##### **2) What is your Project Operating Environment?**

Microsoft Windows 10

##### **3) What is your project domain and Application Environment?**

Our project is Banking Application,

Our AUT (Application Under Test) developed using Java Technology and Database is Oracle.

##### **4) What are the major challenges in Functional Test Automation?**

• Object Identification.

• Debugging Issues. etc…

##### **5) What are the difficulties that you faced in Object identification?**

Some Elements (Objects) not recognized properly using Selenium WebDriver Element locators.

##### **6) How you conducted Data-driven Testing in your project?**

We conducted Data-driven Testing using an external Excel file as Resource, we added some third-party excel jar files to Java Project in Eclipse.

##### **7) How you conducted Batch Testing in your project?**

We conducted Batch Testing using TestNG Testing Framework.

##### **8) How you conducted Cross Browser testing in your project?**

Using Mozilla Firefox, IE, and Google Chrome browsers(Downloaded IE and Google Chrome Browser drivers). we executed Test cases.

##### **9) How you handled duplicate Elements in your project?**

Using the index property of Elements we handled duplicate objects.

##### **10) How many Test cases you wrote for your Project/Module?**

I prepared around 120 Test cases in my Module.

##### **11) How many defects you detected and give one example?**

I detected nearly 20 Defects of which 5 defects are Severe defects.

##### **12) How you selected Test cases for Regression Testing?**

We selected Test cases for Regression Testing based on Defect affected Test cases and from defect-dependent Test cases.

##### **13) How you organized your Test Automation resources?**

##### **14) Did you use any build management tool in your project?**

We used Maven build management tool in our project.

##### **15) How you handled errors in your Test scripts?**

We handled errors in our Test Scripts using Java Error handling features.

##### **16) Did you create any reusable components?**

Yes, We created some reusable components in our project for Login Functionality, Registration Functionality, etc…

##### **17) Did you find any Test Scenarios that not to be automated in your project using Selenium?**

Yes, We find some Some Test Scenarios in our Current project,

Functionalities that require more user interaction,

Functionalities that require Dynamic test data submission.

##### **18) How to execute multiple Java programs at a time?**

We execute multiple Java programs using XML files in the TestNG framework.

##### **19) How to conduct parallel Test Execution?**

Usually, We conduct Parallel Test Execution using Selenium Grid, but no parallel test execution in my Current project.

##### **20) What Defect management / Test management tool you used in your project?**

We are using the Jira Test Management tool in our project with Selenium.

##### **21) How you communicated with the development team to resolve the issues.**

We communicate Development team via Our Test Manager.

##### **22) Did you involve in Selenium Test Environment Setup?**

Yes, I involved in Selenium Environment Setup in my Current Project.

As per my project, we selected Java, Selenium WebDriver and TestNG Framework, and Maven.

> We Downloaded Eclipse IDE and Extracted.

> Downloaded Java Software and Installed.

> Environment Variable path setup.

> Downloaded Selenium WebDriver Java language bindings(jar files) and added to Java Project in Eclipse.

> Downloaded and Installed TestNG Framework from Eclipse IDE.

> Installed Maven build management tool.

##### **4. What are the important tasks in the Test Planning stage?**

a) Understanding and analyzing the requirements

b) Risk Analysis

c) Test Strategy Implementation

d) Test Estimations (Scope of the project, Time, Budget, Available resources)

e) Team formation

f) Test Plan Documentation

g) Configuration management Planning

h) Traceability Matrix

i) Defining Test Environment set up

##### **5. What are the reference documents for Test Planning?**

Reference Documents for Test Planning stage:  
Requirements  
Project Plan  
Test Strategy  
—  
Design docs  
Process guidelines docs  
Corporate standards docs  
Etc…

##### **6. What is the Output of the Test Planning phase?**

Test Plan Document

##### **7. How Test Lead defines Test Lab Setup?**

Test Lead defines Test Environment set-up based on System Requirements specification document.

##### **8. What are the considerable factors for Test Estimations?**

Scope of the project,

Time,

Budget,

Available Human and Environmental resources

##### **9. Who is the author of the Test Plan Document?**

Test Lead or Team Lead

##### **10. Who approves the Test Plan document?**

Generally, the Project Manager approves the Test Plan Document after the review process.

##### **11. What is Test Point Analysis?**

A formula-based test estimation method based on function point analysis.

##### **12. What is Software Test Process?**

The fundamental test process comprises test planning and control, test analysis and design, test implementation and execution, evaluating exit criteria and reporting, and test closure activities.

##### **13. What is Function Point Analysis?**

A Method aiming to measure the size of the functionality of an information system. The measurement is independent of the technology. This measurement may be used as a basis for the measurement of productivity, the estimation of the needed resources, and project control.

##### **14. What is the Entry criteria in Test Plan?**

The set of generic and specific conditions for permitting a process to go forward with a defined task, e.g. test phase. The purpose of entry criteria is to prevent a task from starting which would entail more (wasted) effort compared to the effort needed to remove the failed entry criteria.

##### **15. What is Exit criteria in Test Plan?**

The set of generic and specific conditions, agreed upon with the stakeholders, for permitting a process to be officially completed. The purpose of exit criteria is to prevent a task from being considered completed when there are still outstanding parts of the task which have not been finished. Exit criteria are used to report against and to plan when to stop testing.

##### **16. What is a Test deliverable?**

Any test (work) product must be delivered to someone other than the test (work) product’s author.

##### **17. What are the Test deliverables in Software Test Process?**

Test deliverables

Test plan document,

Test cases,

Test design specifications,

Tools and their outputs,

Simulators,

Static and dynamic generators,

Error logs and execution logs,

Problem reports and corrective actions.

##### **18. What is Master Test Plan?**

A test plan that typically addresses multiple test levels.

##### **19. What is Wide Band Delphi?**

An expert-based test estimation technique that aims at making an accurate estimation using the collective wisdom of the team members. 1) How to select appropriate add-ins for our AUT (Application Under Test)?

### Selenium Tricky Interview Questions PDF

* Tell me about the work you’ve been doing recently. What’s the most interesting bug that you’ve found, and why?
* What kind of challenges does testing present? Can you tell me about some specific software testing challenges you’ve faced, and how you overcame them?
* Why did you choose software testing as a career, and what motivates you to stick with it?
* Have you encountered any challenges working with your colleagues? Tell me about a specific instance when you were in a difficult situation, and how you dealt with it.
* How about situations where you have to make decisions… Have you ever made a bad decision? What contributed to you making that decision? How did you deal with the consequences?
* How have you added value to the organisations you’ve worked with? Can you give me a specific example from your last or current position?
* What process are you using for testing currently? Can you describe how you might improve it?
* What kind of tests have you been doing? What do you enjoy about them? How do you develop those tests?
* When you perform a test, what steps do you take? What’s your process?
* Have you ever written a test plan? What would you put in one?
* How do you know when it’s time to stop testing?
* What’s the role of risk in your testing? How do you analyse and measure it?
* Do you measure how effective (or not) your testing is? What metrics do you use?
* If I left you testing for two hours, what would you have to show me when I returned?
* Have you automated any of your tests? How so?
* What’s your favorite testing tool? Why? If some technical constraint meant you were unable to use it, what would you do instead?
* How do you know when you (or your automation) has found a bug? What makes it a bug? Are some bugs more important than others? How do you report them?
* What do you do if the developers decide the bug is not a bug?
* Testing can be challenging. What keeps you motivated?
* How do you stay at the top of your game? What self-learning do you do?
* What have you been criticized for in the past? How did you respond to that criticism? What did you do about it?
* Describe the characteristics of your ideal boss, and why.

## Tricky Selenium Interview Questions

* Write code for Action class
* Write code for positive and negative scenarios for Alerts
* Write code for handling multiple windows
* Find odd number
* Disadvantages of Selenium
* Difference between get() and navigate().to()
* Write code to click on the Check box which is inside the Dynamic Table
* Write code for taking Screenshot
* Explains Maps in Java
* Explain framework (Questions based on your framework explanation)
* What is Pom.xml
* Which is the correct Xpath for this code (Lot of questions on Xpath)
* Xpath methods Ex: Starts-with & Contains
* The syntax for the CSS selector
* How to identify dynamic images
* From a given string, separate characters, integers, and special characters and store in a separate variable and print them
* Remove duplicates from ArrayList
* Print all the frame names
* How to read from XML or CSV file and store in hashmap
* Get the value of a cell in the Dynamic table
* What is the Burndown chart (Agile)
* Print these characters from a given string and change them to uppercase
* Explain Access specifiers
* Difference between Priority and Severity
* Example for High Priority and Low Severity and vice versa
* Difference between Test Strategy and Test Scenario
* What Software Metrics you have used in your project
* How to handle Dynamic Elements, since the webpage is designed in Angular Js
* Implicit and Explicit Waits
* Write code for Cross Browser Testing
* Explain Method Overloading and Method Overriding with Example
* What is Static Keyword
* Dependencies in Pom.xml
* Write code for fetching data from Excel
* Select this value in the dropdown and hover to this element and click
* Assert and Verify
* Check if a given string is Palindrome or not
* Remove duplicate characters from a string and print
* Which Code Repository you are using (Ex: GitHub)
* How will you estimate the time to automate a scenario?
* How to perform Right Click
* In a Dynamic Table, if I give 1 cell value, it should give me the values of other cells in that row
* Have you Developed any Tool, If yes explain
* Write code for handling Frames
* Read from a text file and store it in HashMap
* Print the occurrence of each character if it is present more than once in a given string
* Write code for nested drop-down, You have to check all the values in the dropdown, All permutation, and combination
* Advantages of Selenium
* How to check if a checkbox is displayed
* If the element is not present, how will you print the Element that is not present in the message?
* What all exceptions you have faced
* What all difficulties you have faced in Selenium
* What all TestNG Annotations you have used in the project
* Where will you maintain the code?
* What all Collections, you have used in your project
* How to run multiple test cases
* What are Primitive and Non-primitive Data Types?
* What are JDK, JRE, and JVM
* Settings.xml in Maven
* Eliminate first and last string from array and print
* What is Encapsulation
* What is the use of build() and perform() in Actions
* How you will check the actual vs expected result
* Xpath Axes, Ex: Following
* Automate Menu and Sub Menu and click on a link in Sub Menu and navigate to the page and click on an element
* Syntax for Alerts
* How will you generate Reports?
* What is the execution time of your test cases?
* Print a Reverse Pyramid
* Go to frame and click on the upload button and select the file which is in this directory
* Difference between PUTS and POST in API
* Read data from Excel and given that data as input for login and password and click on submit and validate the popup which says Login is successful
* Read data from two text files and compare if they are the same or not
* Read data from an Excel file and compare the data to the web table and check whether it is the same or not
* Select multiple options from the dropdown
* Explain Defect Lifecycle
* How many people are working on your project, what all teams are there
* What is your role in your project?
* How often Daily Triage Call will happen and what will be discussed
* What all packages you have used in your project
* How will you check Broken Links?
* Read from a text file and change that content
* Write test scenario for Credit Cards
* How to read Properties file
* Which is the latest Java version and which one you have used and what are the features of that version
* Check if the given two strings are an anagram
* What is the difference between Interface and Abstract Methods?
* Difference between BeforeSuite and BeforeMethod
* Difference between Default and Protected
* Write a program to divide without using division or modulus symbol
* String = ‘AaBbCcDD’ ,In that change a lowercase ‘a’ to uppercase
* Hierarchy of TestNg Annotations
* How many Sprints you have worked on, how often you will get Sprints
* How Agile Methodology works
* Do Exceptions have priority?
* Can a try block have more than 1 catch block?
* Can a class be Public, Private, Protected, and Default
* How will you compare the data from the database to the data on the webpage?
* Blackbox vs Whitebox Testing
* Explain Waterfall Methodology
* What is Traceability Matrix
* Explain STLC
* Explain SDLC
* What is a class
* What is an object
* What is a variable
* How to clone one list and store it in a new list
* How to run a group of test cases in TestNg
* How to include or exclude test case in TestNg
* How to run the parallel test case in TestNg
* What is Selenium Grid
* Can a Map have a Null value?
* What all different test annotations you have used in TestNg
* How to switch frame in Selenium
* Difference between this and super
* Difference between Constructor and Method
* Difference between String Buffer and String Builder
* Difference between List and Set
* How to run a test suite in different browsers
* What is static and final
* Difference between String and String Builder
* How to run failed test cases in TestNg
* Difference between Iterator and ListIterator
* How to set the proxy in Jenkins
* Explain Maven Life Cycle
* Explain POM
* What will be there in POM.xml
* Without using Select statement, how to select dropdown
* Difference between Sanity and Smoke Testing
* Can the Main Method be overridden?
* What is Retrospective Meeting?
* What all methods String has?

##### Get: [Selenium Interview Questions](https://www.softwaretestingo.com/software-testing-interview-questions/)

### Tricky Selenium Automation Interview Questions

* What are XPath and its types?
* What are cross-browser testing and parallel testing?
* Challenges faced during selenium testing?
* What is the Actions class?
* How to handle drop-down in selenium?
* How to handle multiple browser pop up?
* How to handle multiple browser tabs in selenium?
* How to perform upload files using selenium?
* How to perform download files using selenium?
* How to get all values of dropdown in selenium?
* How to perform (control + a) through selenium?
* How to shift between tabs of the same browser using selenium?
* What is a Robot class?
* What is AutoIT?
* What is the difference between get() and navigate()?
* What are the difference between findElement() and findElements()?
* What is difference between quit() and close()?
* What are different locators used?
* Difference between XPath and CSS selector?
* Different approaches to click the submit button?
* What is javascriptExecutor and when it is used?
* Handling WebTable(static and dynamic) in selenium
* What is POM? Advantage and its disadvantage?
* What is a maven? list its phases or life cycle? Command to run our project through the maven?
* Explain ur project folder structure? Or Explain ur framework?
* What is TestNG?
* How to create and delete cookies?
* What does getwindowhandles() and getwindowhandle() return? Or its differences?
* Is it possible to use only perform() without build()? 30.What is perform() and build()?
* How to scroll the browser window?
* Preceding sibling and following sibling of custom XPath?
* What is the test management tool used in ur project?
* What is the build automation tool used in ur project?
* How u will handle the SSL certification?
* What are DesiredCapabilities?
* How to verify ‘Bangalore’ present in the dropdown box or not?
* How to verify ‘Bangalore’ present in 4×4 webtable? And print the column and row number of it is present?
* How to fetch the data from a particular row and column of excel?
* List all maven plugins like surefire plugin etc
* What is Jenkins? And explain its use?
* Explain the tags present in the testng.xml file
* What is TDD?
* What is BDD? Explain the cucumber framework? What are gherkins?
* What is Listener?
* What is DataProvider?
* What is parameterization?
* What is PageFactory?
* What is Apache POI API? Or how to read data from excel?
* What are explicit and implicit waits?
* What are the challenges faced in automation testing?
* Write code for handling multiple browsers and switch to new windows?
* What is webdriver? And why webdriver is used?
* List some selenium exceptions
* What is StaleElementReferenceException?When this occurs? And how to overcome such exceptions?
* How do you group the test cases? And why?
* How to include or exclude test cases?
* What is NullPointerException?When it occurs?
* What is a selenium grid?
* Should have knowledge of all TestNG annotations.
* How do you control the execution of your test cases/test classes?
* Git and its commands
* Maven commands to execute, debug, compile
* What is the current version of maven used?
* How to identify broken links? How have done you in your project? Write code or tell approach.
* Write a code to fetch the value ‘Test’ from the excel sheet which might be present in any cell in excel. Or check whether the value ‘Test’ is present in excel or not.
* How to pass values to textbox other than using sendKeys()?
* How to click the login button other than using click(), submit(), and JavascriptExecutor?
* What is subversion?

### Selenium Tricky Interview Questions

Selenium Tricky Interview Questions: Here are the best Selenium Tricky Interview Questions of Manual Testing.

* What are test design techniques? Explain BVA and ECP with some examples?
* Explain STLC
* Explain Bug Life Cycle
* What is the difference between bug and defect?
* What are severity and priority?
* Explain SDLC
* What are the differences between smoke and sanity testing?

### Tricky Selenium Interview Questions For 5 Year Experienced Testers

Question asked in an interview in different organizations for 5 years of exp in last one month.

* Explain your current automation framework.
* Current roles and responsibilities.
* TestNg sequence.
* Why no main method is required in TestNG execution.
* How to connect to database.
* Simple SQL queries on a group by and conditions.
* SQL query to find the second highest salary without using a subquery.
* SQL query to sort the column in ascending.
* SQL query to find duplicate using self join.
* What is the difference between HTTP and HTTPS?
* Java program on finding duplicate characters.
* Java program on bubble sort.
* Excel utility to read excel using hashmap of hashmap.
* What is dependency injection in cucumber and testng Both and how we can achieve it?
* Program to remove white space and replace it with a comma.
* Java program for taking input in ArrayList and returning in an array.
* What is thrust testing?
* Write a creative test case for lift.
* Write cucumber feature file using datatable.
* What are the latest enhancements in selenium 4
* How to pass parameters in Jenkins.
* What is java generics and where you have used it in our current automation framework?
* Wap to take pass a get request using rest assured and from response verify if data present in the database using SQL.
* Difference between hashmap and linked hashmap
* Different error codes.
* What is the global variable in postman?
* Environment variable in postman.
* Difference between put and patch.
* What is the 409 response code?
* How to pass JSON file to a payload
* Pass payload using a hashmap.
* How to pass cookies in rest assured.
* What is OUTH and why company use nowadays?
* What is agile. Explain its different components. What is the burndown chart?
* Is velocity in agile.
* How to resolve conflict in Git.
* What is a pull request?
* How to reverse ur code in git
* Jenkins Cron’s job to set at every hour how.
* Apart from Jenkins what ci/cd tool you can use.
* What is an effective pom in maven?
* How many different build phases are available in maven.
* How to pass TestNG in maven file.
* How to create a profile in maven and execute the same.
* How the optimize ur current framework.
* What has expected conditions in explicit wait is it a class or interface.
* How to take ss of failed TC.
* How to rerun failed TC 3 times.
* What is the difference between drop and truncate in SQL?
* What is alert in selenium.
* Have you used JavaScript executor in ur framework is yes where?
* Which framework is easy to handle data-driven, keyword-driven, or hybrid.
* Different design patterns we can use with selenium.
* Can we integrate Sprint boot with selenium?
* What is Jira? how ur project maintains test case and defect
* What are the deliverables you deliver after the project is done?
* How do you see automation growth in the next five years?

## Tricky Selenium Interview Questions

**What are the Selenium Tools, and Testing framework that you are using in your Current Project?**  
**Ans:** We are using,

* Selenium WebDriver for Creating Test Cases.
* Java Programming for Enhancing Test cases.
* TestNG Testing Framework for Grouping Test cases, executing Test batches, and generating Test reports. Also used,
* Firebug and Firepath for inspecting elements.
* IE Browser driver, Chrome browser driver for Cross Browser testing.

**What is your Project Operating environment?**  
**Ans:** Microsoft Windows 8.1

**What is your project domain and Application Environment?**  
**Ans:** Our project is Banking Application, Our AUT (Application Under Test) was developed using Java Technology and the Database is Oracle.

**What are the major challenges in Functional Test Automation?**  
**Ans:**

* Object Identification.
* Debugging Issues. etc…

**What are the difficulties that you faced in Object identification?**  
**Ans:** Some Elements (Objects) are not recognized properly using Selenium WebDriver Element locators.

**How do**you conduct Data-driven Testing in your project?  
Ans: We conducted Data-driven Testing using an external Excel file as Resource, we added some third-party excel jar files to Java Project in Eclipse.

How do you conduct**Batch Testing in your project?**  
**Ans:** We conducted Batch Testing using TestNG Testing Framework.

**How do you conduct Cross-browser testing in your project?**  
**Ans:** Using Mozilla Firefox, IE, and Google Chrome browsers(Downloaded IE and Google Chrome Browser drivers). we executed Test cases.

**How do you handle duplicate Elements in your project?**  
**Ans:** Using the index property of Elements we handled duplicate objects.

**How many Test cases did you write for your Project/Module?**  
**Ans:** I prepared around 120 Test cases in my Module.

**How many defects do**you detect and give one example?  
Ans: I detected nearly 20 Defects of which 5 defects are Severe defects.

**How do**you select Test cases for Regression Testing?  
Ans: We selected Test cases for Regression Testing based on Defect affected Test cases and defect-dependent Test cases.

**How do you organize your Test Automation resources?**

**Did you use any build management tool in your project?**  
**Ans:** We used the Maven build management tool in our project.

**How you handled errors in your Test scripts?**  
**Ans:** We handled errors in our Test Scripts using Java Error handling features.

**Did you create any reusable components?**  
**Ans:** Yes, We created some reusable components in our project for Login Functionality, Registration Functionality, etc.  
**Did you find any Test Scenarios that not to be automated in your project using Selenium?**  
**Ans:** Yes, We find some Some Test Scenarios in our Current project, Functionalities that require more user interaction, Functionalities that require Dynamic test data submission.

**How to execute multiple Java programs at a time?**  
**Ans:** We execute multiple Java programs using an XML file in the TestNG framework.

**How to conduct parallel Test execution?**  
**Ans:** Usually We conduct Parallel Test Execution using Selenium Grid, but no parallel test execution in my Current project.

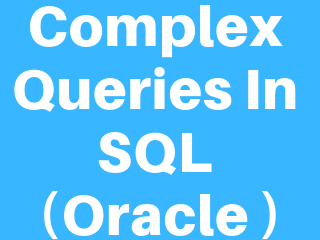
**What Defect management / Test management tool you used in your project?**  
**Ans:** We are using the Jira Test Management tool in our project with Selenium.

**How you communicated with the development team to resolve the issues.**  
**Ans:** We communicate Development team via Our Test Manager.

**Did you involve in the Selenium Test environment Setup?**  
**Ans:** Yes, I involved in Selenium Environment Setup in my Current Project. As per my project, we selected Java, Selenium WebDriver and TestNG Framework, and Maven.

* We Downloaded Eclipse IDE and Extracted it.
* Downloaded Java Software and Installed.
* Environment Variable path setup.
* Downloaded Selenium WebDriver Java language bindings(jar files) and added them to Java Project in Eclipse.
* Downloaded and Installed TestNG Framework from Eclipse IDE.
* Installed Maven build [management tool](https://www.atlassian.com/software/jira).

[**Complex Queries in SQL ( Oracle )**](https://www.pavantestingtools.com/2012/03/complex-queries-in-sql-oracle.html)

[](https://2.bp.blogspot.com/-Xh9tESBHFBs/XFVHoDl8V8I/AAAAAAAAP6I/FoAK38yVk7QZDvuw-jcZI9H4oLW_1IX0QCLcBGAs/s1600/Programs%2Bfor%2BSelenium%25286%2529.png)

These questions are the most frequently asked in interviews.  
  
  
**1.To fetch ALTERNATE records from a table. (EVEN NUMBERED)**  
  
select \* from emp where rowid in (select decode(mod(rownum,2),0,rowid, null) from emp);  
  
**2.To select ALTERNATE records from a table. (ODD NUMBERED)**  
  
select \* from emp where rowid in (select decode(mod(rownum,2),0,null ,rowid) from emp);  
  
**3.Find the 3rd MAX salary in the emp table.**  
  
select distinct sal from emp e1 where 3 = (select count(distinct sal) from emp e2 where e1.sal <= e2.sal);  
  
**4.Find the 3rd MIN salary in the emp table.**  
  
select distinct sal from emp e1 where 3 = (select count(distinct sal) from emp e2where e1.sal >= e2.sal);  
  
**5.Select FIRST n records from a table.**  
  
select \* from emp where rownum <= &n;  
  
**6.Select LAST n records from a table**  
  
  
select \* from emp minus select \* from emp where rownum <= (select count(\*) - &n from emp);  
  
**7.List dept no., Dept name for all the departments in which there are no employees in the department.**  
  
select \* from dept where deptno not in (select deptno from emp);  
  
alternate solution: select \* from dept a where not exists (select \* from emp b where a.deptno = b.deptno);  
  
altertnate solution: select empno,ename,b.deptno,dname from emp a, dept b where a.deptno(+) = b.deptno and empno is null;  
  
**8.How to get 3 Max salaries ?**  
  
select distinct sal from emp a where 3 >= (select count(distinct sal) from emp b where a.sal <= b.sal) order by a.sal desc;  
  
**9.How to get 3 Min salaries ?**  
  
select distinct sal from emp a where 3 >= (select count(distinct sal) from emp b where a.sal >= b.sal);  
  
**10.How to get nth max salaries ?**  
  
select distinct hiredate from emp a where &n = (select count(distinct sal) from emp b where a.sal >= b.sal);  
  
**11.Select DISTINCT RECORDS from emp table.**  
  
select \* from emp a where rowid = (select max(rowid) from emp b where a.empno=b.empno);  
  
**12.How to delete duplicate rows in a table?**  
  
delete from emp a where rowid != (select max(rowid) from emp b where a.empno=b.empno);  
  
**13.Count of number of employees in department wise.**  
  
select count(EMPNO), b.deptno, dname from emp a, dept b where a.deptno(+)=b.deptno group by b.deptno,dname;  
  
**14. Suppose there is annual salary information provided by emp table. How to fetch monthly salary of each and every employee?**  
  
select ename,sal/12 as monthlysal from emp;  
  
**15.Select all record from emp table where deptno =10 or 40.**  
  
select \* from emp where deptno=30 or deptno=10;  
  
**16.Select all record from emp table where deptno=30 and sal>1500.**  
  
select \* from emp where deptno=30 and sal>1500;  
  
**17.Select all record from emp where job not in SALESMAN or CLERK.**  
  
select \* from emp where job not in ('SALESMAN','CLERK');  
  
**18.Select all record from emp where ename in 'BLAKE','SCOTT','KING'and'FORD'.**  
  
select \* from emp where ename in('JONES','BLAKE','SCOTT','KING','FORD');  
  
**19.Select all records where ename starts with ‘S’ and its lenth is 6 char.**  
  
select \* from emp where ename like'S\_\_\_\_';  
  
**20.Select all records where ename may be any no of character but it should end with ‘R’.**  
  
select \* from emp where ename like'%R';  
  
**21.Count MGR and their salary in emp table.**  
  
select count(MGR),count(sal) from emp;  
  
**22.In emp table add comm+sal as total sal .**  
select ename,(sal+nvl(comm,0)) as totalsal from emp;  
  
**23.Select any salary <3000 from emp table.**  
  
select \* from emp where sal> any(select sal from emp where sal<3000);  
  
**24.Select all salary <3000 from emp table.**  
  
select \* from emp where sal> all(select sal from emp where sal<3000);  
  
**25.Select all the employee group by deptno and sal in descending order.**  
  
select ename,deptno,sal from emp order by deptno,sal desc;  
  
**26.How can I create an empty table emp1 with same structure as emp?**  
  
Create table emp1 as select \* from emp where 1=2;  
  
**27.How to retrive record where sal between 1000 to 2000?**  
  
Select \* from emp where sal>=1000 And sal<2000  
  
**28.Select all records where dept no of both emp and dept table matches.**  
  
select \* from emp where exists(select \* from dept where emp.deptno=dept.deptno)  
  
**29.If there are two tables emp1 and emp2, and both have common record. How can I fetch all the recods but common records only once?**  
  
(Select \* from emp) Union (Select \* from emp1)  
  
**30.How to fetch only common records from two tables emp and emp1?**  
  
(Select \* from emp) Intersect (Select \* from emp1)  
**31. How can I retrive all records of emp1 those should not present in emp2?**  
  
(Select \* from emp) Minus (Select \* from emp1)  
  
**32.Count the totalsa deptno wise where more than 2 employees exist.**  
  
SELECT deptno, sum(sal) As totalsal  
  
FROM emp  
  
GROUP BY deptno  
  
HAVING COUNT(empno) > 2

A **subquery**is a type of SQL query, where a query is embedded within another query. Sub-queries are very powerful. To help you understand a subquery consider the following SELECT statement to retrieve the details of employees who belong to department 30.

SELECT \* FROM EMPLOYEES

WHERE DEPARTMENT\_ID=30;

In the above query, the department ID value has been provided, and is used on the right hand side of the WHERE condition. However, such constant values might not also be provided or known. For example, consider the query re-phrased as - retrieve the details of employees who belong to the same department as 'Alexander Khoo'. Here the department number has not been provided. Instead the name of an employee is given. Using this name, you would need to first find out - to which department does Alexander Khoo belong. Let say this is some value 'X'. You would have to proceed further to find out all the other employees who belong to the department X.

If you notice this is a 2-step process involving:

1) Which department does Alexander Khoo belong to.

2) Who are the others who belong to the department number returned by the first step.

Subquery Syntax:

SELECT select\_list

FROM table\_name

WHERE column\_name operator (SELECT select\_list

FROM table\_name

…)

In the syntax, observe a second SELECT statement written in the WHERE clause, on the right hand side of the WHERE condition. This SELECT statement is enclosed in parantheses. This subquery is called the inner query and is executed once to return a value that is used by the main (outer) query. Subqueries can be different in different places in a SELECT statement, such as the WHERE clause, HAVING clause, FROM clause, SELECT column list etc.

The query to retrieve the details of employees who belong to the same department as Alexander Khoo is :

SELECT \*

FROM EMPLOYEES

WHERE DEPARTMENT\_ID = (SELECT DEPARTMENT\_ID

FROM EMPLOYEES

WHERE FIRST\_NAME='Alexander' AND LAST\_NAME='Khoo')

**Some guidelines related to subqueries are:**

• Enclose subqueries in parentheses.

• Place subqueries on the right side of the comparison condition.

• Use single-row operators with single-row subqueries.

• Use multiple-row operators with multiple-row subqueries.

**A single-row** subquery is one where the subquery returns only one value. In such a subquery you must use a single-row operator such as:

|  |  |
| --- | --- |
| Operator | Description |
| = | Equal To |
| <> | Not Equal To |
| > | Greater Than |
| >= | Greater Than Equal To |
| < | Less Than |
| <= | Less Than Equal To |

The single-row operators are used to write single-row subqueries. The table below demonstrates the use of the single-row operators in writing single-row subqueries.

|  |  |  |
| --- | --- | --- |
| Operator | Query | Example |
| = | Retreive the details of employees who get the same salary as the employee whose ID is 101. | SELECT \* FROM EMPLOYEES  WHERE SALARY=(SELECT SALARY FROM EMPLOYEES  WHERE EMPLOYEE\_ID=101); |
| <> | Retreive the details of departments that are not located in the same location ID as department 10. | SELECT \*  FROM DEPARTMENTS  WHERE LOCATION\_ID <>(SELECT           LOCATION\_ID         FROM DEPARTMENTS         WHERE DEPARTMENT\_ID=10); |
| > | Retrieve the details of employees whose salary is greater than the minimum salary. | SELECT \*  FROM EMPLOYEES  WHERE SALARY > (SELECT          MIN(SALARY)         FROM EMPLOYEES); |
| >= | Retrieve the details of employees who were hired on or after the same date that employee 201 was hired. | SELECT \* FROM EMPLOYEES  WHERE HIRE\_DATE >=(SELECT         HIRE\_DATE         FROM EMPLOYEES        WHERE EMPLOYEE\_ID=201); |
| < | Retrieve the details of employees whose salary is less than the maximum salary of employees in department 20. | SELECT \* FROM EMPLOYEES  WHERE SALARY < (SELECT      MAX(SALARY)      FROM EMPLOYEES      WHERE DEPARTMENT\_ID=20); |
| <= | Retrieve the details of employees who were hired on or before the same date that employee 201 was hired. | SELECT \* FROM EMPLOYEES  WHERE HIRE\_DATE <=(SELECT        HIRE\_DATE        FROM EMPLOYEES        WHERE EMPLOYEE\_ID=201); |

**A multiple row** subquery is one where the subquery may return more than one value. In such type of subquery, it is necessary to use a multiple-row operator. If not you might get the ORA-01427 error: single-row subquery returns more than requested number of rows.

The table below describes the multiple-row operators that can be used when writing multiple-row subqueries:

|  |  |
| --- | --- |
| Operator | Meaning |
| IN | Equal to any value returned by the subquery |
| ANY | Compare value to each value returned by the subquery |
| ALL | Compare value to every value returned by the subquery |

The multiple-row operators are used to write multiple-row subqueries. The table below demonstrates the use of the multiple-row operators in writing multiple-row subqueries.

|  |  |  |
| --- | --- | --- |
| Operator | Query | Example |
| IN | Retreive the department ID, department name and location ID of departments that are located in the same location ID as a location in the UK. | ﻿﻿SELECT DEPARTMENT\_ID, DEPARTMENT\_NAME, LOCATION\_ID  FROM DEPARTMENTS  WHERE LOCATION\_ID IN (SELECT LOCATION\_ID FROM LOCATIONS WHERE COUNTRY\_ID='UK') |
| >ALL  (Greater than the maximum returned by the subquery) | Retrieve the first name of employees whose salary is greater than the all the salaries of employees belonging to department 20. | SELECT FIRST\_NAME  FROM EMPLOYEES  WHERE SALARY > ALL  (SELECT SALARY  FROM EMPLOYEES  WHERE DEPARTMENT\_ID=20) |
| <ALL  (Less than the least value returned by the subquery) | Retrieve the first name of employees whose salary is less than all the salaries of employees belonging to department 20. | SELECT FIRST\_NAME  FROM EMPLOYEES  WHERE SALARY < ALL  (SELECT SALARY  FROM EMPLOYEES  WHERE DEPARTMENT\_ID=20) |
| >ANY  (Greater than the minimum value returned by the subquery) | Retrieve the first name of employees whose salary is greater than the minimum salary of employees in department 60. | SELECT FIRST\_NAME  FROM EMPLOYEES  WHERE SALARY > ANY (SELECT SALARY FROM EMPLOYEES WHERE DEPARTMENT\_ID=60) |
| <ANY  (Less than the maximum value returned by the subquery) | Retrieve the first name of employees whose salary is less than the maximum salary of employees in department 60. | SELECT FIRST\_NAME  FROM EMPLOYEES  WHERE SALARY < ANY  (SELECT SALARY  FROM EMPLOYEES WHERE DEPARTMENT\_ID=10) |

A sub query is a type of SQL query, where a query is embedded within another query. Sub-queries are very powerful. To help you understand subqueries consider the following SELECT statement to retrieve the details of employees who belong to department 30.  
  
  
**SELECT \* FROM EMPLOYEES**  
  
  
**WHERE DEPARTMENT\_ID=30;**  
  
  
In the above query, the department ID value has been provided, and is used on the right hand side of the WHERE condition. However, such constant values might not also be provided or known. For example, consider the query re-phrased as - retrieve the details of employees who belong to the same department as 'Alexander Khoo'. Here the department number has not been provided. Instead the name of an employee is given. Using this name, you would need to first find out - to which department does Alexander Khoo belong. Let say this is some value 'X'. You would have to proceed further to find out all the other employees who belong to the department X.  
  
  
If you notice this is a 2-step process involving:  
  
  
1) Which department does Alexander Khoo belong to.  
  
  
2) Who are the others who belong to the department number returned by the first step.  
  
  
Subquery Syntax:  
  
  
**SELECT select\_list**  
  
  
**FROM table\_name**  
  
  
**WHERE column\_name operator (SELECT select\_list**  
  
  
**FROM table\_name**  
  
  
**…)**  
  
  
  
In the syntax, observe a second SELECT statement written in the WHERE clause, on the right hand side of the WHERE condition. This SELECT statement is enclosed in parantheses. This subquery is called the inner query and is executed once to return a value that is used by the main (outer) query. Subqueries can be different in different places in a SELECT statement, such as the WHERE clause, HAVING clause, FROM clause, SELECT column list etc.  
  
  
The query to retrieve the details of employees who belong to the same department as Alexander Khoo is :  
  
  
**SELECT \***  
  
  
**FROM EMPLOYEES**  
  
  
**WHERE DEPARTMENT\_ID = (SELECT DEPARTMENT\_ID**  
  
  
**FROM EMPLOYEES**  
  
  
**WHERE FIRST\_NAME='Alexander' AND LAST\_NAME='Khoo')**  
  
  
Some guidelines related to subqueries are:  
  
  
• Enclose subqueries in parentheses.  
  
  
• Place subqueries on the right side of the comparison condition.  
  
  
• Use single-row operators with single-row subqueries.  
  
  
• Use multiple-row operators with multiple-row subqueries.  
  
  
  
  
**A single-row subquery** is one where the subquery returns only one value. In such a subquery you must use a single-row operator such as:  
  
  
The single-row operators are used to write single-row subqueries. The table below demonstrates the use of the single-row operators in writing single-row subqueries.  
  
  
  
  
=    **Retreive the details of employees who get the same salary as the employee whose ID is 101.**  
  
SELECT \* FROM EMPLOYEES  
  
  
WHERE SALARY=(SELECT SALARY FROM EMPLOYEES  
  
  
WHERE EMPLOYEE\_ID=101);  
  
  
<> **Retreive the details of departments that are not located in the same location ID as department 10.**  
  
  
SELECT \*  
  
  
FROM DEPARTMENTS  
  
  
WHERE LOCATION\_ID <>(SELECT  
  
  
LOCATION\_ID  
  
  
FROM DEPARTMENTS  
  
  
WHERE DEPARTMENT\_ID=10);  
  
  
>   **Retrieve the details of employees whose salary is greater than the minimum salary.**  
  
  
SELECT \*  
  
  
FROM EMPLOYEES  
  
  
WHERE SALARY > (SELECT  
  
  
MIN(SALARY)  
  
  
FROM EMPLOYEES);  
  
  
>=    **Retrieve the details of employees who were hired on or after the same date that employee 201 was hired.**  
  
SELECT \* FROM EMPLOYEES  
  
  
WHERE HIRE\_DATE >=(SELECT  
  
  
HIRE\_DATE  
  
  
FROM EMPLOYEES WHERE EMPLOYEE\_ID=201);  
  
  
<   **Retrieve the details of employees whose salary is less than the maximum salary of employees in department 20.**  
  
  
SELECT \* FROM EMPLOYEES  
  
  
WHERE SALARY < (SELECT  
  
  
MAX(SALARY)  
  
  
FROM EMPLOYEES  
  
  
WHERE DEPARTMENT\_ID=20);  
  
  
<=    **Retrieve the details of employees who were hired on or before the same date that employee 201 was hired.**  
  
  
SELECT \* FROM EMPLOYEES  
  
  
WHERE HIRE\_DATE <=(SELECT  
  
  
HIRE\_DATE  
  
  
FROM EMPLOYEES  
  
  
WHERE EMPLOYEE\_ID=201);  
  
  
**A multiple row subquery** is one where the subquery may return more than one value. In such type of subquery, it is necessary to use a multiple-row operator. If not you might get the ORA-01427 error: single-row subquery returns more than requested number of rows.  
  
  
The table below describes the multiple-row operators that can be used when writing multiple-row subqueries:  
  
  
  
  
**IN** Equal to any value returned by the subquery  
  
  
**ANY**  Compare value to each value returned by the subquery  
  
  
**ALL** Compare value to every value returned by the subquery  
  
  
The multiple-row operators are used to write multiple-row subqueries. The table below demonstrates the use of the multiple-row operators in writing multiple-row subqueries.  
  
  
  
  
IN  -    **Retreive the department ID, department name and location ID of departments that are located in the same location ID as a location in the UK.**  
  
  
SELECT DEPARTMENT\_ID, DEPARTMENT\_NAME, LOCATION\_ID  
  
  
FROM DEPARTMENTS  
  
  
WHERE LOCATION\_ID IN (SELECT LOCATION\_ID FROM LOCATIONS WHERE COUNTRY\_ID='UK')  
  
  
>  **ALL** (Greater than the maximum returned by the subquery)  
  
**Retrieve the first name of employees whose salary is greater than the all the salaries of employees belonging to department 20.**  
  
  
SELECT FIRST\_NAME  
  
  
FROM EMPLOYEES  
  
  
WHERE SALARY > ALL  
  
  
(SELECT SALARY  
  
  
FROM EMPLOYEES  
  
  
WHERE DEPARTMENT\_ID=20)  
  
  
  
  
  
(Less than the least value returned by the subquery)  
  
**Retrieve the first name of employees whose salary is less than all the salaries of employees belonging to department 20.**  
  
  
SELECT FIRST\_NAME  
  
  
FROM EMPLOYEES  
  
  
WHERE SALARY < ALL  
  
  
(SELECT SALARY  
  
  
FROM EMPLOYEES  
  
  
WHERE DEPARTMENT\_ID=20)  
  
  
**>ANY -**(Greater than the minimum value returned by the subquery)  
  
**Retrieve the first name of employees whose salary is greater than the minimum salary of employees in department 60.**  
  
  
SELECT FIRST\_NAME  
  
  
FROM EMPLOYEES  
  
  
WHERE SALARY > ANY (SELECT SALARY FROM EMPLOYEES WHERE DEPARTMENT\_ID=60)  
  
  
  
**(Less than the maximum value returned by the subquery)**  
  
Retrieve the first name of employees whose salary is less than the maximum salary of employees in department 60.  
  
  
SELECT FIRST\_NAME  
  
  
FROM EMPLOYEES  
  
  
WHERE SALARY < ANY  
  
  
(SELECT SALARY  
  
  
FROM EMPLOYEES WHERE DEPARTMENT\_ID=10)

[Responsibilities of an ETL tester](https://www.pavantestingtools.com/2014/08/responsibilities-of-etl-tester.html)

**[](https://4.bp.blogspot.com/-xG0KHwnrP3Q/XE64MOsfbhI/AAAAAAAAPzE/nuvzvwojlx4WJIAlmTWuIE6qzOkJK7tfwCLcBGAs/s1600/Programs%2Bfor%2BSelenium%25289%2529.png)**

**Responsibilities of an ETL tester**

Key responsibilities of an ETL tester are segregated into three categories

Stage table/ SFS or MFS

Business transformation logic applied

Target table loading from stage file or table after applying atransformation.

Some of the responsibilities of an ETL tester are

Test ETL software

Test components of  ETL datawarehouse

Execute backend data-driven test

Create, design and execute test cases, test plans and test harness

Identify the problem and provide solutions for potential issues

Approve requirements and design specifications

Data transfers and Test flat file

Writing SQL queries3 for various scenarios like count test

**ETL Performance Testing and Tuning**

ETL performance testingis a confirmation test to ensure that an ETL system can handle the load of multiple users and transactions.  The goal of performance tuning is to optimize session performance by eliminating performance bottlenecks. To tune or improve the performance of the session, you have to identify performance bottlenecks and eliminate it. Performance bottlenecks can be found in source and target databases, the mapping, the session and the system. One of the best tools used for performance testing is Informatica.

**Automation of ETL Testing**

The general methodology of ETL testing is to use SQL scripting or do “eyeballing” of data.. These approaches to ETL testing are time-consuming, error-prone and seldom provide complete test coverage. To accelerate, improve coverage, reduce costs, improve defect detection ration of ETL testing in production and development environments, automation is the need of the hour. One such tool is Informatica.

**Best Practices for ETL Testing**

Make sure data is transformed correctly

 Without any data loss and truncation projected data should be loaded into the data warehouse

 Ensure that ETL application appropriately rejects and replaces with default values and reports invalid data

 Need to ensure that the data loaded in data warehouse within prescribed and expected time frames to confirm scalability and performance

 All methods should have appropriate unit tests regardless of visibility

To measure their effectiveness all unit tests should use appropriate coverage techniques

Strive for one assertion per test case

 Create unit tests that target exceptions

|  |  |
| --- | --- |
| **ETL Testing** | **Data Base Testing** |
| Verifies whether data is moved as expected | The primary goal is to check if the data is following the rules/ standards defined in the Data Model |
| Verifies whether counts in the source and target are matching  Verifies whether the data transformed is as per expectation | Verify that there are no orphan records and foreign-primary key relations are maintained |
| Verifies that the foreign primary key relations are preserved during the ETL | Verifies that there are no redundant tables and database is optimally normalized |
| Verifies for duplication in loaded data | Verify if data is missing in columns where required |

[**ETL testing Fundamentals**](https://www.pavantestingtools.com/2015/05/etl-testing-fundamentals.html)

Comprehensive testing of a data warehouse at every point throughout the ETL (extract, transform, and load) process is becoming increasingly important as more data is being collected and used for strategic decision-making. Data warehouse or ETL testing is often initiated as a result of mergers and acquisitions, compliance and regulations, data consolidation, and the increased reliance on data-driven decision making (use of Business Intelligence tools, etc.). ETL testing is commonly implemented either manually or with the help of a tool (functional testing tool, ETL tool, proprietary utilities). Let us understand some of the basic ETL concepts.  
  
BI / Data Warehousing testing projects can be conjectured to be divided into ETL (Extract – Transform – Load) testing and henceforth the report testing.  
  
**Extract Transform Load** is the process to enable businesses to consolidate their data while moving it from place to place (i.e.) moving data from source systems into the data warehouse. The data can arrive from any source:  
  
  
**Extract -** It can be defined as extracting the data from numerous heterogeneous systems.  
  
**Transform -** Applying the business logics as specified b y the business on the data derived from sources.  
  
**Load -** Pumping the data into the final warehouse after completing the above two process. The ETL part of the testing mainly deals with how, when, from, where and what data we carry in our data warehouse from which the final reports are supposed to be generated. Thus, ETL testing spreads across all and each stage of data flow in the warehouse starting from the source databases to the final target warehouse.  
  
**Star Schema**  
The star schema is perhaps the simplest data warehouse schema. It is called a star schema because the entity-relationship diagram of this schema resembles a star, with points radiating from a central table. The center of the star consists of a large fact table and the points of the star are the dimension tables.  
A star schema is characterized by one OR more of very large fact tables that contain the primary information in the data warehouse, and a number of much smaller dimension tables (OR lookup tables), each of which contains information about the entries for a particular attribute in the fact table.  
  
A star query is a join between a fact table and a number of dimension tables. Each dimension table is joined to the fact table using a primary key to foreign key join, but the dimension tables are not joined to each other. The cost-based optimizer recognizes star queries and generates efficient execution plans for them. A typical fact table contains keys and measures. For example, in the sample schema, the fact table sales, contain the measures, quantity sold, amount, average, the keys time key, item-key, branch key, and location key. The dimension tables are time, branch, item and location.  
  
**Snow-Flake Schema**The snowflake schema is a more complex data warehouse model than a star schema, and is a type of star schema. It is called a snowflake schema because the diagram of the schema resembles a snowflake. Snowflake schemas normalize dimensions to eliminate redundancy. That is, the dimension data has been grouped into multiple tables instead of one large table.  
For example, a location dimension table in a star schema might be normalized into a location table and city table in a snowflake schema. While this saves space, it increases the number of dimension tables and requires more foreign key joins. The result is more complex queries and reduced query performance. Figure above presents a graphical representation of a snowflake schema.  
  
**When to use star schema and snowflake schema?**When we refer to Star and Snowflake Schemas, we are talking about a dimensional model for a Data Warehouse or a Datamart. The Star schema model gets it name from the design appearance because there is one central fact table surrounded by many dimension tables. The relationship between the fact and dimension tables is created by PK -> FK relationship and the keys are generally surrogate to the natural or business key of the dimension tables. All data for any given dimension is stored in the one dimension table. Thus, the design of the model could potentially look like a STAR. On the other hand, the Snowflake schema model breaks the dimension data into multiple tables for the purpose of making the data more easily understood or for reducing the width of the dimension table. An example of this type of schema might be a dimension with Product data of multiple levels. Each level in the Product Hierarchy might have multiple attributes that are meaningful only to that level. Thus, one would break the single dimension table into multiple tables in a hierarchical fashion with the highest level tied to the fact table. Each table in the dimension hierarchy would be tied to the level above by natural or business key where the highest level would be tied to the fact table by a surrogate key. As you can imagine the appearance of this schema design could resemble the appearance of a snowflake.  
  
**Types of Dimensions Tables**  
 **Type 1:** This is straightforward r e f r e s h . The fields are constantly overwritten and history is not kept for the column. For example should a description change for a Product number,the old value will be over written by the new value.  
**Type 2:** This is known as a slowly changing dimension, as history can be kept. The column(s) where the history is captured has to be defined. In our example of the Product description changing for a product number, if the slowly changing attribute captured is the product description, a new row of data will be created showing the new product description. The old description will still be contained in the old.  
**Type 3:** This is also a slowly changing dimension. However, instead of a new row, in the example, the old product description will be moved to an “old value” column in the dimension, while the new description will overwrite the existing column. In addition, a date stamp column exists to say when the value was updated. Although there will be no full history here, the previous value prior to the update is captured. No new rows will be created for history as the attribute is measured for the slowly changing value.  
  
**Types of fact tables:**  
 **Transactional:** Most facts will fall into this category. The transactional fact will capture transactional data such as sales lines or stock movement lines. The measures for these facts can be summed together.  
**Snapshot:** A snapshot fact will capture the current data for point for a day. For example, all the current stock positions, where items are, in which branch, at the end of a working day can be captured.  
Snapshot fact measures can be summed for this day, but cannot be summed across more than 2 snapshot days as this data will be incorrect.  
**Accumulative:**An accumulative snapshot will sum data up for an attribute, and is not based on time. For example, to get the accumulative sales quantity for a sale of a particular product, the row of data will be calculated for this row each night – giving an “accumulative” value.  
 **Key hit-points in ETL testing are:**There are several levels of testing that can be performed during data warehouse testing and they should be defined as part of the testing strategy in different phases (Component Assembly, Product) of testing. Some examples include:  
 **1. Constraint Testing:** During constraint testing, the objective is to validate unique constraints, primary keys, foreign keys, indexes, and relationships. The test script should include these validation points. Some ETL processes can be developed to validate constraints during the loading of the warehouse. If the decision is made to add constraint validation to the ETL process, the ETL code must validate all business rules and relational data requirements. In Automation, it should be ensured that the setup is done correctly and maintained throughout the ever-changing requirements process for effective testing. An alternative to automation is to use manual queries. Queries are written to cover all test scenarios and executed manually.  
 **2. Source to Target Counts:** The objective of the count test scripts is to determine if the record counts in the source match the record counts in the target. Some ETL processes are capable of capturing record count information such as records read, records written, records in error, etc. If the ETL process used can capture that level of detail and create a list of the counts, allow it to do so. This will save time during the validation process. It is always a good practice to use queries to double check the source to target counts.  
 **3. Source to Target Data Validation:**No ETL process is smart enough to perform source to target field-to-field validation. This piece of the testing cycle is the most labor intensive and requires the most thorough analysis of the data. There are a variety of tests that can be performed during source to target validation. Below is a list of tests that are best practices:  
 **4. Transformation and Business Rules:** Tests to verify all possible outcomes of the transformation rules, default values, straight moves and as specified in the Business Specification document. As a special mention, Boundary conditions must be tested on the business rules.  
 **5. Batch Sequence & Dependency Testing:** ETL’s in DW are essentially a sequence of processes that execute in a particular sequence. Dependencies do exist among various processes and the same is critical to maintain the integrity of the data. Executing the sequences in a wrong order might result in inaccurate data in the warehouse. The testing process must include at least 2 iterations of the end–end execution of the whole batch sequence. Data must be checked for its integrity during this testing. The most common type of errors caused because of incorrect sequence is the referential integrity failures, incorrect end-dating (if applicable) etc, reject  
records etc.  
 **6. Job restart Testing:**In a real production environment, the ETL jobs/processes fail because of number of reasons (say for ex: database related failures, connectivity failures etc). The jobs can fail half/partly executed. A good design always allows for a restart ability of the jobs from the failure point. Although this is more of a design suggestion/approach, it is suggested that every ETL job is built and tested for restart capability.  
 **7. Error Handling:** Understanding a script might fail during data validation, may confirm the ETL process is working through process validation. During process validation the testing team will work to identify additional data cleansing needs, as well as identify consistent error patterns that could possibly be diverted by modifying the ETL code. It is the responsibility of the validation team to identify any and all records that seem suspect. Once a record has been both data and process validated and the script has passed, the ETL process is functioning correctly. Conversely, if suspect records have been identified and documented during data validation those are not supported through process validation, the ETL process is not functioning correctly.  
 **8. Views:** Views created on the tables should be tested to ensure the attributes mentioned in the views are correct and the data loaded in the target table matches what is being reflected in the views.  
 **9. Sampling:** Sampling will involve creating predictions out of a representative portion of the data that is to be loaded into the target table; these predictions will be matched with the actual results obtained from the data loaded for business Analyst Testing. Comparison will be verified to ensure that the predictions match the data loaded into the target table.  
 **10. Process Testing:** The testing of intermediate files and processes to ensure the final outcome is valid and that performance meets the system/business need.  
 **11. Duplicate Testing:** Duplicate Testing must be performed at each stage of the ETL process and in the final target table. This testing involves checks for duplicates rows and also checks for multiple rows with same primary key, both of which cannot be allowed.  
 **12. Performance:** It is the most important aspect after data validation. Performance testing should check if the ETL process is completing within the load window.  
 **13. Volume:** Verify that the system can process the maximum expected quantity of data for a given cycle in the time expected.  
 **14.Connectivity Tests:** As the name suggests, this involves testing the upstream, downstream interfaces and intra DW connectivity. It is suggested that the testing represents the exact transactions between these interfaces. For ex: If the design approach is to extract the files from source system, we should actually test extracting a file out of the system and not just the  
connectivity.  
 **15. Negative Testing:** Negative Testing checks whether the application fails and where it should fail with invalid inputs and out of boundary scenarios and to check the behavior of the application.  
 **16. Operational Readiness Testing (ORT):** This is the final phase of testing which focuses on verifying the deployment of software and the operational readiness of the application. The main areas of testing in this phase include:  
  
Deployment Test  
  
  
1. Tests the deployment of the solution  
2. Tests overall technical deployment “checklist” and timeframes  
3. Tests the security aspects of the system including user authentication and  
authorization, and user-access levels.

|  |  |
| --- | --- |
| **Type of Bugs** | **Description** |
| User interface bugs/cosmetic bugs | ·          Related to GUI of application  ·          Font style, font size, colors, alignment, spelling mistakes, navigation and so on |
| Boundary Value Analysis (BVA) related bug | ·         Minimum and maximum values |
| Equivalence Class Partitioning (ECP) related bug | ·          Valid and invalid type |
| Input/Output bugs | ·         Valid values not accepted  ·          Invalid values accepted |
| Calculation bugs | ·         Mathematical errors  ·         Final output is wrong |
| Load Condition bugs | ·         Does not allows multiple users  ·         Does not allows customer expected load |
| Race Condition bugs | ·         System crash & hang  ·         System cannot run client platforms |
| Version control bugs | ·         No logo matching  ·          No version information available  ·         This occurs usually in regression testing |
| H/W bugs | ·         Device is not responding to the application |
| Help Source bugs | ·         Mistakes in help documents |

[**ETL Test Scenarios and Test Cases**](https://www.pavantestingtools.com/2014/08/etl-test-scenarios-and-test-cases.html)

|  |  |
| --- | --- |
| **Test Scenario** | **Test Cases**  **<https://2.bp.blogspot.com/-hdd0LzVtqlg/XE7MsiQkZTI/AAAAAAAAPzk/GRZ0c8DKZiMKOniESFPGbVZFIgm5-oregCEwYBhgL/s1600/Programs%2Bfor%2BSelenium%252812%2529.png>** |
| Mapping doc validation | Verify mapping doc whether corresponding ETL information is provided or not.  Change log should maintain in every mapping doc. |
| Validation | 1.      Validate the source and target table structure against corresponding mapping doc.  2.      Source data type and target data type should be same  3.      Length of data types in both source and target should be equal  4.      Verify that data field types and formats are specified  5.      Source data type length should not less than the target data type length  6.      Validate the name of columns in the table against mapping doc. |
| Constraint Validation | Ensure the constraints are defined for specific table as expected |
| Data consistency issues | 1.      The data type and length for a particular attribute may vary in files or tables though the semantic definition is the same.  2.      Misuse of integrity constraints |
| Completeness Issues | 1.      Ensure that all expected data is loaded into target table.  2.      Compare record counts between source and target.  3.      Check for any rejected records  4.      Check data should not be truncated in the column of target tables  5.      Check boundary value analysis  6.      Compares unique values of key fields between data loaded to WH and source data |
| Correctness Issues | 1.      Data that is misspelled or inaccurately recorded  2.      Null, non-unique or out of range data |
| Transformation | Transformation |
| Data Quality | 1.      Number check: Need to number check and validate it  2.      Date Check: They have to follow date format and it should be same across all records  3.      Precision Check  4.      Data check  5.      Null check |
| Null Validate | Verify the null values, where “Not Null” specified for a specific column. |
| Duplicate Check | 1.      Needs to validate the unique key, primary key and any other column should be unique as per the business requirements are having any duplicate rows  2.      Check if any duplicate values exist in any column which is extracting from multiple columns in source and combining into one column  3.      As per the client requirements, needs to be ensure that no duplicates in combination of multiple columns within target only |
| Date Validation | Date values are using many areas in ETL development for  1.      To know the row creation date  2.      Identify active records as per the ETL development perspective  3.      Identify active records as per the business requirements perspective  4.      Sometimes based on the date values the updates and inserts are generated. |
| Complete Data Validation | 1.      To validate the complete data set in source and target table minus a query in a best solution  2.      We need to source minus target and target minus source  3.      If minus query returns any value those should be considered as mismatching rows  4.      Needs to matching rows among source and target using intersect statement  5.      The count returned by intersect should match with individual counts of source and target tables  6.      If minus query returns of rows and count intersect is less than source count or target table then we can consider as duplicate rows are existed. |
| Data Cleanness | Unnecessary columns should be deleted before loading into the staging area. |

**How to create ETL Test Case**

ETL testing is a concept which can be applied to different tools and databases in information management industry.  **The objective of ETL testing is to assure that the data that has been loaded from a source to destination after business transformation is accurate.**  It also involves the verification of data at various middle stages that are being used between source and destination.

While performing ETL testing, two documents that will always be used by an ETL tester are

**ETL mapping sheets :**An ETL mapping sheets contain all the information of source and destination tables including each and every column and their look-up in reference tables. An ETL testers need to be comfortable with SQL queries as ETL testing may involve writing big queries with multiple joins to validate data at any stage of ETL. ETL mapping sheets provide a significant help while writing queries for data verification.

**DB Schema of Source, Target:**It should be kept handy to verify any detail in mapping sheets.

[**Types of ETL Testing**](https://www.pavantestingtools.com/2014/08/types-of-etl-testing.html)

|  |  |
| --- | --- |
| <https://2.bp.blogspot.com/-XZfY9i6iuV8/XFAV34QsyxI/AAAAAAAAP0E/MJtI9KQWkREGAP5sLxEl6a8BkQYni7GawCLcBGAs/s1600/Programs%2Bfor%2BSelenium%252814%2529.png>  **Types Of Testing** | **Testing Process** |
| Production Validation Testing | “Table balancing” or “production reconciliation” this type of ETL  testing is done on data as it is being moved into production systems.  To support your business decision, the data in your production systems has to be in the correct order.  Informatica Data Validation Option provides the ETL testing automation and management capabilities to ensure that production systems are not compromised by the data. |
| Source to Target Testing (Validation Testing) | Such type of testing is carried out to validate whether the data values transformed are the expected data values. |
| Application Upgrades | Such type of ETL testing can be automatically generated, saving substantial test development time. This type of testing checks whether the data extracted from an older application or repository are exactly same as the data in a repository or new application. |
| Metadata Testing | Metadata testing includes testing of data type check, data length check and index/constraint check. |
| Data Completeness Testing | To verify that all the expected data is loaded in target from the source, data completeness testing is done. Some of the tests that can be run are compare and validate counts, aggregates and actual data between the source and target for columns with simple transformation or no transformation. |
| Data Accuracy Testing | This testing is done to ensure that the data is accurately loaded and transformed as expected. |
| Data Transformation Testing | Testing data transformation is done as in many cases it cannot be achieved by writing one source SQL  query and comparing the output with the target.  Multiple SQL queries may need to be run for each row to verify the transformation rules. |
| Data Quality Testing | Data Quality Tests includes syntax and reference tests.  In order to avoid any error due to date or order number during business process Data Quality testing is done.  Syntax Tests: It will report dirty data,  based on invalid characters, character pattern, incorrect upper or lower case order etc.  Reference Tests: It will check the data according to the data model.  For example: Customer ID  Data quality testing includes number check, date check, precision check, data check , null check etc. |
| Incremental ETL testing | This testing is done to check the data integrity of old and new data with the addition of new data.  Incremental testing verifies that the inserts and updates are getting processed as expected during incremental ETL process. |
| GUI/Navigation Testing | This testing is done to check the navigation or GUI aspects of the front end reports. |

**ETL Testing Process**

Similar to other Testing Process, ETL also go through different phases. The different phases of ETL testing process is as follows



ETL testing is performed in five stages

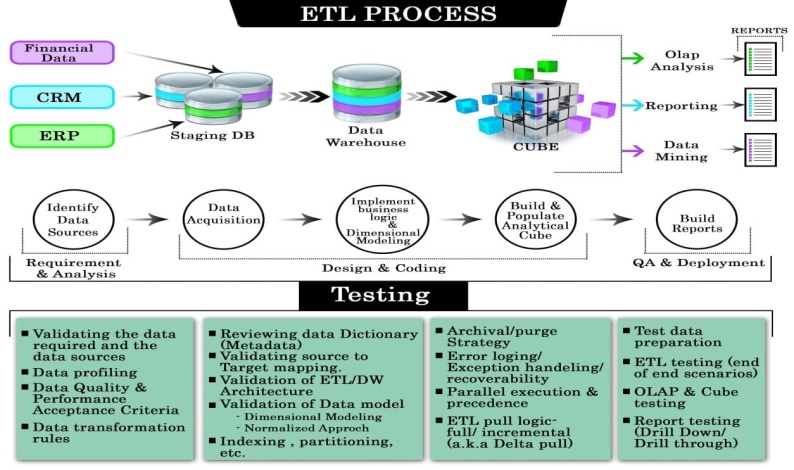
 Identifying data sources and requirements

Data acquisition

Implement business logics and dimensional Modelling

Build and populate data

Build Reports



[**Data Warehousing Concepts**](https://www.pavantestingtools.com/2014/02/data-warehousing-concepts.html)

[](https://2.bp.blogspot.com/-rNtLD8rugek/XFKpZyMEL9I/AAAAAAAAP5s/5SAz9eWYaNIIE42frUT6S6HKgjZNJlQ7wCLcBGAs/s1600/Programs%2Bfor%2BSelenium%25285%2529.png)

**Data Warehouse**  
-----------------------  
1) A data warehouse is a relational database that is designed for query and analysis rather than for transaction processing.  
2) A single, complete and consistent store of data obtained from a variety of different sources made available to end users in a format that they can understand and use in a business context.  
3) A technique for assembling and managing data from various sources for the purpose of answering business questions, thus making decisions that were previously not possible.  
4) It contains historical data derived from transaction data.  
5) It can include data from other sources.  
6) It is a consistent store of data obtained from a variety of different sources.  
7) It made available to end users in a way they can understand and use in a business context.  
  
**Why Data Warehouse and It’s testing?**  
  
Business Mandate: There are some major mergers and acquisition taking place and huge amount of data migration takes place  
Testing is to ensure that data transformation and data movement is correct.  
  
**Basic Elements of the Data Warehouse**  
-----------------------------------  
**Characteristics of Data ware House**  
Subject Oriented: Data warehouses are designed to help you analyze data.  
Integrated: Data warehouses must put data from disparate sources into a consistent format.  
They must resolve such problems as naming conflicts and inconsistencies among units of measure.  
Nonvolatile:  It means the data once entered into the data warehouse then it should not be changed.  
Time Variant: It means a data warehouse's focus on change over time.  
  
**Goals of a Data Warehouse**  
It must make an organization’s information more accessible  
It must make the organization’s information consistent  
It must be adaptive and resilient to change  
It must serve as a foundation for improved decision making  
  
**Data warehouse Advantages**  
To provide a consistent common source of information for various cross organizational and functional activity  
To Store Large Volumes of Historical Detail Data  
Improve the Ability to Access, Report Against, and Analyze Information  
To solve or improve upon Business Processes  
  
**Why do organizations need a data warehouse?**  
--------------------------------------------  
  
**Ad-hoc Reporting and Analysis**  
  
**Dynamic presentation through dashboards**  
  
**Predictive Analysis**  
 In business, predictive models utilize the patterns found in historical and transactional data to identify risks and opportunities.  
 Guiding in decision making for business expansion, business strategy etc.  
  
Predictive analytics is majorly used in  
  
 1)Financial services  
 2)Insurance  
 3)Retail  
4) Travel  
5)Healthcare  
6)Pharmaceuticals etc.  
  
  
**Different Schemas**  
--------------------  
Data Warehouse environment usually transforms the relational data model into some special architectures called **schema.**  
  
There are many schema models designed for data warehousing but the most commonly used are:  
  
1) Star schema  
2) Snowflake schema  
  
**There are 2 types of tables in data warehousing**  
  
**1) Fact Table**  
a Fact Table consists of the measurements, metrics or facts of a business process  
  
**2) Dimension Table**  
Dimension tables contain attributes that describe fact records in the fact table.  
  
  
**Warehouse Database - Types**  
----------------------------  
  
**Relational (ROLAP)**  
  
Central Warehouse is usually relational because of potentially large size of Data warehouse  
 **Multidimensional (MOLAP)**  
  
Faster response to analytical queries and OLAP computations but they have size limitations  
  
**Hybrid Architecture (HOLAP)**  
  
Uses relational component to support large databases and multidimensional component for fast response to analytical queries

[**ETL Testing / Data Warehouse Testing Overview**](https://www.pavantestingtools.com/2014/02/etl-testing-data-warehouse-testing.html)

ETL or Data warehouse testing is categorized into four different engagements irrespective of technology or ETL tools used:

• New Data Warehouse Testing – New DW is built and verified from scratch. Data input is taken from customer requirements and different data sources and new data warehouse is build and verified with the help of ETL tools.

• Migration Testing – In this type of project customer will have an existing DW and ETL performing the job but they are looking to bag new tool in order to improve efficiency.

• Change Request – In this type of project new data is added from different sources to an existing DW. Also, there might be a condition where customer needs to change their existing business rule or they might integrate the new rule.

• Report Testing – Report are the end result of any Data Warehouse and the basic propose for which DW is build. Report must be tested by validating layout, data in the report and calculation.

**ETL Testing Techniques:**

 1) Verify that data is transformed correctly according to various business requirements and rules.

 2) Make sure that all projected data is loaded into the data warehouse without any data loss and truncation.

 3) Make sure that ETL application appropriately rejects, replaces with default values and reports invalid data.

 4) Make sure that data is loaded in data warehouse within prescribed and expected time frames to confirm improved performance and scalability.

Apart from these 4 main ETL testing methods other testing methods like integration testing and user acceptance testing is also carried out to make sure everything is smooth and reliable.

**ETL Testing Process:**

Similar to any other testing that lies under Independent Verification and Validation, ETL also go through the same phase.

• Business and requirement understanding

• Validating

• Test Estimation

• Test planning based on the inputs from test estimation and business requirement

• Designing test cases and test scenarios from all the available inputs

• Once all the test cases are ready and are approved, testing team proceed to perform pre-execution check and test data preparation for testing

• Lastly execution is performed till exit criteria are met

• Upon successful completion summary report is prepared and closure process is done.

It is necessary to define test strategy which should be mutually accepted by stakeholders before starting actual testing. A well defined test strategy will make sure that correct approach has been followed meeting the testing aspiration. ETL testing might require writing SQL statements extensively by testing team or may be tailoring the SQL provided by development team. In any case testing team must be aware of the results they are trying to get using those SQL statements.

**Difference between Database and Data Warehouse Testing**

 There is a popular misunderstanding that database testing and data warehouse is similar while the fact is that both hold different direction in testing.

• Database testing is done using smaller scale of data normally with OLTP (Online transaction processing) type of databases while data warehouse testing is done with large volume with data involving OLAP (online analytical processing) databases.

• In database testing normally data is consistently injected from uniform sources while in data warehouse testing most of the data comes from different kind of data sources which are sequentially inconsistent.

• We generally perform only CRUD (Create, read, update and delete) operation in database testing while in data warehouse testing we use read-only (Select) operation.

• Normalized databases are used in DB testing while demoralized DB is used in data warehouse testing.

There are number of universal verifications that have to be carried out for any kind of data warehouse testing.  
Below is the list of objects that are treated as essential for validation in ETL testing:

 - Verify that data transformation from source to destination works as expected

 - Verify that expected data is added in target system

 - Verify that all DB fields and field data is loaded without any truncation

 - Verify data checksum for record count match

 - Verify that for rejected data proper error logs are generated with all details

 - Verify NULL value fields

 - Verify that duplicate data is not loaded

 - Verify data integrity

**ETL Testing Challenges:**

ETL testing is quite different from conventional testing. There are many challenges we faced while performing data warehouse testing. Here is the list of few ETL testing challenges I experienced on my project:

 - Incompatible and duplicate data.

 - Loss of data during ETL process.

 - Unavailability of inclusive test bed.

 - Testers have no privileges to execute ETL jobs by their own.

 - Volume and complexity of data is very huge.

 - Fault in business process and procedures.

 - Trouble acquiring and building test data.

 - Missing business flow information.

Data is important for businesses to make the critical business decisions. ETL testing plays a significant role validating and ensuring that the business information is exact, consistent and reliable. Also, it minimizes hazard of data loss in production.

Source\_schema validation:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Test case #** | **Test Case Name** | **Test Case Type** | **Step No** | **Action/Query** | **Expected Results** | **Comments/Queries** | **Status** |
| **TC\_HRSRC\_EMP01** | **Check number of columns in EMPLOYEES Table** | Source Schema validation | 1 | select count(\*)  from user\_tab\_columns where table\_name='EMPLOYEES'; | 11 | 11 | Passed |
| **TC\_HRSRC\_EMP02** | **Check Data type of the columns in EMPLOYEES Table** | Source Schema validation | 1 | SELECT column\_name, data\_type FROM user\_tab\_columns where table\_name = 'EMPLOYEES'; | Verify result should be as per the design. | as expected | Passed |
| **TC\_HRSRC\_EMP03** | **Check size of the columns in EMPLOYEES Table** | Source Schema validation | 1 | SELECT column\_name, data\_length FROM user\_tab\_columns where table\_name = 'EMPLOYEES'; | Verify result should be as per the design. |  |  |
| **TC\_HRSRC\_EMP04** | **Check Contraints of columns in EMPLOYEES Table** | Source Schema validation | 1 | SELECT column\_name,constraint\_name from user\_cons\_columns where table\_name = 'EMPLOYEES'; | Verify result should be as per the design. | as expected | Passed |
| **TC\_HRSRC\_EMP05** | **Check Indexes of Columns in EMPLOYEES Table** | Source Schema validation | 1 | SELECT COLUMN\_NAME,INDEX\_NAME from dba\_ind\_columns where table\_name='EMPLOYEES' AND INDEX\_OWNER='HR'; | Verify result should be as per the design. | as expected | Passed |

Target shema validation:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Test case #** | **Test Case Name** | **Test Case Type** | **Step No** | **Action/Query** | **Expected Results** | **Comments/Queries** | **Result** |
| **TC\_HRTRG\_EMP01** | Check number of columns in EMP\_TOTSAL\_TRG Table | Target schema validation | 1 | select count(\*)  from user\_tab\_columns where table\_name='EMP\_TOTSAL\_TRG'; | 10 | As Expecteds | Passed |
| **TC\_HRTRG\_EMP02** | Check Data type of the columns in EMP\_TOTSAL\_TRG Table | Target schema validation | 1 | SELECT column\_name, data\_type FROM user\_tab\_columns where table\_name = 'EMP\_TOTSAL\_TRG'; | Verify result should be as per the design. |  |  |
| **TC\_HRTRG\_EMP03** | Check size of the columns in EMP\_TOTSAL\_TRG Table | Target schema validation | 1 | SELECT column\_name, data\_length FROM user\_tab\_columns where table\_name = 'EMP\_TOTSAL\_TRG'; | Verify result should be as per the design. |  |  |
| **TC\_HRTRG\_EMP04** | Check Contraints of columns in EMP\_TOTSAL\_TRG Table | Target schema validation | 1 | SELECT column\_name,constraint\_name from user\_cons\_columns where table\_name = 'EMP\_TOTSAL\_TRG'; | Verify result should be as per the design. | As Expecteds | Passed |
| **TC\_HRTRG\_EMP05** | Check Indexes of Columns in EMP\_TOTSAL\_TRG Table | Target schema validation | 1 | SELECT COLUMN\_NAME,INDEX\_NAME from dba\_ind\_columns where table\_name='EMP\_TOTSAL\_TRG' AND INDEX\_OWNER='HR'; | Verify result should be as per the design. | indexes not mapped | Failed |

Mapping Test cases:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Test case #** | **Test Case Name** | **Test Case Type** | **Step No** | **Action/Query** | **Expected Results** | **Actual Results** |
| **TC\_MAP1\_01** | Check number of records present in Source table | Data validation | 1 | Select count(\*) From EMPLOYEES | 107 | Passed |
| **TC\_MAP1\_02** | Check number of records present in Target table after data is loaded | Data validation | 2 | Select count(\*) From EMP\_TOTSAL\_TRG | 107 | Passed |
| **TC\_MAP1\_03** | Check the records pulled from source table(s) after tranformations applied | Data validation | 3 | SELECT EMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER , ROUND((SYSDATE-HIRE\_DATE)/365,0) EXPEREINCE, JOB\_ID,  NVL(SALARY,0) + NVL(COMMISSION\_PCT,0) TOTAL\_SALARY,  MANAGER\_ID,DEPARTMENT\_ID FROM EMPLOYEES | As per the design | Passed |
| **TC\_MAP1\_04** | Check the records loaded in to target table(s) | Data validation | 4 | SELECTEMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER ,EXPEREINCE,TOTAL\_SALARY,MANAGER\_ID,DEPARTMENT\_ID FROM EMP\_TOTSAL\_TRG | As per the design | Passed |
| **TC\_MAP1\_05** | Check the records present in source table which are not in target table | Data validation | 5 | SELECT EMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER , ROUND((SYSDATE-HIRE\_DATE)/365,0) EXPEREINCE, JOB\_ID,  NVL(SALARY,0) + NVL(COMMISSION\_PCT,0) TOTAL\_SALARY,  MANAGER\_ID,DEPARTMENT\_ID FROM EMPLOYEES  MINUS  SELECTEMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER ,EXPEREINCE,TOTAL\_SALARY,MANAGER\_ID,DEPARTMENT\_ID FROM EMP\_TOTSAL\_TRG | No Records Found | Failed |
| **TC\_MAP1\_06** | Check the records present in target table which are not in source table | Data validation | 6 | SELECTEMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER ,EXPEREINCE,TOTAL\_SALARY,MANAGER\_ID,DEPARTMENT\_ID FROM EMP\_TOTSAL\_TRG  MINUS  SELECT EMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER , ROUND((SYSDATE-HIRE\_DATE)/365,0) EXPEREINCE, JOB\_ID,  NVL(SALARY,0) + NVL(COMMISSION\_PCT,0) TOTAL\_SALARY,  MANAGER\_ID,DEPARTMENT\_ID FROM EMPLOYEES; | No Records Found | Failed |
| **TC\_MAP1\_07** | Check if any records missed from source to tartget tables | Data validation | 7 | SELECT EMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER , ROUND((SYSDATE-HIRE\_DATE)/365,0) EXPEREINCE, JOB\_ID,  NVL(SALARY,0) + NVL(COMMISSION\_PCT,0) TOTAL\_SALARY,  MANAGER\_ID,DEPARTMENT\_ID FROM EMPLOYEES  MINUS  SELECTEMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER ,EXPEREINCE,TOTAL\_SALARY,MANAGER\_ID,DEPARTMENT\_ID FROM EMP\_TOTSAL\_TRG  UNION  SELECTEMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER ,EXPEREINCE,TOTAL\_SALARY,MANAGER\_ID,DEPARTMENT\_ID FROM EMP\_TOTSAL\_TRG  MINUS  SELECT EMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER , ROUND((SYSDATE-HIRE\_DATE)/365,0) EXPEREINCE, JOB\_ID,  NVL(SALARY,0) + NVL(COMMISSION\_PCT,0) TOTAL\_SALARY,  MANAGER\_ID,DEPARTMENT\_ID FROM EMPLOYEES; | No Records Found | Failed |
| **TC\_MAP1\_08** | Check if any Duplicate records in target tables | Data validation | 8 | SELECT \* FROM EMP\_TOTSAL\_TRG WHERE ROWID IN ( SELECT rowid FROM EMP\_TOTSAL\_TRG GROUP BY rowid HAVING COUNT(\*)>1); | No Records Found |  |

ETL TEST RESULTS:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Test case #** | **Test Case Name** | **Test Case Type** | **Step No** | **Action/Query** | **Expected Results** | **Test Results** |
| **TC\_HRSRC\_EMP01** | Check number of columns in EMPLOYEES Table | Source Schema validation | 1 | select count(\*)  from user\_tab\_columns where table\_name='EMPLOYEES'; | 11 |  |
| **TC\_HRSRC\_EMP02** | Check Data type of the columns in EMPLOYEES Table | Source Schema validation | 1 | SELECT column\_name, data\_type FROM user\_tab\_columns where table\_name = 'EMPLOYEES'; | Verify result should be as per the design. |  |
| **TC\_HRSRC\_EMP03** | Check size of the columns in EMPLOYEES Table | Source Schema validation | 1 | SELECT column\_name, data\_length FROM user\_tab\_columns where table\_name = 'EMPLOYEES'; | Verify result should be as per the design. |  |
| **TC\_HRSRC\_EMP04** | Check Contraints of columns in EMPLOYEES Table | Source Schema validation | 1 | SELECT column\_name,constraint\_name from user\_cons\_columns where table\_name = 'EMPLOYEES'; | Verify result should be as per the design. |  |
| **TC\_HRSRC\_EMP05** | Check Indexes of Columns in EMPLOYEES Table | Source Schema validation | 1 | SELECT COLUMN\_NAME,INDEX\_NAME from dba\_ind\_columns where table\_name='EMPLOYEES' AND INDEX\_OWNER='HR'; | Verify result should be as per the design. |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **TC\_HRTRG\_EMP01** | Check number of columns in EMP\_TOTSAL\_TRG Table | Target schema validation | 1 | select count(\*)  from user\_tab\_columns where table\_name='EMP\_TOTSAL\_TRG'; | 10 |  |
| **TC\_HRTRG\_EMP02** | Check Data type of the columns in EMP\_TOTSAL\_TRG Table | Target schema validation | 1 | SELECT column\_name, data\_type FROM user\_tab\_columns where table\_name = 'EMP\_TOTSAL\_TRG'; | Verify result should be as per the design. |  |
| **TC\_HRTRG\_EMP03** | Check size of the columns in EMP\_TOTSAL\_TRG Table | Target schema validation | 1 | SELECT column\_name, data\_length FROM user\_tab\_columns where table\_name = 'EMP\_TOTSAL\_TRG'; | Verify result should be as per the design. |  |
| **TC\_HRTRG\_EMP04** | Check Contraints of columns in EMP\_TOTSAL\_TRG Table | Target schema validation | 1 | SELECT column\_name,constraint\_name from user\_cons\_columns where table\_name = 'EMP\_TOTSAL\_TRG'; | Verify result should be as per the design. |  |
| **TC\_HRTRG\_EMP05** | Check Indexes of Columns in EMP\_TOTSAL\_TRG Table | Target schema validation | 1 | SELECT COLUMN\_NAME,INDEX\_NAME from dba\_ind\_columns where table\_name='EMP\_TOTSAL\_TRG' AND INDEX\_OWNER='HR'; | Verify result should be as per the design. |  |
|  |  |  |  |  |  |  |
| **TC\_MAP1\_01** | Check number of records present in Source table | Data validation | 1 | Select count(\*) From EMPLOYEES | 11 |  |
| **TC\_MAP1\_02** | Check number of records present in Target table after data is loaded | Data validation | 2 | Select count(\*) From EMP\_TOTSAL\_TRG | 11 |  |
| **TC\_MAP1\_03** | Check the records pulled from source table(s) after tranformations applied | Data validation | 3 | SELECT EMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER , ROUND((SYSDATE-HIRE\_DATE)/365,0) EXPEREINCE, JOB\_ID,  NVL(SALARY,0) + NVL(COMMISSION\_PCT,0) TOTAL\_SALARY,  MANAGER\_ID,DEPARTMENT\_ID FROM EMPLOYEES | As per the design |  |
| **TC\_MAP1\_04** | Check the records loaded in to target table(s) | Data validation | 4 | SELECTEMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER ,EXPEREINCE,TOTAL\_SALARY,MANAGER\_ID,DEPARTMENT\_ID FROM EMP\_TOTSAL\_TRG | As per the design |  |
| **TC\_MAP1\_05** | Check the records present in source table which are not in target table | Data validation | 5 | SELECT EMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER , ROUND((SYSDATE-HIRE\_DATE)/365,0) EXPEREINCE, JOB\_ID,  NVL(SALARY,0) + NVL(COMMISSION\_PCT,0) TOTAL\_SALARY,  MANAGER\_ID,DEPARTMENT\_ID FROM EMPLOYEES  MINUS  SELECTEMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER ,EXPEREINCE,TOTAL\_SALARY,MANAGER\_ID,DEPARTMENT\_ID FROM EMP\_TOTSAL\_TRG | No Records Found |  |
| **TC\_MAP1\_06** | Check the records present in target table which are not in source table | Data validation | 6 | SELECTEMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER ,EXPEREINCE,TOTAL\_SALARY,MANAGER\_ID,DEPARTMENT\_ID FROM EMP\_TOTSAL\_TRG  MINUS  SELECT EMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER , ROUND((SYSDATE-HIRE\_DATE)/365,0) EXPEREINCE, JOB\_ID,  NVL(SALARY,0) + NVL(COMMISSION\_PCT,0) TOTAL\_SALARY,  MANAGER\_ID,DEPARTMENT\_ID FROM EMPLOYEES; | No Records Found |  |
| **TC\_MAP1\_07** | Check if any records missed from source to tartget tables | Data validation | 7 | SELECT EMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER , ROUND((SYSDATE-HIRE\_DATE)/365,0) EXPEREINCE, JOB\_ID,  NVL(SALARY,0) + NVL(COMMISSION\_PCT,0) TOTAL\_SALARY,  MANAGER\_ID,DEPARTMENT\_ID FROM EMPLOYEES  MINUS  SELECTEMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER ,EXPEREINCE,TOTAL\_SALARY,MANAGER\_ID,DEPARTMENT\_ID FROM EMP\_TOTSAL\_TRG  UNION  SELECTEMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER ,EXPEREINCE,TOTAL\_SALARY,MANAGER\_ID,DEPARTMENT\_ID FROM EMP\_TOTSAL\_TRG  MINUS  SELECT EMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER , ROUND((SYSDATE-HIRE\_DATE)/365,0) EXPEREINCE, JOB\_ID,  NVL(SALARY,0) + NVL(COMMISSION\_PCT,0) TOTAL\_SALARY,  MANAGER\_ID,DEPARTMENT\_ID FROM EMPLOYEES; | No Records Found |  |
| **TC\_MAP1\_08** | Check if any Duplicate records in target tables | Data validation | 8 | SELECT \* FROM EMP\_TOTSAL\_TRG WHERE ROWID IN ( SELECT rowid FROM EMP\_TOTSAL\_TRG GROUP BY rowid HAVING COUNT(\*)>1); | No Records Found |  |

BUG REPORTS:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SNO** | **ID** | **TITLE** | **PRIORITY** | **SEVIROTY** | **DESCRIPTION** | **STEPS** | **CATEGORY** | **REPORTED BY** | **ASSIGNED TO** | **STATUS** | **RESOLUTION TYPE** | **BUILDNO** | **REGRESSION(Y/N)** |
| 1 | HR\_ETL\_1 | Indexes are not mapped to target table **EMP\_TOTSAL\_TRG** | 2 | 2 | Indexes are not mapped to target table EMP\_TOTSAL\_TRG | SELECT COLUMN\_NAME,INDEX\_NAME from dba\_ind\_columns where table\_name='EMP\_TOTSAL\_TRG' AND INDEX\_OWNER='HR'; | sanity | xxx | xxx | new | xxxxx | 1 | N |
| 2 | HR\_ETL\_2 | Data is incorrect in target tables for Mapping-1 | 1 | 1 | Data is incorrect in target tables for Mapping-1 | SELECT EMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER , ROUND((SYSDATE-HIRE\_DATE)/365,0) EXPEREINCE, JOB\_ID,  NVL(SALARY,0) + NVL(COMMISSION\_PCT,0) TOTAL\_SALARY,  MANAGER\_ID,DEPARTMENT\_ID FROM EMPLOYEES  MINUS  SELECTEMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER ,EXPEREINCE,TOTAL\_SALARY,MANAGER\_ID,DEPARTMENT\_ID FROM EMP\_TOTSAL\_TRG  UNION  SELECTEMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER ,EXPEREINCE,TOTAL\_SALARY,MANAGER\_ID,DEPARTMENT\_ID FROM EMP\_TOTSAL\_TRG  MINUS  SELECT EMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER , ROUND((SYSDATE-HIRE\_DATE)/365,0) EXPEREINCE, JOB\_ID,  NVL(SALARY,0) + NVL(COMMISSION\_PCT,0) TOTAL\_SALARY,  MANAGER\_ID,DEPARTMENT\_ID FROM EMPLOYEES; | Functional |  |  |  |  | 1 | N |
| 3 | HR\_ETL\_3 |  |  |  |  |  |  |  |  |  |  |  |  |
| 4 | HR\_ETL\_4 |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 | HR\_ETL\_5 |  |  |  |  |  |  |  |  |  |  |  |  |

Source Table:

|  |  |  |  |
| --- | --- | --- | --- |
| **TABLE-1** | **COLUMN NAMES** | **DATA TYPES** | **KEYS** |
| **EMPLOYEES** | EMPLOYEE\_ID | NUMBER(6) | **P** |
| FIRST\_NAME | VARCHAR2(20) |  |
| LAST\_NAME | VARCHAR2(20) |  |
| EMAIL | VARCHAR2(25) | **U** |
| PHONE\_NUMBER | VARCHAR2(20) |  |
| HIRE\_DATE | DATE |  |
| JOB\_ID | VARCHAR2(10) | **F** |
| SALARY | NUMBER(8,2) |  |
| COMMISSION\_PCT | NUMBER(2,2) |  |
| MANAGER\_ID | NUMBER(6) | **F** |
| DEPARTMENT\_ID | NUMBER(4) | **F** |
| **TABLE-2** | **COLUMN NAMES** | **DATA TYPES** | **KEYS** |
| **DEPARTMENTS** | DEPARTMENT\_ID | NUMBER(4) | **P** |
| DEPARTMENT\_NAME | VARCHAR2(30) |  |
| MANAGER\_ID | NUMBER(6) | **F** |
| LOCATION\_ID | NUMBER(4) | **F** |
| **TABLE-3** | **COLUMN NAMES** | **DATA TYPES** | **KEYS** |
| **JOBS** | JOB\_ID | VARCHAR2(10) | **P** |
| JOB\_TITLE | VARCHAR2(35) |  |
| MIN\_SALARY | NUMBER(6) |  |
| MAX\_SALARY | NUMBER(6) |  |
| **TABLE-4** | **COLUMN NAMES** | **DATA TYPES** | **KEYS** |
| **JOB\_HISTORY** | EMPLOYEE\_ID | NUMBER(6) | **PF** |
| START\_DATE | DATE | **P** |
| END\_DATE | DATE |  |
| JOB\_ID | VARCHAR2(10) | **F** |
| DEPARTMENT\_ID | NUMBER(4) | **F** |
| **TABLE-5** | **COLUMN NAMES** | **DATA TYPES** | **KEYS** |
| **REGIONS** | REGION\_ID | NUMBER | P |
| REGION\_NAME | VARCHAR2(25) |  |
| **TABLE-6** | **COLUMN NAMES** | **DATA TYPES** | **KEYS** |
| **COUNTRIES** | COUNTRY\_ID | CHAR(2) | P |
| COUNTRY\_NAME | VARCHAR2(40) |  |
| REGION\_ID | NUMBER |  |
|  |  |  |  |
|  |  |  |  |
| **TABLE-7** | **COLUMN NAMES** | **DATA TYPES** | **KEYS** |
| **LOCATIONS** | LOCATION\_ID | NUMBER(4) | P |
| STREET\_ADDRESS | VARCHAR2(40) |  |
| POSTAL\_CODE | VARCHAR2(12) |  |
| CITY | VARCHAR2(30) |  |
| STATE\_PROVINCE | VARCHAR2(25) |  |
| COUNTRY\_ID | CHAR(2) | F |

Target Table:

|  |  |  |
| --- | --- | --- |
| **TABLE-1** | **COLUMN NAMES** | **DATA TYPES** |
| **EMP\_TOTSAL\_TRG** | EMPLOYEE\_ID | NUMBER(6) |
| FIRST\_NAME | VARCHAR2(20) |
| LAST\_NAME | VARCHAR2(20) |
| EMAIL | VARCHAR2(25) |
| PHONE\_NUMBER | VARCHAR2(20) |
| EXPERIENCE | NUMBER(2) |
| JOB\_ID | VARCHAR2(10) |
| TOTAL\_SALARY | NUMBER(8,2) |
| MANAGER\_ID | NUMBER(6) |
| DEPARTMENT\_ID | NUMBER(4) |
|  |  |  |
|  |  |  |
| **TABLE-2** | **COLUMN NAMES** | **DATA TYPES** |
| **EMP\_DEPT\_TRG** | EMPLOYEE\_ID | NUMBER(6) |
| FIRST\_NAME | VARCHAR2(20) |
| LAST\_NAME | VARCHAR2(20) |
| EMAIL | VARCHAR2(25) |
| PHONE\_NUMBER | VARCHAR2(20) |
| HIRE\_DATE | DATE |
| JOB\_ID | VARCHAR2(10) |
| SALARY | NUMBER(8,2) |
| COMMISSION\_PCT | NUMBER(2,2) |
| MANAGER\_ID | NUMBER(6) |
| DEPARTMENT\_ID | NUMBER(4) |
|  |  |  |
|  |  |  |
| **TABLE-3** | **COLUMN NAMES** | **DATA TYPES** |
| **EMP\_SUMSAL\_DEPTWISE\_TRG** | DEPARTMENT\_ID | NUMBER(4) |
| SUM\_SALARY | NUMBER(5) |
|  |  |  |
| **TABLE-4** | **COLUMN NAMES** | **DATA TYPES** |
| **EMP\_DEPTNAME\_TRG** | EMPLOYEE\_ID | NUMBER(6) |
| FIRST\_NAME | VARCHAR2(20) |
| LAST\_NAME | VARCHAR2(20) |
| EMAIL | VARCHAR2(25) |
| PHONE\_NUMBER | VARCHAR2(20) |
| HIRE\_DATE | DATE |
| JOB\_ID | VARCHAR2(10) |
| SALARY | NUMBER(8,2) |
| COMMISSION\_PCT | NUMBER(2,2) |
| MANAGER\_ID | NUMBER(6) |
| DEPARTMENT\_ID | NUMBER(4) |
| DEPARTMENT\_NAME | VARCHAR2(30) |
|  |  |  |
|  |  |  |
| **TABLE-5** | **COLUMN NAMES** | **DATA TYPES** |
| **EMP\_COUNT\_SAL\_DEPWISE\_TRG** | DEPARTMENT\_ID | NUMBER(4) |
| NUM\_OF\_EMPLOYEES | NUMBER(5) |
| MAXSAL | NUMBER(5,5) |
| MINSAL | NUMBER(5,5) |
| AVGSAL | NUMBER(5,5) |
|  |  |  |
| **TABLE-6** | **COLUMN NAMES** | **DATA TYPES** |
| **EMP\_MANAGER\_TRG** | EMPLOYEE\_ID | NUMBER(4) |
| FIRST\_NAME | VARCHAR2(10) |
| MANAGER\_NAME | VARCHAR2(10) |
|  |  |  |
|  |  |  |
| **TABLE-7** | **COLUMN NAMES** | **DATA TYPES** |
| **EMP\_SAL\_RANKS\_TRG** | EMPLOYEE\_ID | NUMBER(4) |
| FIRST\_NAME | VARCHAR2(10) |
| SALARY | NUMBER(8,2) |
| RANK | NUMBER(2) |
| DENSE\_RANK | NUMBER(2) |
| ROWNUMBER | NUMBER(2) |
|  |  |  |

Mapping Sheets:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **MAPPING-1** |  |  |  |  |
|  |  |  |  |  |
| **SOURCE** | | **TRANSFORMATIONS** | **TARGET** | |
| **HR.EMPLOYEES** | |  | **HR.EMP\_TOTSAL\_TRG** | |
| **Column Names** | **Data Types** | **Expression Tranformation** | **Column Names** | **Data Types** |
| EMPLOYEE\_ID | NUMBER(6) | Direct Move | EMPLOYEE\_ID | NUMBER(6) |
| FIRST\_NAME | VARCHAR2(20) | Direct Move | FIRST\_NAME | VARCHAR2(20) |
| LAST\_NAME | VARCHAR2(20) | Direct Move | LAST\_NAME | VARCHAR2(20) |
| EMAIL | VARCHAR2(25) | Direct Move | EMAIL | VARCHAR2(25) |
| PHONE\_NUMBER | VARCHAR2(20) | Direct Move | PHONE\_NUMBER | VARCHAR2(20) |
| HIRE\_DATE | DATE | ***round((sysdate-Hiredate)/365,0)*** | EXPERIENCE | NUMBER(2) |
| JOB\_ID | VARCHAR2(10) | Direct Move | JOB\_ID | VARCHAR2(10) |
| SALARY | NUMBER(8,2) | ***Sal+Comm; Check NULL values in each column And if NULL value is encountered overwrite it to Zero.*** | TOTAL\_SALARY | NUMBER(8,2) |
| COMMISSION\_PCT | NUMBER(2,2) |
| MANAGER\_ID | NUMBER(6) | Direct Move | MANAGER\_ID | NUMBER(6) |
| DEPARTMENT\_ID | NUMBER(4) | Direct Move | DEPARTMENT\_ID | NUMBER(4) |
|  |  |  |  |  |
|  |  |  |  |  |
| **MAPPING-2** |  |  |  |  |
|  |  |  |  |  |
| **SOURCE** | | **TRANSFORMATIONS** | **TARGET** | |
| **HR.EMPLOYEES** | |  | **HR.SUM\_SAL\_DEPWISE\_TRG** | |
| **Column Names** | **Data Types** | **Aggregator Transformation** | **Column Names** | **Data Types** |
| EMPLOYEE\_ID | NUMBER(6) | Don’t move |  |  |
| FIRST\_NAME | VARCHAR2(20) | Don’t move |  |  |
| LAST\_NAME | VARCHAR2(20) | Don’t move |  |  |
| EMAIL | VARCHAR2(25) | Don’t move |  |  |
| PHONE\_NUMBER | VARCHAR2(20) | Don’t move |  |  |
| HIRE\_DATE | DATE | Don’t move |  |  |
| JOB\_ID | VARCHAR2(10) | Don’t move |  |  |
| SALARY | NUMBER(8,2) | ***sum(sal) department wise*** | SUM\_SALARY | NUMBER(5) |
| COMMISSION\_PCT | NUMBER(2,2) | Don’t move |  |  |
| MANAGER\_ID | NUMBER(6) | Don’t move |  |  |
| DEPARTMENT\_ID | NUMBER(4) | Direct move | DEPARTMENT\_ID | NUMBER(4) |
|  |  |  |  |  |
|  |  |  |  |  |
| **MAPPING-3** |  |  |  |  |
|  |  |  |  |  |
| **SOURCE** | | **TRANSFORMATIONS** | **TARGET** | |
| **HR.EMPLOYEES** | |  | **HR.EMP\_DEPT\_TRG** | |
| **Column Names** | **Data Types** | **Filter Transformation** | **Column Names** | **Data Types** |
| EMPLOYEE\_ID | NUMBER(6) | Direct move | EMPLOYEE\_ID | NUMBER(6) |
| FIRST\_NAME | VARCHAR2(20) | Direct move | FIRST\_NAME | VARCHAR2(20) |
| LAST\_NAME | VARCHAR2(20) | Direct move | LAST\_NAME | VARCHAR2(20) |
| EMAIL | VARCHAR2(25) | Direct move | EMAIL | VARCHAR2(25) |
| PHONE\_NUMBER | VARCHAR2(20) | Direct move | PHONE\_NUMBER | VARCHAR2(20) |
| HIRE\_DATE | DATE | Direct move | HIRE\_DATE | DATE |
| JOB\_ID | VARCHAR2(10) | Direct move | JOB\_ID | VARCHAR2(10) |
| SALARY | NUMBER(8,2) | Direct move | SALARY | NUMBER(8,2) |
| COMMISSION\_PCT | NUMBER(2,2) | Direct move | COMMISSION\_PCT | NUMBER(2,2) |
| MANAGER\_ID | NUMBER(6) | Direct move | MANAGER\_ID | NUMBER(6) |
| DEPARTMENT\_ID | NUMBER(4) | ***Only records which have department\_id =10 will be loadeded to target,rest other records will be dropped.*** | DEPARTMENT\_ID | NUMBER(4) |
|  |  |  |  |  |
|  |  |  |  |  |
| **MAPPING-4** |  |  |  |  |
|  |  |  |  |  |
| **SOURCE** | | **TRANSFORMATIONS** | **TARGET** | |
| **HR.EMPlOYEES, HR.DEPARTMENTS** | |  | **HR.EMP\_DEPTNAME\_TRG** | |
| **Column Names** | **Data Types** | **Joiner Transformation ( EQUI JOIN)** | **Column Names** | **Data Types** |
| EMPLOYEE\_ID | NUMBER(6) | Direct move | EMPLOYEE\_ID | NUMBER(6) |
| FIRST\_NAME | VARCHAR2(20) | Direct move | FIRST\_NAME | VARCHAR2(20) |
| LAST\_NAME | VARCHAR2(20) | Direct move | LAST\_NAME | VARCHAR2(20) |
| EMAIL | VARCHAR2(25) | Direct move | EMAIL | VARCHAR2(25) |
| PHONE\_NUMBER | VARCHAR2(20) | Direct move | PHONE\_NUMBER | VARCHAR2(20) |
| HIRE\_DATE | DATE | Direct move | HIRE\_DATE | DATE |
| JOB\_ID | VARCHAR2(10) | Direct move | JOB\_ID | VARCHAR2(10) |
| SALARY | NUMBER(8,2) | Direct move | SALARY | NUMBER(8,2) |
| COMMISSION\_PCT | NUMBER(2,2) | Direct move | COMMISSION\_PCT | NUMBER(2,2) |
| MANAGER\_ID | NUMBER(6) | Direct move | MANAGER\_ID | NUMBER(6) |
| DEPARTMENT\_ID | NUMBER(4) | ***Load all the employees if Employees.Department\_id maches with Departmenets.Department\_id with department\_name*** | DEPARTMENT\_ID | NUMBER(4) |
| DEPARTMENT\_ID | NUMBER(4) | DEPARTMENT\_NAME | VARCHAR2(30) |
| DEPARTMENT\_NAME | VARCHAR2(30) |  |  |
| MANAGER\_ID | NUMBER(6) | Don’t move |  |  |
| LOCATION\_ID | NUMBER(4) | Don’t move |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| **MAPPING-5** |  |  |  |  |
|  |  |  |  |  |
| **SOURCE** | | **TRANSFORMATIONS** | **TARGET** | |
| **HR.EMPLOYEES** | |  | **HR.EMP\_COUNT\_SAL\_DEPWISE\_TRG** | |
| **Column Names** | **Data Types** | **Aggregator Transformation** | **Column Names** | **Data Types** |
| EMPLOYEE\_ID | NUMBER(6) | Don't move |  |  |
| FIRST\_NAME | VARCHAR2(20) | Don't move |  |  |
| LAST\_NAME | VARCHAR2(20) | Don't move |  |  |
| EMAIL | VARCHAR2(25) | Don't move |  |  |
| PHONE\_NUMBER | VARCHAR2(20) | Don't move |  |  |
| HIRE\_DATE | DATE | Don't move |  |  |
| JOB\_ID | VARCHAR2(10) | Don't move | NUM\_OF\_EMPLOYEES | NUMBER(5) |
| SALARY | NUMBER(8,2) | ***max(sal),min(sal), avg(sal)*** | MAXSAL | NUMBER(5,5) |
| COMMISSION\_PCT | NUMBER(2,2) | Don't move | MINSAL | NUMBER(5,5) |
| MANAGER\_ID | NUMBER(6) | Don't move | AVGSAL | NUMBER(5,5) |
| DEPARTMENT\_ID | NUMBER(4) | ***Count No.of employees department wise move them to target.*** | DEPARTMENT\_ID | NUMBER(4) |
|  |  |  |  |  |
|  |  |  |  |  |
| **MAPPING-6** |  |  |  |  |
|  |  |  |  |  |
| **SOURCE** | | **TRANSFORMATIONS** | **TARGET** | |
| **HR.EMPLOYEES** | |  | **HR.EMP\_MANAGER\_TRG** | |
| **Column Names** | **Data Types** | **Joiner Transformation** | **Column Names** | **Data Types** |
| EMPLOYEE\_ID | NUMBER(6) | Direct move | EMPLOYEE\_ID | NUMBER(6) |
| FIRST\_NAME | VARCHAR2(20) | Direct move | FIRST\_NAME | VARCHAR2(20) |
| LAST\_NAME | VARCHAR2(20) | Don't move |  |  |
| EMAIL | VARCHAR2(25) | Don't move |  |  |
| PHONE\_NUMBER | VARCHAR2(20) | Don't move |  |  |
| HIRE\_DATE | DATE | Don't move |  |  |
| JOB\_ID | VARCHAR2(10) | Don't move |  |  |
| SALARY | NUMBER(8,2) | Don't move |  |  |
| COMMISSION\_PCT | NUMBER(2,2) | Don't move |  |  |
| MANAGER\_ID | NUMBER(6) | ***Load only EMPLOYEE\_ID,FIRST\_NAME details with their MANAGER Names*** | MANAGER\_NAME | VARCHAR2(20) |
| DEPARTMENT\_ID | NUMBER(4) | Don't move |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| **MAPPING-7** |  |  |  |  |
|  |  |  |  |  |
| **SOURCE** | | **TRANSFORMATIONS** | **TARGET** | |
| **HR.EMPLOYEES** | |  | **HR.EMP\_SAL\_RANKS\_TRG** | |
| **Column Names** | **Data Types** | **Rank Transformation** | **Column Names** | **Data Types** |
| EMPLOYEE\_ID | NUMBER(6) | Direct move | EMPLOYEE\_ID | NUMBER(6) |
| FIRST\_NAME | VARCHAR2(20) | Direct move | FIRST\_NAME | VARCHAR2(20) |
| LAST\_NAME | VARCHAR2(20) | Don't move |  |  |
| EMAIL | VARCHAR2(25) | Don't move |  |  |
| PHONE\_NUMBER | VARCHAR2(20) | Don't move |  |  |
| HIRE\_DATE | DATE | Don't move |  |  |
| JOB\_ID | VARCHAR2(10) | Don't move |  |  |
| SALARY | NUMBER(8,2) | Direct move | SALARY | NUMBER(8,2) |
| COMMISSION\_PCT | NUMBER(2,2) | ***rank() over( order by salary)*** | RANK | NUMBER(2) |
| MANAGER\_ID | NUMBER(6) | ***dense\_rank() over( order by salary)*** | DENSE\_RANK | NUMBER(2) |
| DEPARTMENT\_ID | NUMBER(4) | ***row\_number() over( order by salary)*** | ROWNUMBER | NUMBER(2) |

DataValidation Quieres:

|  |  |
| --- | --- |
| **MAP1** | **SELECT EMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER , ROUND((SYSDATE-HIRE\_DATE)/365,0) EXPEREINCE,JOB\_ID,  NVL(SALARY,0) + NVL(COMMISSION\_PCT,0) TOTAL\_SALARY,  MANAGER\_ID,DEPARTMENT\_ID FROM EMPLOYEES  MINUS  SELECT EMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER ,EXPEREINCE,JOB\_ID,TOTAL\_SALARY,MANAGER\_ID,DEPARTMENT\_ID FROM EMP\_TOTSAL\_TRG  UNION  SELECT EMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER ,EXPEREINCE,JOB\_ID,TOTAL\_SALARY,MANAGER\_ID,DEPARTMENT\_ID FROM EMP\_TOTSAL\_TRG  MINUS  SELECT EMPLOYEE\_ID, FIRST\_NAME,LAST\_NAME,EMAIL,PHONE\_NUMBER , ROUND((SYSDATE-HIRE\_DATE)/365,0) EXPEREINCE,JOB\_ID,  NVL(SALARY,0) + NVL(COMMISSION\_PCT,0) TOTAL\_SALARY,  MANAGER\_ID,DEPARTMENT\_ID FROM EMPLOYEES;** |
| **MAP2** | **SELECT DEPARTMENT\_ID,SUM(SALARY) SUM\_SALARY FROM EMPLOYEES GROUP BY DEPARTMENT\_ID MINUS SELECT DEPARTMENT\_ID, TOTAL\_SALARY FROM SUM\_SAL\_DEPWISE\_TRG   UNION  SELECT DEPARTMENT\_ID, TOTAL\_SALARY FROM SUM\_SAL\_DEPWISE\_TRG  MINUS SELECT DEPARTMENT\_ID,SUM(SALARY) SUM\_SALARY FROM EMPLOYEES GROUP BY DEPARTMENT\_ID;** |
| **MAP3** | **SELECT \* FROM EMPLOYEES WHERE DEPARTMENT\_ID=10 MINUS SELECT \* FROM EMP\_DEPT\_TRG  UNION  SELECT \* FROM EMP\_DEPT\_TRG MINUS SELECT \* FROM EMPLOYEES WHERE DEPARTMENT\_ID=10;** |
| **MAP4** | **SELECT E.\*,D.DEPARTMENT\_NAME FROM EMPLOYEES E, DEPARTMENTS D WHERE E.DEPARTMENT\_ID=D.DEPARTMENT\_ID MINUS SELECT \* FROM EMP\_DEPTNAME\_TRG  UNION  SELECT \* FROM EMP\_DEPTNAME\_TRG MINUS  SELECT E.\*,D.DEPARTMENT\_NAME FROM EMPLOYEES E, DEPARTMENTS D WHERE E.DEPARTMENT\_ID=D.DEPARTMENT\_ID;** |
| **MAP5** | **SELECT DEPARTMENT\_ID,COUNT(\*)NUM\_OF\_EMPLOYEES,MAX(SALARY)MAXSAL,MIN(SALARY) MINSAL,AVG(SALARY)AVGSAL FROM EMPLOYEES GROUP BY DEPARTMENT\_ID; MINUS SELECT DEPARTMENT\_ID,NUM\_OF\_EMPLOYEES,MAXSAL,MINSAL,AVGSAL FROM EMP\_COUNT\_SAL\_DEPWISE\_TRG  UNION  SELECT DEPARTMENT\_ID,NUM\_OF\_EMPLOYEES,MAXSAL,MINSAL,AVGSAL FROM EMP\_COUNT\_SAL\_DEPWISE\_TRG MINUS SELECT DEPARTMENT\_ID,COUNT(\*)NUM\_OF\_EMPLOYEES,MAX(SALARY)MAXSAL,MIN(SALARY) MINSAL,AVG(SALARY)AVGSAL FROM EMPLOYEES GROUP BY DEPARTMENT\_ID;** |
| **MAP6** | **SELECT E.EMPLOYEE\_ID,E.FIRST\_NAME,M.FIRST\_NAME MANAGER\_NAME FROM EMPLOYEES E, EMPLOYEES M WHERE E.EMPLOYEE\_ID=M.MANAGER\_ID MINUS SELECT EMPLOYEE\_ID,FIRST\_NAME,MANAGER\_NAME FROM EMP\_MANAGER\_TRG  UNION   SELECT EMPLOYEE\_ID,FIRST\_NAME,MANAGER\_NAME FROM EMP\_MANAGER\_TRG MINUS SELECT E.EMPLOYEE\_ID,E.FIRST\_NAME,M.FIRST\_NAME MANAGER\_NAME FROM EMPLOYEES E, EMPLOYEES M WHERE E.EMPLOYEE\_ID=M.MANAGER\_ID;** |
| **MAP7** | **select employee\_id, first\_name,salary,rank() over( order by salary)rank, dense\_rank() over( order by salary) dense\_rank, row\_number() over( order by salary) rownumber from employees MINUS Select employee\_id, first\_name ,salary,rank,dense\_rank,rownumber from EMP\_SAL\_RANKS\_TRG  UNION  Select employee\_id, first\_name ,salary,rank,dense\_rank,rownumber from EMP\_SAL\_RANKS\_TRG MINUS select employee\_id, first\_name,salary,rank() over( order by salary)rank, dense\_rank() over( order by salary) dense\_rank, row\_number() over( order by salary) rownumber from employees** |

Difference between rank(),

dense\_rank(),row\_number()

• select first\_name, salary, rank() over( order by salary)rank from

employees;

• select first\_name, salary, dense\_rank() over( order by salary)rank

from employees;

• select first\_name, salary, row\_number() over( order by salary)rank

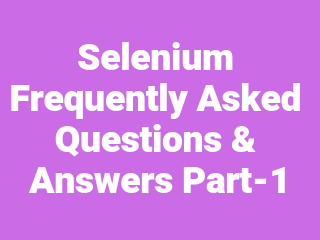
from employees;

• select first\_name,salary,rank() over( order by salary)rank,

dense\_rank() over( order by salary) dense\_rank, row\_number() over(

order by salary) rownumber from employees;

# [Selenium Frequently Asked Questions & Answers Part-1](https://www.pavantestingtools.com/2015/11/selenium-faq-part1_12.html)

[](https://2.bp.blogspot.com/-uladYMZtsVM/XEg6pmYepaI/AAAAAAAAPpU/I-P3Y3IVoLEWHaSIsGWgtLFLKNIIi18KgCLcBGAs/s1600/Programs%2Bfor%2BSelenium%252835%2529.png)

**Ques.1. What is Selenium?**

Ans. Selenium is a robust test automation suite that is used for automating web based applications. It supports multiple browsers, programming languages and platforms.

**Ques.2. What are different forms of selenium?**

Ans. Selenium comes in four forms-

Selenium WebDriver - Selenium WebDriver is used to automate web applications using browser's native methods.

Selenium IDE - A Firefox plugin that works on record and play back principle.

Selenium RC - Selenium Remote Control(RC) is officially deprecated by selenium and it used to work on javascript to automate the web applications.

Selenium Grid - Allows selenium tests to run in parallel across multiple machines.

**Ques.3. What are some advantages of selenium?**

Selenium is open source and free to use without any licensing cost.

It supports multiple languages like Java, ruby, python etc.

It supports multi browser testing.

It has good amount of resources and helping community over the internet.

Using selenium IDE component, non-programmers can also write automation scripts

Using selenium grid component, distributed testing can be carried out on remote machines possible.

**Ques.4. What are some limitations of selenium?**

We cannot test desktop application using selenium.

We cannot test web services using selenium.

For creating robust scripts in selenium webdriver, programming langauge knowledge is required.

We have to rely on external libraries and tools for performing tasks like - logging(log4J), testing framework-(testNG, JUnit), reading from external files(POI for excels) etc.

**Ques.5. Which all browsers/drivers are supported by Selenium Webdriver?**

Ans. Some commonly used browsers supported by selenium are-

Google Chrome - ChromeDriver

Firefox - FireFoxDriver

Internet Explorer - InternetExplorerDriver

Safari - SafariDriver

HtmlUnit (Headless browser) - HtmlUnitDriver

Android - Selendroid/Appium

IOS - ios-driver/Appium

**Ques.6. Can we test APIs or web services using Selenium webdriver?**

Ans. No selenium webdriver uses browser's native method to automate the web applications. Since web services are headless, so we cannot automate web services using selenium webdriver.

**Ques.7. What are the testing type supported by Selenium WebDriver?**

Ans. Selenium webdriver can be used for performing automated functional and regression testing.

**Ques.8. What are various ways of locating an element in selenium?**

Ans. The different locators in selenium are-

Id

XPath

cssSelector

className

tagName

name

linkText

partialLinkText

**Ques.9. What is an XPath?**

Ans. Xpath or XML path is a query language for selecting nodes from XML documents. XPath is one of the locators supported by selenium webdriver.

**Ques.10. What is an absolute XPath?**

Ans. An absolute XPath is a way of locating an element using an XML expression beginning from root node i.e. html node in case of web pages. The main disadvantage of absolute xpath is that even with slightest change in the UI or any element the whole absolute XPath fails.

Example - html/body/div/div[2]/div/div/div/div[1]/div/input

**Ques.11. What is a relative XPath?**

Ans. A relative XPath is a way of locating an element using an XML expression beginning from anywhere in the HTML document. There are different ways of creating relative XPaths which are used for creating robust XPaths (unaffected by changes in other UI elements).

Example - //input[@id='username']

**Ques.12. What is the difference between single slash(/) and double slash(//) in XPath?**

Ans. In XPath a single slash is used for creating XPaths with absolute paths beginning from root node.

Whereas double slash is used for creating relative XPaths.

**Ques.13. Which XPath you will prefer to use? Why?**

Normally we prefer to use Relative XPath.

Ralative Xpath can identify element evethou some UI changes happed, but can’t identify by Absolute Xpath.

**Ques.14. What is the difference between Absolute XPath and Relative XPath?**

Absolute Xpath will traverse entire HTML from the root node /html.

Relative Xpath directly jump to node based on attribute specified.

**Ques.15. How can we inspect the web element attributes in order to use them in different locators?**

Ans. Using Chropath or developer tools we can inspect the specific web elements. Chropath is a plugin that provides xpaths and CSS Selectors. From automation perspective, “Right click on page inspect element” is used specifically for inspecting web-elements in order to use their attributes like id, class, name etc. in different locators.

**Ques.16. How can we locate an element by only partially matching its attributes value in Xpath?**

Ans. Using contains() method we can locate an element by partially matching its attribute's value. This is particularly helpful in the scenarios where the attributes have dynamic values with certain constant part.

**xPath expression = //\*[contains(@name,'user')]**

The above statement will match the all the values of name attribute containing the word 'user' in them.

**Ques.17. How can we locate elements using their text in XPath?**

Ans. Using the text() method

**Ques.18. How can we move to nth child element using XPath?**

Ans. There are two ways of navigating to the nth element using XPath-

Using square brackets with index position

Example - div[2] will find the second div element.

Using position()

Example - div[position()=3] will find the third div element.

**Ques.19. What is the syntax of finding elements by class using CSS Selector?**

Ans. By .className we can select all the element belonging to a particluar class e.g. '.inputtext ' will select all elements having class ' inputtext '.

**Ques.20. What is the syntax of finding elements by id using CSS Selector?**

Ans. By #idValue we can select all the elements belonging to a particluar id e.g. ‘#u\_0\_n' will select the element having id - u\_0\_n.

**Ques.21. How can we select elements by their attribute value using CSS Selector?**

Ans. Using [attribute=value] we can select all the element belonging to a particluar attribute e.g. '[type=radio]' will select the element having attribute type of value ‘radio'.

**Ques.22. What is fundamental difference between XPath and css selector?**

Ans. The fundamental difference between XPath and css selector is using XPaths we can traverse up in the document i.e. we can move to parent elements. Whereas using CSS selector we can only move downwards in the document.

**Ques.23. How can we launch different browsers in selenium webdriver?**

Ans. By creating an instance of driver of a particular browser-

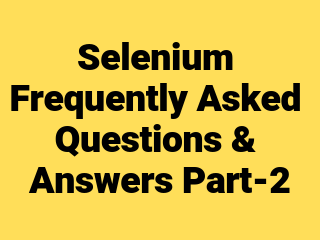
**Ques.24. What is the use of driver.get("URL") and driver.navigate().to("URL") command? Is there any difference between the two?**

Ans. Both driver.get("URL") and driver.navigate().to("URL") commands are used to navigate to a URL passed as parameter. There is no difference between the two commands.

**Ques.25. How can we type text in a textbox element using selenium?**

WebElement searchTextBox = driver.findElement(By.id("search")); searchTextBox.sendKeys("searchTerm");

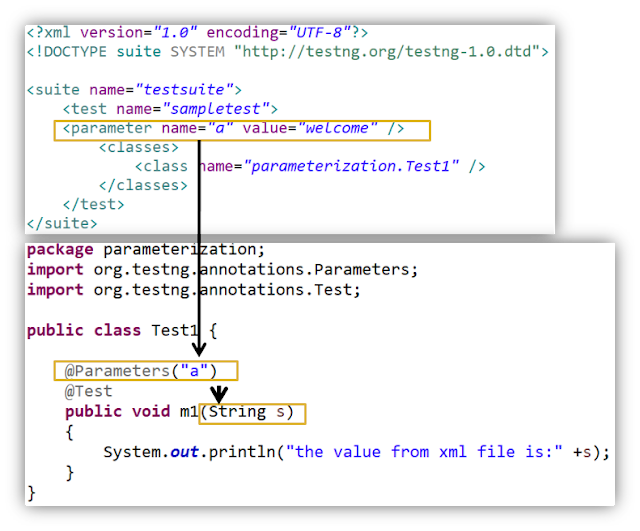
# [Selenium Frequently Asked Questions & Answers Part-2](https://www.pavantestingtools.com/2015/11/selenium-faq-part2_12.html)

[](https://2.bp.blogspot.com/-K3Yn3gSNWR4/XEg6akGUmPI/AAAAAAAAPpQ/TR7KfWA73Kc1BlE54dQbo_qoEB1t4og5gCLcBGAs/s1600/Programs%2Bfor%2BSelenium%252834%2529.png)

**Ques.26. How can we clear a text written in a textbox?**  
Ans. Using clear() method we can delete the text written in a textbox.  
  
driver.findElement(By.id("elementLocator")).clear();   
 **Ques.27. How to check a checkBox in selenium?**  
Ans. The same click() method used for clicking buttons or radio buttons can be used for checking checkbox as well.  
  
**Ques.28. How can we submit a form in selenium?**  
Ans. Using submit() method we can submit a form in selenium.  
  
driver.findElement(By.id("form1")).submit();   
  
Also, the click() method can be used for the same purpose.  
  
  
**Ques.29. Explain the difference between close and quit command.**  
Ans. driver.close() - Used to close the current browser having focusdriver. quit() - Used to close all the browser instances  
  
**Ques.30. How to switch between multiple windows in selenium?**  
Ans. Selenium has driver.getWindowHandles() and driver.switchTo().window("{windowHandleName}") commands to work with multiple windows.  
The getWindowHandles() command returns a list of ids corresponding to each window and on passing a particular window handle to driver.switchTo().window("{windowHandleName}") command we can switch control/focus to that particular window  
  
for (String windowHandle : driver.getWindowHandles())  
{  
driver.switchTo().window(handle);   
  
**Ques.31. What is the difference between driver.getWindowHandle() and driver.getWindowHandles() in selenium?**  
Ans. driver.getWindowHandle() returns a handle of the current page (a unique identifier)Whereas driver.getWindowHandles() returns a set of handles of the all the pages available.  
  
**Ques.32. How can we move to a particular frame in selenium?**  
Ans. The driver.switchTo() commands can be used for switching to frames.  
  
driver.switchTo().frame("{frameIndex/frameId/frameName}");   
  
  
For locating a frame we can either use the index (starting from 0), its name or Id.  
  
**Ques.33. Can we move back and forward in browser using selenium?**  
Ans. Yes, using driver.navigate().back() and driver.navigate().forward() commands we can move backward and forward in a browser.  
  
**Ques.34. Is there a way to refresh browser using selenium?**  
Ans. There a multiple ways to refresh a page in selenium-  
Using driver.navigate().refresh() command  
Using sendKeys(Keys.F5) on any textbox on the webpage  
  
**Ques.35. How can we maximize browser window in selenium?**  
Ans. We can maximize browser window in selenium using following command-  
  
driver.manage().window().maximize();   
 **Ques.36. How can we fetch a text written over an element?**  
Ans. Using getText() method we can fetch the text over an element.  
  
String text = driver.findElement("elementLocator").getText(); **Ques.37. How can we find the value of different attributes like name, class, value of an element?**  
Ans. Using getAttribute("{attributeName}") method we can find the value of different attrbutes of an element e.g.-  
  
String valueAttribute = driver.findElement(By.id("elementLocator")).getAttribute("value");   
  
**Ques.38. How to delete cookies in selenium?**  
Ans. Using deleteAllCookies() method-  
  
driver.manage().deleteAllCookies();   
 **Ques.39. What is an implicit wait in selenium?**  
Ans. An implicit wait is a type of wait which waits for a specified time while locating an element before throwing NoSuchElementException. By default selenium tries to find elements immediately when required without any wait. So, it is good to use implicit wait. This wait is applied to all the elements of the current driver instance.  
  
driver.manage().timeouts().implicitlyWait(5, TimeUnit.SECONDS);   
  
**Ques.40. What is an explicit wait in selenium?**  
Ans. An explicit wait is a type of wait which is applied to a particular web element untill the expected condition specified is met.  
  
WebDriverWait wait = new WebDriverWait(driver, 10);  
WebElement element = wait.until(ExpectedConditions.elementToBeClickable(By.id("elementId")));   
  
**Ques.41. What are some expected conditions that can be used in Explicit waits?**  
Ans. Some of the commonly used expected conditions of an element that can be used with expicit waits are-  
elementToBeClickable(WebElement element or By locator)  
visibilityOfElementLocated(By locator)  
attributeContains(WebElement element, String attribute, String value)  
alertIsPresent()  
titleContains(String title)  
titleIs(String title)  
textToBePresentInElementLocated(By, String)  
  
**Ques.42. What is fluent wait in selenium?**  
Ans. A fluent wait is a type of wait in which we can also specify polling interval(intervals after which driver will try to find the element) along with the maximum timeout value.  
  
Wait wait = new FluentWait(driver)  
.withTimeout(20, SECONDS)  
.pollingEvery(5, SECONDS)  
.ignoring(NoSuchElementException.class);  
WebElement textBox = wait.until(new Function()  
{  
public WebElement apply(WebDriver driver) {  
return driver.findElement(By.id("textBoxId"));  
} } );   
 **Ques.43. What are the different keyboard operations that can be performed in selenium?**  
Ans. The different keyboard operations that can be performed in selenium are-  
.sendKeys("sequence of characters") - Used for passing character sequence to an input or textbox element.  
.pressKey("non-text keys") - Used for keys like control, function keys etc that are non-text.  
.releaseKey("non-text keys") - Used in conjuntion with keypress event to simulate releasing a key from keyboard event.  
  
**Ques.44. What are the different mouse actions that can be performed?**  
Ans. The different mouse events supported in selenium are  
click(WebElement element)  
doubleClick(WebElement element)  
contextClick(WebElement element)  
moveToEelement(WebElement element)  
dragAndDrop(source WebElement, target WebElement)  
  
**Ques.45. Write the code to double click an element in selenium?**  
Actions action = new Actions(driver);  
WebElement element=driver.findElement(By.id("elementId")); action.doubleClick(element).build().perform();  
  
**Ques.46. Write the code to right click an element in selenium?**  
Actions action = new Actions(driver);  
WebElement element=driver.findElement(By.id("elementId")); action.contextClick(element). build().perform();    
  
**Ques.47. How to mouse hover an element in selenium?**  
Actions action = new Actions(driver);  
WebElement element=driver.findElement(By.id("elementId"));  
action.moveToElement(element). build().perform();   
 **Ques.48. How to fetch the current page URL in selenium?**  
Ans. Using getCurrentURL() command we can fetch the current page URL-  
  
  
driver.getCurrentUrl();  
   
**Ques.49. How can we fetch title of the page in selenium?**  
Ans. Using driver.getTitle(); we can fetch the page title in selenium. This method returns a string containing the title of the webpage.  
  
**Ques.50. How can we fetch the page source in selenium?**  
Ans. Using driver.getPageSource(); we can fetch the page source in selenium. This method returns a string containing the page source.

**Ques.51. How to verify tooltip text using selenium?**  
Ans. Webelements have an attribute of type 'title'. By fetching the value of 'title' attribute we can verify the tooltip text in selenium.  
  
String toolTipText = element.getAttribute("title");  
  
**Ques.52. How to locate a link using its text in selenium?**  
Ans. Using linkText() and partialLinkText() we can locate a link.  
The difference between the two is linkText matches the complete string passed as parameter to the link texts. Whereas partialLinkText matches the string parameter partially with the link texts.  
  
WebElement link1 = driver.findElement(By.linkText(“pavantestingtools"));  
WebElement link2 = driver.findElement(By.partialLinkText(“testingtools"));    
  
  
**Ques.53. What are DesiredCapabilities in selenium webdriver?**  
Ans. Desired capabilities are a set of key-value pairs that are used for storing or configuring browser specific properties like its version, platform etc in the browser instances.  
  
**Ques.54. How can we find all the links on a web page?**  
Ans. All the links are of anchor tag 'a'. So by locating elements of tagName 'a' we can find all the links on a webpage.  
  
List links = driver.findElements(By.tagName("a"));   
  
**Ques.55. What are some commonly encountered exceptions in selenium?**  
Ans. Some of the commonly seen exception in selenium are-  
NoSuchElementException - When no element could be located from the locator provided.  
ElementNotVisibleException - When element is present in the dom but is not visible.  
NoAlertPresentException - When we try to switch to an alert but the targetted alert is not present.  
NoSuchFrameException - When we try to switch to a frame but the targetted frame is not present.  
NoSuchWindowException - When we try to switch to a window but the targetted window is not present.  
TimeoutException - When a command execution gets timeout.  
InvalidElementStateException - When the state of an element is not appropriate for the desired action.  
NoSuchAttributeException - When we are trying to fetch an attribute's value but the attribute is not correct  
WebDriverException - When there is some issue with driver instance preventing it from getting launched.  
 **Ques.56. How can we capture screenshots in selenium?**  
Ans. Using getScreenshotAs method of TakesScreenshot interface we can take the screenshots in selenium.  
  
File scrFile = ((TakesScreenshot)driver).getScreenshotAs(OutputType.FILE); FileUtils.copyFile(scrFile, new File("D:\\testScreenShot.jpg"));   
  
**Ques.57. How to handle dropdowns in selenium?**  
Ans. Using Select class-  
  
Select countriesDropDown = new Select(driver.findElement(By.id("countries")));  
dropdown.selectByVisibleText("India"); //or using index of the option starting from 0  
dropdown.selectByIndex(1); //or using its value attribute  
dropdown.selectByValue("Ind");   
  
**Ques.58. How to check which option in the dropdown is selected?**  
Ans. Using isSelected() method we can check the state of a dropdown's option.  
  
Select countriesDropDown = new Select(driver.findElement(By.id("countries"))); dropdown.selectByVisibleText("India"); //returns true or false value System.out.println(driver.findElement(By.id("India")).isSelected());  
   
  
**Ques.59. How can we check if an element is getting displayed on a web page?**  
Ans. Using isDisplayed method we can check if an element is getting displayed on a web page.  
  
driver.findElement(By locator).isDisplayed();   
  
**Ques.60. How can we check if an element is enabled for interaction on a web page?**  
Ans. Using isEnabled method we can check if an element is enabled or not.  
  
driver.findElement(By locator).isEnabled();   
  
**Ques.61. What is the difference between driver.findElement() and driver.findElements() commands?**  
Ans. findElement() returns a single WebElement (found first) based on the locator passed as parameter. Whereas findElements() returns a list of WebElements, all satisfying the locator value passed.  
Syntax of findElement():WebElement textbox = driver.findElement(By.id("textBoxLocator"));  
Syntax of findElements():List elements = element.findElements(By.id(“value”));  
Another difference between the two is- if no element is found then findElement() throws NoSuchElementException whereas findElements() returns a list of 0 elements.  
  
**Ques.62. Explain the difference between implicit wait and explicit wait.?**  
Ans. An implicit wait, while finding an element waits for a specified time before throwing NoSuchElementException in case element is not found. The timeout value remains valid throughout the webDriver's instance and for all the elements.  
  
driver.manage().timeouts().implicitlyWait(180, TimeUnit.SECONDS);   
  
Whereas, Explicit wait is applied to a specified element only-  
  
WebDriverWait wait = new WebDriverWait(driver, 5); wait.until(ExpectedConditions.presenceOfElementLocated(ElementLocator));  
 **Ques.63. How can we handle window UI elements and window POP ups using selenium?**  
Ans. Selenium is used for automating Web based application only(or browsers only). For handling window GUI elements we can use AutoIT or Sikuli.  
  
**Ques.64. What is Robot API?**  
Ans. Robot API is used for handling Keyboard or mouse events. It is generally used to upload files to the server in selenium automation  
  
Robot robot = new Robot(); //Simulate enter key action   
robot.keyPress(KeyEvent.VK\_ENTER);    
  
**Ques.65. How to do file upload in selenium?**  
Ans. File upload action can be performed in multiple ways-  
Using element.sendKeys("path of file") on the webElement of input tag and type file i.e. the elements should be like…    
  
Using Robot API.  
Using AutoIT.  
Using Sikuli  
  
**Ques.66. How to handle HTTPS website in selenium? or How to accept the SSL untrusted connection?**  
Ans. Using profiles in firefox we can handle accept the SSL untrusted connection certificate. Profiles are basically set of user preferences stored in a file.  
  
  
Firefox  
  
FirefoxProfile profile = new FirefoxProfile();  
profile.setAcceptUntrustedCertificates(true);  
profile.setAssumeUntrustedCertificateIssuer(false);  
WebDriver driver = new FirefoxDriver(profile);  
  
IE  
  
DesiredCapabilities capabilities = new DesiredCapabilities();  
capabilities.setCapability(CapabilityType.ACCEPT\_SSL\_CERTS, true);  
System.setProperty("webdriver.ie.driver","IEDriverServer.exe");  
WebDriver driver = new InternetExplorerDriver(capabilities);  
  
Chrome  
  
  
DesiredCapabilities handlSSLErr = DesiredCapabilities.chrome ()  
handlSSLErr.setCapability (CapabilityType.ACCEPT\_SSL\_CERTS, true)  
WebDriver driver = new ChromeDriver (handlSSLErr);   
  
  
**Ques.67 How to do drag and drop in selenium?**  
Using Action class, drag and drop can be performed in selenium. Sample code-  
  
Actions act = new Actions(driver);  
  
act.clickAndHold(source Element).moveToElement(target Element).release().build().perform();  
  
OR  
  
act.dragAndDrop(source Element, target Element).build().perform();     
  
**Ques.68. How to execute javascript in selenium?**  
Ans. JavaScript can be executed in selenium using JavaScriptExecuter. Sample code for javascript execution-  
  
 JavascriptExecutor js = ((JavascriptExecutor) driver);  
js.executeScript(“{Java script code }”);  
  
**Ques.69. How to handle alerts in selenium?**  
Ans. In order to accept or dismiss an alert box the alert class is used. This requires first switching to the alert box and than using accept() or dismiss() command as the case may be.  
  
Alert alert = driver.switchTo().alert(); //To accept the alert  
alert.accept();  
  
Alert alert = driver.switchTo().alert(); //To cancel the alert box  
alert.dismiss();  
   
  
**Ques.70. What is HtmlUnitDriver?**  
Ans. HtmlUnitDriver is the fastest WebDriver. Unlike other drivers (FireFoxDriver, ChromeDriver etc), the HtmlUnitDriver is non-GUI, while running no browser gets launched.  
  
**Ques.71. How to handle hidden elements in Selenium webDriver?**  
Ans. Using javaScript executor we can handle hidden elements-  
(JavascriptExecutor(driver)) .executeScript("document.getElementsByClassName(ElementLocator).click();");  
  
**Ques.72. What is Page Object Model or POM?**  
Ans. Page Object Model(POM) is a design pattern in selenium. POM helps to create a framework for maintaining selenium scripts.  
In POM for each page of the application a class is created having the web elements belonging to the page and methods handling the events in that page.  
The test scripts are maintained in separate files and the methods of the page object files are called from the test scripts file.  
  
**Ques.73. What are the advantages of POM?**  
Ans. The advantages are POM are-  
Using POM we can create an Object Repository, a set of web elements in separate files along with their associated functions. Thereby keeping code clean.  
For any change in UI(or web elements) only page object files are required to be updated leaving test files unchanged.  
It makes code reusable and maintainable.  
 **Ques.74. What is Page Factory?**  
Ans. Page factory is an implementation of Page Object Model in selenium. It provides @FindBy annotation to find web elements and PageFactory.initElements() method to initialize all web elements defined with @FindBy annotation.  
  
public class SamplePage  
{  
WebDriver driver;  
@FindBy(id="search")  
WebElement searchTextBox;  
@FindBy(name="searchBtn")  
 WebElement searchButton;  
  
//Constructor public samplePage(WebDriver driver)  
{  
this.driver = driver; //initElements method to initialize all elements  
PageFactory.initElements(driver, this);  
}  
 //Sample method  
public void search(String searchTerm)  
{  
 searchTextBox.sendKeys(searchTerm); searchButton.click();   
  
**Ques.75. What is an Object repository?**  
Ans. An object repository is centralized location of all the objects or WebElements of the test scripts.  
In selenium we can create object repository using Page Object Model and Page Factory design patterns. **Ques.76. What is a data driven framework?**  
Ans. A data driven framework is one in which the test data is put in external files like csv, excel etc separated from test logic written in test script files. The test data drives the test cases, i.e. the test methods run for each set of test data values.   
  
**Ques.77. What is a keyword driven framework?**  
Ans. A keyword driven framework is one in which the actions are associated with keywords and kept in external files e.g. an action of launching a browser will be associated with keyword - launchBrowser(), action to write in a textbox with keyword - writeInTextBox(webElement, textToWrite) etc.  
The code to perform the action based on a keyword specified in external file is implemented in the framework itself.  
  
  
**Ques.78. What is a hybrid framework?**  
Ans. A hybrid framework is a combination of one or more frameworks. Normally it is associated with combination of data driven and keyword driven frameworks where both the test data and test actions are kept in external files(in the form of table).  
  
**Ques.79. What is selenium Grid?**  
Ans. Selenium grid is a tool that helps in distributed running of test scripts across different machines having different browsers, browser version, platforms etc in parallel. In selenium grid there is hub that is a central server managing all the distributed machines known as nodes.  
  
**Ques.80. What are some advantages of selenium grid?**  
Ans. The advantages of selenium grid are-  
It allows running test cases in parallel thereby saving test execution time.  
Multi browser testing is possible using selenium grid by running the test on machines having different browsers.  
It is allows multi-platform testing by configuring nodes having different operating systems.  
  
**Ques.81. What is a hub in selenium grid?**  
Ans. A hub is server or a central point in selenium grid that controls the test executions on the different machines.  
  
**Ques.82. What is a node in selenium grid?**  
Ans. Nodes are the machines which are attached to the selenium grid hub and have selenium instances running the test scripts. Unlike hub there can be multiple nodes in selenium grid.  
  
**Ques.83. Explain the line of code Webdriver driver = new FirefoxDriver();**  
Ans. In the line of code Webdriver driver = new FirefoxDriver();  
'WebDriver' is an interface and we are creating an object of type WebDriver instantiating an object of FirefoxDriver class.  
 **Ques.84 What is the purpose of creating a reference variable- 'driver' of type WebDriver instead of directly creating a FireFoxDriver object or any other driver's reference in the statement Webdriver driver = new FirefoxDriver();?**  
Ans. By creating a reference variable of type WebDriver we can use the same variable to work with multiple browsers like ChromeDriver, IEDriver etc.  
  
**Ques.85. What is testNG?**  
Ans. TestNG(NG for Next Generation) is a testing framework that can be integrated with selenium or any other automation tool to provide multiple capabilities like assertions, reporting, parallel test execution etc.  
  
**Ques.86. What are some advantages of testNG?**  
Ans. Following are the advantages of testNG:  
TestNG provides different assertions that helps in checking the expected and actual results.  
It provides parallel execution of test methods.  
We can define dependency of one test method over other in TestNG.  
We can assign priority to test methods in selenium.  
It allows grouping of test methods into test groups.  
It allows data driven testing using @DataProvider annotation.  
It has inherent support for reporting.  
It has support for parameterizing test cases using @Parameters annotation.  
 **Ques.87. What is the use of testng.xml file?**  
Ans. testng.xml file is used for configuring the whole test suite.  
 In testng.xml file we can create test suite, create test groups, mark tests for parallel execution, add listeners and pass parameters to test scripts.  
Later this testng.xml file can be used for triggering the test suite.  
Ques.88. How can we pass parameter to test script using testNG?  
Ans. Using @Parameter annotation and 'parameter' tag in testng.xml we can pass parameters to the test script.  
  
 **Ques.88. How can we pass parameter to test script using testNG?**

Ans. Using @Parameter annotation and 'parameter' tag in testng.xml we can pass parameters to the test script.

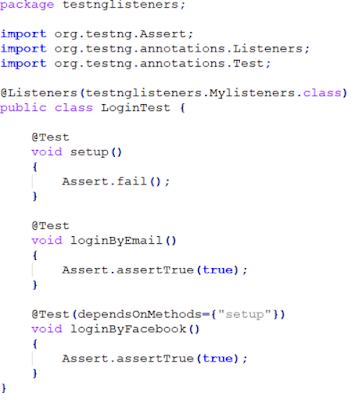
[](https://2.bp.blogspot.com/-0fkq12cvljc/XEbwPhprnTI/AAAAAAAAPjM/JgufdhBbRLcMJ2jWW51myKPpJUXEP0JnwCEwYBhgL/s1600/Picture12.png)

**Ques.89. How can we create data driven framework using testNG?**  
Ans. Using @DataProvider we can create a data driven framework in which data is passed to the associated test method and multiple iteration of the test runs for the different test data values passed from the @DataProvider method.  
The method annotated with @DataProvider annotation return a 2D array of object.

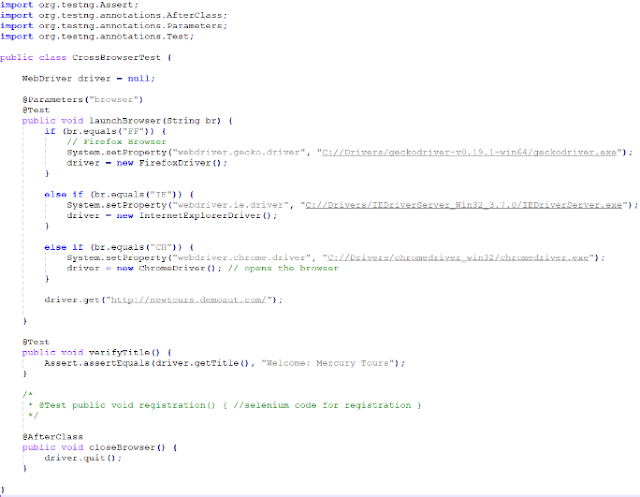
[](https://4.bp.blogspot.com/-yl4VnICUinI/XEbwgfWE0vI/AAAAAAAAPjU/8qAFoisu5-g28m9wbtj_b-ul68Z3kKC1QCLcBGAs/s1600/Picture13.png)

**Ques.90. What is the use of TestNG Listeners?**  
Ans. TestNG provides us different kind of listeners using which we can perform some action in case an event has triggered.  
Usually testNG listeners are used for configuring reports and logging.  
One of the most widely used lisetner in testNG is ITestListener interface and TestListenerAdapter Class.  
 It has methods like onTestSuccess, onTestFailure, onTestSkipped etc.  
We need to implement this interface creating a listener class of our own.  
Ques.91. What is the use of @Listener annotation in TestNG?  
We need to implement ITestListener interface by creating a listener class of our own.  
After that using the @Listener annotation, we can use specify that for a particular test class, our customized listener class should be used.  
  
**Ques.91. What is the use of @Listener annotation in TestNG?**  
  
Ans. We need to implement ITestListener interface by creating a listener class of our own.  
After that using the @Listener annotation, we can use specify that for a particular test class, our customized listener class should be used.

[](https://4.bp.blogspot.com/-sSx4AZtNsBw/XEbw_9rJ6yI/AAAAAAAAPjc/-XH4acMkRggGfHKLehChvwCvcL1ZhSVBACLcBGAs/s1600/Picture14.png)

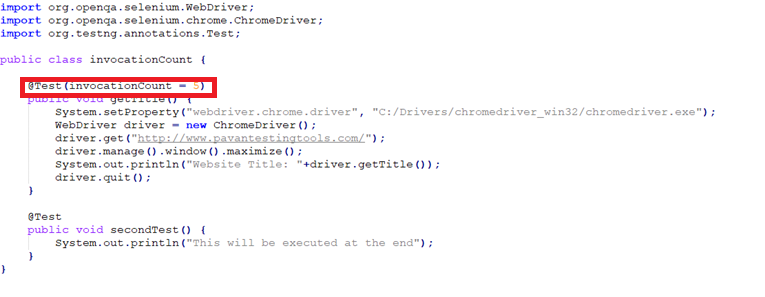
[](https://2.bp.blogspot.com/-C67qk_5ZM64/XEbxMeX__hI/AAAAAAAAPjg/D_u2klo8a5suJ_LihDtQoKZEBYIsYladQCLcBGAs/s1600/Picture15.png)

**Ques.92. How can we make one test method dependent on other using TestNG?**  
Ans. Using dependsOnMethods parameter inside @Test annotation in testNG we can make one test method run only after successful execution of dependent test method.  
  
  
  
@Test(dependsOnMethods = { "preTests" })   
  
**Ques.93. How can we set priority of test cases in TestNG?**  
Ans. Using priority parameter in @Test annotation in TestNG we can define priority of test cases. The default priority of test when not specified is integer value 0. Example:  
  
@Test(priority=1)   
  
  
**Ques.94. What are commonly used TestNG annotations?**  
Ans. The commonly used TestNG annotations are-  
@Test  
@BeforeMethod  
@AfterMethod  
@BefoerClass  
@AfterClass  
@BeforeTest  
@AfterTest  
@BeforeSuite  
@AfterSuite  
  
**Ques.95. What are some common assertions provided by testNG?**  
Ans. Some of the common assertions provided by testNG are-  
assertEquals(String actual, String expected, String message) - (and other overloaded data type in parameters)  
assertNotEquals(double data1, double data2, String message) - (and other overloaded data type in parameters)  
assertFalse(boolean condition, String message)  
assertTrue(boolean condition, String message)  
assertNotNull(Object object)  
fail(boolean condition, String message)  
true(String message)  
 **Ques.96. How can we run test cases in parallel using TestNG?**  
Ans. In order to run the tests in parallel just add these two key value pairs in suite-  
parallel="{methods/tests/classes}"  
thread-count="{number of thread you want to run simultaneously}".

[](https://3.bp.blogspot.com/-Jtxh684e8S0/XEbx-09ECHI/AAAAAAAAPjw/lZ2XQqievoQNn32O6C2G-DxHkbte3wzswCLcBGAs/s1600/Picture16.png)

[](https://2.bp.blogspot.com/-dvhWedhGHX4/XEbyOGadt9I/AAAAAAAAPj0/gszT1Yr3nvkkXZKz59mJputyGsvqNC_qgCLcBGAs/s1600/Picture17.png)

**Ques.97. Name an API used for reading and writing data to excel files.**  
Ans. Apache POI API and JXL(Java Excel API) can be used for reading, writing and updating excel files.  
**Ques.98. Name an API used for logging in Java.**  
Ans. Log4j is an open source API widely used for logging in Java.  
It supports multiple levels of logging like - ALL, DEBUG, INFO, WARN, ERROR, TRACE and FATAL.  
  
**Ques.99. What is the use of logging in automation?**  
Ans. Logging helps in debugging the tests when required and also provides a storage of test's runtime behaviour.  
   
**Ques.100. What is InvocationCount in TestNG?**  
This is a TestNG attribute that defines number of times a test method should be invoked or executed before executing any other test method.

[](https://2.bp.blogspot.com/-hNbp-_utk1s/XEby5yTaHfI/AAAAAAAAPkE/UhjRD9FLpqMj6Q-UqproIfw3Lrn3mmV8gCLcBGAs/s1600/p.png)

Advanced Level Selenium Interview Questions:-

1. Is there a way to type in a textbox without using sendKeys()?

you can use Javascript Executer to input text into a text box without using sendKeys() method:

// Initialize JS object

JavascriptExecutor JS = (JavascriptExecutor)webdriver;

// Enter username

JS.executeScript("document.getElementById('User').value='Abha\_Rathour'");

// Enter password

JS.executeScript("document.getElementById('Password').value='password123'");

2. How to select a value from a dropdown in Selenium WebDriver?

Select select = new Select(driver.findElement(By.id("abcd")));

select.selectByVisibleText()/deselectByVisibleText(); - selects/deselects an option by its displayed text

select.selectByValue()/deselectByValue(); - selects/deselects an option by the value of its "value" attribute

select.selectByIndex()/deselectByIndex(); - selects/deselects an option by its index

select.isMultiple(); - returns TRUE if the drop-down element allows multiple selection at a time; FALSE if

otherwise

select.deselectAll(); - deselects all previously selected options

3. What does the switchTo() command do?

It is used to switch to that browser window/frame/Alert

-driver.switchTo().window("windowName");

-driver.switchTo().frame("frameName");

-Alert alert = driver.switchTo().alert();

4. How to upload a file in Selenium WebDriver?

Uploading files in WebDriver is done by simply using the sendKeys() method on the file-select input field to enter

the path to the file to be uploaded.

WebElement uploadElement = driver.findElement(By.id("uploadfile\_0"));

// enter the file path onto the file-selection input field

uploadElement.sendKeys("C:\\newhtml.html");

// click the "UploadFile" button

driver.findElement(By.name("send")).click();

5. How to set browser window size in Selenium?

Selenium WebDriver allows resizing and maximizing window natively from its API. We use 'Dimension' class to

resize the window.

WebDriver driver = new FirefoxDriver();

driver.navigate().to("http://google.co.in");

System.out.println(driver.manage().window().getSize());

Dimension d = new Dimension(420,600);

//Resize the current window to the given dimension

driver.manage().window().setSize(d);

6. When do we use findElement() and findElements()?

findElement():

syntax: WebElement elementName = driver.findElement(By.LocatorStrategy("LocatorValue"));

Returns the first most web element if there are multiple web elements found with the same locator

Throws exception NoSuchElementException if there are no elements matching the locator strategy

It will only find one web element

Indexing is not Applicable

findElements();

syntax: List<WebElement> elementName = driver.findElements(By.LocatorStrategy("LocatorValue"));

Returns a list of web elements

Returns an empty list if there are no web elements matching the locator strategy

It will find a collection of elements whose match the locator strategy.

Each Web element is indexed with a number starting from 0 just like an array

7. What is a pause on an exception in Selenium IDE?

pause(waitTime): Wait for the specified amount of time in milliseconds.

1. Thread.sleep(1000);

2. webDriver.manage().timeouts().implicitlyWait(1, TimeUnit.SECONDS);

3. WebDriverWait wait = new WebDriverWait(driver, 10);

WebElement element = wait.until(ExpectedConditions.visibilityOfElementLocated(By.id("ID")));

8. What is the difference between single and double slash in Xpath?

A double slash " // " means any descendant node of the current node in the HTML tree which matches the locator. //

->Selects nodes in the document from the current node that match the selection no matter where they are

A single slash " / " means a node which is a direct child of the current. / -> Selects from the root node

Eg:

1. /bookstore -> Selects the root element bookstore

2. bookstore/book -> Selects all book elements that are children of bookstore

3. //book -> Selects all book elements no matter where they are in the document

4. bookstore//book -> Selects all book elements that are descendant of the bookstore element, no matter where they

are under the bookstore element

5. //@lang -> Selects all attributes that are named lang

9. How do you find broken links in Selenium WebDriver?

Collect all the links in the web page based on <a> tag.

Send HTTP request for the link and read HTTP response code.

Find out whether the link is valid or broken based on HTTP response code.

Repeat this for all the links captured.

10. How to login to any site if it is showing an Authentication Pop-Up for Username and Password?

Approach 1: Handling Authentication/Login Popup Window using Selenium WebDriver

By passing user credentials in URL. Its simple, append your username and password with the URL.

e.g., http://Username:Password@SiteURL

http://rajkumar:myPassword@www.softwaretestingmaterial.com

here, Username is rajkumar

Password is myPassword

SiteURL is www.softwaretestingmaterial.com

Sample code:

String URL = "http://" + rajkumar + ":" + myPassword + "@" + www.softwaretestingmaterial.com;

driver.get(URL);

Alert alert = driver.switchTo().alert();

alert.accept();

Approach 2: Handling Authentication/Login Popup Window using Selenium WebDriver

By using AutoIt, we could handle authentication pop up.

Sample AutoIT Script:

WinWaitActivate("Authentication Required","")

Send("rajkumar{TAB}myPassword{ENTER}")

Sample Java Code:

public static void login(String email, String password) throws Exception{

driver.get(URL);

//Passing the AutoIt Script here

Runtime.getRuntime().exec("D:\\Selenium\\workspace\\AutoItFiles\\ExecutableFiles\\FirefoxBrowser.exe");

driver.findElement

loginpage.setEmail(email);

loginpage.setPassword(password);

loginpage.clickOnLogin();

}

Approach 3: Handling Authentication/Login Popup Window using Selenium WebDriver

By using Alerts in Selenium, we could handle authentication pop up.

driver.switchTo().alert();

//Selenium-WebDriver Java Code for entering Username & Password as below:

driver.findElement(By.id("userID")).sendKeys("userName");

driver.findElement(By.id("password")).sendKeys("myPassword");

driver.switchTo().alert().accept();

driver.switchTo().defaultContent();

}

***Websites for Practicing Automation Testing***

**Beginners**

[***https://itera-qa.azurewebsites.net/home/automation***](https://itera-qa.azurewebsites.net/home/automation)

[***https://the-internet.herokuapp.com/***](https://the-internet.herokuapp.com/)

[***https://www.globalsqa.com/demo-site/***](https://www.globalsqa.com/demo-site/)

[***https://testautomationpractice.blogspot.com/***](https://testautomationpractice.blogspot.com/)

[***https://www.saucedemo.com/***](https://www.saucedemo.com/)

**Intermediate & Advanced**

[***https://opensource-demo.orangehrmlive.com/***](https://opensource-demo.orangehrmlive.com/)

[***http://demo.nopcommerce.com/***](http://demo.nopcommerce.com/)

[***http://admin-demo.nopcommerce.com/***](http://admin-demo.nopcommerce.com/)

[***https://demo.opencart.com/***](https://demo.opencart.com/)

[***https://demo.opencart.com/admin/***](https://demo.opencart.com/admin/)

[***http://automationpractice.com/***](http://automationpractice.com/)

[***http://live.demoguru99.com/***](http://live.demoguru99.com/)