**HP ALM**

**What does ALM stand for?**

* Application Lifecycle Management. There is also HP QC which stands for Quality Center.

**What does ALM do?**

* ALM Manages projects. You can store requirements, tests, and defects in it. You can also build reports to help understand the overall status of the project.
* It is a web-based tool and supports communication and association among various stakeholders. It also integrates with QTP , WinRunner & LoadRunner. We can also create reports and graphs for Analysis and Tracking for Test processes.

**Describe all 5 modules in HP ALM?**

The five modules are Dashboard, Management, Requirements, Testing, and Defects.

* + The dashboard is for reporting
  + Management is where you create releases, cycles, and libraries.
  + Requirements are where you create and store requirements.
  + Testing is where you create and execute your tests.
  + Defects are where you store your defects.

**What is the difference between test plan and test lab?**

* The test plan is where you write and store your test cases. The test lab is where you execute them.

**What are Test Runs?**

* A test run is an audit log of all tests ever run.

**What is the purpose of parameters?**

* Suppose your test required a username and a password.  You could store this as a [parameter](https://rossoneill.ca/hp-alm-test-parameters/) in your test.

**Give an example of how you would use test configurations?**

* Suppose you want to test adding money to your account and you want to test all 3 major credit cards. Instead of creating 3 separate tests you could create 1 test with 3 configurations.
* When you add your single test to the test lab it will create three separate tests (one for each configuration).

**Explain why do we need management of release and cycles in ALM?**

* There are many releases for a specific product
* Each release is segregated into a number of cycles
* Each release has also have a pre-defined scope and milestone associated with it
* There is a specific number of test cases and requirements associated with it
* Upon executing tests, the defects are mapped and logged to the corresponding tests after which we can trace requirements and defects

**What is the difference between a release and a cycle?**

|  |  |
| --- | --- |
| **release** | **cycle** |
| * A **release** represents a group of changes in one or more applications that will be available for distribution at the same time. Each release can contain a number of cycles. | A **cycle** is a set of development and quality assurance efforts performed to achieve a common goal based on the release timeline. Both releases and cycles have defined start and end dates. |

**What are Libraries?**

[Libraries](https://rossoneill.ca/hp-alm-libraries/) are a way to track change. You can use libraries to track change with requirements, resources, or test cases.

For example, suppose I want to see how the requirements for a particular project has changed. First, I would create a library and define the scope which in this example would be all requirements in the current project. I would then assign a baseline to that scope (think of the baseline as a picture of all the requirements at a point in time).  Assume a month has passed and you defined the second baseline and assign it to all the requirements in the project.  With the library feature, you can then compare baselines and see how the requirements have changed, added, or updated over time.

**What does pin a baseline to a test set mean?**

* Suppose you wanted to test version 1.5 that would be released 1 month from today.  A colleague wanted to write test cases for version 1.6 that would be released 2 months from today.  The problem is your colleague may overwrite your test cases by updating them.
* To overcome this obstacle you can pin a test set to a baseline.

**How do you create traceability between test cases and requirements?**

* When you create a requirement the direct cover status will be set to “not covered”. This states there is not a test case associated with this requirement.
* To create coverage you need to link your test case to the requirement. This can be done in the requirements module or in the test plan module.

**What is the purpose of the Test Resources module?**

* The test resources module stores the object repository (UFT or QTP code) and Sprinter Data.

**What is Requirement to Requirement Traceability? Why would you use it?**

* Most people think of traceability between a requirement and a test case. However, you can create traceability from a requirement to a requirement. The reason we do this is to perform an impact assessment.
* For example, suppose a change in Requirement A will impact Requirement B. If requirements to requirements traceability are set up correctly you can see we need to update Requirement B if we change Requirement A.

**What is the traceability matrix?**

* In ALM you can create traceability between requirements and test cases. In ALM you can export this matrix into an excel sheet to show testing coverage.
* You can also create requirements to requirements traceability to help perform impact assessment.

**The Requirements module comes with a column called “Direct Cover Status” Explain this column?**

* Not Covered
* No Run
* Passed
* Failed
* N/A
* Not Completed
* Blocked

**What is Sprinter? Mention how sprinter tools are helpful?**

Sprinter is a tool to help speed up the manual testing process. It is a plugin is included with HP ALM. Some of the features include a smart defect, macros, annotation tools, New Defect, Add Defect Reminder and mirroring.

**What are Business Components?**

Quality Center provides Business Component for Business Process Testing (BPT). Many Enterprise Applications are a) complex and b) require extensive test scripts/case. A Test /Automation Engineer can not handle both complexity of Application Under Test as well as extensive test script/test case creation.

Using Business Component, Subject Matter Experts ( who are experts on the Application Under Test ) can create tests in a script free environment without involving in the Nitty-gritty of test case/script designing. It helps increase test coverage and creates re-usable business components used for testing essential Business Processes.

Development of Test Script / Cases is done by Automation / Test Engineer.

* A single test is comprised of one or many test steps.  You can break these steps down into [business components](https://rossoneill.ca/hp-alm-business-components/).  You can then group these components into a single test.   This becomes very useful when steps are repetitive such as “Login” or “Logout”.
* Another advantage of Business Components is each component can be automated and grouped together by a non-technical user and create an automated test.
* ALM supports Business Process Testing (BPT) in which Subject Matter Experts can create tests in a without involving in the Nitty-gritty of test case/script designing.

**What are synchronizers?**

* Synchronizers automatically copy data from one ALM source to another.  For example, suppose you house your defects in HP ALM but the vendor users Jira.  You can download and install a synchronizer to copy defects from HP ALM and insert them into Jira (this works both ways).

**What are the benefits of Requirement Traceability?**

* The benefits of Requirement traceability track from links indicates requirements that affect a selected requirement. Trace to links indicates requirements that are affected by a selected requirement.

**Can We Convert or Generate Test from the requirements?**

* Yes there are two ways to generate test from requirements. Convert Requirement to test and Generate a test from requirements.

**Can we create a Utest from ALM?**

* Yes we can create UFT test from ALM but we must first make sure UFT has the ability to execute tests from ALM.

**What is the difference between test management tool and defect management tool?**

|  |  |
| --- | --- |
| test management tool | defect management tool |
| Test management tool enables testers to create, execute and log defects | Defect management tool helps us to create and track defects only. |

**What is the Purpose of Creating Child Requirement in ALM?**

If a requirement depend on other requirement then treating Child requirements to the main requirement you can evaluate the sub requirements related to the main requirements.

**What is Test Lab?**

Test Lab is the module where we execute the Test Cases that we developed using the test plan Module. Both Manual and Automation executions happens in the Test Lab. Test Lab module helps the tester to execute the created tests. Using this module one can schedule, run and analyze and post defects.

**What do meant by test Instance?**

A Test Case is imported from Test Plan module to Test Lab module for execution under a test set known as test instance. Sometime it is okay to have multiple instances of the same Test Case in the Test Lab Module.

**Is it possible to maintain test data in ALM?**

Test data can be stored in a seperate file(say excel sheets) and uploaded along with the test cases or it can be maintained under parameters tab of a test case.

**How to avoid logging duplicate defects in Quality Center?**

In the defect tracking window of ALM, there is a “find similar defect” icon. When this button is clicked after writing the defect, if anybody else has logged a similar defect then the system points it out.

**How to generate defect ID in ALM?**

The Defect ID is automatically generated after clicking Submit button.

**What are the status of a Test Case?**

The Execution status of a test case can be − Pass, Fail, Blocked, No Run.

**Is it possible to import test cases from Excel / Word to ALM?**

Yes. Using the MS Excel/Word Plugin.

**Is it possible to export ALM test cases to Excel?**

Yes. Select the tests that needs to be exported and perform Right Click and select "Save selected" or "Save All" and enter the file name to be exported to excel.

**How would you import test cases in excel?**

* State you would find the appropriate plugin to export test cases. This is found on the Micro Focus website. This plugin is inserted into Microsoft Excel.  Once the plugin is installed you need to map the excel columns to the appropriate test plan field.
* Note this process can be repeated for requirements and defects.

**Can we export the file from Quality Centre to Excel / Word. If yes then how?**

Yes.

* Requirement tab– Right click on main Req/click on export/save as word, excel or other template. This would save all the child requirements
* Test plan tab: Only individual test can be exported. No parent child export is possible. Select a test script, click on the design steps tab, right click anywhere on the open window. Click on export and save as.
* Test lab tab: Select a child group. Click on execution grid if it is not selected. Right click anywhere. Default save option is excel. But can be saved in documents and other formats
* Defects Tab: Right click anywhere on the window, export all or selected defects and save excel sheet or document.

**How can we save the tests Executed in test lab?**

Once a test is executed the status of the tests are automatically saved when the user clicks on "END RUN" button in the Test Lab

**What are the supported databases of HP ALM?**

HP ALM supports MS SQL and ORACLE

**How to use UFT as an automation tool in ALM?**

HP UFT can be used in conjuction with HP ALM using the add-in HP ALM − UFT addin

**Can you switch between two projects in ALM?**

Testers can switch between ALM projects by navigating to Tools >> Change Projects >> Select Project. In other version , you will need to log-off and log-in again.

**What is the purpose of storing requirement in ALM?**

You store requirements in Quality Center for following reasons

a) To ensure 100% coverage : You can create and track test plan / sets for the requirements stored in Quality Center to ensure all the requirements are tested.

b) Easy Change Management : If any requirement changes during course of test case creation , the underlying test case is automatically highlighted and Test Engineer can change the test case to suite the new requirement.

C) Ease of Tracking : Using Advanced Reporting & Graphs provided by QC , Managers can determine various metrics useful in project tracking and monitoring.

**What is Coverage status, what does it do?**

Coverage status is percentage of testing covered at a given time and also to keep track of project deadline. Coverage status is percentage of testing covered at a given time. For Example, If you have 100 test cases in a project and you have executed 35 test cases than your coverage status of the project is 35%. Coverage status is helps keep track of project deadline.

**What are the main components of HP ALM?**

It consists of HP ALM Client(IE Browser), ALM Server, Database server.

**Mention what are the different edition for HP ALM?**

The different edition of HP ALM includes

* HP ALM essentials: It is for the corporates that need the basic features for supporting their entire software life cycle
* HP QC enterprise edition: This version is used by corporates more commonly who use ALM more testing purposes. It also provides integration with UFT
* HP ALM performance center edition: This license is best suitable for organizations who would like to use HP ALM to drive HP-Load runner scripts. It helps the users to manage, maintain, execute, schedule and monitor performance tests.

**Explain the Workflow in HP ALM.**

HP ALM Workflow includes Release Specification >> Requirement Specification >> Test Planning >> Test Execution >> Defect Tracking.

**Explain how you can customize the defect management cycle in ALM?**

Defect Management Cycle can be customized using Project customization menu under Tools menu. Only Project Admins can customize and also we can make use of Script editor for the same.

One should gather all the features or attributes that have to be part of the defect management like defect origin, version, defect details, etc. Later in QC using the modify options, one can change the defect modules accordingly.

**What is the use of Dashboard?**

A Dashboard gives a brief and quick view of the project status to the project managers or stakeholders.

The dashboard analysis consists of two views

* Analysis View: It consists of the analysis tree using which project managers/QA can arrange all of their analysis items like-graphs, excel reports and project reports
* Dashboard View: It consists of the dashboard tree in which managers or testers arrange dashboard pages that can arrange multiple graphs that was formed in the analysis tree and manifest them in a single view

**What is the use of HP Sprinter?**

Sprinter is manual testing utility that is integrated with HP ALM more effectively. It helps us to record and fast farward manual testing. It also allows testers to log defects from Sprinter UI.

**What is sprinter-data injection?**

It is a feature in HP Sprinter using which we can enter data into the application. We can insert multi-set of data directly into the application with respective matching fields all at once. Choose the row that you want to insert and tap on the inject icon which directly inject the data into the corresponding fields

**Explain how you can add requirements to test cases in ALM.**

We can add either a parent requirement or a child requirement against a test case in ALM.

* Parent Requirements which covers high-level functions of the requirements
* Child Requirements which covers low-level functions of the requirements.

**What are the default groups and permissions in HP ALM?**

* Developer
* Project Manager
* QA Tester
* TD Admin
* View

The permissions of these above groups cannot be changed at any cost. And also these group names cannot be renamed/edited. Neither these groups can be deleted from ALM.

* ***Note:*** A newly added user to the project in ALM will have only the VIEW permissions.

**Differentiate “Entity Graph” and “Business View Graph”?**

* **A)** Entity Graph is related to either defect or requirements or tests or test sets or test runs. All these fields are specific to an entity.
* **Business View Graph** is related to a single entity or combination of a defect and requirement or defect and test. The fields of a business view graph contain useful information of the business.

**What Types of Graphs available in HP ALM?**

The Graphs, Reports, Live Analysis Graphs are available in HP ALM.

**On Which entities, Follow Up Alert can be created on?**

Follow up entities can be created on Test Plan, Test Execution Grid, Defect grid.

**Defects can be linked to what types of ALM Entities?**

Defects can be linked to Tests, Test Steps, Run and Run Steps, Requirements.

**What type of Tests can be scheduled to be run at a specific Date and Time?**

Manual or Automated Tests can be executed at a specified date and time.

**In which module, the Results of an AUTOMATED test case are stored?**

The results are always stored in Test Runs Tab of Test Lab Module.

**A Test Instance is**

a copy of test case that contains various test steps.

**What is Purge Run?**

Purge Run is a process used to delete old test run result in project. We can delete the test runs that are old or even a particular test step.

**How many types of report are there in ALM?**

Requirement Module Reports, Test Plan Module Reports, Test Lab Module Reports, Defects Module Reports.

**What is Unattached Folder in Test Plan?**

When we delete a folder, we can choose to delete the folder only, or the folder, its subfolders, and test. If we choose to delete the folder only, all the tests are moved to unattached folder in the test plan tree.

**Is 'Not covered' and 'Not run' status are same ?**

No, Not Covered status meant for requirements for those tests are neither created nor mapped while Not Run status means for requirements that are yet to be executed

**What are the types of tests that you can execute using HP ALM?**

HP UFT/QTP Tests, Manual Tests, HP Load Runner/Win Runner Scripts.

**What are the currently supported user defined field types?**

Number, Date, String, List, User List, Look up list.

**Why is the use of a filter?**

Filter is used to view the data based on user criteria and Filters are available for Graphs, Reports and Grids.

**Can you schedule a test in HP ALM?**

Yes. We can schedule test by navigating to Goto >> Execution flow tab and selecting 'Test Run Schedule'.

**Explain how one can map a single defect to more than one test script?**

Using the “associate defect” option in TestDirector one can assign the same defect to a number of test cases.

**Mention how many types of tabs are there in Quality Center and explain them?**

1. Requirement: To track the customer requirements
2. Test Plan: To store the test scripts and design the test cases
3. Test Lab: To track the results and execute the test cases
4. Defect: To track down the logged defects and log a defect

**What will be the status in Quality Center if you give "Suggestion" to the Developer?**

This is a trick question. You can give "Suggestion" to the developer using the Comments sections provided in QC. This is will not change the current status of Defect in QC. In sum, the status of the defect remains the same, as that before giving suggestion to the developer.

**What is the difference between Test Director and Quality Center?**

Quality Center is upgraded version of Test Director built by the same vendor Mercury (Now acquired by HP).Test Director Version 8.2 onwards is known as Quality Center. Quality Center is has enhanced Security/Test management /Defect management features when compared to Test Director.

**JIRA VS ALM**

* Atlassian realized long ago that ***every development team is different***. Each team follows different sets of workflows, build schedules, and release processes. Within JIRA, teams could change tools regardless of development methodology, whereas with large ALM vendors like HP, organizations needed to follow a rigid process due to their tool architecture.
* Easy Extension: JIRA was primarily targeted towards issue and project management, but with countless add-ons, the functionality could be easily extended. Therefore, when compared with traditional ALM vendors like HP, JIRA lacked out-of-the-box functionality, such as project planning capabilities for roadmap discussions. However, customers requiring these functionalities could easily extend JIRA using add-ons.
* Easy to try and buy: Unlike **big ALM vendors including HP, which required expensive professional services along with other add-ons,** JIRA took the complexity out of that process with a try and buy business model. The tool, along with add-ons, was available at a fraction of a cost and no need for professional services.
* The Death of IE: **With no browsers other than IE supported,** HP ALM essentially dug its own grave. Users were restricted to one browser in a world that was moving towards multi-platform and multi-operating systems. JIRA’s support for different browsers and operating systems made it a compelling sell.
* Pricing: free too jira.

**How can we create automated test scripts or performance test scripts from ALM?**

One cannot create automated test scripts or performance test scripts using ALM. For that, we need to use [HP QTP/UFT](https://www.softwaretestinghelp.com/qtp-quicktest-professional-tutorial-1/) for functional scripts and [HP Load Runner](https://www.softwaretestinghelp.com/hp-loadrunner-load-testing-tool-training-tutorials/) for performance test scripts and create the scripts.

We should upload or save the above-created scripts into ALM and can execute, monitor, schedule and report the same.

**Can we delete the default test configuration from HP ALM?**

No, the default test configuration cannot be deleted. However, we can edit the same and can work on it.

**Define Test Resources Module and its Uses?**

**A)** “Test Resources” helps users to deal with the resources that are utilized by automation scripts or performance scripts or tests.

The excel file we used to import tests into ALM can be uploaded into test resources module.

We can upload and download resources to test resource tree. And also can define the dependencies between resources, tests etc.

**Which types of test resources are used for executing automated tests in HP ALM?**

**A)** Below are the tests resources used for executing automated tests in ALM

i) Data Table

ii) Environmental Variables

iii) Function Libraries

iv) Recovery Scenarios and

v) Shared Object Repository

**Define “Project Entities”?**

By using “Project Entities” module, a project Administrator will be able to modify/edit the ALM system fields or can create new user-defined fields.

**Can the “Username” be edited in HP ALM?**

No, “Username” cannot be edited by users and even the user of type Project Administrator also cannot edit it.

**Name the tabs that are located on the left side of HP ALM?**

Following are the tabs located on left side of HP ALM

i) Dashboard

ii) Management

iii) Requirements

iv) Lab Resources

v) Testing

vi) Performance Center and Defects

**Who can create Domain, Projects and Users in How?**

Only the HP ALM site Administrator can create Projects, Domain, and Users. End Users do not have the rights to access to site admin page.

**How many built-in tables does Quality Center have?**

1. Test Table
2. Test Step Table
3. Test Set Table
4. Run Table
5. Defect Table
6. Requirement Table

**How does u control the access to a QC project?**  
**Ans.**We need to specify the users and the privileges for each user.

**Do we have programming interface in Quality Center?**  
**Ans.**No, we don’t have programming interface in Quality Center

**What is the difference between Quality Center and Bugzilla?**  
**Ans.**Quality Center is a test management tool which supports various phases of software development life cycle whereas [BugZilla is Defect Management tool](https://www.softwaretestinghelp.com/popular-bug-tracking-software/) only.

**Explain the architecture of HP-ALM?**  
**Ans.**HP ALM has following components:

1. HP ALM client.
2. ALM server/Application server.
3. Database servers.

**What is Risk Category?**  
**Ans.**We determine the risk category for each assessment requirement under the analysis requirement, It has two factors:

1. Business Criticality
2. Failure Probability.

**Does Quality Center supports UNIX Operating environment?**  
**Ans.** Yes, Quality center comes with two kinds of licenses:

1. Quality Center for Windows.
2. Quality Center for UNIX.

**What is Matching Defects?**  
**Ans.** Matching Defects helps us to find and eliminate duplicate or similar defects in the project. There are two methods to search for similar defects.

* Finding similar Defects which compare a selected defect with all other existing defects in the project.
* Finding similar Text which compares a specific test string against all other existing defects in the project.

**What is Defect Tracking?**  
**Ans.** Defect Tracking is a method of finding and removing application defects. We can add or detect defects to project at any stage of application management process.

**What is test set notification, and when we need it?**  
**Ans.** To inform any specific user we use test set notification if case of any failure.

**What is the need of Host Manager?**  
**Ans.** Host manager helps to run test on a host connected to our network. It shows the list of available host for test execution and also organizes them into groups for a specific project.

**Explain Linking Defect to test in Quality Control?**  
**Ans.** Defects can be linked to test in the defect grid. It helps to run the tests based on the status of the defect. Defects can be linked to other entities as well such as requirements. Linking can be direct or indirect. If the defect link is with entity then QC adds a direct link and if the link is with run step then QC adds an indirect link to its run, test instance, test set and test.

**What is HP Quality Center and why do companies use it?**  
HP Quality Center (QC) is a set of web-based test management software from HP. It supports high level of communication and interaction among various stakeholders (especially developers, testers, project managers, final users) in order to achieve more efficient global testing process.

**Can you name at least five products of HP Quality Center and describe the components in one sentence?**

* HP Change Impact Testing Module for SAP Apps – it is designed to offer recommendations on SAP testing priorities. It is able to evaluate business risk, analyze the technical impact, tune the strategy and create execution plan for SAP apps.
* HP Functional Testing software – It is designed for manual and automated testing for GUI based services and applications.
* HP QuickTest – Provides functional and regression testing automation for application environments.
* HP Service Test software – provides simplified and fully automated testing of service oriented architecture services.
* HP Test Data Management software – Automated the process of data collection from online applications and combines masking data extraction with automated data extraction.

**How To Use Quality Centre In Real Time Project?**

After completing the test cases, we do:

1. Export the test cases into Quality Centre.
2. The test cases will be loaded in the test plan module.
3. When execution is started. We move the test cases from test plan tab to the test lab module.
4. In test lab, we execute the test cases and put as pass or fail or incomplete. We generate the graph in the test lab for daily report and sent to the specific user.
5. If we got any defects and raise the defects in the defect module. When raising the defects, attach the defects with the screen shot.

**What Is The Need Of Host Manager?**

Host manager helps to run test on a host connected to our network. It shows the list of available host for test execution and also organizes them into groups for a specific project.

**What Is Test Set Notification, And When We Need It?**

To inform any specific user we use test set notification if case of any failure.

**SDLC**

**What Is SDLC?**

SDLC is an abbreviation of Software Development Life Cycle. SDLC is series of steps that offers a defined model for the development and lifecycle management of an application. SDLC (Software Development Life Cycle) is the process of design and development of a product or service to be delivered to the customer that is being followed for the software or systems projects in the Information Technology or Hardware Organizations. SDLC framework is useful in delivering the products or customers which ensures high quality and efficient.

**Name five Models used in SDLC**

* Waterfall model
* Rapid Application Development(RAD) model
* Agile model
* Iterative model
* Spiral model

**What is the ‘scope’ of a project?**

* The scope of the project is nothing but, the goals, objectives, and expectations of the project. Software scope is a well-defined boundary, which includes all the process which are performed to develop and deliver the software product. The software scope consists of all functionalities and artifacts to be delivered to the software system. The software scope also helps to identifies what the system will do and what it will not do.

**According to you, when should users be trained on a new system?**

* During the implementation phase

**In which step of SDLC project early termination could be done?**

* In the SDLC process, project termination can be performed in the feasibility study phase.

**Can bug fixes also include software maintenance?**

* Yes, bug fixes stage also includes software maintenance

**Cost of error correction is least in which stage of SDCL life cycle?**

* Cost of error correction is very less at the early stage of requirement analysis.

**What are LLDs or HLDs in SDLC?**

The LLD (Low-Level Design) and HLD (High-level Design) are used to analyze and understand the project in a high level and low-level overview to different types of team members to the customers depending on the technical or business knowledge of the person. The Low-level Design is a detailed design implementation which will be helpful in the development process for the Developers whereas the High-Level Design will be given by Architects to proceed with the development process initially. This will be easier to know or look at a glance to understand about the project easily.

**What are the different phases in the Agile model?**

The different phases involved in the Agile model are Planning, Requirements, Analysis, Design, Coding, Unit Testing, System Integration Testing, Non-Functional Testing, and Acceptance Testing. The Agile model will be followed using any Agile boards such as Scrum or Kanban. There will be a number of Sprints to be followed and all the deliverables will be done in the form of Story Points.

**What are the advantages of the agile model?**

This is the advanced SDLC Interview Questions asked in an interview. The different advantages of following the Agile model in a Software Development Life Cycle process are as below:

It is easier and simple to understand and to use and implement.

It has simple and easier deliverables which are planned frequently based on Sprints which ensures frequent and high-quality deliverables.

It is very good for smaller and also larger or complex projects and ends up with high-quality project deliverables.

**What Are The Models In Sdlc?**

* Waterfall model
* V model
* Incremental model
* Rapid Application Development(RAD) model
* Agile model
* Iterative model
* Spiral model
* Big-bang Model
* Prototype Model
* Capability Maturity Model

**What Is Srs?**

SRS or Software Requirement Specification is a document produced at the time of requirement gathering process. It can be also seen as a process of refining requirements and documenting them.

SRS is a formal document that acts as a written agreement between the development team and the customer. SRS acts as input to the design phase and includes functional, performance, software, hardware, and network requirements of the project.

**What Is The Difference Between Crs And Srs?**

* The CRS is a brief document prepared by the business analyst and might contains many contradicting data, duplicates, missing information.
* The SRS is a base lined and final document that is well organized and clear in terms of understanding which is used as reference by the test engineers.

**What Is Deployment Phase?**

The Deployment phase is nothing but the product is delivered / deployed to the customer for their use after the successful testing.

**What Is Meant By Agile Model?**

In agile model, the product or solution is first divided into features which need to be developed. If there are new features identified in the midst of complete product release it again gets planned across sprints. Agile Sprint duration is decided based on feature to be developed. Every sprint goes through the phases of Requirement, Design, Development and Testing phase. The most important of the principles is customer satisfaction by giving rapid and continuous delivery of small and useful software.

**What Is Meant By Spiral Model?**

The spiral model is similar to the incremental model, but incorporates risk analysis. The spiral model has four phases: Planning, Risk Analysis, Engineering and Evaluation. A software project repeatedly passes through these phases in iterations (called Spirals in this model). The baseline spiral, starting in the planning phase, requirements are gathered and risk is assessed. Each subsequent spiral builds on the baseline spiral. Requirements are gathered during the planning phase. This model of development combines the features of the prototyping model and the waterfall model. The spiral model is intended for large, expensive, and complicated projects.

**What Is Meant By Capability Maturity Model?**

Capability Maturity Model is a bench-mark for measuring the maturity of an organization’s software process. It is a methodology used to develop and refine an organization’s software development process. CMM can be used to assess an organization against a scale of five process maturity levels based on certain Key Process Areas (KPA). It describes the maturity of the company based upon the project the company is dealing with and the clients. Each level ranks the organization according to its standardization of processes in the subject area being assessed.

**What Are The Advantages And Disadvantages Of Waterfall Model?**

The Waterfall model is the earliest of the SDLC models also known as Linear-Sequential Life Cycle Model. In this model, each stage has to be completed before the initialization of the next step. The sequential flow of the model is responsible for its name.

**Advantages:**

* This model is simple and easy to understand and use.
* It is easy to manage due to the rigidity of the model – each phase has specific deliverables and a review process.
* In this model phases are processed and completed one at a time. Phases do not overlap.
* Waterfall model works well for smaller projects where requirements are very well understood.
* It allows for departmentalization and managerial control.
* As its linear model, it’s easy to implement.

**Disadvantages:**

* Software is delivered late in project, delays discovery of serious errors.
* Difficult to integrate risk management.
* Difficult and expensive to make changes to documents “swimming upstream”.
* Significant administrative overhead, costly for small teams and projects.
* If client want the requirement to be changed, it will not implemented in the current development process.
* Poor model for long and ongoing projects.

**What Are The Advantages And Disadvantages Of V Model?**

The Waterfall model is the earliest of the **SDLC models** also known as **Linear-Sequential Life Cycle Model**. In this model, each stage has to be completed before the initialization of the next step. The sequential flow of the model is responsible for its name.

**Advantages:**

* Simple and easy to use.
* Each phase has specific deliverables.
* Higher chance of success over the waterfall model due to the early development of test plans during the life cycle.
* Works well for small projects where requirements are easily understood.
* Avoids the downward flow of the defects.

**Disadvantages:**

* Very rigid and least flexible.
* Software is developed during the implementation phase, so no early prototypes of the software are produced.
* If any changes happen in midway, then the test documents along with requirement documents has to be updated.

**What Is Scrum Methodology In Agile Software Development?**

There are different methodologies, which are a part of the agile model. The most famous one is scrum methodology. Like all the other agile computer programming, scrum is also an iterative and incremental methodology. This methodology is different than the other methodologies because, the idea of empirical process control was introduced in this process. As a matter of fact, scrum was introduced for software project management. However, it was eventually also used for software maintenance.

The best part of the scrum methodology is that it makes use of real world progress of a project, which is used for planning and scheduling releases. The entire computer software project is divided into small parts known as sprints.

The duration of sprint can range from one week to three weeks. At the end of the duration of the sprint, the team members along with the stakeholders meet. This meeting helps in assessing the progress of the project and chalk out the further plan of action. This assessment helps in taking stalk of the current state of affairs and rework the line of work and complete the project on time and not just speculate or predict the further outcome.

**What Is Requirements Gathering Phase In Sdlc,explain It?**

This is an initial stage in SDLC; in this stage business analyst category people gather requirements from the customer and document them, the document called BRS (Business requirements specification) or CRS (customer requirements specification) or URS (user requirements specification) or PRD (product requirements specification) or BDD (business design document)

**Explain About The Software Release Process?**

PM (Project Manager) forms Release Team, Release team consists of a few developers, testers,project management executive, and system administrator Release Team goes to customer place and deploys software. Release Team provides some training to the customer site people (if required)

**What Is The Difference Between Sdlc And Stlc?**

| **SDLC** | **STLC** |
| --- | --- |
| It is the Software Development Life Cycle used by the developers to design, test, develop and deploy a software product. | It is the software testing life cycle that consists of the various processes to test the software product in the Testing phase of the SDLC. |
| The requirements are gathered from market and sales data, which is analyzed by the development team. | The testing team analyses the requirements for testing the product by SRS (Software Requirement Specification) document. |
| Based on the SRS, the developers write the code for the software in the development phase. | A test architect or test lead writes the code for test cases and identify the testing points to use these cases. |
| After deployment, the development teams release update or patches to improve the functionality of the product. | After deployment, the testers release updated test plans and automation scripts for the product. |

**What are the different phases of SDLC?**

SDLC stands for Software Development Life Cycle which is the process used by the software developers to design, develop, maintain, test and deploy software. The cycle describes the process flow of the development of the software to meet user expectations properly while adhering to the development guidelines. The different phases of SDLC are:

|  |  |
| --- | --- |
| 1. Requirement analysis and planning | The first step of the SDLC is requirement analysis of the software. Based on customer requirements and sales data, the developers chalk out the basic approach needed for the software project. A technical, economic, social and operational feasibility study is carried out in this phase. The possible risks associated with the software project are also identified here. |
| 1. Definition |  |
| 1. Design | In the design phase, the basic design approach to be followed for developing the software is proposed based on the **Software Requirement Specification (SRS)**. The data flow representation and architectural modules are defined here. The details are documented in a **DDS (Design Document Specification)**. |
| 1. Development | In this phase, the actual code for the software is written here based on the information gathered from the **DDS (Design Document Specification)** and the **SRS (Software Requirement Specification)**. Based on the type of software product, the programming language is chosen like **Python, Java or C#**. The budget, time, robustness and risks associated with the project are analyzed here |
| 1. Testing | Before deployment of the software, it is tested for problems. The SDLC stages where the defects and bugs are reported are fixed here. The entire software is retested until it meets the quality specifications mentioned in the **SRS (Software Requirement Specification)**. It is analyzed whether the software works according to customer requirements and meets their demands. |
| 1. Deployment and maintenance | After the deployment of the software, the product needs to be maintained to meet the market demands. In the maintenance stage, the software is monitored to measure its **stability, flexibility, user-friendliness, and performance**.  Based on the analysis report and customer feedbacks, the software is further upgraded and tweaked using patches. New updates to the software are also released by the development team.  After the software product is tested and it passes through every level of the testing phase, it is formally launched in the deployment phase. It may be released as a demo or prototype for getting user reviews, upon which the product will be improved further. The formalities like handing over the ownership of the product, deployment preparation and closing the phase are carried out in this stage. |

**Which SDLC model is best?**

There is no model that can be considered as the best in case of software development. However, the Agile model is currently the most popular and widely used by software firms.In this model after every development stage, the user is able to see whether the product meets their requirements. The risks are reduced this way as continuous alterations are done based on user feedback.

|  |  |
| --- | --- |
| System Testing | End-to-End Testing |
| Validates the software system but doesn’t look outside of it. | Validates interconnected systems and external interfaces. |
| Looks at system features (viewing each feature as a subsystem). | Looks at the UI/GUI, backend and hardware to cover all functionality that the user experiences when using an application |
| Follows integration testing. | Follows system testing. |
| Is easier to automate (though manual system testing is still a widespread practice). | Manual end-to-end testing is more common due to the need of dealing with external interfaces. |

**How would you handle multiple tasks at a time ?**

**What is end-to-end testing?**

**End-to-end testing (e2e testing)** is a software quality assurance methodology that ensures correct functioning and performance of applications in production-like scenarios. This methodology checks if an application performs as designed *on all levels and across all subsystems*. The scope of end-to-end testing encompasses the application in its entirety, as well as its integration with external interfaces and outside applications.

### Basic Difference between Android and iOS Testing

**You might have gone through all the tutorials, I have put in some major differences here, which in turn will help you as part of your testing:**

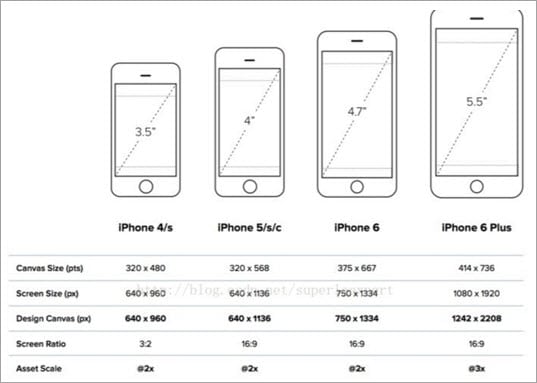
**#1)** As we have a lot of Android devices available in the market and all of them come with different screen resolutions and sizes, hence this is one of the major difference.

**For Example*,*** Samsung S2 size is too small when compared with Nexus 6. There are high possibilities that your app layout and design get distorted on one of the devices. Probability is low in iOS as there are only countable devices available in the market and out of those many phones have similar resolutions.

**For Example,** before iPhone 6 and above came into existence all the older versions had the similar size only.

**#2)** Example to assert the above point is that in Android the developers must use 1x,2x,3x,4x and 5x images to support image resolutions for all devices whereas iOS uses just 1x,2x and 3x. However, it becomes the tester’s responsibility to ensure that the images and the other UI elements are displayed correctly on all devices.

**You can refer to the below diagram to understand the concept of image resolutions:**

[](https://cdn.softwaretestinghelp.com/wp-content/qa/uploads/2018/03/Mobile-resolutions.jpg)

**#3)** As we have the market flooded with Android devices, the code must be written in such a way in which the performance remains steady. So, it is quite probable that your app may behave slowly on lower-end devices.

**#4)** Another issue with Android is that software upgrades are not available for all devices at a go. Device manufacturers decide when to upgrade their devices. It becomes a very difficult task to test everything both with the new OS and the old OS.

Also, it becomes a cumbersome task for the developers to modify their code to support both the versions.**For Example*,*** when Android 6.0 came, there was a major change as this OS started supporting app level permissions. To clarify further, the user could **change permissions (location, contacts) at app level also.**Now the testing team owes the responsibility to make sure that showing permissions screen on the app launch on Android 6.0 and above and not showing permission screen on the lower versions.

**#5)** From the testing perspective, Pre-production build (i.e. beta version) testing is different on both the platforms. In Android, if a user is added to beta users list then he can see the updated beta build on the Play Store only if he is signed in into the play store with the same email ID which is added as a beta user.

**WIREMOCK**

WireMock is a simulator for HTTP-based APIs. Some might consider it a service virtualization tool or a mock server. It enables you to stay productive when an API you depend on doesn't exist or isn't complete.

It supports testing of edge cases and failure modes that the real API won't reliably produce. And because it's fast it can reduce your build time from hours down to minutes.

WireMock is a tool that can mimic the behavior of an HTTP API and capture the HTTP requests send to that API.

It allows us to:

* Configure the response returned by the HTTP API when it receives a specific request.
* Capture the incoming HTTP requests and write assertions for the captured HTTP requests.
* Identify the stubbed and/or captured HTTP requests by using request matching.
* Configure request matchers by comparing the request URL, request method, request headers, cookies, and request body with the expected values.
* Use WireMock as a library or run it as a standalone process.

**Why WireMock?**

1. According to the official document of wiremock.org, WireMock is a simulator for HTTP-based APIs. Some might consider it a service virtualization tool or a mock server. It enables you to stay productive when an API you depend on doesn't exist or isn't complete for using (still in dev phase). It supports testing of edge cases and failure modes that the real API won't reliably produce. And because it's fast it can reduce your build and test time from hours down to minutes.
2. Record and Playback — It can run on recording mode. Get up and running quickly by capturing outside third party traffic to and from an existing API. It caches REST API response to WireMock proxy server.
3. Real API's request and response can be cached locally and can be used as a mock server in the absence of the real server using recording feature.
4. It provides a provision to create the requests and corresponding responses in form of JSON objects.

**Scope of wire mock**

1. WireMock will be used as a mocking server.
   * The scope of this mocking server is to run it as an independent server or at the developer machine for REST API mocking. Also, it should be deployed on the remote non-prod and prod servers for QA testing.
2. It will sync up real third party servers and record all the tested API requests and responses.
3. Additionally, mock JSON files can be created for the custom scenarios for the different set of the request.
4. The Same JSON will be used by web clients internally for local testing during the development phase.

Note: One WireMock instance (JVM) can be only configured for single API server.

**MockLab**

MockLab is a hosted API simulator built on WireMock, with an intuitive web UI, team collaboration and nothing to install. The 100% compatible API supports drop-in replacement of the WireMock server with a single line of code.

**Mock Servers**

1. Fake API that emulates a server response.
2. Configure to return your desired response without writing any code
3. Hosted by postman.

**Service virtualization**

Service virtualization is the process of creating replicas of systems that new applications depend on, in order to test how well the application and systems integrate. It is primarily used for integrating applications that depend on cloud and service-oriented architectures (SOA), or applications that communicate with third-party data and application program interface (APIs.)

Examples of these systems include customer relationship management (CRM) services such as Salesforce Service Cloud, enterprise resource planning (ERP) services such as SAP ECC, and internal systems that are still in developmentt.

**Mocking vs stubbing vs service virtualization**

Mocking and stubbing are similar to service virtualization, but they function on smaller scales. Mocking and stubbing usually involve testing specific behaviors in restricted contexts, whereas service virtualization replicates systems at a production scale.

**When Should We Use WireMock?**

There are three situations when we should use WireMock:

1. We have to implement a feature which uses an HTTP API that is not ready. This is a quite common situation if we are doing greenfield development and we have to integrate our application with other systems (either internal or external) which aren’t written by us. Also, if we are using the microservices architecture, the odds are that we will run into similar situations.

We have to write unit tests for classes which use HTTP APIs. If we are writing unit tests for a class called A which uses another class called B that uses an HTTP API, the first thing that might come to our mind is to replace the B with a mock object when we are writing unit tests for the A class. However, if the API client is written by us, using a mock object isn’t a good choice because it doesn’t allow us to verify that our code can communicate with the HTTP API.

1. This is a good choice if the API client (B class) is provided by someone else because we can assume that the author of the client has ensured that it is working correctly.

In fact, I think that the best option is to test both A and B classes as one unit. This way we can verify that the correct information is send to the HTTP API, and ensure that all “legal” HTTP responses can be processed by the A and B classes.

1. We have to write integration, API, or end-to-end tests for features which use external HTTP APIs. When we write these kinds of tests, we don’t want to invoke external HTTP APIs because if our tests invoke an external HTTP API:

* Our tests depend from the external HTTP API. Naturally, this means that our tests will fail if the external HTTP API is down. Also, it’s very common that the external HTTP API doesn’t allow us to initialize it into a known state before our tests are run. That’s why we cannot write tests which use the data returned by the external HTTP API because we cannot know what kind of data will be returned.
* Our tests are slower than they could be. The thing is that waiting a response from an external HTTP API takes a lot longer than getting the same response from WireMock. To make matters worse, we cannot use a short timeout because otherwise our tests could fail only because the timeout was too short and it was exceeded.
* We cannot run our tests if we don’t have a network connection. This is problem because there are places where we don’t necessarily have a good network connection (like a train). Also, some APIs block requests which don’t come from a “known” IP address. This means that having a working network connection might not good enough. We have to also be connected to the correct network.

In other words, if we don’t want to write slow and inconsistent tests which can be run only if we are connected to the correct network, we should use WireMock.

Tests which use WireMock cannot guarantee that our application is compatible with the used HTTP APIs. These tests can only ensure that:

* Our application sends the expected requests to the used HTTP API.
* Our application is working as expected when it receives an expected response from the HTTP API.

In other words, if our expectations aren’t correct, these tests are dangerous because they create a false sense of security. That’s why we must always test these features manually before we deploy our application to the production environment.

**When we should not use wire mock?**

However, if the API client is written by us, using a mock object isn’t a good choice because it doesn’t allow us to verify that our code can communicate with the HTTP API.

**Steps**

1. Download standalone jar file. <http://wiremock.org/docs/running-standalone/>
2. Open cmd. Give path of your jar file and use this cmd

java -jar wiremock-standalone-2.24.1.jar --port 9999 --verbose. Your server will start

(This command starts WireMock on port 9999 and turns on verbose mode. Turning on verbose mode allows you to see all messages, including URL matches and near misses as your app interacts with the WireMock endpoints. This is a big help when trying to determine why a WireMock endpoint may not be working.)

How to check that WireMock is running on your system? Open a browser and go to http://localhost:9999/\_\_admin/mappings.

You should see the following:

{

"mappings" : [ ],

"meta" : {

"total" : 0

}

}

1. After running WireMock first time, it will create these two folders in the same home directory where WireMock jar has existed:

mappings => It contains request and response JSON.( contains files that map API request patterns to specific files that contain the desired response.)

\_files => It contains response errors and messages JSON. Also, it contains HTML response as text files.( contains the mock responses you want to send back for any given API requests.)

|  |  |
| --- | --- |
| **files directory** | **Mappings directory** |
| Save this response into the \_\_files directory as character-list.json. | you need to let WireMock know how to map the people endpoint to this response. Create a new file in the mappings directory named character-list.json. |
| {  "count": 87,  "next": "https://swapi.co/api/people/?page=2",  "previous": null,  "results": [  {  "name": "Luke Skywalker",  "height": "172",  "mass": "77",  "hair\_color": "blond",  "skin\_color": "fair",  "eye\_color": "blue",  "birth\_year": "19BBY",  "gender": "male",  // Clipped for brevity here  ]  } | {  "request": {  "method": "GET",  "url": "/swapi.co/api/people"  },  "response": {  "status": 200,  "bodyFileName": "wiremock.json"  }  } |
| Save it as .json and select file type as all files | This lets Wiremock know to map any GET request with the /swapi.co/api/people path to the character-list.json response with an HTTP 200 success status. |

1. Verify Functionality

Now, verify that WireMock has your mapping indexed. If your terminal is still running from your previous session, stop it by pressing Control-C, and start WireMock again using the command:

java -jar wiremock-standalone-2.24.1.jar --port 9999 --verbose

1. WireMock should have picked up your new mapping file. To check this, go to <http://localhost:9999/__admin/mappings>... You will see the details of json file
2. Next, check the response returned for your endpoint. Go to a browser and enter <http://localhost:9999/swapi.co/api/people>.
3. Open postman. Choose get option and enter <http://localhost:9999/swapi.co/api/people>. Click send.
4. Check body and status.

<https://www.raywenderlich.com/3462646-local-api-call-tutorial-with-wiremock-and-ui-tests-in-xcode>

**Where to Go From Here?**

In addition to mocking the same responses you always get from live network requests, you can now send back different scenarios to your UI and see how the app responds. For example:

* Does your app show proper error messaging if it receives an HTTP 500 status?
* What happens to your UI if it receives an empty data set?
* Does the app respond in the right way if it receives a malformed data set?
* What happens if some of the strings received are too long for the UI? Does everything wrap or truncate as expected?

# Simulate a back end with Postman’s mock service

<https://blog.getpostman.com/2017/03/16/simulate-a-back-end-with-postmans-mock-service/>

### How does wire mock work?

**What is JDBC?**

JDBC stands for Java Database Connectivity, which is a standard Java API for database-independent connectivity between the Java programming language and a wide range of databases.

**Describe a general JDBC Architecture.**

General JDBC Architecture consists of two layers JDBC API (This provides the application-to-JDBC Manager connection) and JDBC Driver API (This supports the JDBC Manager-to-Driver Connection).

**What are the common JDBC API components?**

JDBC API consists of following interfaces and classes DriverManager, Driver, Connection, Statement, ResultSet, SQLException.

**Why do I need this while (rs.next()) {?**

The cursor is initially placed before the first element. You need to advance it once to access the first element.

This was obviously done because traversing the results using a loop is very convenient then, as you see. Moves the cursor forward one row from its current position. A ResultSet cursor is **initially positioned before the first row**; the first call to the method next makes the first row the current row; the second call makes the second row the current row, and so on.

**What is a JDBC DriverManager?**

JDBC DriverManager is a class that manages a list of database drivers. It matches connection requests from the java application with the proper database driver using communication subprotocol.

**What is a JDBC Driver?**

JDBC driver is an interface enabling a Java application to interact with a database. To connect with individual databases, JDBC requires drivers for each database. The JDBC driver gives out the connection to the database and implements the protocol for transferring the query and result between client and database.

**What is a connection?**

Connection interface consists of methods for contacting a database. The connection object represents communication context.

**What is a statement?**

Statement captures an SQL statement which is passed to the database to be parsed, compiled, planned and executed.

**What is a ResultSet?**

These objects hold data retrieved from a database after you execute an SQL query using Statement objects. It acts as an iterator to allow you to move through its data. The java.sql.ResultSet interface represents the result set of a database query.

**What are types of ResultSet?**

There are three constants which when defined in result set can move cursor in resultset backward, forward and also in a particular row.

* **ResultSet.TYPE\_FORWARD\_ONLY** − The cursor can only move forward in the result set.
* **ResultSet.TYPE\_SCROLL\_INSENSITIVE** − The cursor can scroll forwards and backwards, and the result set is not sensitive to changes made by others to the database that occur after the result set was created.
* **ResultSet.TYPE\_SCROLL\_SENSITIVE** − The cursor can scroll forwards and backwards, and the result set is sensitive to changes made by others to the database that occur after the result set was created.

**What are the basic steps to create a JDBC application?**

Following are the basic steps to create a JDBC application

* Import packages containing the JDBC classes needed for database programming.
* Register the JDBC driver, so that you can open a communications channel with the database.
* Open a connection using the DriverManager.getConnection () method.
* Execute a query using an object of type Statement.
* Extract data from result set using the appropriate ResultSet.getXXX () method.
* Clean up the environment by closing all database resources relying on the JVM's garbage collection.

**What are JDBC driver types?**

There are four types of JDBC drivers

* **JDBC-ODBC Bridge plus ODBC driver** − also called Type 1 calls native code of the locally available ODBC driver.
* **Native-API, partly Java driver** − also called Type 2 calls database vendor native library on a client side. This code then talks to database over network.
* **JDBC-Net, pure Java driver** − also called Type 3 the pure-java driver that talks with the server-side middleware that then talks to database.
* **Native-protocol, pure Java driver** − also called Type 4 the pure-java driver that uses database native protocol.

**When should each of the JDBC driver type be used?**

Following is a list as to when the four types of drivers can be used

* If you are accessing one type of database, such as Oracle, Sybase, or IBM, the preferred driver type is 4.
* If your Java application is accessing multiple types of databases at the same time, type 3 is the preferred driver.
* Type 2 drivers are useful in situations where a type 3 or type 4 driver is not available yet for your database.
* The type 1 driver is not considered a deployment-level driver and is typically used for development and testing purposes only.

**Which type of JDBC driver is the fastest one?**

JDBC Net pure Java driver(Type 4) is the fastest driver because it converts the JDBC calls into vendor specific protocol calls and it directly interacts with the database.

**Does the JDBC-ODBC Bridge support multiple concurrent open statements per connection?**

No. You can open only one Statement object per connection when you are using the JDBC-ODBC Bridge.

**What are the standard isolation levels defined by JDBC?**

The standard isolation levels are

* TRANSACTION\_NONE
* TRANSACTION\_READ\_COMMITTED
* TRANSACTION\_READ\_UNCOMMITTED
* TRANSACTION\_REPEATABLE\_READ
* TRANSACTION\_SERIALIZABLE

**What is the design pattern followed by JDBC?**

JDBC architecture decouples an abstraction from its implementation. Hence JDBC follows a bridge design pattern. The JDBC API provides the abstraction and the JDBC drivers provide the implementation. New drivers can be plugged-in to the JDBC API without changing the client code.

**What are the different types of JDBC Statements?**

Types of statements are

* **Statement** − regular SQL statement.
* **PreparedStatement** − more efficient than statement due to pre-compilation of SQL.
* **CallableStatement** − to call stored procedures on the database.

**What is difference between statement and prepared statement?**

Prepared statements offer better performance, as they are pre-compiled. Prepared statements reuse the same execution plan for different arguments rather than creating a new execution plan every time. Prepared statements use bind arguments, which are sent to the database engine. This allows mapping different requests with same prepared statement but different arguments to execute the same execution plan. Prepared statements are more secure because they use bind variables, which can prevent SQL injection attack.

**How do you register a driver? There are 2 approaches for registering the Driver**

* **Class.forName()** − This method dynamically loads the driver's class file into memory, which automatically registers it. This method is preferable because it allows you to make the driver registration configurable and portable.
* **DriverManager.registerDriver()** − This static method is used in case you are using a non-JDK compliant JVM, such as the one provided by Microsoft.

**What are the benefits of JDBC 4.0?**

Here are few advantages of JDBC 4.0

* Auto loading of JDBC driver class. In the earlier versions we had to manually register and load drivers using class.forName.
* Connection management enhancements. New methods added to javax.sql.PooledConnection.
* DataSet Implementation of SQL using annotations.
* SQL XML support.

**What do you mean by fastest type of JDBC driver?**

JDBC driver performance or fastness depends on a number of issues Quality of the driver code, size of the driver code, database server and its load, Network topology, Number of times your request is translated to a different API.

**In real time project which driver did you use?**

**How do you create a connection object?**

There are 3 overloaded DriverManager.getConnection() methods to create a connection object

getConnection(String url, String user, String password)Using a database URL with a username and password. For example

String URL = "jdbcoraclethin@amrood1521EMP";

String USER = "username";

String PASS = "password"

Connection conn = DriverManager.getConnection(URL, USER, PASS);

getConnection(String url)Using only a database URL. For example

String URL = "jdbcoraclethinusername/password@amrood1521EMP";

Connection conn = DriverManager.getConnection(URL);

getConnection(String url, Properties prop)Using a database URL and a Properties object. For example

String URL = "jdbcoraclethin@amrood1521EMP";

Properties info = new Properties( );

info.put( "user", "username" );

info.put( "password", "password" );

**How can I determine whether a Statement and its ResultSet will be closed on a commit or rollback?**

Use the DatabaseMetaData methods supportsOpenStatementsAcrossCommit() and supportsOpenStatementsAcrossRollback() to check.

**Is there a practical limit for the number of SQL statements that can be added to an instance of a Statement object?**

The specification makes no mention of any size limitation for Statement.addBatch(), this is dependent, on the driver.

**How cursor works in scrollable result set?**

There are several methods in the ResultSet interface that involve moving the cursor, like beforeFirst(), afterLast(), first(), last(), absolute(int row), relative(int row), previous(), next(), getRow(), moveToInsertRow(), moveToCurrentRow().

**How can you view a result set?**

ResultSet interface contains get methods for each of the possible data types, and each get method has two versions

* One that takes in a column name.
* One that takes in a column index.

For e.g. getInt(String columnName), getInt(int columnIndex)

**How do you update a result set?**

ResultSet interface contains a collection of update methods for updating the data of a result set. Each update method has two versions for each data type

* One that takes in a column name.
* One that takes in a column index.

These methods change the columns of the current row in the ResultSet object, but not in the underlying database. To update your changes to the row in the database, you need to invoke one of the following methods

updateRow(), deleteRow(), refreshRow(), cancelRowUpdates(), insertRow()

**How does JDBC handle the data types of Java and database?**

The JDBC driver converts the Java data type to the appropriate JDBC type before sending it to the database. It uses a default mapping for most data types. For example, a Java int is converted to an SQL INTEGER.

**What causes "No suitable driver" error?**

"No suitable driver" is occurs during a call to the DriverManager.getConnection method, may be of any of the following reason

* Due to failing to load the appropriate JDBC drivers before calling the getConnection method.
* It can be specifying an invalid JDBC URL, one that is not recognized by JDBC driver.
* This error can occur if one or more the shared libraries needed by the bridge cannot be loaded.

**How do you handle SQL NULL values in Java?**

SQL's use of NULL values and Java's use of null are different concepts. There are three tactics you can use

* Avoid using getXXX( ) methods that return primitive data types.
* Use wrapper classes for primitive data types, and use the ResultSet object's wasNull( ) method to test whether the wrapper class variable that received the value returned by the getXXX( ) method should be set to null.
* Use primitive data types and the ResultSet object's wasNull( ) method to test whether the primitive variable that received the value returned by the getXXX( ) method should be set to an acceptable value that you've chosen to represent a NULL.

**What does setAutoCommit do?**

When a connection is created, it is in auto-commit mode. This means that each individual SQL statement is treated as a transaction and will be automatically committed right after it is executed. By setting auto-commit to false no SQL statements will be committed until you explicitly call the commit method.

**Why will you set auto commit mode to false?**

Following are the reasons

* To increase performance.
* To maintain the integrity of business processes.
* To use distributed transactions.

**What is SavePoint? Give an example.**

A savepoint marks a point that the current transaction can roll back to. Instead of rolling all of its changes back, it can choose to roll back only some of them. For example, suppose you

* start a transaction.
* insert 10 rows into a table.
* set a savepoint.
* insert another 5 rows.
* rollback to the savepoint.
* commit the transaction.

After doing this, the table will contain the first 10 rows you inserted. The other 5 rows will have been deleted by the rollback. A savepoint is just a marker that the current transaction can roll back to.

**What are SQL warnings?**

SQLWarning objects are a subclass of SQLException that deal with database access warnings. Warnings do not stop the execution of an application, as exceptions do. They simply alert the user that something did not happen as planned. A warning can be reported on a Connection object, a Statement object (including PreparedStatement and CallableStatement objects), or a ResultSet object. Each of these classes has a getWarnings method.

**Why would you use a batch process?**

Batch Processing allows you to group related SQL statements into a batch and submit them with one call to the database.

**What are the steps followed to create a batch process?**

Typical sequences of steps to use Batch Processing with Statement or PrepareStatement Object are

* In case of Batch processing using PrepareStatement object, create SQL statements with placeholders.
* Create a Statement or PrepareStatement object using either createStatement() or prepareStatement() methods respectively.
* Set auto-commit to false using setAutoCommit().
* Add as many as SQL statements you like into batch using addBatch() method on created statement object.
* Execute all the SQL statements using executeBatch() method on created statement object.
* Finally, commit all the changes using commit() method.

**What is a Stored Procedure and how do you call it in JDBC?**

A stored procedure is a group of SQL statements that form a logical unit and perform a particular task. For example operations on an employee database (hire, fire, promote, lookup) could be coded as stored procedures executed by application code. Stored procedures can be called using CallableStatement class in JDBC API. For example the following code demonstrates this

CallableStatement cs = con.prepareCall("{call MY\_SAMPLE\_STORED\_PROC}");

ResultSet rs = cs.executeQuery();

**What is JDBC SQL escape syntax?**

The escape syntax gives you the flexibility to use database specific features unavailable to you by using standard JDBC methods and properties.

The general SQL escape syntax format is as follows

{keyword 'parameters'}.

JDBC defines escape sequences that contain the standard syntax for the following language features

* Date, time, and timestamp literals (d, t, ts Keywords).
* Scalar functions such as numeric, string, and data type conversion functions(fn Keyword).
* Outer joins(oj Keyword)
* Escape characters for wildcards used in LIKE clauses(escape Keyword).
* Procedure calls(call Keyword).

**What is a transaction?**

A transaction is a logical unit of work. To complete a logical unit of work, several actions may need to be taken against a database. Transactions are used to provide data integrity, correct application semantics, and a consistent view of data during concurrent access.

**How will you insert multiple rows into a database in a single transaction?**

Follow steps as below

//turn off the implicit commit

Connection.setAutoCommit(false);

//..your insert/update/delete goes here

Connection.Commit();

//a new transaction is implicitly started.

**When will you get the message "No Suitable Driver"?**

When a Connection request is issued, the DriverManager asks each loaded driver if it understands the URL sent. When the URL passed is not properly constructed, then the "No Suitable Driver" message is returned.

**What is the difference between execute, executeQuery, executeUpdate?**

* **boolean execute()** - Executes the any kind of SQL statement.
* **ResultSet executeQuery()** - This is used generally for reading the content of the database. The output will be in the form of ResultSet. Generally SELECT statement is used.
* **int executeUpdate()** - This is generally used for altering the databases. Generally DROP TABLE or DATABASE, INSERT into TABLE, UPDATE TABLE, DELETE from TABLE statements will be used in this. The output will be in the form of int which denotes the number of rows affected by the query.

**Why do you have to close database connections in Java?**

You need to close the resultset, the statement and the connection. If the connection has come from a pool, closing it actually sends it back to the pool for reuse. We can do this in the finally{} block, such that if an exception is thrown, you still get the chance to close this.

**What is the use of blob, clob datatypes in JDBC?**

These are used to store large amount of data into database like images, movie etc which are extremely large in size.

**Resultset is an interface, how does it support rs.Next()?**

Every vendor of Database provides implementation of ResultSet & other interfaces, through the Driver.

**What is Connection Pooling?**

Connection Pooling is a technique used for reuse of physical connections and reduced overhead for your application. Connection pooling functionality minimizes expensive operations in the creation and closing of sessions.Database vendor's help multiple clients to share a cached set of connection objects that provides access to a database. Clients need not create a new connection everytime to interact with the database.

**How do you implement connection pooling?**

If you use an application server like WebLogic, WebSphere, jBoss, Tomcat. , then your application server provides the facilities to configure for connection pooling. If you are not using an application server then components like Apache Commons DBCP Component can be used.

**Out of byte[] or a java.sql.Blob, which has best performance when used to manipulate data from database?**

java.sql.Blob has better performance as it does not extract any data from the database until you explicitly ask it to.

**Out of String or a java.sql.Clob, which has best performance when used to manipulate data from database?**

java.sql.Clob has better performance as it does not extract any data from the database until you explicitly ask it to.

**Suppose the SELECT returns 1000 rows, then how to retrieve the first 100 rows, then go back and retrieve the next 100 rows?**

Use the Statement.setFetchSize method to indicate the size of each database fetch.

**What does the Class.forName("MyClass") do?**

Class.forName("MyClass")

* Loads the class MyClass.
* Execute any static block code of MyClass.
* Returns an instance of MyClass.

**When you say Class.forName() loads the driver class, does it mean it imports the driver class using import statement?**

No, it doesn't. An import statement tells the compiler which class to look for. Class.forName() instructs the Classclass to find a class-loader and load that particular Class object into the memory used by the JVM.

**What we set the attribute Concurrency in ResultSet?**

The ResultSet concurrency determines whether the ResultSet can be updated, or only read. A ResultSet can have one of two concurrency levels

* **ResultSet.CONCUR\_READ\_ONLY** − means that the ResultSet can only be read.
* **ResultSet.CONCUR\_UPDATABLE** − means that the ResultSet can be both read and updated.

**What are the differences between setMaxRows(int) and SetFetchSize(int)?**

The difference between setFetchSize(int) and setMaxRow(int) are

* setFetchSize(int) defines the number of rows that will be read from the database when the ResultSet needs more rows. setFetchSize(int) affects how the database returns the ResultSet data.
* setMaxRows(int) method of the ResultSet specifies how many rows a ResultSet can contain at a time. setMaxRows(int) affects the client side JDBC object.

**What is a RowSet?**

A JDBC RowSet object holds tabular data in a way that makes it more flexible and easier to use than a result set. A RowSet objects are JavaBeans components.

**What are different types of RowSet objects?**

There are two types of RowSet

* **Connected** A connected RowSet Object is permanent in nature. It doesn't terminate until the application is terminated.
* **Disconnected** A disconnected RowSet object is ad-hoc in nature. Whenever it requires retrieving data from the database, it establishes the connection and closes it upon finishing the required task. The data that is modified during disconnected state is updated after the connection is re-established.

**What is a "dirty read"?**

In typical database transactions, say one transaction reads and changes the value while the second transaction reads the value before committing or rolling back by the first transaction. This reading process is called as 'dirty read'. Because there is always a chance that the first transaction might rollback the change which causes the second transaction reads an invalid value.

**Which isolation level prevents dirty read in JDBC, connection class?**

TRANSACTION\_READ\_COMMITTED prevents dirty reads.

**What is Metadata and why should you use it?**

JDBC API has two Metadata interfaces DatabaseMetaData & ResultSetMetaData. The meta data provides comprehensive information about the database as a whole. The implementation for these interfaces is implemented by database driver vendors to let users know the capabilities of a Database.

**How to Connect to an Excel Spreadsheet using JDBC in Java?**

Follow the steps below

First setup the new ODBC datasource. Goto Administrative Tools−>Data Sources (ODBC)−>System DSN tab−>Add−>Driver do Microsoft Excel(\*.xls)−>Finish. Now give the Data Source Name (SampleExcel) & Description. Next, click Select Workbook and point to your excel sheet.

In the code make to following code additions

Class.forName("sun.jdbc.odbc.JdbcOdbcDriver");

Connection conn = DriverManager.getConnection("jdbcodbcSampleExcel","","");

stmt = conn.createStatement();

sql = "select \* from [Sheet1$]";

rs=stmt.executeQuery(sql);

Where Sheet1 is the excel sheet name.

What is difference between JDBC, JNDI and Hibernate?

* Hibernate is an Object−Relational Mapping tool. It maps Objects to relational data.
* The Java Naming and Directory Interface (JNDI) is an API to access different naming and directory services. You use it to access something stored in a directory or naming service without haveing to code specifically to that naming or directory service.
* Java DataBase Connectivity (JDBC) API is an API to access different relational databases. You use it to access relational databases without embedding a dependency on a specific database type in your code.

**BATCH FILE**

A batch file (.bat) is used in DOS and Windows, which is an unformatted text file that consists of a series of commands to be executed by the command line interpreter.  It consists of a series of commands to be executed by the command-line interpreter, stored in a plain text file.  It takes various commands as input through the keyboard and processes them. A batch file does the work of a mediator between you and the command prompt. It is a file – with .bat, .cmd, .btm file extensions – containing the CMD commands. When you run a batch file, the commands written in it are executed in the Command Prompt following a serial fashion. Otherwise, these would have to be entered manually, line by line. The set of commands is also known as a batch script.

**Batch file commands**

title: It’s used to change the title text displayed on top of CMD window.

echo – Displays the input string as the output. Use ON or OFF option for ECHO to turn the echoing feature on or off. If you turn on the ECHO, the CMD will display the command it is executing.

pause – Used to stop the execution of a Windows batch file.

EXIT – To exit the Command Prompt.

cls – Used to clear the command prompt screen.

We will create Two(project) class as 'TestA.class' and 'TestB.class'. Now we have created classes and testng.xml file.

Step 1: Open notepad  
Step 2: Paste the below lines of code - You may need to add your project location. In the example, project location is set as 'F:\Selenium\TestNGBatchExample'.  
Step 3: Save the file as 'testNGBatchFile.bat' in location that you want to save.

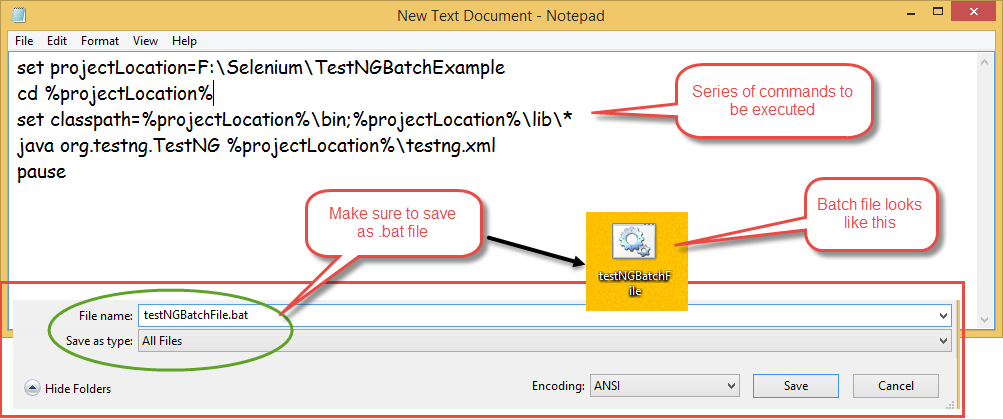
set projectLocation=F:\Selenium\TestNGBatchExample

cd %projectLocation%

set classpath=%projectLocation%\bin;%projectLocation%\lib\\*

java org.testng.TestNG %projectLocation%\testng.xml

pause



In the above line of code, at the end of a batch file, we have added 'pause' statement to prevent auto-closing of console after the execution, which will print a nice message as 'Press any key to continue . . . ' so that we can view the output. Or, if we don't want "Press any key to continue . . ." message you can just ignore that.

**Appium**

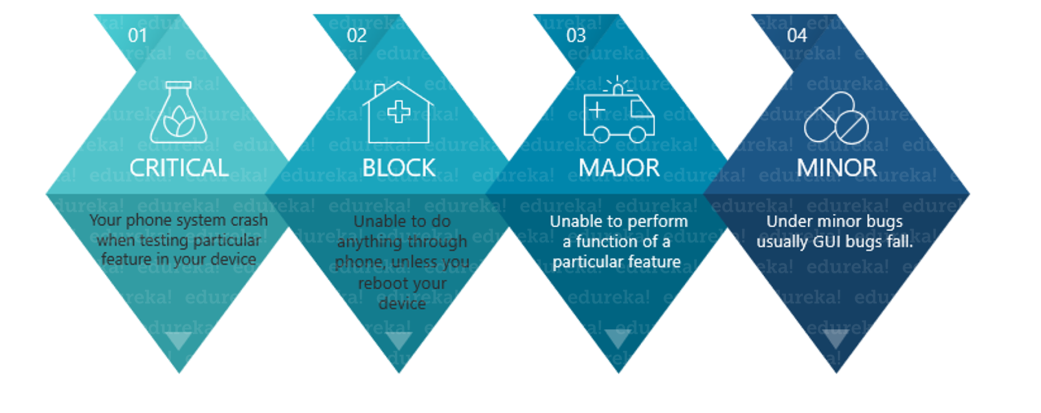
### Explain The Difference Between Simulator And Emulator?

Emulation is the process of mimicking the outwardly observable behavior to match an existing target. The internal state of the emulation mechanism does not have to accurately reflect the internal state of the target which it is emulating.

Simulation, on the other hand, involves modeling the underlying state of the target. The end result of a good simulation is that the simulation model will emulate the target which it is simulating.

Ideally, you should be able to look into the simulation and observe properties that you would also see if you looked into the original target. In practice, there are some shortcuts to the simulation for performance reasons — that is, some internal aspects of the simulation may actually be an emulation.

### Mention what are the common bugs found while mobile testing?



Native App: Native app is developed specifically for one platform, which is coded with a specific programming language (like Objective C for iOS, [Java](https://www.edureka.co/blog/java-tutorial/) for Android) and installed directly onto the device and can take full advantage of all the device features. Native apps can use the device’s notification system and can work offline. Native apps are installed through an application store (such as Google Play or Apple’s App Store). Native mobile apps provide fast performance and a high degree of reliability. Example of native apps: Temple Run, Candy Crush, etc.

Web App: Web applications are mobile web portals that are designed, customized and hosted specifically for mobiles. They are accessed through the mobile device’s web browser using a URL. Web apps became really popular when HTML5 came around and people realized that they can obtain native-like functionality in the browser. Mobile web applications cannot use device functionality. Example of web app: google.com, m.snapdeal.com, m.yahoo.com, etc.

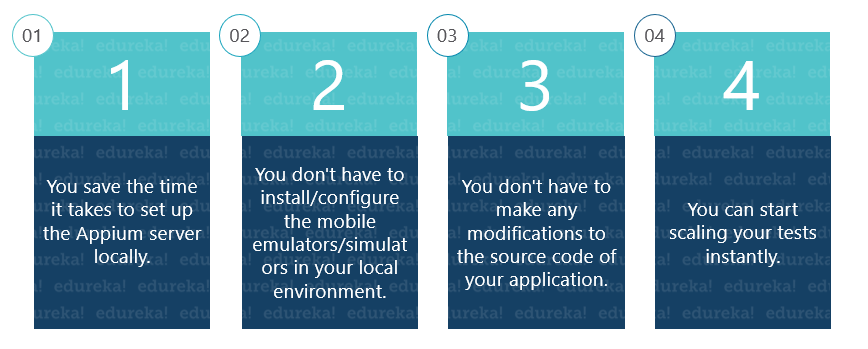
Hybrid App: Hybrid Apps are web apps embedded in a native app, run on the device, and are written with web technologies (HTML5, CSS, and [JavaScript](https://www.edureka.co/blog/what-is-javascript/)). Hybrid apps run inside a native container and leverage the device’s browser engine (but not the browser) to render the HTML and process the JavaScript locally. A web-to-native abstraction layer enables access to devices capabilities that are not accessible in mobile web applications, such as the accelerometer, camera, and local storage. A hybrid app is **NOT** tied to any platform or any particular mobile device. So, it can run on any device once built. Example of a Hybrid app: Flipkart, Facebook, Twitter, etc.

**Question 8. What is the Appium philosophy?**

These are the four philosophies [Appium](https://www.edureka.co/blog/what-is-appium/) is based around-

* Test the same app you submit to the marketplace
* Write your tests in any language, using any framework
* Use a standard automation specification and API
* Build a large and thriving open-source community effort

### What are the main advantages Of Using Appium On Sauce Labs?



### Question 12. List Out The Appium Abilities.

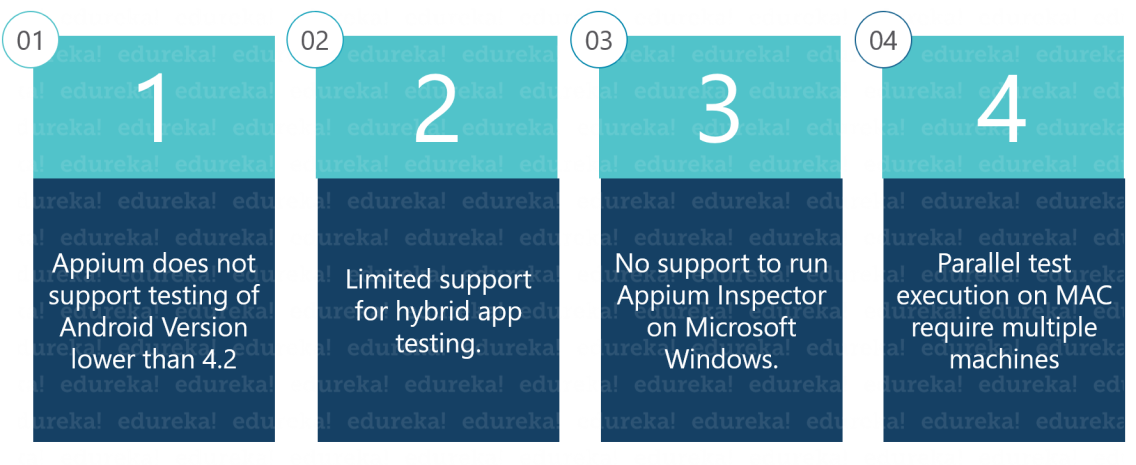
Appium abilities are:

* Test Web
* Provides cross-platform for Native and Hybrid mobile automation
* Support JSON wire protocol
* It does not require recompilation of App
* Support automation test on a physical device as well as simulator or emulator both
* It has no dependency on a mobile device

### Question 13. Can you comment about the performance of Appium?

Appium is not a huge application and requires very little memory. Its architecture is actually pretty simple and light as Appium acts like a proxy between your test machine and each platform automation toolkit. Once up and running, Appium will listen to HTTP requests from your tests. When a new session is created, a component in Appium’s Node.js code called *\_proxy\_* will forward these Selenium commands to active platform drivers. In the case of Android, for example, Appium will forward incoming commands to the [chromedriver] (90% of cases, Appium will not even change commands while routing them), this happens because [ChromeDriver supports WebDriver and Selenium](https://www.edureka.co/blog/selenium-chromedriver-and-geckodriver/" \t "_blank). For this reason, Appium will not allocate much memory itself, you will see a lot of memory being allocated by other processes like [adb], ChromeDriver or the iOS automation toolkit (called by Appium while testing and automating).

### List Out The Limitations Of Using Appium?



### List some issues Faced With Cross-Platform Testing?

Generally, the issue depends upon the different OS/device version. It might be that the same application is working on one OS while it might not work on another version. For example, we faced an issue that our application was working fine on iOS 6.x version devices but on tapping a few modules on iOS 5.x devices application crashes and the same happened with 2.3.5 Vs.

### When Performing End To End Mobile Testing What Major Criteria Are Taken Into Consideration?

* Installation of the application.
* First time launching an application without having network access.
* Uninstallation of the app.
* The orientation of the app if it is supported.
* Testing application performance on different kinds of devices and network scenarios.
* Testing the application response and how it responds when an invalid user credential is provided.

Also, if your application is accessing any network then you must check the logs generated during that period so that the sensitive information should always go in an encrypted form.

### Question 21. How Do You Test Patches Intended For An App Already In Production?

We generally do [regression testing](https://www.edureka.co/blog/regression-testing) of a relative module and mainly focus on the area which is related to the bug fixes as per the developer. This is because we cannot perform complete regression testing in a very short span of time. So, we just perform [sanity tests](https://www.edureka.co/blog/smoke-testing-and-sanity-testing) on the rest of the application, but only for high priority devices. High priority devices are systems that are running the latest versions of the operating system.

### Question 22. What Kind of Testing Would You Perform For a General Application?

The very first test we have to perform is installation. After that, we check the basic functionality and following which, we check the connectivity of the application with its peripherals. Then we uninstall the build and verify how the application responds when we interrupt it during installation. We also check interruption scenarios when our application requests a network call. We also perform low network/poor connectivity testing during a network call. The process of upgrading from an older version to a newer version is also tested. Navigation in the application without a network is an important feature that is tested in general testing. Also, the compatibility of the app on different kinds of phones is a major criterion in general testing.

### Question 23. How Much Time Does It Take To Write A Test In Appium?

Of course, it depends on the test. If your test simply runs a scenario, it will take as many commands as the number of interactions needed to be performed (thus very few lines). If you are trying to exchange data, then your test will take more time for sure and the test will also become difficult to read.

**Consider A Scenario Where You Don’t Want To Setup A Whole Infrastructure, And Neither Spend Money. Can Appium Help Out In Such A Scenario?**

If you think about it, what really is required from is the test script. The fact that you must deploy an Appium server somewhere is just an extra feature. If you want to skip this part, you can rely on some web services that have already deployed a whole architecture of Appium servers for your tests. Most of them are online labs and they support Selenium and Appium. In this way, you don’t spend exorbitant amounts of money and you also don’t invest time and effort on new infrastructure.

### Question 28. Is Debugging Appium Difficult?

No. Appium is a Node.js application, therefore, in essence, it is Javascript. The code is available on GitHub and can be downloaded in a few seconds as it is small and not so complex. Depending on what you have to debug, you will probably need to go deeper in your debugging experience. However, there are some key points were setting a breakpoint is always worth it, for example, the proxy component is worth a mention. In **appium/lib/server/proxy.js** you can set a breakpoint in function **doProxy(req, res)**, that will be hit every time commands are sent to platform-specific components to be translated into automation commands.

### Question 29. Mention The Basic Requirement For Writing Appium Tests.

* Driver Client: Appium drives mobile applications as though it were a user. Using a client library you write your Appium tests which wrap your test steps and sends them to the Appium server over HTTP.
* Appium Session: You have to first initialize a session, as such Appium test takes place in that session. Once the Automation is done for one session, it can be ended.
* Desired Capabilities: To initialize an Appium session you need to define certain parameters known as “desired capabilities” like PlatformName, PlatformVersion, Device Name and so on. It specifies the kind of automation one requires from the Appium server.
* Driver Commands: You can write your test steps using a large and expressive vocabulary of commands.

### What Would You Prefer To Test Your Application On – Real Devices Or Use Simulators/Emulators?

It’s one of the most commonly asked Appium interview questions. You’ve to be a little logical and practical while answering it. Don’t just simply answer “It would depend on what you need.”, because it would be a layman answer which interviewer won’t expect from you. Rather you should explain it by an example. You can answer by saying that it’s always best to test on real devices. As it would allow you to catch errors that you may not detect otherwise, but, you have to configure the device smartly with the Appium server so that it can detect the device. Sometimes the ADB(Android Debug Bridge) may disconnect from the device even if it remains plugged in, and it can cause your tests to fail. To handle such issues, you can write a module which resets the ADB after some time to re-connect to the devices.

### Question 37: What Is Appium Inspector And Why Is It Used?

It is similar to the [Selenium IDE](https://www.edureka.co/blog/selenium-ide) plugin and enables the record and playback support in Appium. It captures the moves of a native application by inspecting DOM and produces the test scripts in any desired language. However, Appium Inspector does not support Windows and uses the <UIAutomator> viewer.

### What Are The Problems Faced While Running A Test In A Multithreaded Environment?

You need special care while using Appium in a multithreaded environment. The problem does not rely on the fact of using threads in your tests. You can use them but, you must ensure that no more than one test runs at the same time against the same Appium server. Appium does not support multiple sessions, and unless you have implemented an additional layer on top of it to handle this case, multiple tests might fail.

**What is Docker ?**

Docker is a containerization platform that packages your application and all its dependencies together in the form of a docker container to ensure that your application works seamlessly in any environment.

With it, you can isolate applications from their underlying infrastructure so that software delivery is faster than ever. Docker’s main benefit is to package applications in “containers,” so they’re portable for any system running the Linux operating system (OS) or Window OS.

The brilliance of [Docker](https://www.simplilearn.com/docker-tutorial-article) is that, once you package an application and all its dependencies into a Docker run container, you ensure it will run in any environment. Also, DevOps professionals can build applications with Docker and ensure that they will not interfere with each other. As a result, you can build a container having different applications installed on it and give it to your QA team, which will then only need to run the container to replicate your environment.

**What is Container ?**

Docker Container is a standardized unit which can be created on the fly to deploy a particular application or environment. It could be an Ubuntu container, CentOs container, etc. to full-fill the requirement from an operating system point of view. A Docker container, as partially explained above, is a standard unit of software that stores up a code and all its dependencies so the application runs fast and reliably from one computer environment to different ones. A Docker container image is a lightweight, standalone, executable package of software that has everything you need to run an application – code, runtime, system tools, system libraries, and settings.

A company needs to develop a Java Application. In order to do so the developer will setup an environment with tomcat server installed in it. Once the application is developed, it needs to be tested by the tester. Now the tester will again set up tomcat environment from the scratch to test the application. Once the application testing is done, it will be deployed on the production server. Again the production needs an environment with tomcat installed on it, so that it can host the Java application. If you see the same tomcat environment setup is done thrice.

There are some issues that I have listed below with this approach:

1) There is a loss of time and effort.

2) There could be a version mismatch in different setups i.e. the developer & tester may have installed tomcat 7, however the system admin installed tomcat 9 on the production server. unlike when using Virtual Machines (VMs), you don’t have to worry about what platform you’re using – Docker containers work everywhere.

In this case, the developer will create a tomcat docker image ( A Docker Image is nothing but a blueprint to deploy multiple containers of the same configurations ) using a base image like Ubuntu, which is already existing in Docker Hub (Docker Hub has some base docker images available for free) . Now this image can be used by the developer, the tester and the system admin to deploy the tomcat environment. This is how docker container solves the problem.

Advantage of docker on virtual machine

* When it comes to start-up, Virtual Machine takes a lot of time to boot up because the guest operating system needs to start from scratch, which will then load all the binaries and libraries. This is time consuming and will prove very costly at times when quick startup of applications is needed. In case of Docker Container, since the container runs on your host OS, you can save precious boot-up time. This is a clear advantage over Virtual Machine.

**What is Docker Image?**

Docker Image can be compared to a template which is used to create Docker Containers. They are the building blocks of a Docker Container. These Docker Images are created using the build command.

**What is Jenkins?**

**Answer:**Jenkins is a free open source Continuous Integration tool and automation server to monitor continuous integration and delivery. It is written in Java.

It is known as an automated Continuous Delivery tool that helps to build and test the software system with easy integration of changes to the system. Jenkins follows Groovy Scripting.

Also, it enables developers to continuously check in their code and also analyze the post-build actions. The automation testers can use to run their tests as soon as the new code is added or code is modified.

**What are the features of Jenkins?**

Answer: Jenkins comes with the following features:

1. Free open source.
2. Easy installation on various operating systems.
3. Build Pipeline Support.
4. Workflow Plugin.
5. Test harness built around JUnit.
6. Easy upgrades.
7. Rapid release cycle.
8. Easy configuration setup.
9. Extensible with the use of third-party plugins

**What are the advantages of Jenkins? Why we use Jenkins?**

**Answer:**Jenkins is used to continuously monitor the large code base in real time. It enables developers to find bugs in their code and fix. Email notifications are made to the developers regarding their check-ins as a post-build action.

**Advantages of Jenkins are as follows:**

* Build failures are cached during the integration stage.
* Notifies the developers about build report status using LDAP (Lightweight Directory Access Protocol) mail server.
* Maven release project is automated with simple steps.
* Easy bug tracking.
* Automatic changes get updated in the build report with notification.
* Supports Continuous Integration in agile development and test-driven development.

**Define the process of Jenkins?**

* In Source code management repository, developers need to commit their code on daily basis or as per the team’s instructions because Jenkins check the repository changes at regular intervals. SCM can be GIT, SVN, and TFS. GIT and SVN are widely used nowadays.
* After committing the changes, Jenkins will detect the changes from a repository, will pull the changes and process of new build will be started.
* It will iterate through the different stages that are mentioned in the Jenkins pipeline. If one stage will get successfully completed then it will go to another task or stage.
* If particular stage fails, Jenkins build also stop there and it will not proceed further. Jenkins has a feature to send the email notification to a concerned team or to particular email id, which has been configured for Jenkins.
* If all the stages will successfully be completed then it deploys the code in particular mentioned server and testing will get started.
* If testing stage gets passed successfully, Jenkins will share the results with the team. The whole process keeps on iterating whenever code will be committed in SCM.

**Mention pre-requisites for using Jenkins?**

**Answer**:  
Pre-requisites are:

* Access to source code management repository like GIT or SVN repository.
* Build script that should be working like [mavens builds script](https://www.educba.com/maven-commands/).

**Which Command is used to start Jenkins?**

**Answer: You can follow the below mentioned steps to start Jenkins:**

1. Open Command Prompt
2. From the Command Prompt browse the directory where Jenkins. war resides
3. Run the command given below:

D:\>Java –jar Jenkins.war

**3. Explain the terms Agent, post-section, Jenkins file?**

**Agent: –** It is directive to tell Jenkins to execute the pipeline in particular manner and order.

 Popular Course in this category

**Post-section: –** If we have to add some notification and to perform other tasks at the end of a pipeline, post-section will definitely run at the end of every pipeline’s execution.

**Jenkins file: –** It is a text file having the information about Jenkins pipeline and is checked into source control. The text file where all the definitions of pipelines are defined is called Jenkinsfile. It is  
being checked in the source control repository.

**Trigger** in Jenkins defines the way in which the pipeline should be executed  
frequently. PollSCM, Cron, etc are the currently available Triggers.

**Post** is a section that contains several additional steps which might execute after  
the completion of the pipeline. The execution of all the steps within the condition block  
depends upon the completion status of the pipeline.

The condition block includes the following conditions – changed success, always, failure, unstable and aborted.

**Flow Control** follows the pipeline structure (scripted pipeline) that are being  
executed from the top to bottom of the Jenkins file.

**Parameters** are supported by Agent section and are used to support various use-cases pipelines. Parameters are defined at the top-level of the pipeline or inside an  
individual stage directive.

**Input directive** The input directive on a stage allows you to prompt for input, using the input step. The stage will pause after any options have been applied, and before entering the stage`s `agent or evaluating its when condition. If the input is approved, the stage will then continue. Any parameters provided as part of the input submission will be available in the environment for the rest of the stage.

**Scripted Pipeline,** like Declarative Pipeline, is built on top of the underlying Pipeline sub-system. Unlike Declarative, Scripted Pipeline is effectively a general purpose DSL [2] built with Groovy. Most functionality provided by the Groovy language is made available to users of Scripted Pipeline, which means it can be a very expressive and flexible tool with which one can author continuous delivery pipelines.

**4. Explain the advantages of using Jenkins?**

**Answer**:  
Advantages of using Jenkins are:

* Do not need to check the code and start to build manually.
* Whenever there are changes in source code, an automatic build will get started.
* If there are any build failures, automatic email sends to concerned team.
* Bugs or defects can be easily tracked and resolved at early stages.
* Helps in achieving the continuous integration agile development and test-driven development.
* It makes the process faster and smoother.

**5. What is the use of pipelines in Jenkins?**

**Answer:**  
Pipeline plugin is used in Jenkins for making the Jenkins Pipeline, which gives us the view of stages or tasks to perform one after the other in pipeline form. It models the series of related tasks. Pipelines help the teams to review, edit and iterate upon the tasks. Pipelines are durable and it can optionally stop and wait for human approval as well to start the next task. A pipeline is extensible and can perform work in parallel. It supports complex CD requirements. Code: Pipelines are implemented in code and typically checked into source control, giving teams the ability to edit, review, and iterate upon their delivery pipeline.

Durable: Pipelines can survive both planned and unplanned restarts of the Jenkins master.

Pausable: Pipelines can optionally stop and wait for human input or approval before continuing the Pipeline run.

Versatile: Pipelines support complex real-world CD requirements, including the ability to fork/join, loop, and perform work in parallel.

Extensible: The Pipeline plugin supports custom extensions to its DSL [1] and multiple options for integration with other plugins.

**What are the two components (pre-requisites) that Jenkins is mainly integrated with?**

Answer: Jenkins integrates with:

1. Build tools/ Build working script like Maven script.
2. Version control system/Accessible source code repository like Git repository.

**How to make sure that your project build does not break in Jenkins?**

**Answer:**You need to follow the below-mentioned steps to make sure that the Project build does not break:

1. Clean and successful installation of Jenkins on your local machine with all unit tests.
2. All code changes are reflected successfully.
3. Checking for repository synchronization to make sure that all the differences and changes related to config and other settings are saved in the repository.

**6. Mention the steps to set up Jenkins Job?**

**Answer:**  
The steps are:

* Go to Jenkins page, select ‘new job’
* Enter the name of the job and choose ‘build free-style project’.
* Click ok and start configuring your job.
* Put the details of SVN or GIT repository, where the source code has been placed.
* Provide all other information regarding plugins that required using in a project like for unit testing, code coverage, code quality.
* Mention the build tool script like Maven script.
* Collect the information regarding results
* Configure the steps to send the notifications via emails, etc.

**7. How do you start the Jenkins manually?**

**Answer**:  
The steps are as follow:

* Open the command line prompt and go to Jenkins installation directory.
* ‘Jenkins.exe start’ command helps in starting the Jenkins.
* ‘Jenkins.exe restart’ to restart Jenkins and ‘Jenkins.exe stop’ to stop Jenkins.

**8.Mention steps to copy/move Jenkins from one server to other?**

**Answer**:  
The steps are as follows:

* Copy the whole Jenkins directory from the first server and paste it to other servers.
* Make a copy of existing job by cloning a job directory with a different name.
* Rename an existing job by renaming the directory.

**9. How to create a backup for Jenkins?**

**Answer:**  
Take periodically back up of JENKINS\_HOME directory by just copy this directory to other places. Rename, clone and replication of job can also be done.

**10. How can we schedule build in Jenkins?**

**Answer:**  
Whenever a change is committed in a repository, scheduled at a specified time, build manually and other builds get completed.

**11. Which plugins are useful in Jenkins?**

**Answer:**  
[Some plugins](https://www.educba.com/jenkins-plugins/) are listed below:

* Maven (build tool)
* GIT (SCM)
* Selenium (continuous testing)
* Amazon EC2
* Puppet (Configuration management)
* Nagios (Continuous monitoring)
* Copy artifact
* HTML publisher

**12. How do you secure Jenkins?**

**Answer:**

* Global security should be enabled.
* Jenkins should be integrated with appropriate plugins.
* Automate the process of setting rights and privileges.
* Limit the physical access to folders.
* Periodically run security audits.

**Why is Jenkins called a Continuous Delivery Tool?**

We have seen the Continuous Delivery workflow in the previous question, now let's see the step by step process of why Jenkins is being called as a Continuous Delivery Tool:

* Developers work on their local environment for making changes in the source code and push it into the code repository.
* When a change is detected, Jenkins performs several tests and code standards to check whether the changes are good to deploy or not.
* Upon a successful build, it is being viewed by the developers.
* Then the change is deployed manually on a staging environment where the client can have a look at it.
* When all the changes get approved by the developers, testers, and clients, the final outcome is saved manually on the production server to be used by the end users of the product.

**How can you move or copy Jenkins from one server to another? steps**

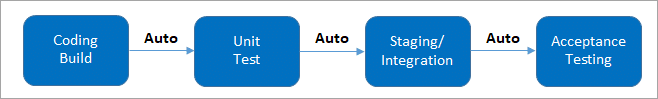
* First, copy the related job directory and slide a job from one installation of Jenkins to another.
* Make a copy of an already existing job by making clone of a job directory by a different name.
* Renaming an existing job by rename a directory.

**What is Jenkins pipeline? What is a CI CD pipeline?**

Answer: The pipeline can be defined as the suite of plugins supporting implementation and  
integration of continuous delivery pipelines in Jenkins.

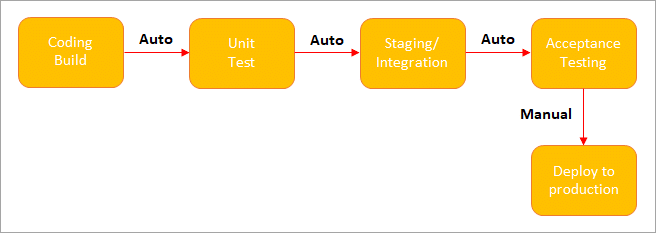
Continuous integration or continuous delivery pipeline consists of build, deploy, test, release pipeline. The pipeline feature saves a lot of time and error in maintaining the builds. Basically, a pipeline is a group of build jobs that are chained and integrated in sequence.

**What is the difference between Continuous Integration, Continuous Delivery, and Continuous Deployment?**

[](https://cdn.softwaretestinghelp.com/wp-content/qa/uploads/2019/02/Continuous-Integration.png)

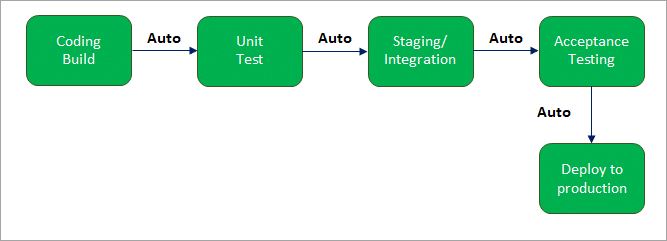
**(**Involves keeping the latest copy of the source code at a commonly shared hub where all the  
developers can check to fetch out the latest change in order to avoid conflict**)**

**Continuous Delivery:**

[](https://cdn.softwaretestinghelp.com/wp-content/qa/uploads/2019/02/Continuous-Delivery.png)

**(Manual Deployment to Production.**Does not involve every change to be deployed.**)** Continuous Delivery is a software development practice where you build software in such a way that the software can be released to the production at any time. You achieve Continuous Delivery by continuously integrating the products built by the development team, running automated tests on those built products to detect problems and then push those files into production-like environments to ensure that the software works in production.

**Continuous Deployment:**

[](https://cdn.softwaretestinghelp.com/wp-content/qa/uploads/2019/02/Continuous-Deployment.png)

**(Automated Deployment to Production.**Involves every change to be deployed  
automatically.**)** Continuous deployment means that every change that you make, goes through the pipeline, and if it passes all the tests, it automatically gets deployed into production. So, with this approach, the quality of the software release completely depends on the quality of the test suite as you have automated everything.

**Which SCM tools does Jenkins support?**

Jenkins supports the following SCM tools:

* AccuRev
* CVS
* Subversion
* Git
* Mercurial
* Perforce
* Clearcase
* RTC

**10) Which commands can be used to start Jenkins manually?**

You can use any one of the following commands to start Jenkins manually:

* (Jenkins\_url)/restart: Forces a restart without waiting for builds to complete.
* (Jenkin\_url)/safeRestart: Allows all running builds to complete.

**How to create a backup and copy files in Jenkins?**

If you want to create a back-up of your Jenkins setup, just copy the directory that saves all the setting, build artifacts and logs of Jenkins in its home directory. You can also copy a job directory to clone or replicate a job or rename the directory.

**How can you clone a Git repository via Jenkins?**

If you want to clone a Git repository via Jenkins, you have to enter the e-mail and user name for your Jenkins system. Switch into your job directory and execute the "git config" command for that.

**What is the difference between Maven, Ant and Jenkins?**

Maven and Ant are Build Technologies whereas Jenkins is a continuous integration tool.

**What is the relation between Hudson and Jenkins?**

You can just say Hudson was the earlier name and version of current Jenkins. After some issues, they renamed the project from Hudson to Jenkins.

**How Can You Clone A Git Repository Via Jenkins?**

If you want to clone a Git repository via Jenkins, you have to enter the e-mail and user name for your Jenkins system. Switch into your job directory and execute the “git config” command for that.

**Explain how you can deploy a custom build of a core plugin?**

Below are the steps to deploy a custom build of a core plugin:

* Stop Jenkins.
* Copy the custom HPI to **$Jenkins\_Home/plugins**.
* Delete the previously expanded plugin directory.
* Make an empty file called **<plugin>.hpi.pinned**.
* Start Jenkins.

**What are the various ways in which build can be scheduled in Jenkins?**

You can schedule a build in Jenkins in the following ways:

* By source code management commits
* After completion of other builds
* Can be scheduled to run at a specified time (crons)
* Manual Build Requests

**Have you run automated tests on Jenkins? How is it done?**

Yes, this can be done easily. Automated tests can be run through tools like Selenium or maven. Developers can schedule the test runs. Jenkins displays the test results and sends a report to the developers.

**Let us say, you have a pipeline. The first job was successful, but the second failed.  What should you do next?**

You just need to restart the pipeline from the point where it failed by doing ‘restart from stage’.

**What are the types of pipelines in Jenkins?**

There are 3 types –

1. CI CD pipeline (Continuous Integration Continuous Delivery)
2. Scripted pipeline
3. Declarative pipeline

**Name two ways a Jenkins node agent can be configured to communicate back with the Jenkins master.**

These are the mechanisms for starting a Jenkins node agent:

* From the browser window, launch a Jenkins node agent
* From the command line, launch a Jenkins node agent

When we launch a Jenkins node agent, it will download a JNLP file. A new process is launched on the client machine by the JNLP when it runs.

**What are the steps included in a Jenkins pipeline?**

A complete Jenkins pipeline includes building a project from the source code, putting it through a variety of units, integrating, testing for user acceptance and performance, and then finally deploying the packaged application on an application server.

So, the steps in a Jenkins pipeline can be listed as below:

* Build
* Test
* Deploy

**Why is Jenkins used with Selenium?**

Selenium allows you to test Jenkins whenever software changes or sends it into a new environment. Jenkins will then schedule tests to run at the times you specify using Selenium.

**Provide three ways for Jenkins to authenticates users.**

Jenkins authenticates users via:

1. An internal database with user data and credentials. (The default.)
2. By using the Lightweight Directory Access Protocol server.
3. By using the authentication mechanism used by the application server the Jenkins code is deployed on.

**What are the best ways to make sure that your Jenkins database is secure?**

There are plenty of ways to ensure security is of the top level when it comes Jenkins, but some of the more notable ones include (but are not limited to) keeping global security on, running security checks, keeping your database protected on the physical level (not letting unauthorized personnel near it), etc.

**What is Ansible?**

Ansible is a configuration management tool that can be used for provisioning and can be implemented into Jenkins.

**Blue Ocean**

Blue Ocean is a new User Interface (UI) and User Experience (UX) for Jenkins. It is designed to make Jenkins UI more efficient (reduces clutter and increases the clarity) In simple words: Blue Ocean is a new User Interface for Jenkins and provides an interactive view for Jenkins Pipeline (and jobs)

How to get Blue Ocean

Ensure you have Jenkins 2.7 or above and follow the steps:

Step 1 Install Blue Ocean Plugin

Step 2 Switch to Blue Ocean View

**Test-Driven Development: “Is the code correct?”**

Test-Driven Development (TDD) focuses on the “inside-out” perspective. The methodology focuses specifically on “unit tests.” The developer takes a requirement and then converts it into a specific test case. Then the developer writes the code to pass those particular test cases only.

Test-Driven Development (TDD) is a simple process that follows six steps

**Step 1: Add a test**

The first step is to take a requirement and turn it into a test that is clear so that the developer can fully understand the feature specifications.

*Let’s say that we work for Spotify and want to create a feature where a subscriber can search for a specific and album and stream it. The test would be to check if a user is a paid subscriber and if the specific album is both in the Spotify catalog and licensed by the artist. If all conditions are met, then stream the album.*

**Step 2: Run all tests and see if the new test fails**

Next step is to run the test to make sure that it fails. If the new test passes, that means that the required behavior already exists and new code is not needed or that the new test is flawed and needs to be modified.

*Now we need to run the test to make sure that it fails. The user should not be able to search for and stream a specific album.*

**Step 3: Write the code**

Third, the developer writes code that would make the test pass. Code quality is not as important at this stage; the developer’s goal is to write code that will make the test pass.

*In our example, the developer would write the code necessary to allow Spotify subscribers to search for and stream a specific album.*

**Step 4: Run Tests**

The fourth step is to run all the tests. If all tests pass, we are satisfied that the code meets the requirements and that it did not affect existing features. If not all tests pass, the developer must continue to adjust.

*Following our example, the tester should be able to search for an album, let’s say “Because The Internet” by Childish Gambino, and stream it.*

**Step 5: Refactor code**

Now that we passed all the tests, the new code must be cleaned up to meet the hygiene standards.

**Behavior Driven-Development (BDD) – “Is this what we should be testing?”**

Behavior Driven-Development (BDD) focuses on the “outside-in” perspective, meaning we test behaviors which are related to business outcomes. The process is very similar to TDD. However, you are applying the “Five Why’s” principleto each user story to ensure that a business outcome connects with the purpose. BDD requires guidance from developers, testers, and users to ensure answers to the “whys” behind a user story. All of this leads to the driving question behind BDD which is “is this what we should be testing?”

BDD is largely an extension of the TDD methodology. The developer defines a test case, tests code to verify that the test case will fail. Next, the developer writes the code necessary to pass the test case and then tests the code to ensure compliance. Where BDD differs from TDD is how the test case is specified. BDD tests cases exist in a way that specifies the desired behavior.  The clear language of BDD test cases makes it simple for all stakeholders in a development project to understand. The following is an example of a  BDD test case for a user attempting to stream a specific album on Spotify.

**Story:**Stream specific album on Spotify *– description of a user story*

**As a**Spotify subscriber *– “who”:  primary stakeholder of a user story*

**In order to**play my favorite album *– “what”: effect of a user story on primary stakeholder*

**I want to**search and stream my favorite album from the Spotify catalog *– “why”: value to primary stakeholder*

**Scenario 1:**

**Given**that Childish Gambino has licensed *– condition*

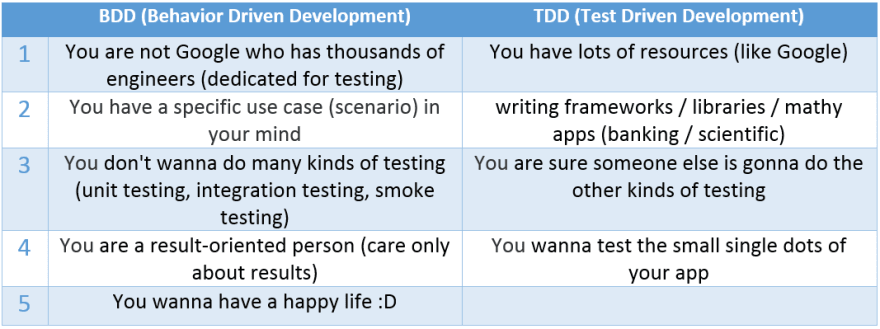
**And**the user is a subscriber of the Spotify service *– condition*

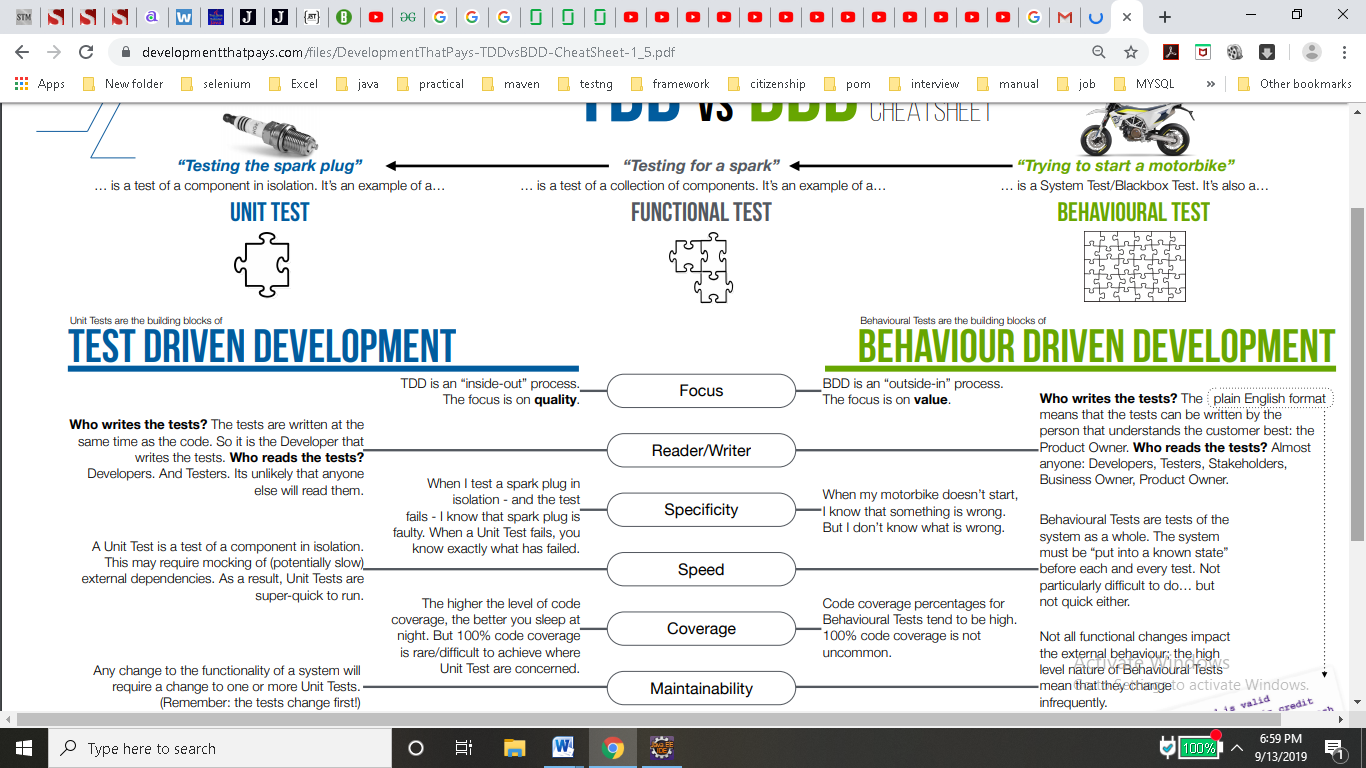
**When**Spotify subscriber selects “Because The Internet” album by Childish Gambino from the Spotify Catalog *– when the event is triggered*

**Then**Spotify service will stream “Because THE Internet” album by Childish Gambino from the beginning for the user *– Expected outcome*

BDD provides several key benefits to practitioners. The methodology provides a solid structure and format to make it easy for developers, testers, and users to collaborate. Simple language and specification involved in writing BDD test cases make it easy for people all skill levels to adopt. Finally, the methodology ensures that user stories are focused on business outcomes.

**Usage**





|  |  |
| --- | --- |
| **Agile** | **Waterfall** |
| It separates the project development lifecycle into sprints. | Software development process is divided into distinct phases. |
| It follows an incremental approach | Waterfall methodology is a sequential design process. |
| Agile methodology is known for its flexibility. | Waterfall is a structured software development methodology so most times it can be quite rigid. |
| Agile can be considered as a collection of many different projects. | Software development will be completed as one single project. |
| Agile is quite a flexible method which allows changes to be made in the project development requirements even if the initial planning has been completed. | There is no scope of changing the requirements once the project development starts. |
| Agile methodology, follow an iterative development approach because of this planning, development, prototyping and other software development phases may appear more than once. | All the project development phases like designing, development, testing, etc. are completed once in the Waterfall model. |
| Test plan is reviewed after each sprint | The test plan is rarely discussed during the test phase. |
| Agile development is a process in which the requirements are expected to change and evolve. | The method is ideal for projects which have definite requirements and changes not at all expected. |
| In Agile methodology, testing is performed concurrently with software development. | In this methodology, the "Testing" phase comes after the "Build" phase |
| Agile introduces a product mindset where the software product satisfies needs of its end customers and changes itself as per the customer's demands. | This model shows a project mindset and places its focus completely on accomplishing the project. |
| Agile methdology works exceptionally well with Time & Materials or non-fixed funding. It may increase stress in fixed-price scenarios. | Reduces risk in the firm fixed price contracts by getting risk agreement at the beginning of the process. |
| Prefers small but dedicated teams with a high degree of coordination and synchronization. | Team coordination/synchronization is very limited. |
| Products owner with team prepares requirements just about every day during a project. | Business analysis prepares requirements before the beginning of the project. |
| Test team can take part in the requirements change without problems. | It is difficult for the test to initiate any change in requirements. |
| Description of project details can be altered anytime during the SDLC process. | Detail description needs to implement waterfall software development approach. |
| The Agile Team members are interchangeable, as a result, they work faster. There is also no need for project managers because the projects are managed by the entire team | In the waterfall method, the process is always straightforward so, project manager plays an essential role during every stage of SDLC. |
|  |  |

**System requirements**

To be used efficiently, all computer software needs certain hardware components or other software resources to be present on a computer.[1] These prerequisites are known as (computer) system requirements and are often used as a guideline as opposed to an absolute rule.

**Functional specification**

A functional specification is a formal document used to describe a product's intended capabilities, appearance, and interactions with users in detail for software developers. The functional specification is a kind of guideline and continuing reference point as the developers write the programming code. Eg login module will have fields like enter username, password and submit button

**Requirements**

This is a formal statement of what the product planners informed by their knowledge of the marketplace and specific input from existing or potential customers believe is needed for a new product or a new version of an existing product. Requirements are usually expressed in terms of narrative statements and in a relatively general way.