Types of Testing

INTRODUCTION

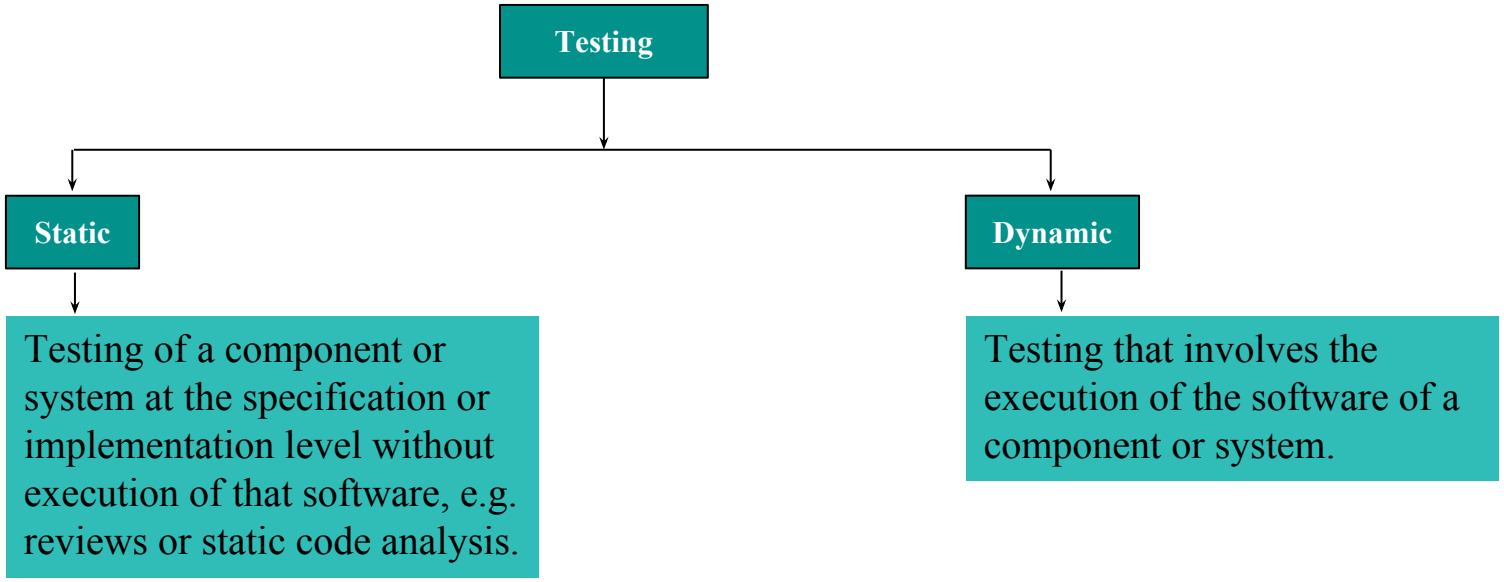
Types Of Testing Overview

LEARNING OBJECTIVES

At the end of this lesson, you will be able to:

- Types of Testing Overview
- Types of Functional Testing
- Types of Non Functional Testing
- Other types of testing
- Digital World Overview

RECOGNIZING VARIOUS TESTING CONCEPTS



STATIC TESTING

- Static Testing:
  - Type of testing which involves only the source code of the product and not the binaries or executable
  - Done before the code is completed or executed
  - Involves selected people going through the code to find out the defects

- Primary aim of Static Testing is to check if:
  - Code is according to the Functional Requirements (FS)
  - Code is according to the design
  - Code adheres to coding standards
  - All functionalities are covered in code
  - The need for dynamic testing can be reduced

DYNAMIC TESTING

- Dynamic Testing
  - Type of Testing which involves the execution of the software of a component or system.

- Where testing is carried out with executing the code. This type of testing comes under Validation

- It executes the software and validates the output with the expected outcome. Dynamic testing is performed at all levels of testing and it can be either black or white box testing.

QUIZ QUESTION

1. What are the two types of testing?

- ❑ Static and Dynamic testing
- ❑ Dynamic and Reviews testing
- ❑ State Transition testing
- ❑ Reviews and Inspection

CONCEPT

Types of Functional Testing

TYPES OF FUNCTIONAL TESTING

- Unit testing
- Smoke testing
- Sanity testing
- Integration testing
- Interface/Inter-system testing
- System testing
- Regression testing
- User Acceptance testing

UNIT TESTING

- In procedural programming, Unit may be
  - an individual program or
  - a function or
  - a procedure, etc.
- In object oriented programming, the smallest unit is a class.

- Unit may be called as a Component

- Validates the source code of a defined functional unit.
- Helps a Software Developer to :
  - Test code for correctness
  - Design better (i.e., more cohesive ,less coupled code)
  - Re-factor code faster
  - Enhance documentation
  - Provide means for performance regression testing
- Is a proactive approach to code.

SMOKE TESTING

- Smoke Testing is performed after software build to ascertain that the critical functionalities of the program is working fine. It is executed "before" any detailed functional or regression tests are executed on the software build. The purpose is to reject a badly broken application, so that the QA team does not waste time installing and testing the software application.

- Smoke testing is a process where the software build is deployed to QA environment and is verified to ensure the stability of the application. It is also called as "Build verification Testing".

Examples

- New registration button is added in the login window and build is deployed with the new code. We perform smoke testing on a new build.
- Logging window: Able to move to next window with valid username and password on clicking submit button.
- User unable to sign out the from webpage

SANITY TESTING

- After receiving a software build, with minor changes in code or functionality, Sanity testing is performed to ascertain that the bugs have been fixed and no further issues are introduced due to these changes. The goal is to determine that the proposed functionality works roughly as expected. If sanity test fails, the build is rejected to save the time and costs involved in a more rigorous testing.

- It is done for those builds which have gone through many regression and has come after a minor change in code. In this case we normally do the intensive testing of functionality for which this new change has come.

- Sanity testing is designed to test every part of the application. Its deep and narrow.

INTEGRATION TESTING

- Integration Testing: where individual units are combined and tested as a group. The purpose is to validate the interaction between the units.
- verify the assembly and combined operation of components (i.e., individual modules, interface modules, etc.).
- This ensures that the interactions between the components function correctly before building the overall solution

INTERFACE/INTER-SYSTEM TESTING

Application systems often interface with other application systems. Most often, there are multiple applications involved in a single project implementation.

Ensures that the interconnections between applications function correctly.

Interface/Inter-system testing

More complex if the applications operate on different platforms, in different locations , or use different languages.

Examples

- Interface Testing is performed to evaluate whether systems or components pass data and control correctly to one another.
- An inter-system test is the way you find out if the inter-system is working without any problem.

SYSTEM TESTING

- Where the complete software/system is tested as one component. The purpose is to validate the system's compliance with the specific requirements. Basically done by testers.
- System testing is the testing of a complete and fully integrated software product.
- Performed to check the product is working according to functional and business requirements.

REGRESSION TESTING

- Verifies that no unwanted changes were introduced to one part of the system as a result of making changes to another part of the system.

Examples

- It is assumed that several iterations of the system test will be done in order to test program modifications made during the system test period. A regression test will be performed for each new version of the system to detect unexpected impact resulting from program modifications.
- The regression test will be done by running all of the tests on a new version that were run on the previous version and then comparing the resulting files.

USER ACCEPTANCE TESTING

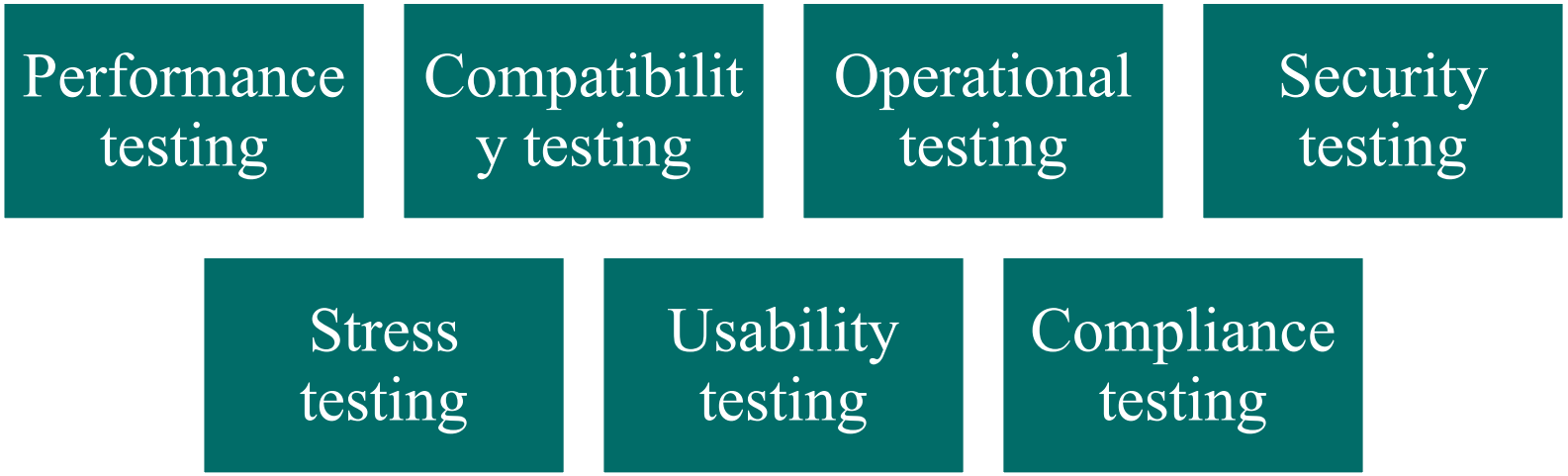
- Most complex and full system test executing complete business scenarios including month end processing, reports or forms, interfaces, and enhancements.
- Performed by expert users with support from functional and development teams.

CONCEPT

Types of Non Functional Testing

TYPES OF NON FUNCTIONAL TESTING

- Ensures that the technical and "housekeeping" functions of the system works
- Designed to verify that the system is structurally sound and can perform the intended tasks
- Categories:



PERFORMANCE TESTING

- Performance testing is designed to test whether the system meets the desired level of performance in a production environment. Performance considerations may relate to response times, turn around times (through-put), technical design issues, and so on.
- Performance testing can be conducted using a production system, a simulated environment, or a prototype.

Example

- Performance will be evaluated against the performance requirements by measuring the run times of several jobs using production data volumes.

COMPATIBILITY TESTING

- It is a type of non-functional testing.
- Compatibility testing is a type of software testing used to ensure compatibility of the system/application/website built with various other objects such as other web browsers, hardware platforms, users (in case if it's very specific type of requirement, such as a user who speaks and can read only a particular language), operating systems etc.
- This type of testing helps find out how well a system performs in a particular environment that includes hardware, network, operating system and other software etc.
- It is basically the testing of the application or the product built with the computing environment.
- It tests whether the application or the software product built is compatible with the hardware, operating system, database or other system software or not.

OPERATIONAL TESTING

Its operational characteristics are equally important as users expect and demand a guaranteed level of service from Computer Services.

Operational testing

All products delivered into production must obviously perform according to the user's requirements.
However, a product's performance is not limited solely to its functional characteristics.

Even though operability testing is the final point where a system's operational behavior is tested, it is still the responsibility of the developers to consider and test operational factors during the construction phase.

Example

- Verifying file labeling and protection functions are working properly.
- Determine a system can run using document

SECURITY TESTING

- Security of an application system is required to ensure the protection of confidential information in a system and in other affected systems is protected against loss, corruption, or misuse; either by deliberate or accidental actions.
- The amount of testing needed depends on the risk assessment of the consequences of a breach in security. Tests should focus on, and be limited to those security features developed as part of the system.

Example

- Attempted access without a proper password to the on-line data entry and display transactions (notification to the user of invalid authentication) will be tested.

STRESS/VOLUME TESTING

- Defined as the processing of a large number of transactions through the system in a defined period of time. Done to measure the performance characteristics of the system under peak load conditions.
- Stress factors may apply to different aspects of the system, such as input transactions, report lines, internal tables, communications, computer processing capacity, throughput, disk space, I/O, and so on.
- Should not begin until the system functions are fully tested and stable. The need for Stress Testing must be identified in the Design Phase and should commence as soon as operationally stable system units are available.

Example

- System is stressed beyond its specifications to check how and when it fails. Performed under heavy load like putting large number beyond storage capacity, complex database queries, and continuous input to system or database load.

USABILITY TESTING

- Ensures that the final product is usable in a practical, day-to-day fashion.
- Looks for simplicity and user-friendliness of the product.
- Would normally be performed as part of functional testing during System and User Acceptance Testing.

Examples

Usability Testing tests the following features of the software:

- How easy it is to use the software
- How easy it is to learn the software
- How convenient is the software to end user

Compliance Testing

- “Compliance testing” also know as Conformance testing is a non-functional testing technique which is done to validate, weather the system developed meets the organization's prescribed standards or not.

- This is basically a kind of an audit which is done on the system to check if all the specified standards are met or not.

- To ensure that the compliances are met, sometimes a board of regulators and compliance expert people are established in every organization. This board puts a check whether the development teams are meeting the standards of the organization or not .The teams do an analysis to check that the standards are properly enforced and implemented. The regulatory board also works simultaneously to improve the standards, which will in turn lead to better quality.

CONCEPT

Other Types of Testing

SOA Testing

- SOA Testing is a Testing of Service Oriented Architecture (SOA) which is an architectural style in which the application components are designed to communicate via communication protocols typically over a network.
- SOA is a method of integrating business applications and processes together so as to meet the business needs.
- SOA provides agility and flexibility to business processes. The changes to the process or application can be directed to a particular component without affecting the whole system.
- The software developers in SOA either develop or buy chunks of programs called SERVICES.

Multi Browser Testing

- Cross Browser Testing is a process to test web applications across multiple browsers.

- Cross browser testing involves checking compatibility of your application across multiple web browsers and ensures that your web application works correctly across different web browsers.

- With wide range of web browsers available, end users using different web browsers to access your web applications, it has now become crucial to test web applications on multiple browsers. On different browsers, client components like JavaScript, AJAX requests, Applets, Flash, Flex etc. may behave differently. Also for different browsers you may have different handling on how requests are processed on server side based on the user-agent received from client browser. So just testing your web application on single web browser is not enough. You need to make sure that your web application works fine across multiple browser.

Web Application Testing

- Web application testing, a software testing technique exclusively adopted to test the applications that are hosted on web in which the application interfaces and other functionalities are tested.

- Web Testing in simple terms is checking your web application for potential bugs before its made live or before code is moved into the production environment.

- Web Application Checklist
  - Functional Testing
  - Usability Testing
  - Interface Testing
  - Database Testing
  - Compatibility Testing
  - Performance Testing
  - Security Testing
  - Crowd Testing

DIGITAL WORLD OVERVIEW

- Digital world means inter connected through digital devices, media or we can say digital marketing services that are available to every one 24/7. It is the world full of ideas, opinions, learning and opportunities. The Internet has made it possible for all of us to connect whenever we consider it necessary.

DIGITAL WORLD OVERVIEW

- Digital World is a contemporary expression to communicate the importance of digital technology today.
- When we say Digital World, we are essentially communicating that the almost the entire world is connected with digital technology.
- Today almost 50% of global population is connected to internet and the mobile is further driving internet connectivity at a rapid rate.
- More than 68% of the connected audience (2.5 Billion out of 3.8 Billion) is already an active social media user on the mobile.

DIGITAL WORLD OVERVIEW

- As per Tubular Insights:
  - 87% millennials are in seperable from their smartphone
  - 92% millennials browse on other devices while watching TV programs on the second device (their mobile phone). On mobile they are spending time on social networks.
  - ** Millennial are the population that is born after 2000.*

- Needless to say we live in a digital world.

SUMMARY

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