Software Testing #4

Categories of Testing

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Black box testing	White box testing	Grey box testing

Black Box Testing

- also known as Behavioral Testing
- The internal structure/design/implementation of the item being tested is not known to the tester
- These tests can be functional or non-functional, but usually functional
- In the eyes of the tester, is like a black box; inside which one cannot see

How Black Box Testing helps?

- Attempts to find errors in the following categories:
  - Incorrect or missing functions
  - Interface errors
  - Errors in data structures or external database access
  - Behavior or performance errors
  - Initialization and termination errors

Levels BBT is applicable to-

- Black Box Testing method is applicable to the following levels of software testing:
  - Integration Testing
  - System Testing
  - Acceptance Testing
- The higher the level, and hence the bigger and more complex the box, the more black-box testing method comes into use.

Techniques-

- Following are some techniques that can be used for designing black box tests.
  - *Equivalence Partitioning:* involves dividing input values into valid and invalid partitions and selecting representative values from each partition as test data.
  - *Boundary Value Analysis:* involves the determination of boundaries for input values and selecting values that are at the boundaries and just inside/ outside of the boundaries as test data.

Advantages of BBT-

- Tests are done from a user's point of view and will help in exposing discrepancies in the specifications.
- Tester need not know programming languages or how the software has been implemented.
- Tests can be conducted by a body independent from the developers, allowing for an objective perspective and the avoidance of developer-bias.
- Test cases can be designed as soon as the specifications are complete

Disadvantages of BBT-

- Only a small number of possible inputs can be tested and many program paths will be left untested.
- Tests can be redundant if the software designer/developer has already run a test case.

White Box Testing

- also known as-
  - Clear Box Testing
  - Open Box Testing
  - Glass Box Testing
  - Transparent Box Testing
  - Code-Based Testing
- The internal structure/design/implementation of the item being tested is known to the tester.
- The tester chooses inputs to exercise paths through the code and determines the appropriate outputs.
- White box testing is testing beyond the user interface and into the nitty-gritty of a system.

Levels WBT is applicable to-

- White Box Testing method is applicable to the following levels of software testing:
    - Unit Testing: For testing paths within a unit.
    - Integration Testing: For testing paths between units.
    - System Testing: For testing paths between subsystems.
- However, it is mainly applied to Unit Testing.

Advantages of WBT

- Testing can be commenced at an earlier stage. One need not wait for the GUI to be available.
- Testing is more thorough, with the possibility of covering most paths.

Disadvantages of WBT

- Since tests can be very complex, highly skilled resources are required, with a thorough knowledge of programming and implementation.
- Test script maintenance can be a burden if the implementation changes too frequently.

Gray Box Testing

- Is a software testing method which is a combination of Black Box Testing method and White Box Testing method.
- In Gray Box Testing, the internal structure is partially known.
- This involves having access to internal data structures and algorithms for purposes of designing the test cases, but testing at the user, or black-box level.
- In the eyes of the tester is like a gray/semi-transparent box; inside which one can partially see.

Levels GBT is applicable to-

- Though Gray Box Testing method may be used in other levels of testing,
- It is primarily used in Integration Testing

Levels of testing – Cont.

System Testing

What is System Testing?

- System Testing is the testing of a complete and fully integrated software product.
- Usually, software is only one element of a larger computer-based system.
- Ultimately, software is interfaced with other software/hardware systems.
- System Testing is actually a series of different tests whose sole purpose is to exercise the full computer-based system.
- System test falls under the **black box testing** category of software testing.

What do we verify in System Testing?

- Testing the fully integrated applications including external peripherals in order to check how components interact with one another and with the system as a whole. This is also called End to End testing scenario.

- Verify thorough testing of every input in the application to check for desired outputs.

- Testing of the user's experience with the application.

- You need to build detailed test cases and test suites that test each aspect of the application as seen from the outside without looking at the actual source code.

Different Types of System Testing

- **Functional testing types include:**
  - System testing
  - Sanity testing
  - Smoke testing
  - Interface testing
  - Regression testing
  - Beta/Acceptance testing

- **Non-functional testing types include:**
  - Performance Testing
  - Load testing
  - Stress testing
  - Volume testing
  - Security testing
  - Compatibility testing
  - Install testing
  - Recovery testing
  - Reliability testing
  - Usability testing
  - Compliance testing
  - Localization testing

- **Alpha Testing**
  - It is the most common type of testing used in the Software industry.
  - The objective of this testing is to identify all possible issues or defects before releasing it into the market or to the user.
  - Alpha testing is carried out at the end of the software development phase but before the Beta Testing.

- **Acceptance Testing**
  - An acceptance test is performed by the client and verifies whether the end to end the flow of the system is as per the business requirements or not and if it is as per the needs of the end user.
  - Client accepts the software only when all the features and functionalities work as expected.
  - It is the last phase of the testing, after which the software goes into production. This is also called User Acceptance Testing (UAT).

- **Ad-hoc Testing**
  - The name itself suggests that this testing is performed on an ad-hoc basis i.e. with no reference to the test case and also without any plan or documentation in place for such type of testing.
  - The objective of this testing is to find the defects and break the application by executing any flow of the application or any random functionality.
  - Ad-hoc testing is an informal way of finding defects and can be performed by anyone in the project.
  - It is difficult to identify defects without a test case but sometimes it is possible that defects found during ad-hoc testing might not have been identified using existing test cases.

- **Accessibility Testing**
  - Type of testing which determines the usability of a product to the people having disabilities (deaf, blind, mentally disabled etc..).
  - The evaluation process is conducted by persons having disabilities.
  - Web content accessibility guidelines-
    - These guidelines suggest the ways that can help to improve the accessibility of a website.
  - Americans with disabilities act-
    - This law states that all the domains like public buildings, schools and organizations should make the technology accessible to everyone.

- **Age Testing**
  - Type of testing which evaluates a system's ability to perform in the future. The evaluation process is conducted by testing teams.

- **API Testing**
  - Testing technique similar to Unit Testing in that it targets the code level.
  - Api Testing differs from Unit Testing in that it is typically a QA task and not a developer task.

- **Backward Compatibility Testing**
  - Testing method which verifies the behavior of the developed software with older versions of the test environment. It is performed by testing team.

- **Beta Testing**
  - Beta Testing is a formal type of software testing which is carried out by the customer. It is performed in the Real Environment before releasing the product to the market for the actual end users.
  - Limited release
  - Usually, the Beta version of the software or product released is limited to a certain number of users in a specific area
  - Ex- Mobile apps

- **Browser Compatibility Testing**
  - Cross Browser Testing
  - Valid only for web apps
  - Browser Compatibility Testing is performed for **web applications** and it ensures that the software can run with the combination of different browser and operating system.
  - This type of testing also validates whether web application runs on all versions of all browsers or not.

- **Big Bang Integration Testing-**
  - Testing technique which integrates individual program modules only when everything is ready. It is performed by the testing teams

- **Bottom Up Integration Testing-**
  - In bottom-up Integration Testing, module at the lowest level are developed first and other modules which go towards the 'main' program are integrated and tested one at a time. It is usually performed by the testing teams.

- **Breadth Testing**
  - A test suite that exercises the full functionality of a product but does not test features in detail. It is performed by testing teams.

Thank You