LOVELY PROFESSIONAL UNIVERSITY

Unit 5.3
Software Engineering

Software Testing

Integration Testing

- Integration testing is the process of testing the interface between two software units or modules
- It can be done in 3 ways
  1. Big Bang Approach
  2. Top Down Approach
  3. Bottom Up Approach

Big Bang Approach

- Combining all the modules once and verifying the functionality after completion of individual module testing

Integration Testing Cont.

Top Down Approach

- Testing take place from to to bottom
- High level modules are tested first and then low-level modules and finally integrated the low level modules to high level to ensure the system is working as intended
- Stubs are used as a temporary module, if a module is not ready for integration testing

Integration Testing Cont.

Bottom Up Approach

- Testing takes place from bottom to up
- Lowest level modules are tested first and then high-level modules and finally integrated the high level modules to low level to ensure the system is working as intended

  - Drivers are used as a temporary module, if a module is not ready integration testing

Regression Testing

- Repeated testing of an already tested program, after modification, to discover any defects introduced or uncovered as a result of the changes in the software being tested
- Regression testing is done by re-executing the tests against the modified application to evaluate whether the modified code breaks anything which was working earlier
- Anytime wemodify anapplication, we should do regression testing
- It gives confidence to the developers that there is no unexpected side effects after modification

When to do regression testing?

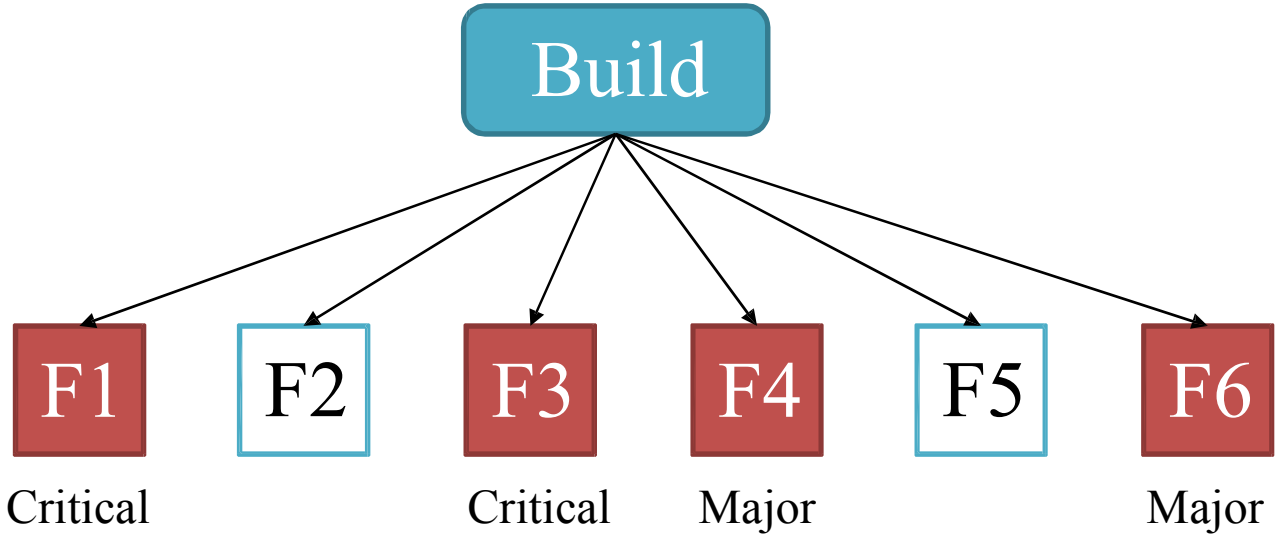
- When new functionalities are added to the application
  - E.g. A website has login functionality with only Email. Now the new features look like "also allow login using Facebook"
- When there is a change requirement

- When there is a defect fix
  - E.g. assume that "Login" button is not working and tester reports a bug. Once the bug is fixed by developer, tester tests using this approach
- When there is a performance issue
  - E.g. loading a page takes 15 seconds. Reducing load time to 2 seconds
- When there is an environment change
  - E.g. Updating database from MySQL to Oracle

Smoke Testing

- Smoke testing is preliminary testing to reveal simple failures severe enough to reject a prospective software release e.g. smoke test may ask basic questions like "Does the program run?", "Does it open a window?"
- The purpose is to determine whether the application is so badly broken that further testing is unnecessary.
- Smoke testing performed on a particular build is also known as a build verification test.
- Smoke testing is done by developers and testers both.
- A smoke test is used as an acceptance test prior to introducing a new build to the main testing process.

Smoke Testing Cont.



- It test the build just to check if any major or critical functionalities are broken
- If there are smoke or Failure in the build after Test, build is rejected and developer team is reported with the issue

Validation Testing

- The process of evaluating software to determine whether it satisfies specified business requirements (client's need).
- It provides final assurance that software meets all informational, functional, behavioral, and performance requirements
- When custom software is build for one customer, a series of acceptance tests are conducted to validate all requirements
- It is conducted by end user rather then software engineers

System Testing

- In system testing the software and other system elements are tested.
- To test computer software, you spiral out in a clockwise direction along streamlines that increase the scope of testing with each turn.
- System testing verifies that all elements mesh properly and overall system function/performance is achieved.
- System testing is actually a series of different tests whose primary purpose is to fully exercise the computer-based system.

Types of System Testing

- Recovery Testing
- Security Testing
- Stress Testing
- Performance Testing
- Deployment Testing

Security Testing:

- Security testing is a process to determine that an information system protects data and maintains functionality as intended.
- The six basic security concepts that need to be covered by security testing are:
- Confidentiality
- Integrity
- Authentication
- Availability
- Authorization
- non-repudiation.

Types of System Testing

Recovery Testing

- It is a system test that forces the software to fail in a variety of ways and verifies that recovery is properly performed.
- If recovery is automatic (performed by the system itself)
  - Re-initialization, check pointing mechanisms, data recovery, and restart are evaluated for correctness.
- If recovery requires human intervention
  - The mean-time-to-repair (MTTR) is evaluated to determine whether it is within acceptable limits.

Performance Testing:

- Performance testing is generally executed to determine how a system or sub-system performs in terms of responsiveness and stability under a particular workload.

- It can also serve to investigate measure, validate or verify other quality attributes of the system, such as scalability, reliability and resource usage.

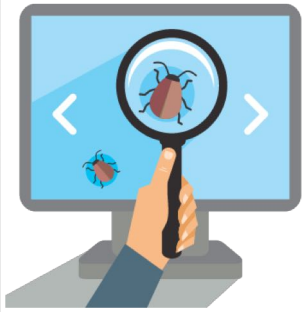
•**Load Testing** is a testing that the system can continue to operate under a specific load, whether that be large quantities of data or a large number of users.

•**Volume testing** is a way to test software functions even when certain components (for example a file or database) increase radically in size.

•**Stress testing** is a testing beyond normal operational capacity, often to a breaking point, in order to observe the results. It is a form of software testing that is used to determine the stability of a given system.

Types of System Testing Cont.

Deployment Testing	

	• It exercises the software in each environment in which it is to operate.
	• In addition, it examines
	  • all installation procedures
	  • specialized installation software that will be used by customers
	  • all documentation that will be used to introduce the software to end users

Destructive Testing:

•Destructive software testing which attempts to cause a piece of software to fail in an uncontrolled manner, in order to test its robustness.

•It verifies that the software functions properly even when it receives invalid or unexpected inputs, thereby establishing the robustness of input validation and error-management routines.

Acceptance Testing

- It is a level of the software testing where a system is tested for acceptability.
- The purpose of this test is to evaluate the system's compliance with the business requirements.
- It is a formal testing conducted to determine whether or not a system satisfies the acceptance criteria with respect to user needs, requirements, and business processes
- It enables the customer to determine, whether or not to accept the system.
- It is performed after System Testing and before making the system available for actual use.