# CTH EDUCATION

Unit – 05: Coding and Testing

- Coding standard and guidelines.
- Code review.
- Software documentation.
- Verification v/s Validation.
- Concept of Testing.
- Testing: - Unit testing.
- Black-box testing and white-box testing.
- Debugging.
- Integration testing.
- system testing.
- User interface inspection

Questions to be discussed:

1. What is software testing? Discuss the role of software testing during software life cycle.
2. Differentiate between black box testing and white box testing.
3. What is regression testing?
4. What do you understand by structural testing?
5. What are various kinds of functional testing? Describe any one in detail.
6. What is the difference between alpha testing and beta testing?
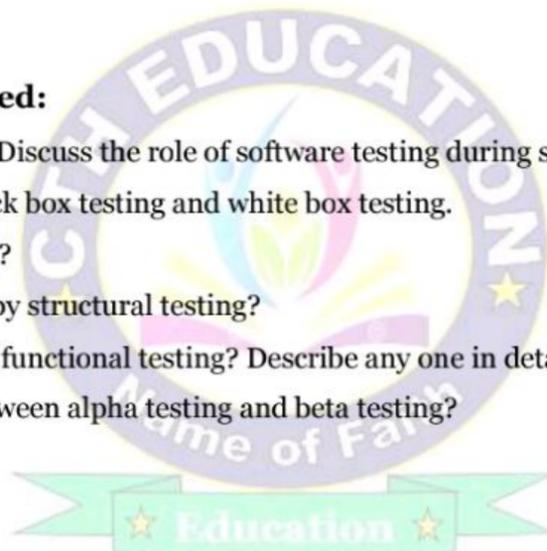
What is Coding?

- The coding is the essential phase of SDLC.
- It is the process of transforming the design of a system into a computer language format.
- Coding is done by the programmers who are independent people than the designer.
- The main goal of the coding phase is to code from the design document prepared after the design phase.
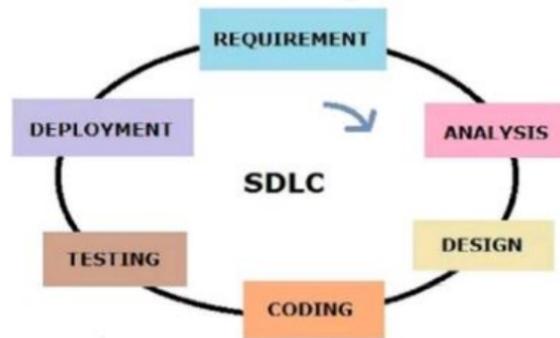
Coding Standards and Guidelines:

- Different design documents are coded in the Coding phase according to the module specification.
- Good software development organizations want their programmers to maintain some well-defined and standard style of coding called coding standards.
- They make their own coding standards & guidelines depending on what suits their organization best.
- It is very important for the programmers to maintain the coding standards otherwise the code will be rejected during code review.

What is a Code review?

- After completed coding, a code review is an important step in the software development process.
- The reviewer can also act as a second step in identifying bugs, logic problems or other issues.
- Reviewers can be from any team or group as long as they're a domain expert.
- If the lines of code cover more than one domain, two experts should review the code.

What do you mean by software documentation?

- It is the information that describes the product to the people who develop, deploy and use it.
- Software documentation is a written piece of text that is often accompanied by a software program.
- Before the development of any software product requirements are documented which is called SRS.

Advantages of software documentation:

➢ Helps development teams during development.
➢ Improves overall quality of software product
➢ It cuts down duplicative work.
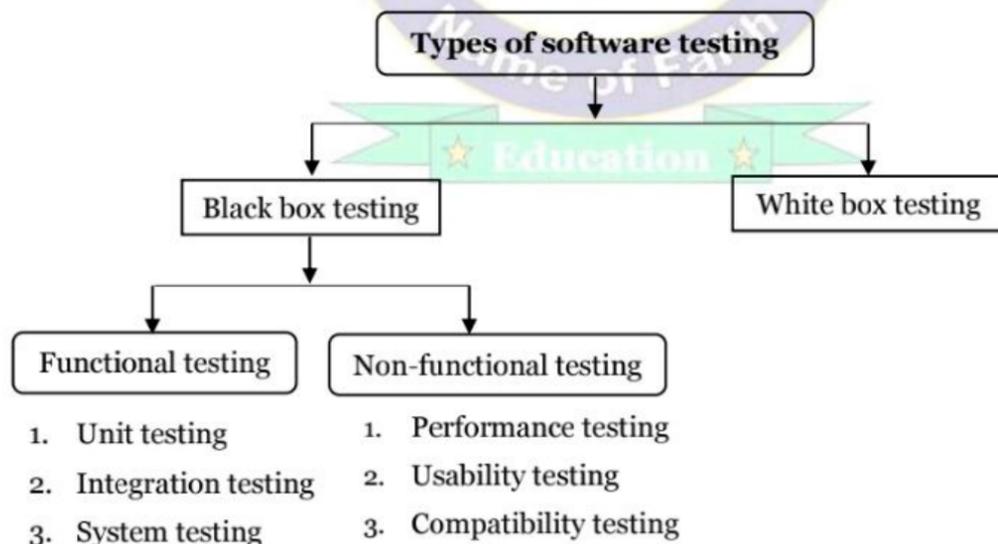➢ Makes easier to understand code.

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Difference between verification and validation:

Verification	Validation
Verification ensure software correctly implements the specific function.	Validation ensure that the software meets the customer requirements.
Verification is about process, standard and guideline.	Validation is about the product.
Verification is for prevention of errors.	Validation is for detection of errors.
It comes before validation.	It comes after verification.
Done by developer.	Done by tester.

What is testing?

- Testing is the important phase of SDLC.
- Software testing means finding the bug in software.
- Software testing is the process of verifying and validating whether a software is bug-free.
- It checks the software meets the technical requirements as guided by its design and development.
- The process of software testing aims not only at finding faults in the existing software but also at finding measures to improve the software in terms of efficiency, accuracy, and usability.

Types of software testing

Black box testing — **White box testing**

Functional testing — **Non-functional testing**

Functional testing:
1. Unit testing
2. Integration testing
3. System testing

Non-functional testing:
1. Performance testing
2. Usability testing
3. Compatibility testing

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Difference between black-box and white-box testing:

Black Box Testing	White Box Testing
It is a way of software testing in which the internal structure is hidden.	It is a way of testing in which the tester has knowledge about the internal structure.
It is mostly done by software testers.	It is mostly done by software developers.
It is the external software testing.	It is the internal software testing.
It is a functional test of the software.	It is a structural test of the software.
No knowledge of programming is required.	Mandatory to have knowledge of programming.
It is also called closed testing.	It is also called as clear box testing.
Example: Search something on google by using keywords	Example: By input to check and verify loops

What is Functional Testing?

- It is a type of Software Testing in which the system is tested against the functional requirements.
- Functional testing ensures that the requirements or specifications are properly satisfied by the application.
- This type of testing is particularly concerned with the result of processing.
- This testing is not concerned with the source code of the application.
- This testing focuses on checking the user interface, APIs, database, security, client or server application, and functionality of the Application Under Test.
- Functional testing can be manual or automated.

Type of Functional Testing:

1. **Unit Testing:** Unit testing is the type of functional testing technique where the individual units or modules of the application are tested. It ensures that each module is working correctly.
2. **Integration Testing:** In Integration testing, combined individual units are tested as a group and expose the faults in the interaction between the integrated units.
3. **Smoke Testing:** Smoke testing is a type of functional testing technique where the basic functionality or feature of the application is tested as it ensures that the most important function works properly.
4. **System Testing:** System testing is a type of software testing that is performed on the complete integrated system to evaluate the compliance of the system with the corresponding requirements.

What is Regression Testing?

- Regression testing is a black box testing techniques.
- It is used to ensure a code change in software does not impact the existing functionality of the product.
- Here, test cases are re-executed to check the previous functionality of the application is working fine, and the new changes have not produced any bugs.
- It is a software testing conducted after a code update to ensure that the update introduced no new bugs.
- This is because new code may bring in new logic that conflicts with the existing code, leading to defects.

Structural testing:

- It is a type of software testing which uses the internal design of the software for testing.
- In this testing team knows the development phase of the software.
- Structural testing is related to the internal design and implementation of the software.
- It involves the development team members in the testing team.
- It basically tests different aspects of the software according to its types.
- Structural testing is just the opposite of behavioral testing.

Differentiate between alpha testing and beta testing:

Alpha Testing	Beta Testing
Alpha testing involves both the white box and black box testing.	Beta testing commonly uses black-box testing.
Alpha testing is performed by testers who are usually internal employees of the organization.	Beta testing is performed by clients who are not part of the organization.
Alpha testing is performed at the developer's site.	Beta testing is performed at the end-user of the product.
Alpha testing requires a testing environment or a lab.	Beta testing doesn't require a testing environment or lab.
Alpha testing may require a long execution cycle.	Beta testing requires only a few weeks of execution.