

Basic Software Engineering (Software Testing)



UNIT – 7 SOFTWARE VERIFICATION & VALIDATION

Content



- Software Testing (Definition)
- Software Testing Types & Techniques
 - Static and Dynamic
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Software Testing



- **Software testing** is an investigation conducted to provide stakeholders with information about the quality of the software product or service under test.

Software Testing Types and Techniques



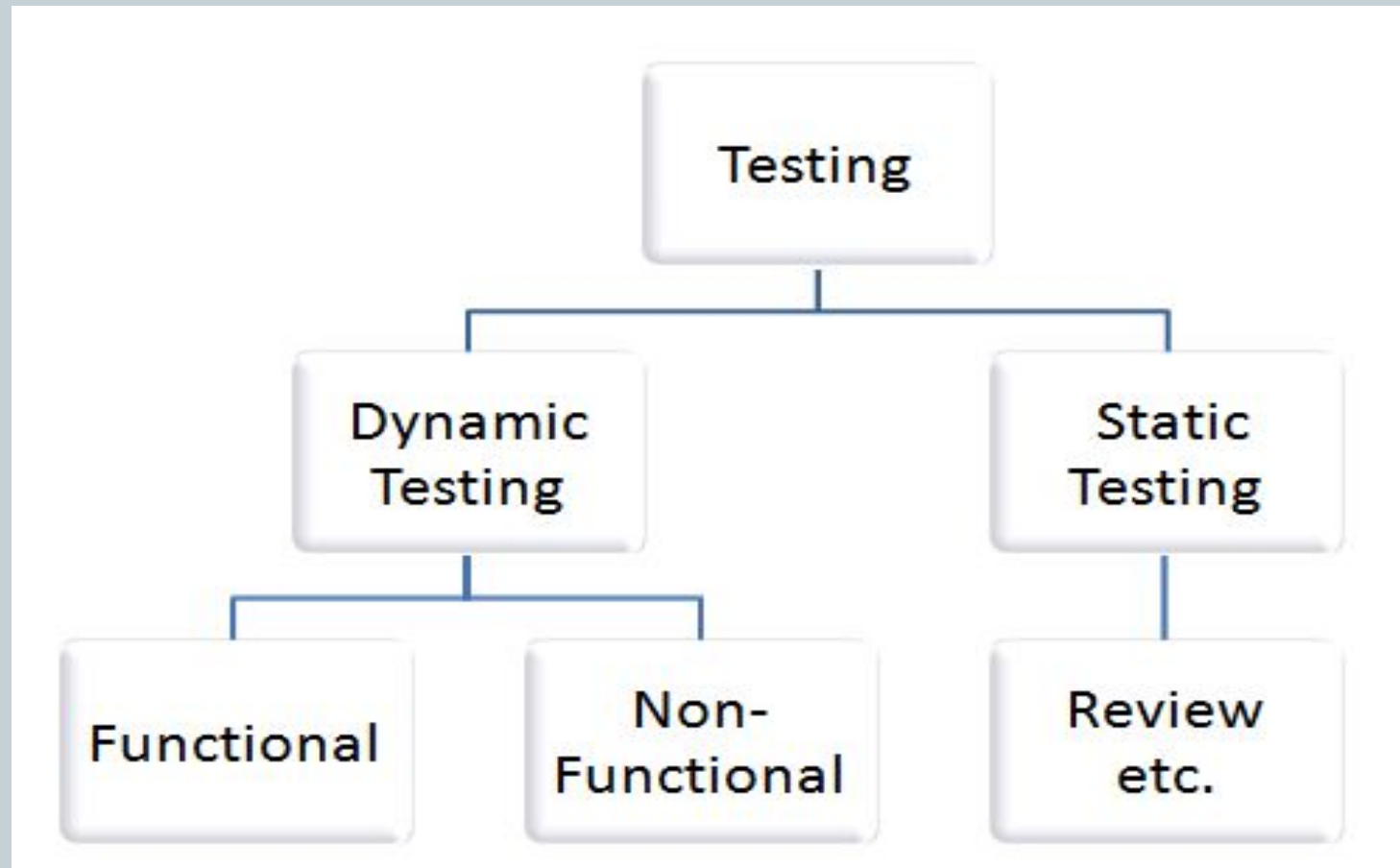
Function types

Unit testing
Integration testing
System testing
Sanity testing
Smoke testing
Interface testing
Regression testing
Beta/Acceptance testing

Non-functional types

Performance Testing
Load Testing
Failover Testing
Security Testing
Compatibility Testing
Usability Testing
Stress Testing
Maintainability Testing

Testing Hierarchy



Static Testing



- Under **Static Testing**, code is not executed. Rather it manually checks the code, requirement documents, and design documents to find errors. *Hence, the name "static".*
- The main objective of this testing is to *improve the quality of software* products by finding errors in the early stages of the development cycle. This testing is also called a Non-execution technique or verification testing.
- Static testing involves manual reviews of the documents. This review is done during an initial phase of testing to catch defect. It examines work documents and provides review comments.

Examples of Work documents



- Requirement specifications
- Design document
- Source Code
- Test Plans
- Test Cases
- Test Scripts
- Help or User document
- Web Page content

Static Testing Techniques



- **Informal Reviews**
- **Technical Reviews**
- **Walkthrough**
- **Inspection**
- **Static code Review**

Dynamic Testing



- Under **Dynamic Testing**, a code is executed. It checks for functional behavior of software system, and overall performance of the system. *Hence the name "Dynamic"*.
- The main objective of this testing is to *confirm* that the software product works in accordance with the business requirements. This testing is also called an Execution technique or validation testing.
- Dynamic testing 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.

Dynamic Testing Techniques



- **Unit Testing**
- **Integration Testing**
- **System Testing**

Black Box Testing



- **Black Box Testing** is a software **testing** method in which the internal structure/ design/ implementation of the software being tested is NOT known to the **tester**.

White Box Testing



- **White Box Testing** is a software **testing** method in which the internal structure/ design/ implementation of the software being tested is known to the **tester**.

Gray Box Testing



- **Gray box testing**, is a strategy for **software** debugging in which the **tester** has limited knowledge of the internal details of the program.
- A **gray box** is a device, program or system whose workings are partially understood.

Example



- **Gray Box Testing** is a technique to **test** the software product or application with partial knowledge of the internal workings of an application.
- **Gray Box Testing** is a software **testing** method, which is a **combination of both White Box Testing and Black Box Testing method**.

Who can do?



- **Gray box testing** can be contrasted with black box testing, a scenario in which the **tester** has no knowledge or access to the internal workings of a program, or white box testing, a scenario in which the internal particulars are fully known.
- **Gray box testing** is commonly used in penetration tests.

Software Testing Strategies



- The **strategies** describe ways of justifying product risks of stakeholders in the **test** level, the kind of **testing** to be performed and which entry and exit criteria would apply.
- A **software testing strategy** is an outline which describes the software development cycle testing approach.
- The **test strategy** describes the **test** level to be performed. There are primarily three levels of testing: **unit testing**, **integration testing**, and **system testing**.
- In most software development organizations, the developers are responsible for unit testing.

Create test strategies



- Test Strategy :
 - Step#1: Scope
 - Step#2 Test Approach
 - Step#3 Test Environment
 - Step#4 Testing Tools
 - Step#5 Release Control
 - Step#6 Risk Analysis
 - Step#7 Review and Approvals

References



- An Integrated Approach to Software Engineering by Pankaj Jalote (3rd edition)
- https://en.wikipedia.org/wiki/Software_testing
- <https://www.guru99.com/static-dynamic-testing.html>
- Other web references



Thank You



Any Questions?