

■ Software Testing Life Cycle (STLC) & Related Concepts

1. Software Testing Life Cycle (STLC)

STLC is a sequence of activities carried out during the testing process to ensure software quality.

- **Requirement Analysis:** Understand requirements, identify testable requirements, output: RTM.
- **Test Planning:** Define objectives, scope, resources, schedule. Output: Test Plan Document.
- **Test Case Development:** Create test cases, test data, and scripts. Output: Test cases & data.
- **Test Environment Setup:** Prepare hardware, software, and network. Output: Ready test environment.
- **Test Execution:** Execute test cases, log defects. Output: Test results & defect reports.
- **Test Cycle Closure:** Evaluate completion, prepare closure report, lessons learned.

2. Types of Testing

■ **Functional Testing** (*Focus: What the system does*)

- Unit Testing – test smallest part (functions, classes).
- Integration Testing – test combined modules.
- System Testing – end-to-end testing.
- User Acceptance Testing (UAT) – done by clients/end-users.
- Regression Testing – ensure new changes don't break existing features.

■ **Non-Functional Testing** (*Focus: How the system performs*)

- Performance Testing – response time, load, scalability.
- Security Testing – data protection, vulnerabilities.
- Usability Testing – user-friendliness.
- Compatibility Testing – across browsers, OS, devices.
- Reliability & Maintainability Testing.

3. Difference Between Manual and Automation Testing

Aspect	Manual Testing	Automation Testing
Execution	Done by human testers	Done using tools (Selenium, JUnit, TestNG, etc.)
Accuracy	Prone to human errors	More reliable
Cost	Low initial cost, high effort	High initial cost, low long-term effort
Speed	Slower	Faster
Best Suited For	Exploratory, Ad-hoc, Usability	Regression, Load, Performance
Maintenance	No script maintenance	Requires maintenance
Reusability	Not reusable	Reusable scripts

4. Verification vs Validation

Aspect	Verification	Validation
Definition	Are we building the product right?	Are we building the right product?
Focus	Ensures requirements, design, development are correct.	Ensures final product meets user needs.
Type	Static process (reviews, inspections)	Dynamic process (executing code)
Example	Review design documents, check standards.	Run functional tests, UAT.

5. Static vs Dynamic Testing

Aspect	Static Testing	Dynamic Testing
Definition	Testing without executing code.	Testing by executing software.
Purpose	Detects errors early in docs/design/code.	Detects defects at runtime.
Examples	Reviews, walkthroughs, inspections.	Unit, Integration, System tests.
Cost	Cheaper (early defect detection).	Costlier (later detection).
Performed By	Developers, testers, reviewers.	Testers (QA team).