STLC -Software Testing Life Cycle

Software Testing is not just a single activity.

Overview

- Software Testing Life Cycle.
- Entry/Exit Criteria.
- Requirement Analysis.
- Test Planning.
- Test Case Development.
- Test Environment Setup.
- Test Execution.
- Test Cycle Closure.
- Software Testing Life Cycle Stage Chart.

Software Testing Life Cycle

Requirements Analysis

↓

Test Planning

↓

Test Case Development

↓

Environmental Setup

↓

Test Execution

↓

Test Cycle Closure

The Software Testing Life Cycle (STLC) is a sequence of activities conducted to perform software testing. It consists of a series of activities carried out methodologically to help certify the software product.

Entry and Exit Criteria

Software Testing Life Cycle (STLC) stages are generally executed sequentially.

Entry Criteria: Gives the prerequisite items that must be completed before testing can *begin*.
Exit Criteria: Defines the items that must be completed before testing can be *concluded*.
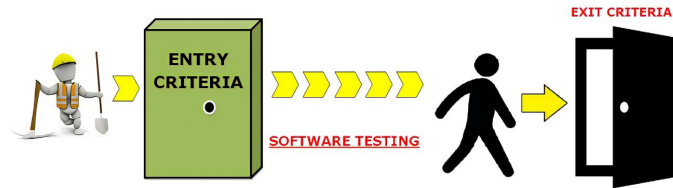
In an ideal world, you will not enter the next stage until the exit criteria for the previous stage has been met. However, practically, this is not always possible.

Requirements Analysis

| Requirements Analysis |
| Test Planning |
| Test Case Development |
| Environmental Setup |
| Test Execution |
| Test Cycle Closure |

Requirements are analyzed to determine how they can be validated.

Requirement Type Considerations
Functional - define what the software must accomplish.
Non-functional - availability, capacity, continuity, and security.

Activities:
- Identify the types of tests to be performed.
- Gather details about testing priorities and focus.
- Prepare Requirement Traceability Matrix (RTM).
- Identify test environment details where testing is supposed to be carried out.
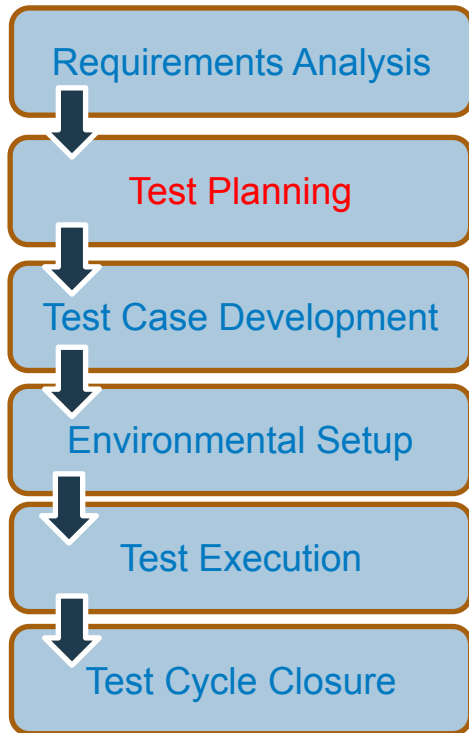- Perform automation feasibility analysis (if required).

Requirements Analysis Stage Detail

STLC Stage	Entry Criteria	Activity	Exit Criteria	Deliverables
Requirement Analysis	Requirements Document available (functional and nonfunctional). Acceptance criteria defined. Application architectural document available.	- Analyze business functionality to know the business modules and module-specific functionalities. - Identify all transactions in the modules. - Identify all the user profiles. - Gather user interface/authentication and geographic-spread requirements. - Identify types of tests to be performed. - Gather details about testing priorities and focus. - Prepare Requirement Traceability (RTM). - Identify test environment details where testing is supposed to be carried out. - Automation feasibility analysis (if required).	- Signed-off RTM. - Signed-off test automation feasibility report.	- RTM. - Automation Feasibility report (if applicable). -List of questions with all answers to be resolved from business (i.e., testable requirements).

Test Planning

Requirements Analysis

⬇

Test Planning

⬇

Test Case Development

⬇

Environmental Setup

⬇

Test Execution

⬇

Test Cycle Closure

Also called the *Test Strategy* phase.

Activities
- Preparation of test plan/strategy document for various types of testing.
- Test tool selection.
- Test effort and cost estimation.
- Resource planning and determination of roles and responsibilities.
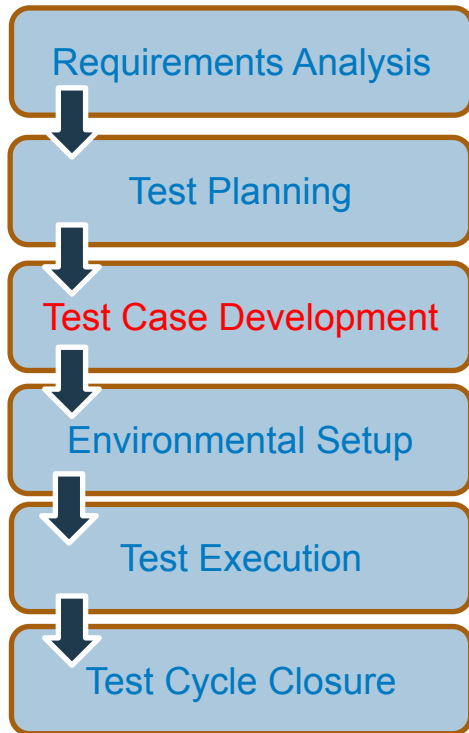- Training requirements.

Test Planning Stage Detail

STLC Stage	Entry Criteria	Activity	Exit Criteria	Deliverables
Test Planning	Requirements Document. Requirement Traceability Matrix (RTM). Test automation feasibility report.	- Analyze various approaches available. - Finalize on the best-suited approach. - Prepare test plan/strategy document for various types of testing. - Test tool selection. - Test effort estimation. Determine resource planning and roles and responsibilities.	- Approved Test plan/strategy document. - Signed-off effort estimation document.	- Test plan/strategy document. - Effort estimation document.

Test Case Development

```
Requirements Analysis
        ↓
   Test Planning
        ↓
Test Case Development
        ↓
Environmental Setup
        ↓
  Test Execution
        ↓
Test Cycle Closure
```

- Creation, verification, and rework of test cases and test scripts.
- Test data, is identified/created, reviewed, and then may be reworked.

Activities:
- Create test cases and automation scripts (if applicable).
- Review and baseline test cases and scripts.
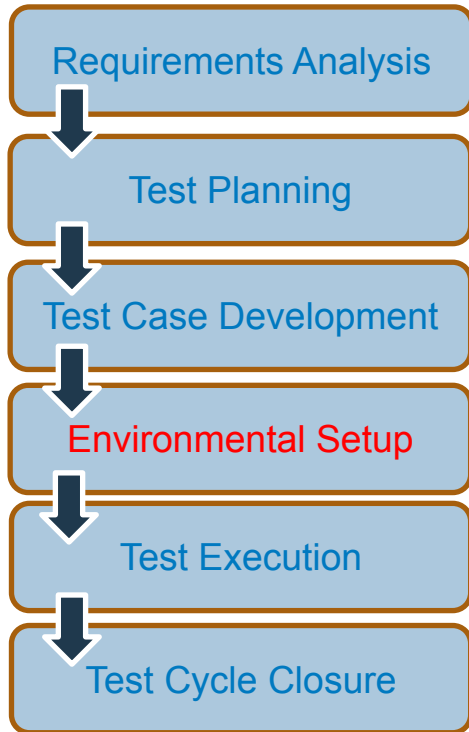- Create test data (if test environment is available).

Test Case Development Stage Detail

STLC Stage	Entry Criteria	Activity	Exit Criteria	Deliverables
Test Case Development	Requirements Document. RTM and Test Plan. Test automation feasibility report.	- Create test cases, test design, and automation scripts (where applicable). - Review and baseline test cases and scripts. - Create test data.	- Reviewed and signed test cases/scripts. - Reviewed and signed test data.	- Test cases and scripts. - Test data.

Test Environment Setup

Requirements Analysis

↓

Test Planning

↓

Test Case Development

↓

Environmental Setup

↓

Test Execution

↓

Test Cycle Closure

- Determines the software and hardware conditions under which a work product is to be tested.
- The Test Environment is set up.

Activities:
- Understand the required architecture and environment setup.
- Prepare hardware and software requirements list for the test environment.
- Set up test environment and test data.
- Perform a smoke test on the build.

Test Environment Setup Stage Detail

STLC Stage	Entry Criteria	Activity	Exit Criteria	Deliverables
Test Environment setup	- System design and architecture documents are available. - Environment set-up plan is available.	- Understand the required architecture, environment setup. - Prepare hardware and software development requirement list. - Finalize connectivity requirements. - Prepare environment setup checklist. - Set up test environment and test data. - Perform smoke test on the build. - Accept/reject the build depending on smoke test result.	- Environment setup is working per the plan and checklist. - Test data setup is complete. - Smoke test is successful.	- Environment ready with test data setup. - Smoke test results.

Smoke Testing

Smoke testing is a software testing process that determines whether or not the deployed software build is stable.

The Aim of Smoke Testing:

1. To detect any early defects in a software product.
2. To demonstrate system stability.
3. To demonstrate conformance to requirements.
4. To assure that the acute functionalities of the program are working fine.
5. To measure the stability of the software product by performing testing.
6. To test all of the functions of the software product.

Smoke Testing Checklist

Smoke Testing Checklist
For Quality Testing

☐ Begin the acceptance test creation process by determining the test team for carrying out the tests.

☐ Draft a work plan and devise a relevant test approach for the same.

☐ Determine whether test scripts meet requirement specifications, which is to be demonstrated to the end user.

☐ To keep a track of the activities, create & maintain a test schedule that narrates all the resources to be used in the process.

☐ Finally execute the acceptance test.

Once acceptance test is completed, it is time to begin with system testing.

☐ Identify the tools to be used for smoke testing.

☐ Analyse data requirements.

☐ Create a test approach which will help in achieving the final objective.

☐ Review the existing test material and create a complete list of test items.

☐ Identify and analyse carefully the designs, conditions, processes etc. as well as the various conditions to be used in white-box testing.

The next consecutive step is creation of test cases.

☐ Group the test cases as per the business functions.

☐ Create test cases based on list of test items.

☐ Review business functions, test cases and data sets and get approval to end the process of test design, from QA or Project leader.
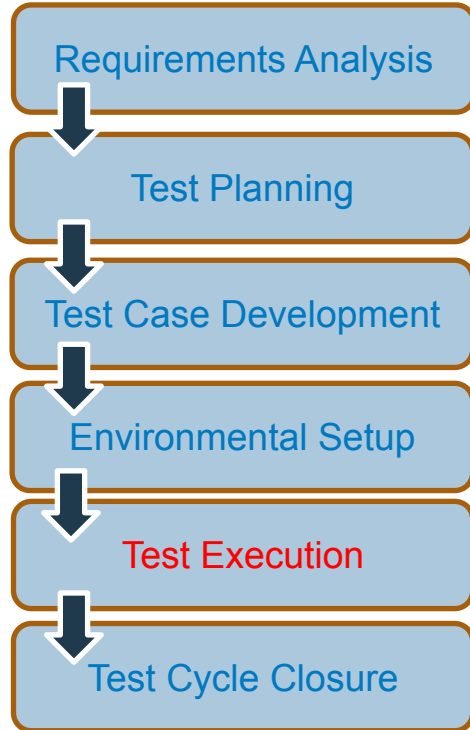
Commence with test preparation by gathering necessary resources.

☐ Outline the expected results for each test case and assimilate test data and validate the same for respective test cases.

☐ Prepare detailed test scripts for test cases and implement them, while comparing the actual & expected results to find out deviations, if any.

☐ Finally, identify issues and prepare a report.

Copy located in your workbook.

14

Test Execution

Process
Requirements Analysis
Test Planning
Test Case Development
Environmental Setup
Test Execution
Test Cycle Closure

- Testing performed per test plans and test cases.
- Bugs reported to the development team for correction.
- Retesting performed after correction.

Activities:
- Execute tests per Test Plan.
- Document test results and log defects for failed test cases.
- Map defects to test cases in RTM.
- Retest the defects submitted and fixed by the development group.
- Track the defects to closure.

Test Execution Stage Detail

STLC Stage	Entry Criteria	Activity	Exit Criteria	Deliverables
Test Execution	- Baselined RTM, Test Plan, and Test case/scripts are available. - Test environment is ready. - Test data setup is done. - Unit/Integration test report for the build to be tested is available.	- Execute tests per plan. - Document test results and log defects for failed cases. - Update test plans/test cases, if necessary. - Map defects to test cases in RTM Retest the defect fixes. - Regression Testing of application. - Track the defects to closure.	- All tests planned are executed. - Defects logged and tracked to closure.	- Completed RTM with execution status. - Test cases updated with results. - Defect reports.

Regression Testing

- Regression testing is a type of software testing. Test cases are re-executed to check that the previous functionality of the application is working fine, and that the new changes have not produced any bugs.

- Regression testing can be performed on a new build when there is a significant change in the original functionality. It ensures that the code still works even when the changes are occurring. Regression means *retesting* those parts of the application that are unchanged.
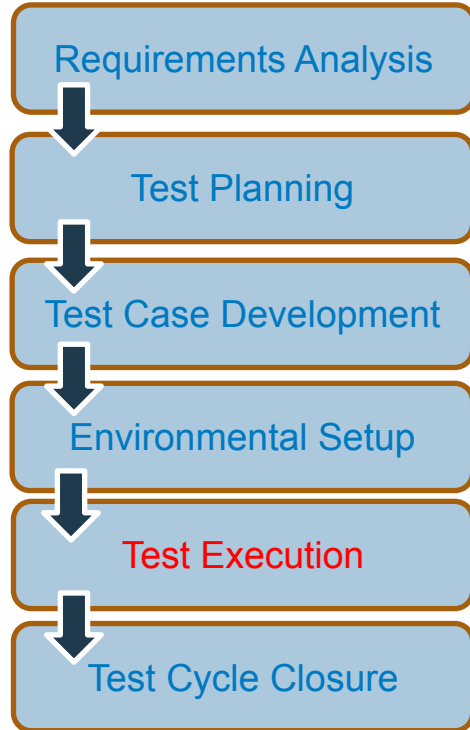
Regression Testing

Whenever the bug is fixed, we retest the Bug, and if there is any dependent module, we go for Regression Testing.

Test Cycle Closure

Requirements Analysis

⬇

Test Planning

⬇

Test Case Development

⬇

Environmental Setup

⬇

Test Execution

⬇

Test Cycle Closure

Activities:

- Evaluate cycle completion criteria based on time, test coverage, cost, software, critical business objectives, and quality.
- Prepare test metrics based on the cycle completion criteria.
- Document the learning out of the project.
- Prepare test closure report.
- Provide qualitative and quantitative report of quality to the customer.
- Test the results analysis for the defect distribution by type and severity.

Test Closure Stage Detail

STLC Stage	Entry Criteria	Activity	Exit Criteria	Deliverables
Test Cycle closure	Testing has been completed. Test results are available. Defect logs are available.	- Evaluate cycle completion criteria based on time, test, cost, software quality, and critical business objectives. - Prepare test metrics based on the above parameters. - Document the learning out of the project. - Prepare test closure report. - Provide qualitative and quantitative reporting of quality of the work product to the customer. - Review test result analysis to find out the defect distribution by type and severity.	N/A	- Test Closure Report.

Summary - Topics with which you should be Familiar

- Software Testing Life Cycle.
- Entry/Exit Criteria.
- Requirement Analysis.
- Test Planning.
- Test Case Development.
- Test Environment Setup.
- Test Execution.
- Test Cycle Closure.
- Software Testing Life Cycle Stage Chart.