SOFTWARE TESTING TECHNIQUES

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INTRODUCTION

- Software testing is conducted to ascertain the quality of the product or service under test.
- Software testing can also provide an objective, independent view of the software to allow the business to appreciate and understand the risks of software implementation.
- Testing techniques include the process of executing a program or application with the intent of finding software bugs.

TEST INFORMATION FLOW

Testing is an activity to evaluate the quality of software and improving it by removing errors in it.

Hence, the goal of testing is systematic detection of different classes of errors in a minimum amount of time and with a minimum amount of effort.

The information flow diagram is as given :-

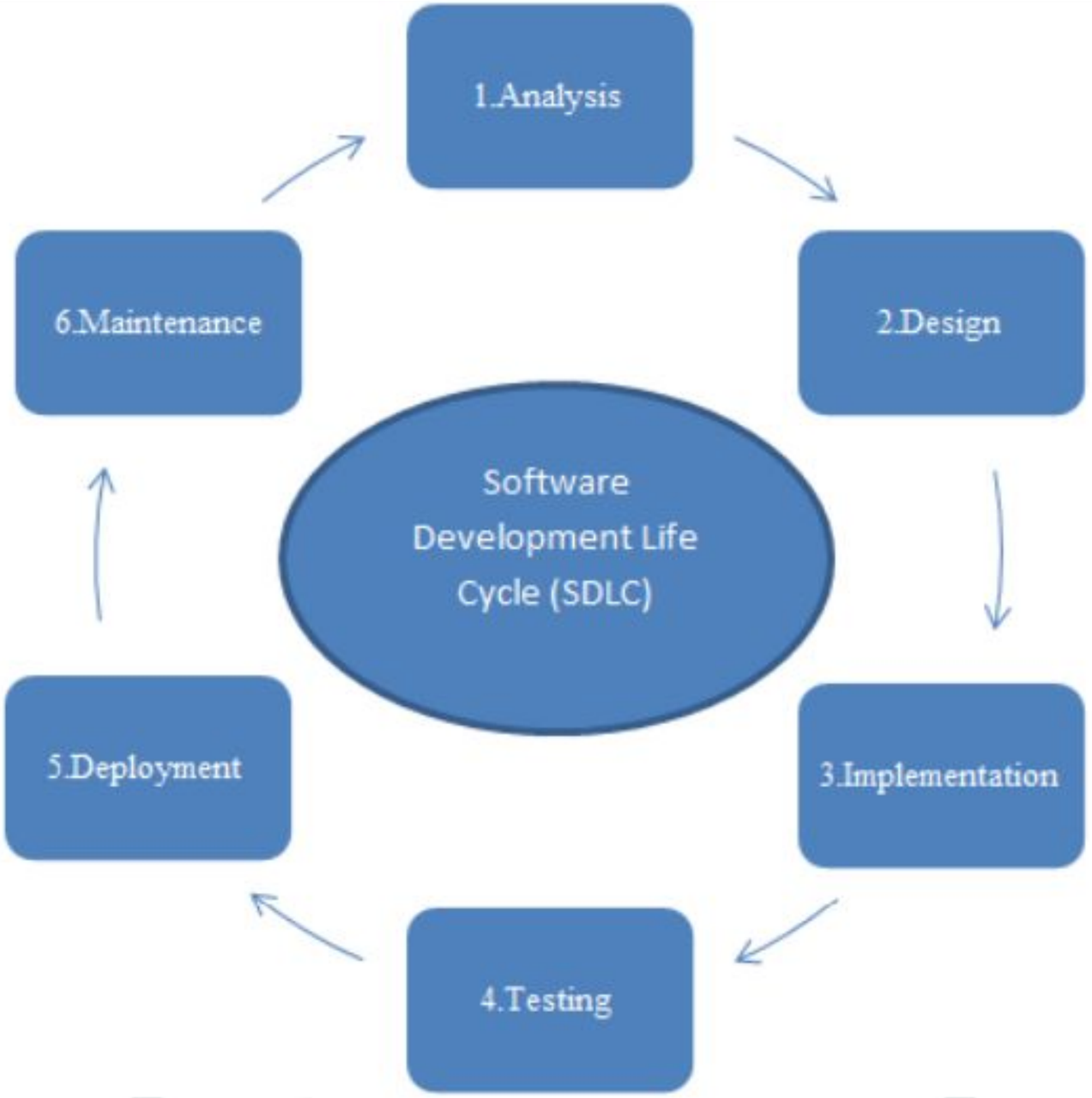

Figure 1: Phases of Software Development Life Cycle (SDLC)

DIFFERENT LEVELS OF TESTING

Tests are frequently grouped by where they are added in the software development process, or by the level of specificity of the test.

Different levels of Testing are as follows:-

- Unit Testing
- Integration Testing
- Functional Testing
- System Testing
- Acceptance Testing
- Beta Testing
- Regression Testing

Testing Type	Specification	General Scope	Opacity	Tester
Unit	Low level design; Actual code	Classes	White box	Programmer
Integration	Low level design; High level design	Multiple classes	White box; Black box	Programmer
Functional	High level design	Whole product	Black box	Independent tester
System	Requirement Analysis	Whole product in environment	Black box	Independent tester
Acceptance	Requirement	Whole product in	Black box	Customer
	Analysis	environment		
Beta	Ad hoc	Whole product in environment	Black box	Customer
Regression	Changed Documentation; High level design	Any of the above	Black box; White box	Programmer or Independent tester

TESTING GOALS

1. Verification and Validation: Testing process has to verify and validate whether the software fulfills conditions laid down for its release/use.

2. Priority Coverage: Testing needs to assign effort reasonably and prioritize thoroughly. Generally every feature should be tested at least with one valid input case.

3. Balanced: Testing process must balance the written requirements, real-world technical limitations, and user expectations. Every defect/shortcoming has to be prioritized with respect to their time and technical constraints.

TESTING GOALS

4. Traceable: Documenting both the successes and failures helps in easing the process of testing. What was tested, and how it was tested, are needed as part of an ongoing testing process. Such things serve as a means to eliminate duplicate testing effort.

5. Deterministic: Problem detection should not be random in testing. We should know what are we doing, what are we targeting, what will be the possible outcome. Having clean insight into the process allows us to better estimate costs and to better direct the overall development.

TESTING TECHNIQUES

The different testing techniques are available for testing software. We can use as per our requirements.

- Static Testing
- Dynamic Testing
- Functional Testing
- Structural Testing

STATIC TESTING

Static program analysis is the analysis of computer software that is performed without actually executing programs. Different static or Manual testing Techniques are as listed below :-

- WalkThrough
- Informal Review
- Technical Review
- Inspection

DYNAMIC TESTING

- In dynamic testing the software must actually be compiled and run. It involves working with the software, giving input values and checking if the output is as expected by executing specific test cases which can be done manually or with the use of an automated process. This is in contrast to static testing.
- Unit tests, integration tests, system tests and acceptance tests utilize dynamic testing.
- Dynamic Testing is also known as dynamic analysis.

FUNCTIONAL TESTING

Functional testing typically involves six steps :-

- The identification of functions that the software is expected to perform
- The creation of input data based on the function's specifications
- The determination of output based on the function's specifications
- The execution of the test case
- The comparison of actual and expected outputs
- To check whether the application works as per the customer need.

STRUCTURAL TESTING

- In structural testing the software entity is viewed as a white box.
- The selection of test cases is based on the implementation of the software entity.
- The goal of selecting such test cases is to cause the execution of
- specific spots in the software entity, such as specific statements, program branches or paths. The expected results are evaluated on a set of coverage criteria.
- Examples of coverage criteria include path coverage, branch coverage, and data-flow coverage.

CONCLUSION

- Testing is a process to evaluate the quality of software.
- There is scope for automation in the activities of testing but testers experience is very much important for successful testing.
- Software testing is component of software quality control. Different types of tests are used to testing like unit testing, integration testing, acceptance testing, system testing are used to test a system.
- Techniques of testing like static testing, functional testing, dynamic testing and structural testing have been used to test the system.

THANK YOU!