

Q1] Define Software testing. Briefly Explain SDLC Principles.

Ans:-

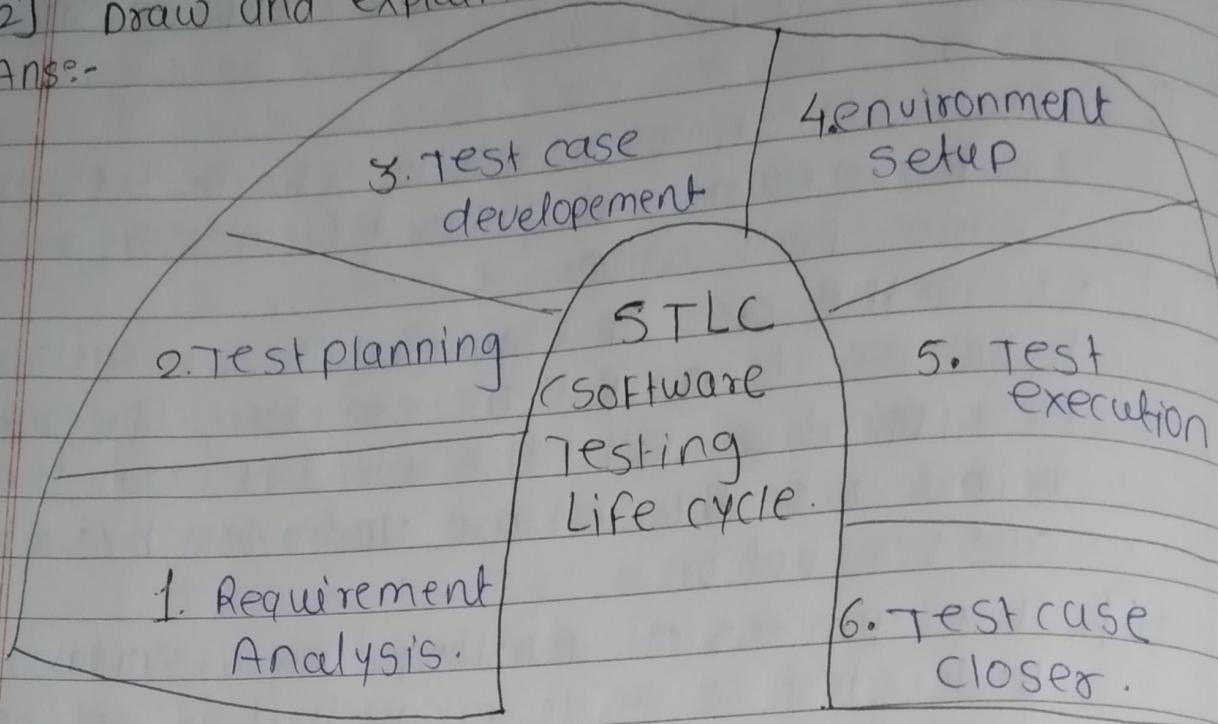
- i] Software Testing is evaluation of the software against requirement gathered from users and System Specification.
- ii] It is the act of examining the artifacts and techniques, design patterns executing a program or application with the intent of exam the behaviour of the Software under test by validation and verification.
- iii] The process of investigating a Software under test so as to ensure that is of the heighest quality.

Software testing Principles:-

- All Test Should be traceble to customer requirements.
- The Pareto principle applies to software testing
- Testing should begin "in the small" and progress toward testing "in the large".
- Test Should be planned long before testing begins.
- Exhaustive testing is not possible.
- To be most effective, testing Should be conducted by an independent third Party.
- Testing Shows the presence of defects.

Q2] Draw and explain SDLC STLC.

Ans:-



STLC :- i] Software testing Life cycle is a sequence of specific activity conducted during the the testing process to ensure software quality goals are met.

ii] STLC involves both verification and validation activities.

iii] Software Testing is not just a single activity i.e. it consist of series of activity carried out methodologically to help certify software product.

iv] STLC is a fundamental part of the SDLC but STLC consist of only the testing phases.

v] STLC Start as soon as requirement are defined or Software document is shared by Stakeholders.

vi] STLC yields a step-by step process to ensure quality Software.

## STLC phases:-

- 1] Requirement Analysis.
- 2] Test planning.
- 3] Test case development.
- 4] Test environment Setup.
- 5] Test execution.
- 6] Test closure.

### 1] Requirement Analysis:-

- i] Raise Requirement analysis is first step of STLC.
- ii] In this phase quality assurance team understands the requirements like what is to be tested.
- iii] If anything is missing or not understandable then quality assurance team meets with the stakeholders to better understand the detail knowledge of requirements.

### 2] Test Planning :-

- i] Test planning is most efficient phase of software testing life cycle where all test plan are predefined.
- ii] In this phase manager of the testing team calculates estimated effort and cost for the test work.
- iii] This phase get started once the requirement gathering phase is completed.

### 3] Test case development :-

- i] The test case development phase gets started once the test planning phase is completed.
- ii] In this phase testing team note down the detailed test cases.
- iii] Testing team also prepared the require test data for the testing.
- iv] When the test case are prepared then they are reviewed by quality assurance team.

### 4] Test environment Setup :-

- i] The test environment Setup is a vital part of the SITC.
- ii] Basically test environment decides the condition on which Software is tested.
- iii] This is independent activity and can be started along with test case development.
- iv] In this process the testing team is not involved either the developer or the customer creates the testing environment.

### 5] Test execution :-

- i] After the test case development and test environment setup test execution phase gets started.
- ii] In this phase testing teams start executing test cases based on prepared test cases in the earlier step.

### 6] Test case closure:-

- i) This is last step of the STLC in which the process of the testing is analyzed.
- ii) It involves several activities like test completion report, collection of test completion metrics and test result.

### Q3] What is Software quality and user Satisfaction? State quality attributes.

Ans:- i] Quality:- Quality is a meeting the requirement, expectation, and need of the customer is free from the defects, lacks and substantial variants.

- ii] Software quality comprises of two levels, which are intrinsic product quality and customer Satisfaction.
- iii] Product quality can be measured by number of bugs or defects occurring during software development phase or how long the software operate without crashing or error occurring.
- iv] Customer satisfaction will be achieved if all the software function or requirement listed in product log are meet.
- v] Therefore Software produced will be at its highest quality if software features and functionality meets all the business, objects and codes written are relatively bug free.
- vi] User Satisfaction = Compliant Product + Good quality + Delivery within budget and schedule

Quality attributes:-

- 1] Portability.
- 2] Usability.
- 3] Reusability.
- 4] Correctness.
- 5] Maintainability.

Q4] What is quality control and quality assurance.

Ans:-

1] Quality controls-

- It involves of set of activities, encourages ensuring the highest quality in software product.
- It contains activities relating to reviews such as requirement review, design review, code review also activities relating to testing such as unit testing, integration testing, system testing and acceptance testing.
- Main purpose of QC is to ensure that the developing software meet all the specification.
- Quality control includes feedback loop to the process that created the work product.
- Quality control as part of the manufacturing process.
- A key concept of quality control is that all work product have defined, measurable specification to which we may compare the output of each process.

Q8] Explain verification and validation

Ans:- Verification and validation is the process of investigating that software system satisfy specification and standards and it fulfills the required purpose.

1] verification :-

- i) verification is the process to ensure wheather the product that is developed is right or not.
- ii) It verifies the weather the developed product fulfills the requirements that we have.
- iii) verification is a static testing.
- iv) verification means we are building the product right?
- v) verification refers to the set of activities that ensure the software correctly implements a specific function.

2] validation :-

- i) It is the process of checking the validation of product. i.e. It checks what are developed is the right product.
- ii) It is validation of actual and expected product.
- iii) validation is the dynamic testing.
- iv) validation refers to a different set of activities that ensure the software that has been built is traceable to customer requirements.

Q7 What is Software quality Assurance and its activities.

Ans:-

- i) Software quality assurance (SQA) is simply a way to assure quality in the software.
- ii) It is set of activities which ensure process, procedure as well as standards are suitable for the project and implemented correctly.
- iii) SQA is kind of Umbrella activity that is applied throughout the software process.

Activities:-

- i) prepare an SQA plan for a project.
- ii) participate in the development of the Project Software Process description.
- iii) Reviews Software engineering activities to verify compliance with the defined Software Process.
- iv) Audits designed software work products to verify compliance with those defined as a part of the Software Process.
- v) SQA is a kind of Umbrella activity that is applied throughout the Software Process.
- vi) Ensure that deviation in Software work and work procedure products are documented and handle according to documented procedure.
- vii) Records any noncompliance and reports to senior management.

8] What is black box testing explain its type and strategies.

Ans:- i] White box testing techniques analyzed and test internal structure.

ii] Black box testing is a type of testing in which the functionality of the software is not known.

iii] The testing is done without the internal knowledge of the products and implementation details and internal path.

iv] The primary source of black box testing is a specification of requirement that is stated by the customer.

v] In this method tester selects a function and gives input value to examine its functionality, and checks whether the function is giving expected output or not.

vi] Black Box testing mainly focuses on input and the output of the software applications and it is entirely based on software requirements and specification.

vii] It is also known as Behavioural testing.

### Black Box Testing types:-

i] Functional testing:- In this testing the functional requirements of a system. It is done by tester. It determines the system's software functional requirements.

## 2] Non Functional Testing:-

- i) Non functional testing is also known as NFT.
- ii) This testing is not functional testing of software.
- iii) It focuses on software's performance, usability and scalability.

## 3] Regression Testing:-

- i) It ensure that the newly added code is compatible with existing code.
- ii) In other words, a new software update has no impact on the functionality of the software.
- iii) This carried out after a system maintenance, operation and upgrades.

## x Black box Testing Strategies:-

### 1] Graph-Based Testing methods:-

### 2] Equivalence partitioning

### 3] Boundary value analysis

### 4] Orthogonal testing

### 5] comparison testing.

### 1] Graph-Based testing methods:-

- Each and every application is built up of some objects. All such objects are identified and graph is prepared.

- From this object graph, each object relationship is identified and test cases are written accordingly to discover the errors.

Q] what is white box testing explain and its types

Ans:-

- i] White box testing techniques analyze and test internal structures.
- ii] WBT is used data structures, internal design, code structure and the working of the software rather than the just functionality.
- iii] It is also called glass box testing or clear box testing or structural testing.
- iv] In white box testing coding are tested to verify input-output flow and improve design, usability and security.
- v] In white box testing code is visible to tester, so it is also called clear box testing, open box testing.

challenges of white box testing :-

- i) Lack of understanding of programming languages used for testing.
- ii) Lack of understanding the logical flow use case.
- iii) Lack of patience to go through the program.
- iv) copying the existing functionality.
- v) Not being honest enough with the client

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10] Differentiate Static testing and Dynamic testing.

Ans:-

| Static testing  | Dynamic testing   |
|---|---|
| 1) Static testing is done by without executing the program.                       | dynamic testing is done by executing the program.   |
| 2) Static testing check the code, requirement and design document To find errors. | Dynamic testing check the functional behaviour of the system, memory (CPU usage and overall performance) of the system. |
| 3) Static testing is about the prevention of defects.                             | Dynamic testing is about finding and fixing the defects.  |
| 4) Static testing does the verification process                                   | Dynamic testing does the validation process.  |
| 5) Static testing performed before compilation.                                   | Dynamic testing does is performed after compilation.  |
| 6) Static testing techniques are structural and statement coverage.               | Dynamic testing techniques are Boundary value analysis and Equivalence Partitioning.                                    |
| 7) Static testing is more cost effective Process.                                 | Dynamic testing is a less cost-effective Process.   |

Q13) What is static testing and explain its types.

Ans:-

- i] Static testing is a type of a software testing method which is performed to check the defect in software without actually executing the code of the software application.
- ii] Static testing is done to avoid error at an early stage of development as it is easier to identify the errors and solve the errors.
- iii] It includes the testing of software for the input values and output values that are analyzed.
- iv] Static testing is a verification process.
- v] Static testing is performed in the white box testing phase, where the programmer checks every line of the code before handing over the test engineer.
- vi] Static testing can be manually or with the help of the tool to improve quality of the application by finding the error at early stage.

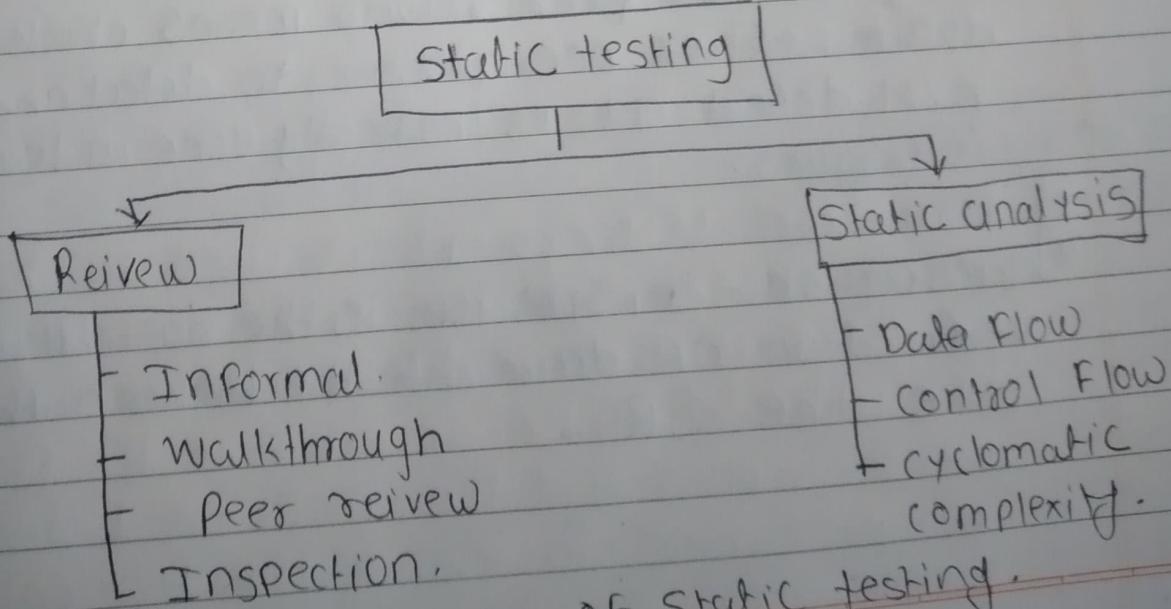


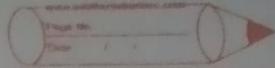
Fig: Types of static testing.

## i] Review Testing:-

- i] In static testing review is a process of technique that is performed to find potential defects in the design of the software.
- ii] It is a process of detect and remove errors and defects in the different supporting document like SRS.

Review has four types:-

- 1] Informals:- The informal review the creator of the document put the content in front of audience and everyone gives their opinion and thus defects are identified in the early stage.
- 2] walkthrough:- It is basically performed by experience person or expert to check the defects so that might not be problem further in the development and testing phase.
- 3] peer review:- Peer review means checking documents of one-another to detect and fix defect. It is basically done in teams of colleagues.
- 4] inspection:- Inspection is the basically the verification of document the higher authority like the SRS.



## 2] Static Analysis:-

- 1] Static analysis includes the evaluation of the code quality that is written by developers.
- ii] different tools are used to the analysis of the code and comparison of the same with standard.
- iii] It also helps in following identification of following defects:-
  - 1] unused variables.
  - 2] Dead code
  - 3] infinite loop
  - 4] variable with undefined value.
  - 5] wrong syntax.

Static analysis is basically has three types-

- 1] Data Flow- Data Flow is related to stream processing.
- 2] control flows- control flow are the basically how the statements or instructions executed.
- 3] cyclomatic complexity-  
cyclomatic complexity is the measurement of the complexity of program that basically calculated to the number of independent paths in the control flow graph of the program.

Q2] Explain Structural testing and its types.

Ans:-

- i] Structural testing is to test the internal design of the software or structure of the coding for the particular software.
- ii] In this testing the development team members are included in the testing team to execute the software's internal design.
- iii] The structural testing process requires an in-depth knowledge of the programming language and it is opposite to functional testing.
- iv] Through the structural testing, the test engineer intends on how the software performs, and it can be used at all levels of testing.

v)

### Types of Structural Testings:-

- 1] Mutation testing.
- 2] Data Flow testing.
- 3] Control flow testing.
- 4] Slice-based testing.

i] Mutation Testing: It is used to check the quality of the software test case that should fail the mutant code.

It uses to cause an error in the program which implies that the mutation testing is performed to evaluate the test case productivity.

## 2] Data Flow testing:-

- It is a group of testing approaches used to observe the control flow of the programs to discover the sequence of the variable as per the series of events.
- It implements the control flow graph and analysis point where the codes can change data.

## 3] Control Flow testing:-

- It is used to check the implementation order of commands or statements of the code over the control structure.
- This entire test is based on how the control is executed during the code.

## 4] Slice based Testing:-

IS the basic idea to sort the complete code into small chunks and then evaluate each portion carefully.