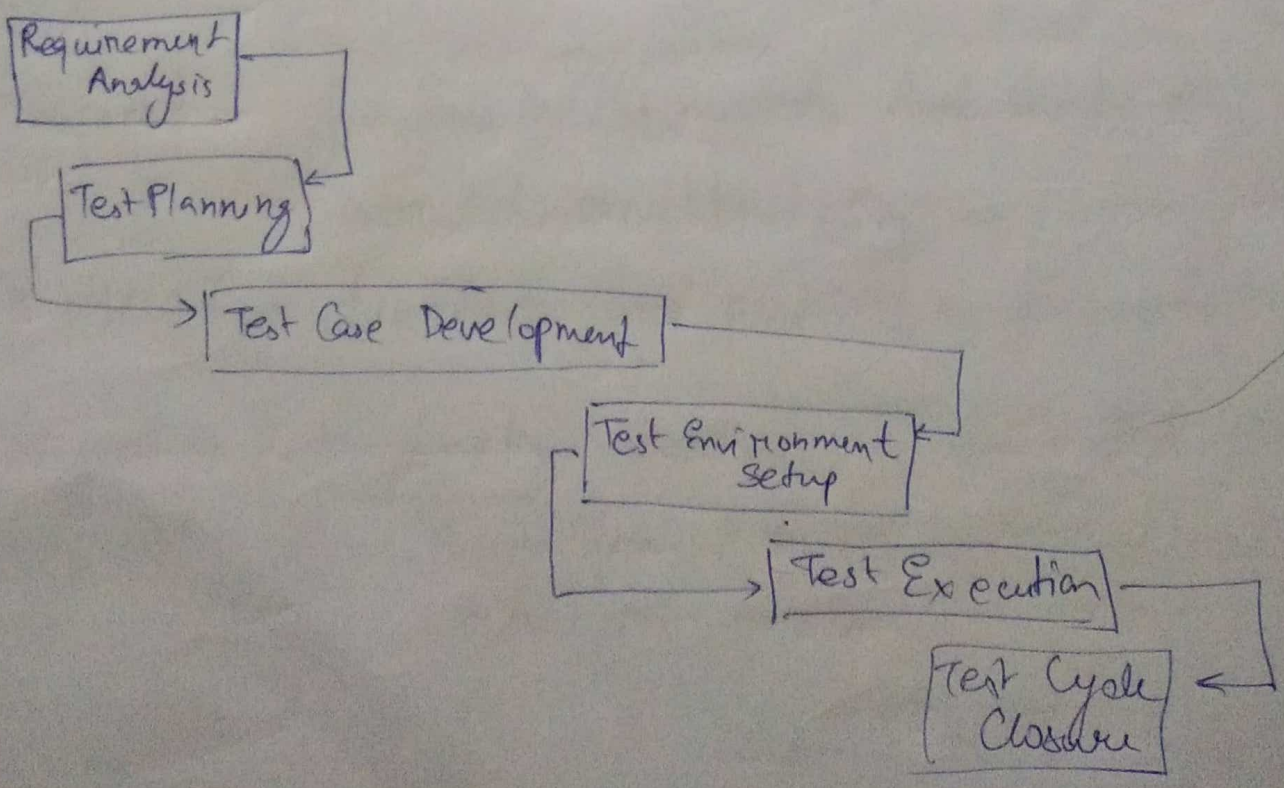
S/w Testing

It is a process of evaluating the functionality of a software application to find any software bugs.
It checks whether the software developed meets the requirement specified & identifies any defect. inorder to produce a quality product.

Why is Testing Required:

- Cost Effective
- Security
- Product Quality
- Customer Satisfaction

STLC (S/W Testing Life Cycle)



Requirement Analysis → The Quality Assurance Team (QA Team) understands the requirements in terms of what we are going to test & figures out the testable requirements.

Test Plan → The testing strategies are decided here. This stage is also test strategy phase. The test manager is involved in determining the effort & cost estimates for the entire project.

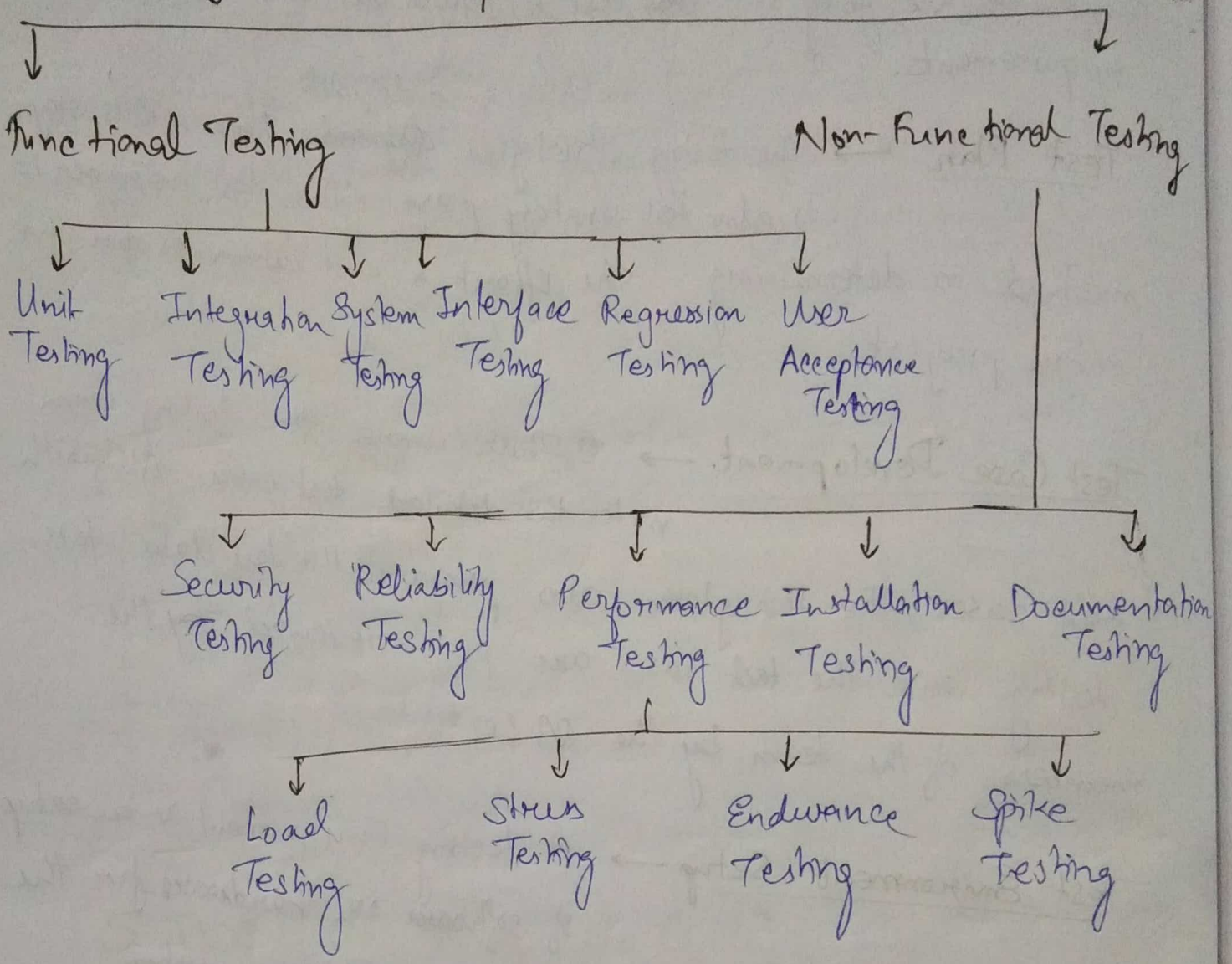
Test Case Development → This is where the testing team writes the detailed test cases. Along with test cases, the testing team also prepares the test data for testing and the test cases are peer reviewed by the members of the team by the QA Lead.

Test Environment Setup → A testing Environment is a setup of software or hardware for the testing team to execute the test cases. ~~It is a setup~~ It supports test execution along with configuration management.

Test Execution → This is the process of executing a code & comparing the expected & actual results. When test Execution begins the test analyst start executing the test scripts based on the strategy picked in the ongoing project.

Test Cycle Closure → It involves closing the testing procedure

Types of Testing



Unit Testing → It is a level of software testing where individual units of S/w are tested. The purpose is to validate that each unit of the software performs as designed.

↓
Smallest testable part
(few inputs, 1 output)

Integration Testing → It is a level of S/w Testing where individual units are combined and tested as a group. The purpose is to expose false

mthe interaction b/w integrated part.

System Testing → It is that level of testing that checks if the system properly or not after all units are combined together & tested at one go.
It is also called Big Bang Testing.

Interface Testing → When a system or application is developed it has several components like database, MIS, servers, etc
The connection which integrates & facilitates the communication b/w these components is termed as an interface.
Interface Testing verifies that communication b/w the components are done correctly.

Regression Testing → It has the following techniques.

1) Retest all → all the test cases in the test suit are reexecuted to ensure that there are no bugs that have occured due to small change in code.
2) Regression Test Selection → Selection of test cases from the test suit to be reexecuted & the selection is done on the code changes in the module
3) Test Case Prioritization → Test cases with high priority are executed first followed by the medium & low priority ones. Priority of the test case depends on its criticality, it's impact on the product
4) Hybrid → A combination of Regression Test Selection & test case prioritization. Here we select only those test cases which are reexecuted depending on their priority.

User Acceptance Testing

1) BAT (Business Acceptance Testing)
2) CAT (Contract Acceptance Testing)
3) OAT (operation Acceptance Testing)
4) α- Testing
5) β- Testing

BAT → This is to assess whether the product needs the business goals

CAT → It specifies that once the product goes live CAT must be performed & it should pass all the acceptance use cases.

OAT → This is to assess the operational readiness of the product. It mainly includes testing of recovery compability, maintainability, Technical support availability, localization etc.

Documentation Testing → This helps estimating testing efforts required & test coverage

Software documentation includes test plans, test cases & requirement section.

Installation Testing → This is a kind of quality assurance work in the software industry that converges on what customers will need to do to install & setup the software successfully.

Performance Testing → This is a type of software testing to ensure where the software application will perform well under the expected workload or not.

i) Load testing → To check the performance/behaviour when workload is increased.

ii) Stress testing → It is a type of performance testing conducted to evaluate the behaviour of the system at or beyond its anticipated workload.

iii) Endurance Testing → This is a type of performance testing conducted to evaluate the behaviour of a system when a significant workload is given continuously

iv) Spike Testing → To check the performance when the load is suddenly & substancially increased

Reliability → Testing how reliable, trustworthy the software is. (Checking if the software

Security ← poses any threat to the system.)

Cyclomatic Complexity.

It is a software metric that measures the complexity of a program. This was developed Mc Cabe

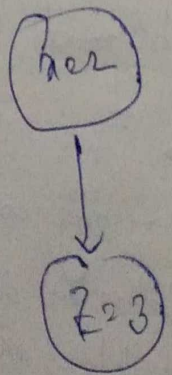
It interpretes computer program as a strongly connected, directed graph.

$$V(G) = E - N + 2*P$$

E = Edges count

N = node count

P = no of connected components



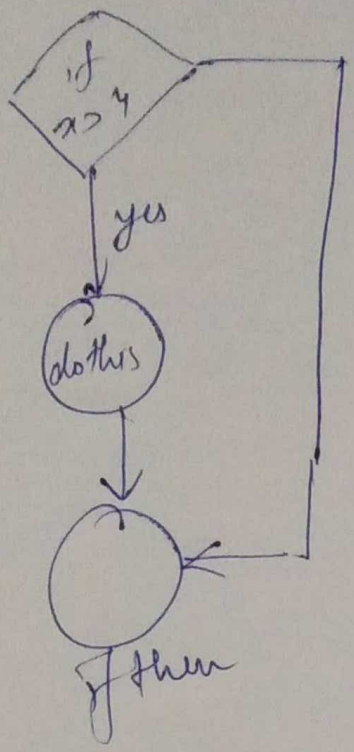
$V(G) = 1 - 2 + 2*1$

$V(a) = 1$

E = 1

N = 2

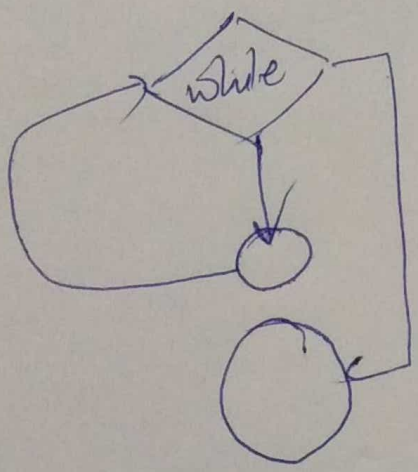
P = 1



$V(G) = 3 - 3 + 2 * 1$

$= 2$

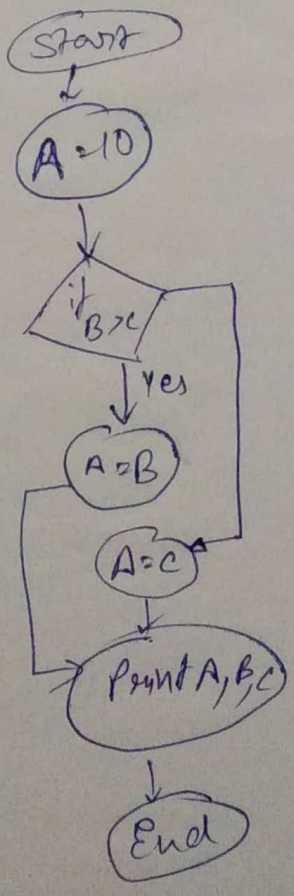
E = 3
N = 3
P = 1

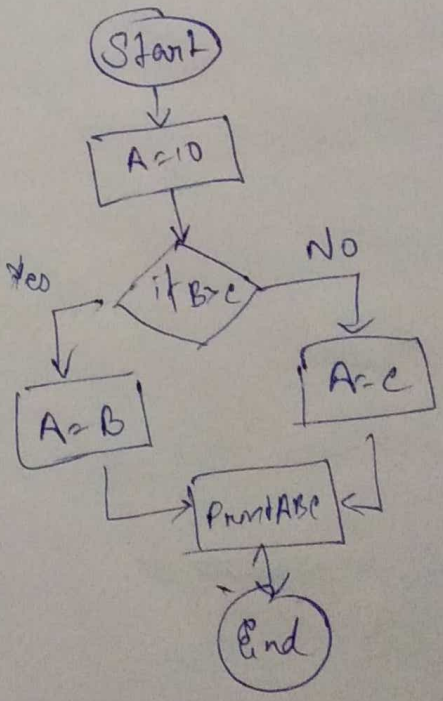


$V(G) = 3 - 3 + 2 * 1 = 2$

E = 3
P = 1
N = 3

A = 10
if B > C then
A = B
else A = C
end if
print A
print B
print C





E = 7
N = 7
P = 1
$V(G) = 7 - 7 + 2 * 1$
$= 2$