Fundamentals of Testing :-

Soft. testing can be stated as the process of verifying and validating whether a soft. is bug-free, meets the technical requirements as guided by its design and ~~docu~~ documentation and meets user requirements effectively by handling all exceptional and boundary cases.

- aims ~~on~~ not only on finding errors but also increasing efficiency, accuracy and usability
- Testing can be divided into two steps :-
  (i) Verification :- refers to set of tasks that ensure that the soft. correctly implements a specific function.
  (ii) Validation :- refers to set of tasks that ensure that the software that has been built is traceable to customer requirements.

- Testing can be broadly classified into two types :
  (1) Manual Testing :- In this, the tester takes the role of end-user and tests the software to identify any unexpected bug. Different levels are :-
    (i) Unit Testing
    (ii) Integration Test.
    (iii) System "
    (iv) Acceptance "

(2) Automation Testing:- Another software tests the ~~prod~~ product. Involves automation of manual process. Quick and can be reimplemented.

→ Different levels of software testing:- (4 types)

1. Unit Testing: In this, individual components/units of a software are tested. The purpose it to validate each unit of the software performs as ~~as~~ expected. Done by developers.

2. Integration Testing:- Individual units are combined and tested as a group. The purpose is to expose the faults between integrated units. Sub ~~categ~~ categories are:-

~~3. System Testing~~

(i) ~~Bang-B~~ Big-bang
(ii) Top-Down
(iii) Bottom-up
(iv) Mixed.

Occurs after unit Testing and before unit Testing

- Big bang:- All the modules are combined and then ~~it~~ test for its functionality. Only for small systems. Debugging errors reported during big-bang ~~integration~~ testing is expensive to fix. As the problem may be in ~~so~~ any of the integrated modules which is difficult to identify.

- Top-down:- Top priority functionality is tested first and ~~so~~ then subsequent functionalities. and then the low-level modules are integrated to high level modules

Bottom-up:- Lowest priority funct. is tested first and then the higher ones- eg: Paytm can perform bank transfers which is high priority and sell movie tickets which is least priority.

Mixed (Sandwich):- Combination of Top-down and bottom up approach. Overcomes the faults of shortcomings of both both models.
- Used for large projects.
- parallel test can be performed.

3. System testing:- It is a level of testing that validates the complete and fully integrated soft. product.
- Evaluation of end-to-end system evaluation.
- Black box testing. I/P → O/P
- Based on — who is doing the testing
  — Functional/Non functional.

~~Performed by team independent of~~

Functional:- α testing
β testing.

- Non functional:-
  1) Performance Testing → speed, efficiency
  2) Load Testing
  3) Stress Testing → robustness.
  4) Scalability "

4) Acceptance Testing:- Test the compliance of the system with the requirement and test whether it's suitable for delivery or not.

1. User Acceptance Testing (UAT)
2. Business " " (BAT)
3. Regulations " " (RAT)

Regression Testing :- The process of testing the modified parts of the code and the code parts that might get affected due to the modifications to ensure that no new errors have been introduced in the soft. after the modif^{n} have been made.

- When it is used ?
  - → After add^{n} of new functionality
  - → Some bug has been identified
  - → code is modified to optimize it.

- Tools used for regression testing :-
  1) Selenium
  2) QTP (Quick Test Professional)
  3) silktest.

- Selection of test cases :-
  1) select all test cases
  2) Select test cases randomly
  3) Select modification traversing test case
  4) Select higher priority test cases.
     - based on bug detection capability

- Advantages:
  - No new bugs have been introduced after add^{n} of functionality.
  - quality is maintained.
  - Easily automated by automation.

Disadvant:-

1) Time taking
2) Expensive

Alpha Testing

1. Involves both white and black box testing.
2. Performed by testers who are internal employees of organization
3. Alpha testing is performed at developers site.
4. Reliability and security are not checked in a testing.
5. Ensures quality of testing before forwarding for β testing.
6. Requires testing environment or lab.
7. Multiple test cycles

Beta Testing

1. ~~D~~ ~~Does~~ commonly uses black-box test.
2. Performed by clients who are not part of the organization.
3. Performed at the end-user of product.
4. Reliability, security and robustness are checked.
5. Also checks quality and collects user inputs on the product and ensures that the product is ready for real time users.
6. Doesn't require testing environment or lab.
7. ~~Dou~~ one or two test cycles.

Test Drivers and Stubs :-

Every element has its own specific utility that helps a lot while soft^{t} testing and delivering the expected functionality as per the SRS document as much as possible. Stubs and Drivers are two such elements. (play crucial role while testing

Stubs and Drivers are considered as elements which are equivalent to to-do modules that could be replaced if modules are in their developing stage, missing. So that necessity of such modules can be met.

- Simulate features and functionalities that a module can provide.
- Reduces useless delay in testing and makes the testing process faster.

- Stubs are used in Top-down integration testing
- Drivers ~~are~~ " " Bottom-up " "

Stubs:- Developed to use them in place of ~~the~~ modules that aren't developed or are unavailable currently ~~are~~ while Top down testing of modules.

- simulates capabilities ~~of~~ ~~the~~ of unavailable module.

Divided into 4 basic categories :- (based on what they do).

- shows the traced messages
- shows the displayed messages.
- Returns the corresponding values utilized by modules
- " " value of chosen parameters.

Drivers:- Same purpose as stubs but used in bottom-up testing.

- more complex than stubs.
- Drivers are used when higher level modules are missing and can be used when lower-level modules are missing.

Difference:-

Stubs:	Drivers:
1. Top-down	1. Bottom up
2. known as "called program".	2. known as "calling program".
3. used in a unavailability of low-level modules.	3. ... High-level modules ...
[Basically both are similar in concepts of working.]	

Static testing strategies:-

- Used to check the errors in software without actually executing the code of the software
- performed in early stage of ~~dev~~ devel.t to avoid errors as it is easier to find sources of failures.
- Errors that cannot be found by Dynamic Testing can be found by static Testing.

STT

Review — Static Analysis

Walk through — Data flow

Peer review: — control flow.

Review:- process that is performed to find the potential defects in the design of software. Process of removing errors or defects in SRS document.

- Walk through :- Performed by experienced person or expert to check the defects so that there does not arise any problem in further stages of desc dev. or testing.

- Peer ~~sit~~ review:- checking documents of one ~~or~~ another to detect and fix the defects. Basically done in a team of 2 colleagues.

- Informal: ~~to~~ creator of document puts the document in front of everyone to analyze errors.

- Inspection: Verification of document of higher authority (SRS)

Software Reliability Metrics:- (Part 1).

white box
black box } ~~by~~ Already done.

(2) ✓

1.30
1.00