Assignment no :- 05

Topics covered :-

- bottoam testing
- white-Black Box testing
- De-engineering + Reverse engineering

Date of performance :-

13-01-22

Evaluation Criteria	Marks (out of 3)	Date	Signature of Instructor
Punctuality	2.1	13-01-22	
Problem solving technique	2.1		
Attainment level (out of 3)	2		

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Assignment No - 05

Q.1) Explain the Diffieent level of testing

- **Software testing**

Software testing is a method to check whether the actual Software product matches expected requirement and to ensure that Software product is Defect free.

The main purpose of Software testing is to identify error, gaps or missing requirements in contrast to actual requirements.

- **Benefits of software testing**
  - Cost-effective
  - Security
  - product quality
  - Customer Satisfaction

- **level of testing**

- 1) **Unit Testing** :- "Unit testing is the first level of Software testing, which is used to test if Software modules are satisfying the given requirement or Not
  - it is functional testing
  - The primary purpose of executing unit testing is to validate unit components with their performance

- Unit testing Techniques :-

Unit testing uses all white box technique as it used code of software application:

- Data flow Testing
- Control Flow Testing
- Branch coverage Testing

- Advantages of unit testing :-

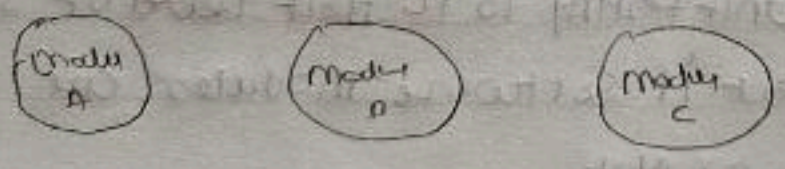
- unit testing uses module approach due to that any part can be tested without waiting for completion of another part testing
- To developing team focus on to provide functionality

- Disadvantage of unit testing:

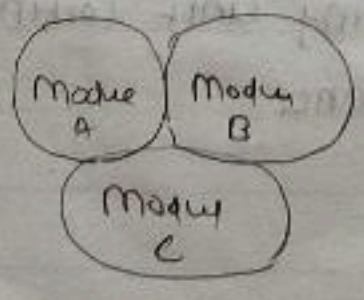
- it cannot identify integration or broad level error as it work on units of the code
- It is best suitable for conjuction with other testing activities.

2) Integration Testing

- The Second level of software testing is the integration testing the integration testing process come after unit testing.
- it is mainly used to test the data flow from one module or componets to other modules



Testing Unit testing



Under integration testing.

Type of integration testing

Software Engineers define variety of strategies to execute integration testing,

- Big Bang Approach
- Top down } Approach
- Bottom up }
- Sandwich Approach

- Big Bang testing :

Big Bang testing an integration testing approach in which all the components or modules are integrated together at once and then tested unit

Advantage:- Convenient for small systems

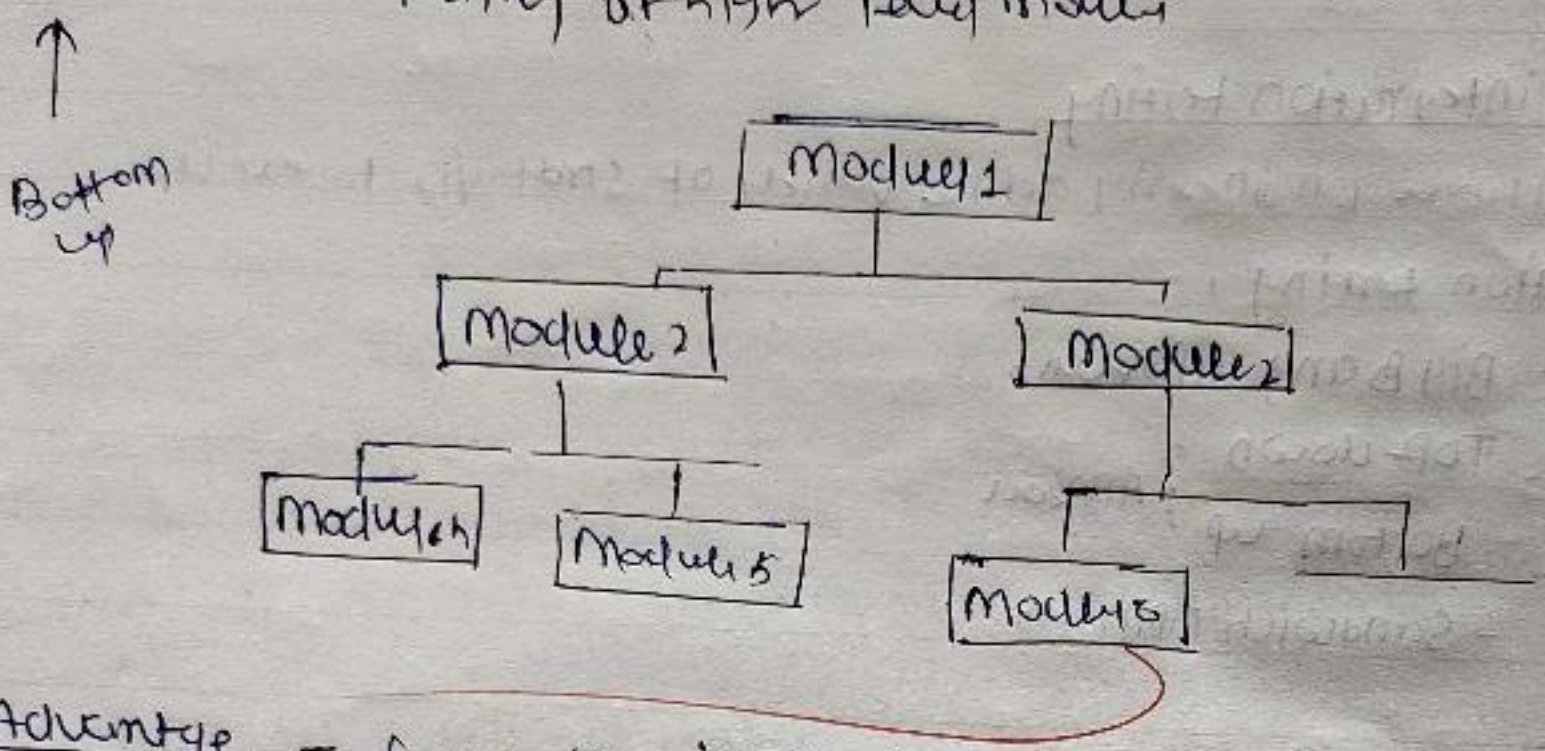
Disadvantage:- ① fault localization is difficult

② Since the integration testing can commence only when all the modules are designed, the testing team will have less time for execution the testing phase

Stubs & Drivers.

- Stubs - is called by the module under test
- Drivers - calls the module to be tested

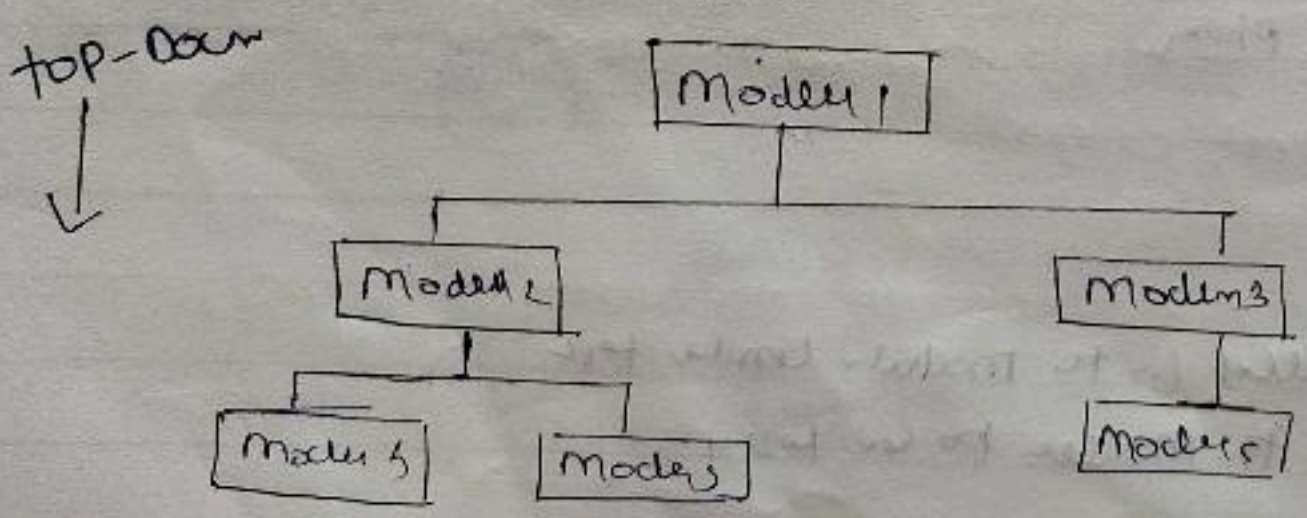
• **Bottom-up** : It is strategy in which the lower level module are tested first these tested modules are further used to facilitate the testing of high level modules



Advantage - Fault localization is easier
- No time wasted

Disadvantage :- - Critical module which control the flow of application are tested last & may be detect
- An early prototype is not possible

• **Top-down** :- Top down integration is which integration testing takes place from top to bottom following the control flow of software systems

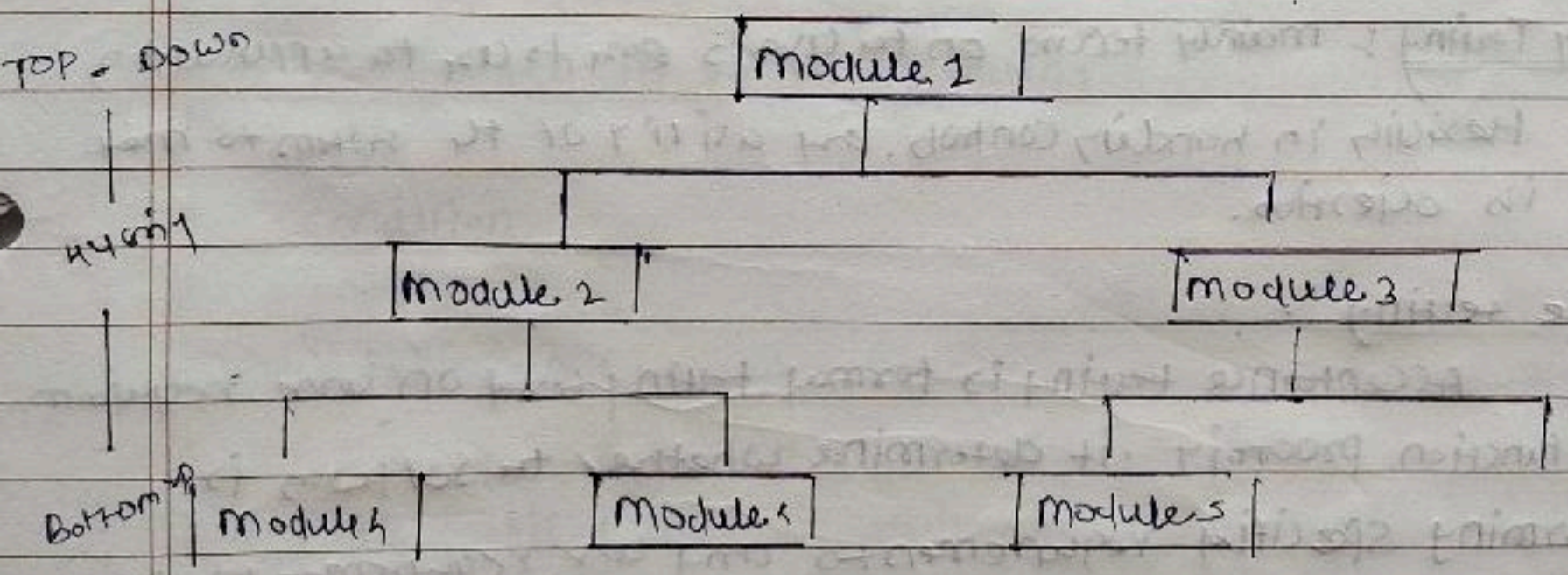


Advantage :- Fault Localization is easy
Possibility to obtain an early prototype

Disadvantage : Need many stubs

- Sandwich Testing

Sandwich testing is strategy in which top Module are tested with lower level Module are the same time lower are integrate with top - down & Bottom up approach
- It Happy ~~test~~ integration testing



- System testing :-

- System testing is is a level of testing that validates the comp and fully integrated software product.
- The purpose of a system test is evaluate the end-to-end system specifications. usally, The software is only one element of a large computer-based system.
- System testing is Black-box testing.
- System testing Category's Based on - function and non func Requirements

- Method :

1) Alpha testing :- Alpha testing is the initial phase of validating whether a new product will perform as expected.

2) Beta testing :- Beta-testing is performed by End users of the software application in real environment.

3) Load testing : is necessary to know that a software solution will perform under real-life loads

4) Usability Testing :- mainly focuses on the User's ease to use the application, flexibility in handling controls, and ability of the system to meet its objectives.

- Acceptance testing :-

Acceptance testing is formal testing based on user requirements and function processing. it determine whether the software is conforming specified requirements and user requirements or not.

it is conducted as a kind of Black Box testing where the No. of end users involved testing the acceptance level of the system.

it is the fourth and last level of software testing.

Q. 2) Explain : White Box - testing & Black Box testing

- The Box testing approach of software testing consist of black box testing & white box testing.
- The White Box testing is also called as which also known as glass box testing, structural testing, clear testing.
- it tests internal coding & infrastructure of software focus on checking of predefine inputs against expected and desired output.
- The primary goal of white box testing is to focus on the flow of input and outputs through the software and strengthening the security of the box software.
- Developer do white box testing

- Various test in White Box testing

- Path
- Condition
- Loop
- performance

- Path testing

In the path testing, we will write the flow graphs and test all independent path. Here written the flow graph implies that flow graph on Exponentially the flow of program.

- Condition testing :- In this we will test all logical conditions for both the true and false values ; that is we will verify for both if & else condition

```
if ((condition) - true
  }
}.....
else - false
}
  - - - .
}
```

- loop testing : in the loop testing, we will test the loops such as while, for, do, while, etc.

- Performance :-
  - when logic is easy
  - for the conditional case, we will get error and adequately
  - Swith case, which mean we cannot use nested if,

- Advantages of white Box testing
  - white box testing optimize code so hidden error can be identify
  - test cases of white Box testing can be easy automate
  - It can be started in the SDLC phase even without GUI

- Disadvantage of white box testing :-
  - white box testing is too much time consuming
  - white box testing is much expensive to complete

Techniques used white Box testing

Data flow testing : DFT is a group of testing strategies that examine the control flow of program

Branch testing :- Branch testing technique is used to cover all Branches of the control flow graph.

Statement testing : In this techniques used to design to all execution of all statement of the source code at least once.

- **Black box testing**

- Black Box testing is technique of software testing which examine the functionality of software without peering into its internal structure or coding.
- Black Box testing is method when software under test (SUT) function is tested without worrying about its details of implementation, internal path knowledge & internal code structure of the software.
- Black box testing an beneficial for the end user who wish to perform software validation.

- **Technique use in Black Box testing**

① **Decision table technique** :- Decision table technique is a systematic approach where various input combination and their respective system behaviour can capture in a tabular form.

② **Boundary value technique** :- Boundary value technique is used to test boundary value, boundary values are those that contain the upper & lower limit of a variable

③ **Equivalence partitioning technique** :- Equivalence partitioning is a technique of software testing in which input data divided into two partition of valid & invalid values i.e it is mandatory that all partitions must exhibit the same behavior.

④ Use Graph-Based testing :- Graph based involves a group drawing that depicts the link between the various (input) of the efforts (output) which make the effort.

- ~~Type of~~

Advantage of Black Box testing

- Well suited & efficient for large code segment
- Code access is not required

- Disadvantage of Black Box testing

- the test conditions difficult to design
- Limited coverage, since only a select No. of test scenarios is actually performed.

Q.2) Short Note on

a] Re-engineering :- Software Re-engineering is process of software development which is done to improve the maintainability of a software system. Re-engineering is the examination & alteration of a system to recon a new form.

- This process Re encompasses a combination of sub-process like reverse engineering, forward engineering, reconstructing, etc.

- Objective of Re-engineering
  - to describe a cost-effective option for system evolution
  - to describe the activities involved in the software maintence process

Advantage
  - Reduce Risk
  - Reduce cost
  - Revelation of Business rule

b) Reverse Engineering

- In Software Reverse Engineering is a process of recovering the design, requirement specification & function of a product from analysis of its code
  - it builds a program database & generate information from this
- The purpose of reverse en.

- Reverse Engineering Goals

- Copy with complexity
- Recover lost information
- Detect side effects
- Synthesize higher abstraction

- Reverse Engineering tools

Reverse Engineering if done manually would consume lot of time and human labour so hence must be supported by automated tools some of tools are given below:

i) Rigi - A visual software understanding tool
ii) Bunch - A software clustering / modification tool
iii) GEN - An application generator to support development of analysis tools for the C++ language.

Q.3 Explain the software maintance with type?

- The software maintence is activity that actually begins after the software product delivery at the clients end. in software maintenance, the modification are carried out or the ~~prod~~ updats in the software are taken place.
- In software maintenance phase no major changes are implement
- In SW maintenance, the change are done in existing program or the some small new functionality is added

• Type of software maintence

Following are four type of maintenance:-

① Corrective maintence :-

- The corrective maintence is the type of maintence in which the error are fixed when it is observed during the use of the software.
- It this the error may be caused due to faulty software design, incorrect logic and improper coding.

② Adaptive maintence :-

- The adaptive maintence means the implementation of the modification in the system. the changes may be hardware or the operating system environments.

③ Perfective maintenance :-

- Perfective maintenance deal with the modified and changed user requirement. the functional enhancements are taken into consideration in perfective maintenance
- in perfective maintenan , the function or efficiency of the code is continuously improved.
- Modifying the payroll program to add new union settlement

④ Preventive maintenance

- Preventive maintenance is used to prevent the possible error to occur. This in this activity , the complexity is minimize and the quality of the program is enhanced.
- It normally full 5% of all the maintenance activities & it is the smallest among all.