Unit-VI
Software Testing

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Syllabus

*Mapping of Course Outcomes for Unit V	CO1,CO2 CO3, CO7	
Unit VI	**Software Testing**	**(07 Hours)**
A Strategic Approach to Software Testing, Verification and Validation, Organizing for Software Testing, Software Testing Strategy—The Big Picture, Criteria for Completion of Testing, Strategic Issues, Test Strategies for Conventional Software, Unit Testing, Integration Testing, Test Strategies for Object-Oriented Software, Unit Testing in the OO Context, Integration Testing in the OO Context, Test Strategies forWebApps, Validation Testing, Validation-Test Criteria, Configuration Review. **Suggested Free Open Source Tools:** Selenium, JUnit.		
#Exemplar/Case Studies	Selemium Testing with any online application	
*Mapping of Course Outcomes for Unit VI	CO1,CO2 CO3, CO6	

What is Software Testing ?

- Software Testing is a procedure to verify whether the actual results are same as of the expected results.
- It provide assurance that the software system does not contain any defects.
- To perform software testing we create test cases and test data.

Objectives of Software Testing

- Finding defects(i.e errors)
- Report the detected errors to developer.
- Software product fulfils all requirement of our end user.
- Deliver quality software to end user.
- Quality software product must be user friendly.

Types of Software Testing

Software testing is divided in two categories:

1. Manual Testing
2. Automation Testing

Manual Testing:

Tester manually runs all test cases without help of any automation testing tools.

List of Manual Testing:

i. Unit Testing
ii. Integration Testing
iii. System Testing
iv. Acceptance Testing

Cont'd..

Automation Testing:

It is a process in which we use automation tools to run our test cases to find out errors from our software product.

List of Automation tools:

i. Selenium
ii. Mentis
iii. Quality Test Professional(QTP)

Principles of Software Testing

- Complete testing of software is not possible
- Detect clustering
- Testing shows presence of defects
- Absence of error
- Early Testing
- Testing is context dependent

Phases of Testing Process

i. Requirement Analysis
ii. Test Planning
iii. Test Case Development
iv. Test Environment Setup
v. Test Execution
vi. Test cycle closure

Unit Testing

- It is a level of software testing where individual units/components of software are tested.

- Unit is the smallest part of any software.

- When is it performed?
  - First level of software testing

- Who performs it?
  - Software developers

Cont’d..

- Stubs and Drivers are used in Unit Testing
- Errors detected by Unit Testing

Integration Testing

It is a type of Software Testing in which the different units, modules or components of a software applications are tested as a combined entity (as a single group).

Types of Integration Testing:

1. Big Bang Approach
2. Incremental Approach

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- **Big Bang Approach :**

In this strategy, all modules of software product are created first and then they are combined together and whole software is tested at once.

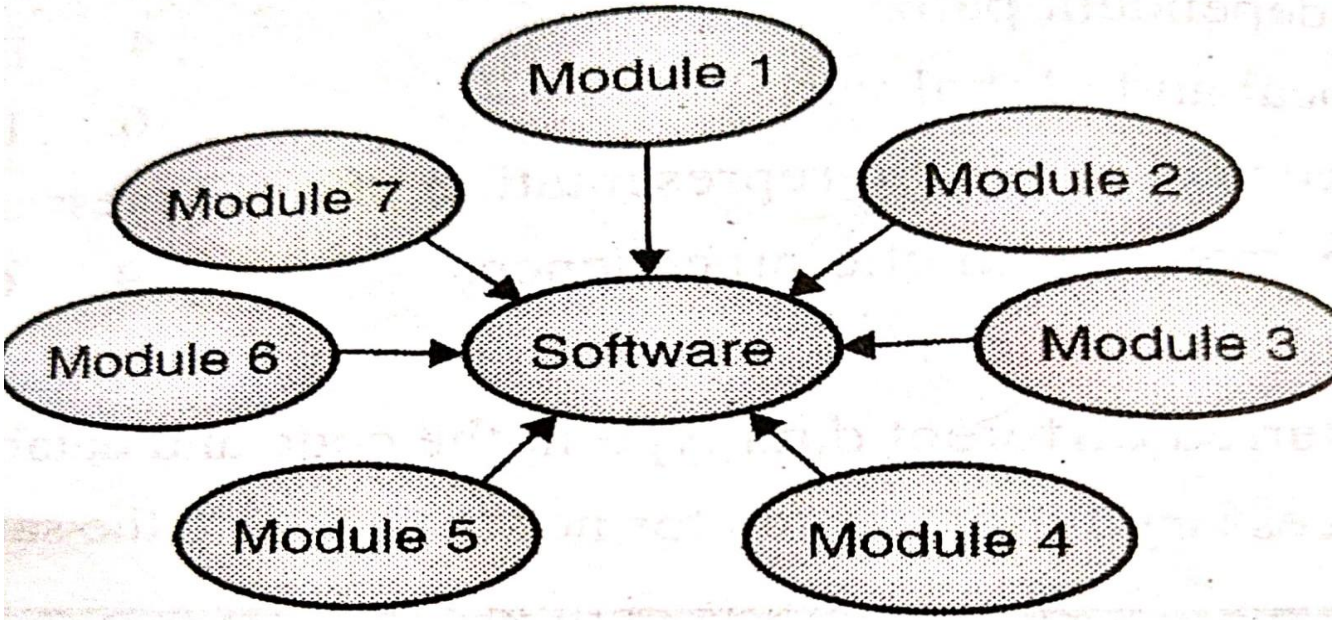

Fig. 6.4.2 : Big bang approach

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- **Incremental Approach :**

In this approach, to perform testing two or more modules are merged with each other which are logically related.

- Incremental approach is performed using two methods:

a. Top Down
b. Bottom Up

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- **Top Down Approach:**

In Top Down Approach, Testing is performed from the modules present at top to modules present at bottom.

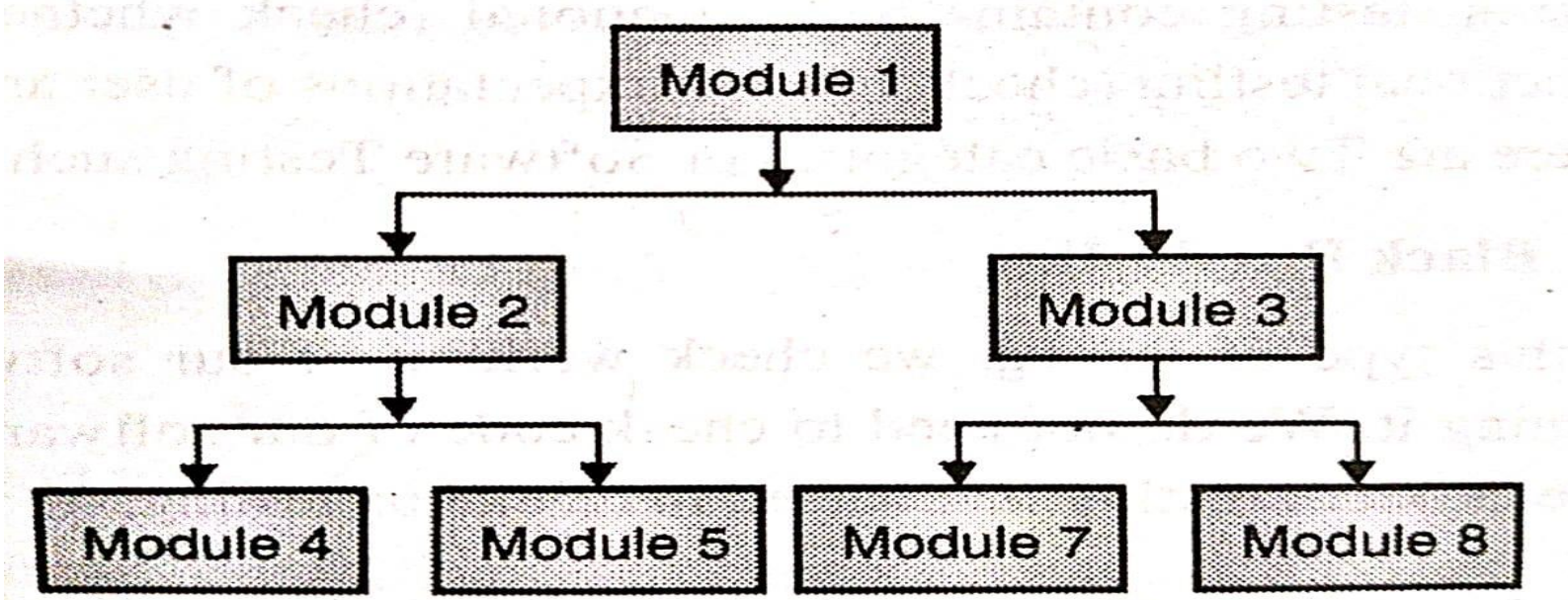

Fig. 6.4.3 : Top down approach

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- **Bottom Up Approach:**

In the Bottom Up Approach, every module present at lower level is tested with modules present at higher levels until all modules are tested.

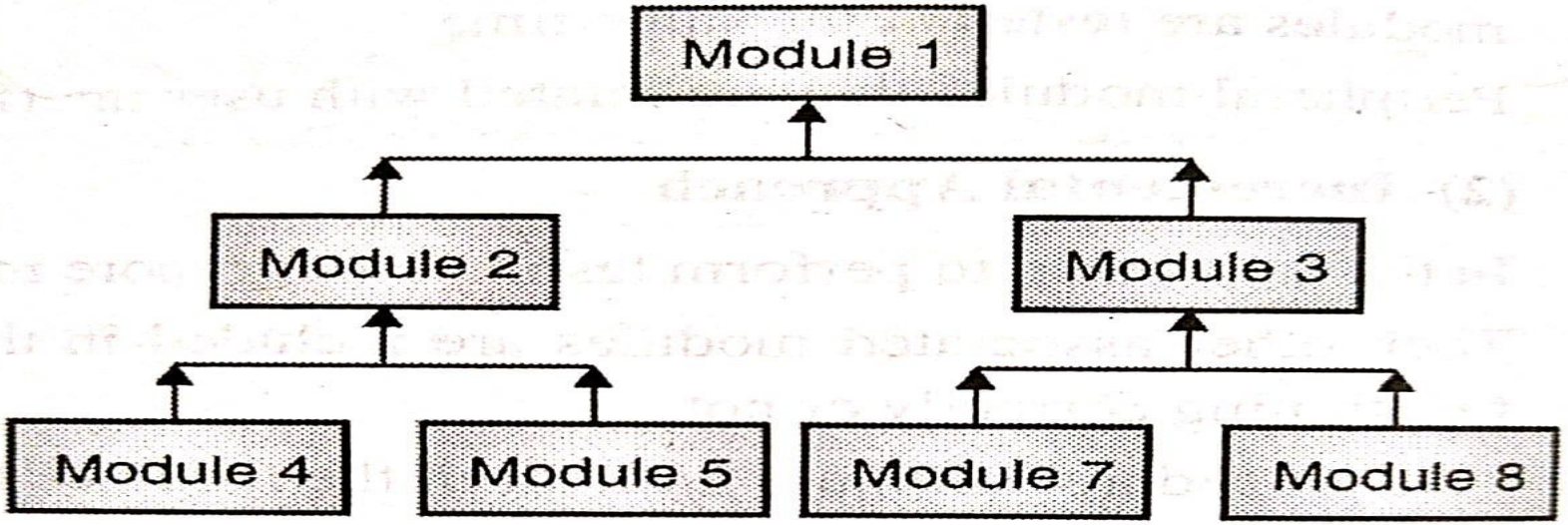

Fig. 6.4.4 : Bottom up approach

System Testing

- System testing is end-to-end testing.

- **Basic Categories of System Testing:**

1. Black Box Testing
2. White Box Testing

Black Box Testing

- In this type of testing, we check working of software project.
- We do not need to check code of our software in this testing type.

- Who performed this testing ?

  - Software tester

White Box Testing

- In this type of testing, we verify internal coding of software product.
- White box testing is also called as Code-Based testing, Clear box testing, Open box testing.

- Who performed this testing ?

  - Software developers

Black box testing Vs. White box testing

Black box testing	White box testing
It is mostly done by software tester	It is mostly done by software developers
It can be referred as external software testing	It can be referred as internal software testing
It is less time-consuming	It is more time-consuming
It is also called as closed testing	It is also called as clear box testing
Programming knowledge is not required	Programming knowledge is required
Implementation knowledge is not required	Implementation knowledge is required
It is less expensive than WBT	It is more expensive than BBT

Acceptance Testing

- **Basic Categories of Acceptance Testing:**

1. Alpha Testing
2. Beta Testing

Alpha Testing

- It is a software testing which is done to find out bugs before deploying the software application to end user.

- Who performed this testing ?

  - Tester

Beta Testing

- It is testing which is performed at the location of customer(i.e End user).

- Who performed this testing ?

  - End user

Beta Testing

- It is testing which is performed at the location of customer(i.e End user).

- Who performed this testing ?

  - End user

Alpha Testing Vs. Beta Testing

Alpha Testing	Beta Testing
It is done by testers who are generally employees of organization	It is done by End users who are not employees of organization
The tester keeps record of all the errors and problems	The end user keeps record of all the errors and problems
It involves both black and white box testing	It involves only black box testing
To find out bugs before deploying the software application to end user	To test software before it is released to public.

Strategic Approach to Software Testing

Two approaches are:

1. Verification
2. Validation

Verification :

It is a process of estimating products of software development lifecycle to verify that we are in correct track of creating end user product.

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Validation :

It is the process of evaluating the final product to ensure that the software meets all the specified requirements.

What is the difference between Verification and Validation?

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Verification	Validation
Are you building it right ?	Have you build the right thing ?
It is done by developer	It is done by tester
It contains Reviews, Meetings & Inspections	It contains testing such as Black and white box testing
Execution of code is not part of verification	Execution of code is part of validation
It can find the bugs in early stage of the development	It can only find the bugs that could not be found by the verification process
It comes before validation	It comes after verification
Static & dynamic activities	Only dynamic activities