SNS COLLEGE OF TECHNOLOGY

Kurumbapalayam (Po), Coimbatore – 641 035

An Autonomous Institution

Accredited by NAAC – UGC with 'A++' Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE NAME: 23ITO201- Software Testing (OPEN ELECTIVE)

III YEAR / VI SEMESTER

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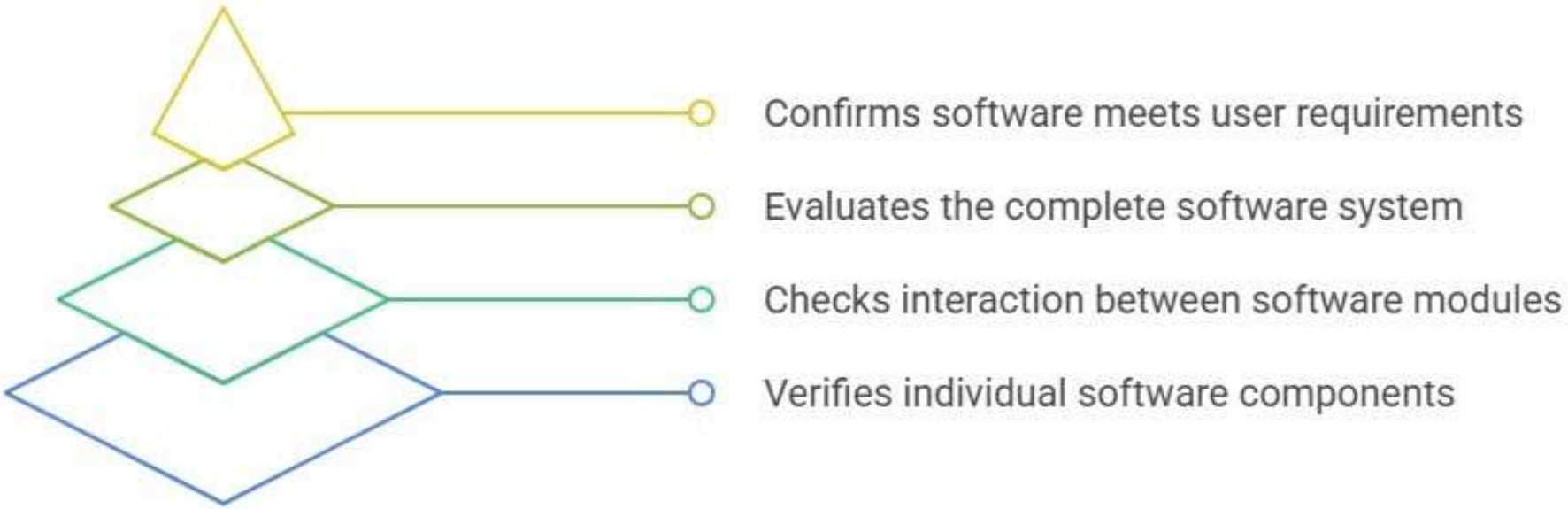
Unit 3 - LEVELS OF TESTING

Topic : The need for Levels of Testing , Unit Test and Unit Test Planning

Empathy in Software Testing Hierarchy

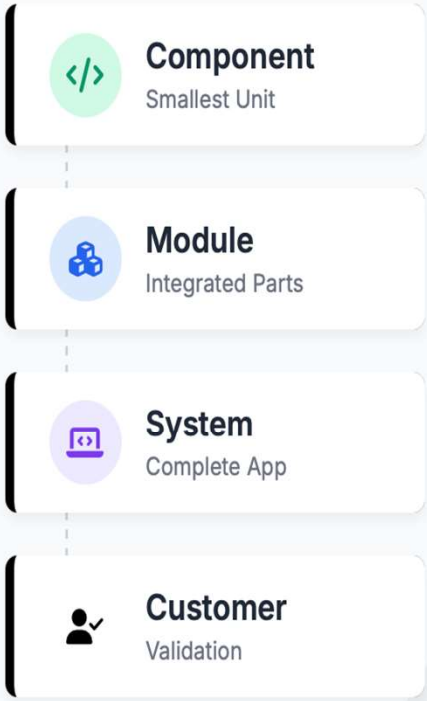


What Are Levels of Testing?

MEANING

Software testing is performed in different **stages or levels** to ensure defects are detected systematically throughout the lifecycle.

- Each level targets **specific types of defects** (e.g., logic errors vs. interface issues).
- Each level has different **objectives** and involves different **stakeholders**.
- Testing progresses from small components up to customer validation.



Empathy in Software Testing Hierarchy

LEVELS OF TESTING

Why Levels of Testing Are Needed?

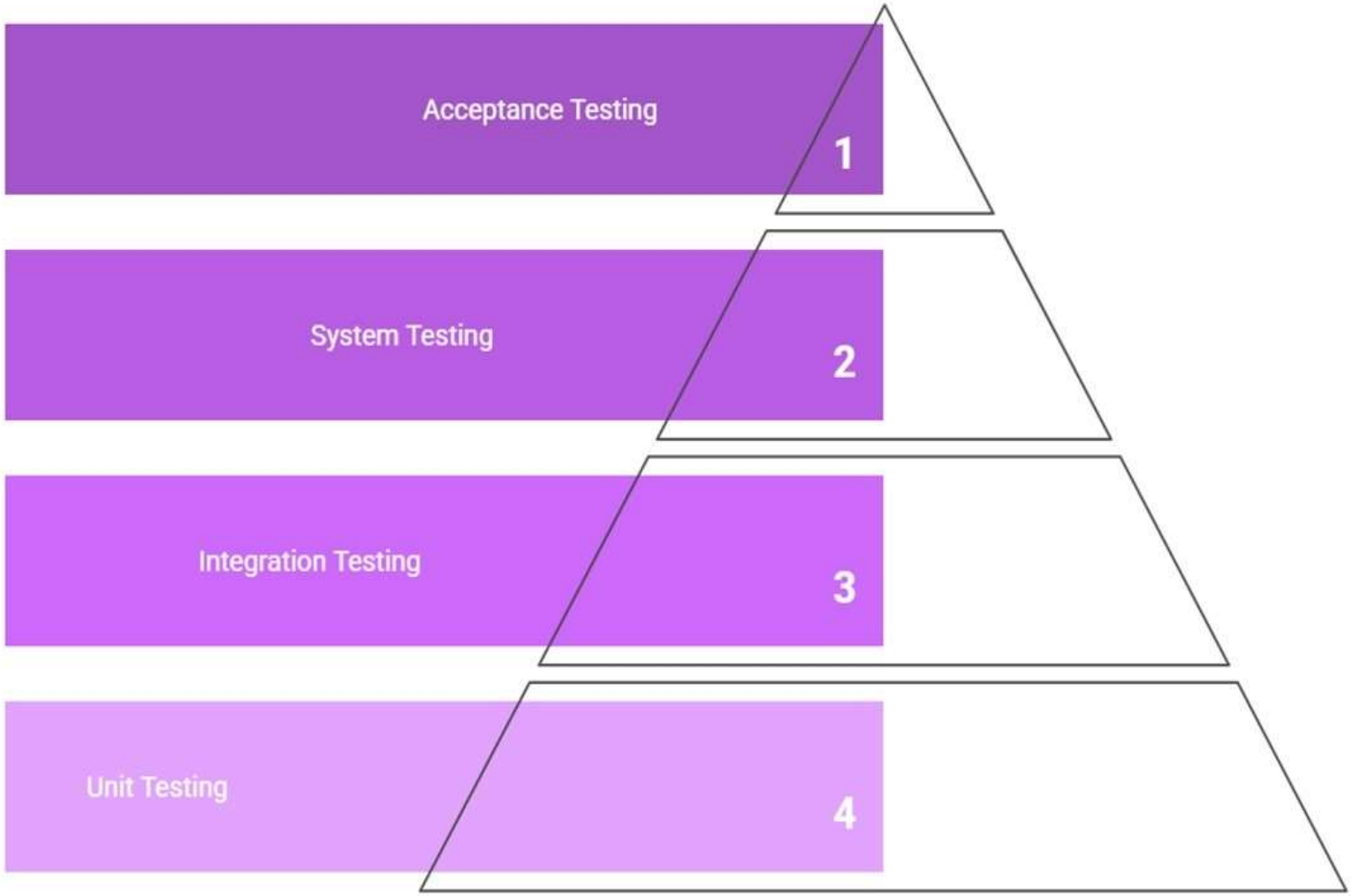
- Detect defects early
- Reduce cost of fixing defects
- Ensure systematic verification
- Isolate errors at different abstraction levels
- Validate functional & non-functional requirements

WITHOUT LEVELS OF TESTING

Unstructured | Inefficient | Costly

3

Software Testing



UNIT 3 LEVELS OF TESTING

Relationship Between Levels

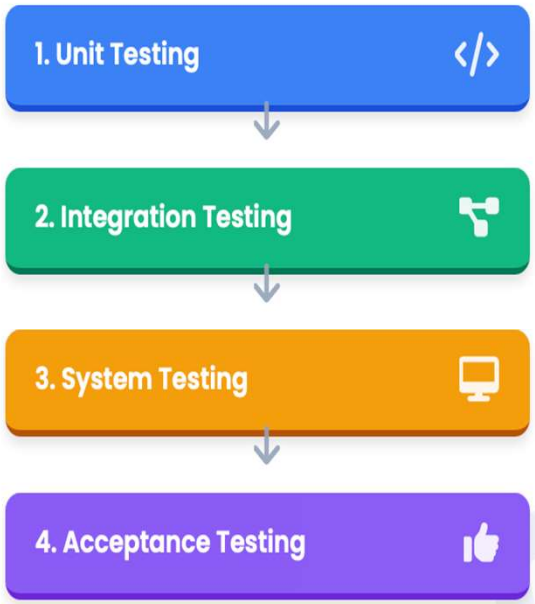
Testing levels are designed to be progressive, meaning each level builds upon the foundation of the previous one.

Unit Testing
Verifies individual components in isolation.

Integration Testing
Verifies interaction between integrated units.

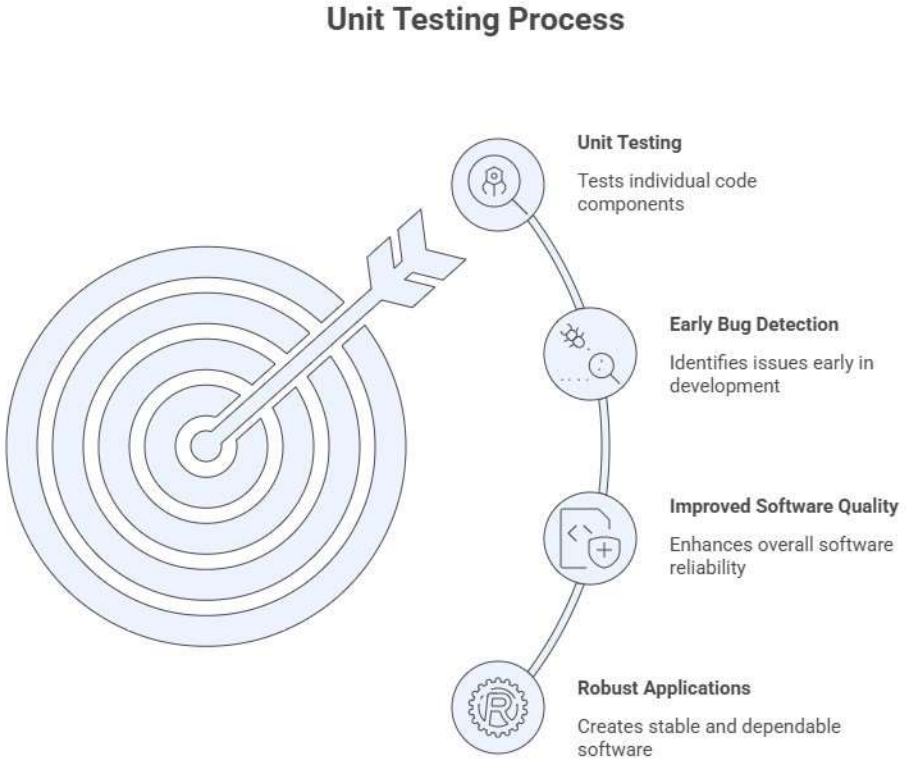
System Testing
Verifies the complete system against requirements.

Acceptance Testing
Validates user requirements and business needs.



Unit testing

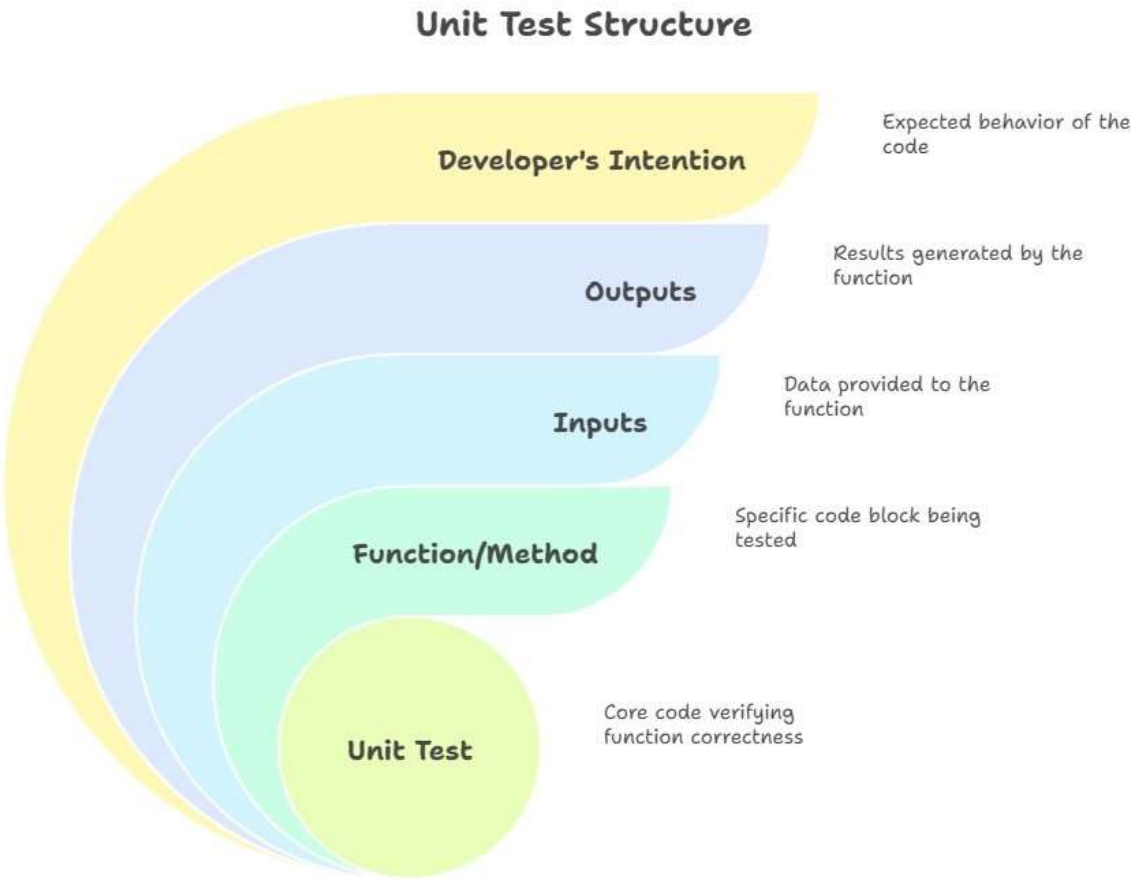
Unit testing is the process of testing the smallest parts of your code

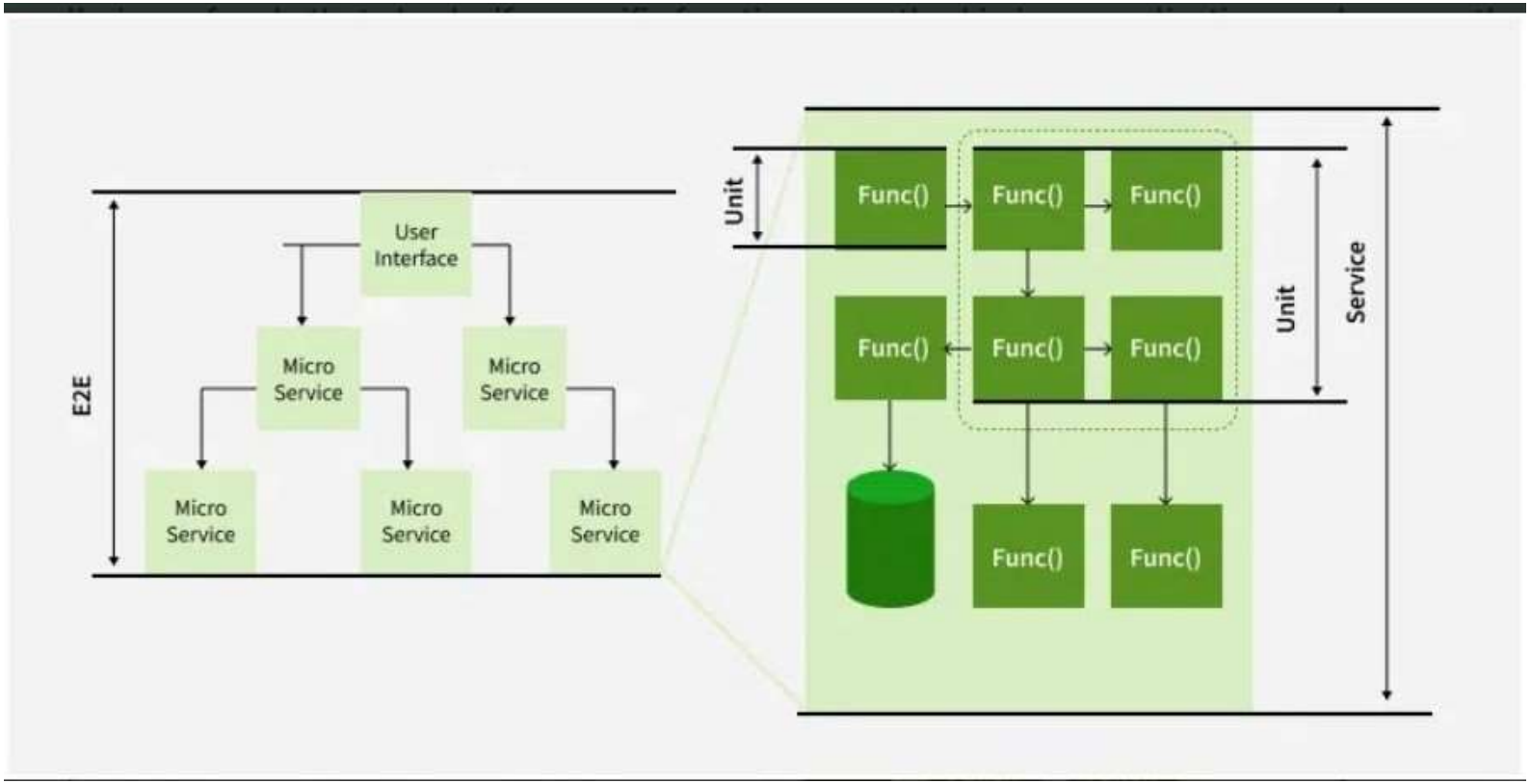


What is a Unit Test?

A unit test is a small piece of code that checks if a specific function or method in is an application works correctly.

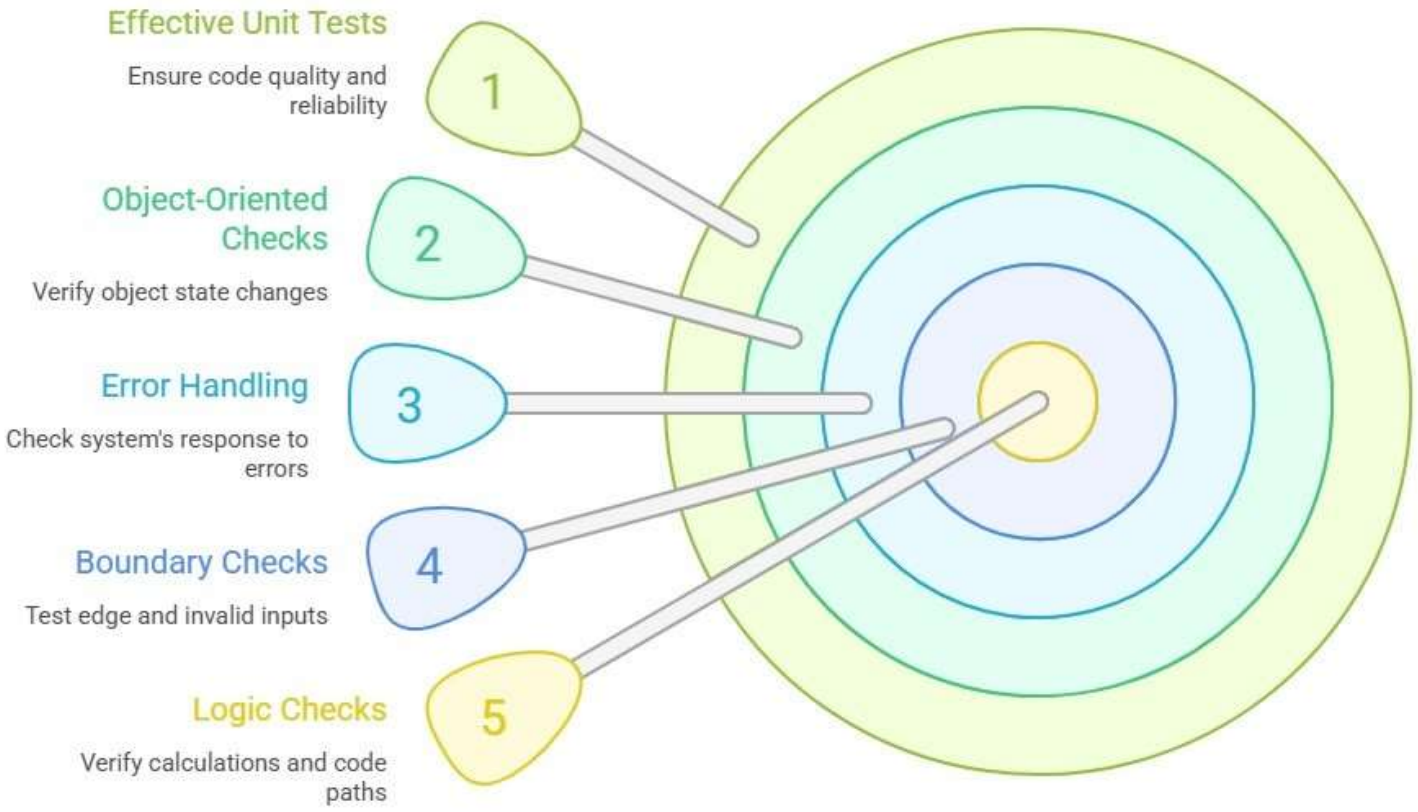
It will work as the function inputs and verifying the outputs. These tests check that the code work as expected based on the logic the developer intended.





Unit testing

Unit Testing Strategies



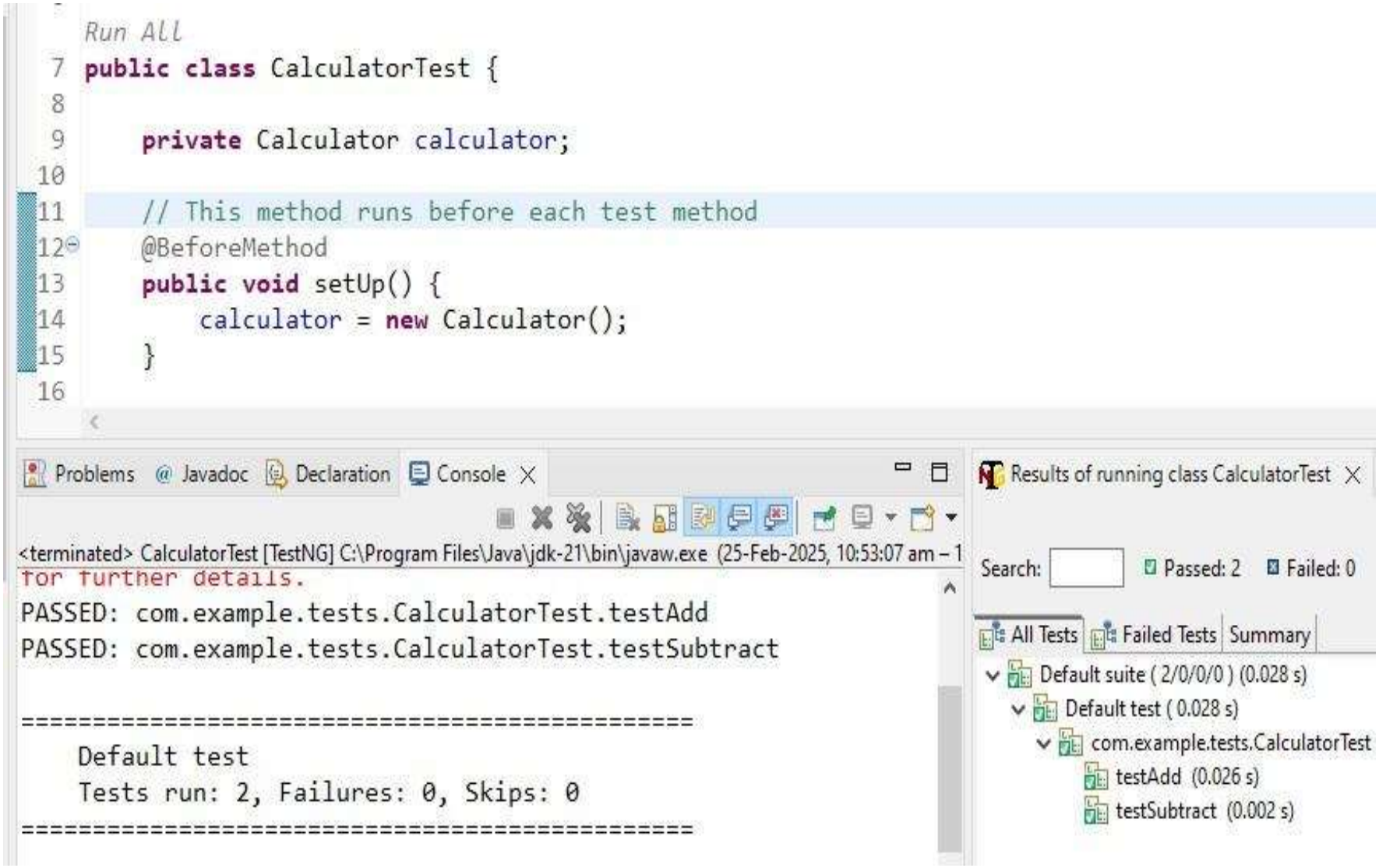
```
package com.example.tests;
import org.testng.Assert;
import org.testng.annotations.BeforeMethod;
import org.testng.annotations.Test;
public class CalculatorTest {
   private Calculator calculator;

   // This method runs before each test method
   @BeforeMethod
   public void setUp() {
      calculator = new Calculator();
   }

   // Test for the 'add' method
   @Test
   public void testAdd() {
      int result = calculator.add(5, 3);
      // Assert that the result of 5 + 3 is 8
      Assert.assertEquals(result, 8, "Addition result is incorrect");
   }
```

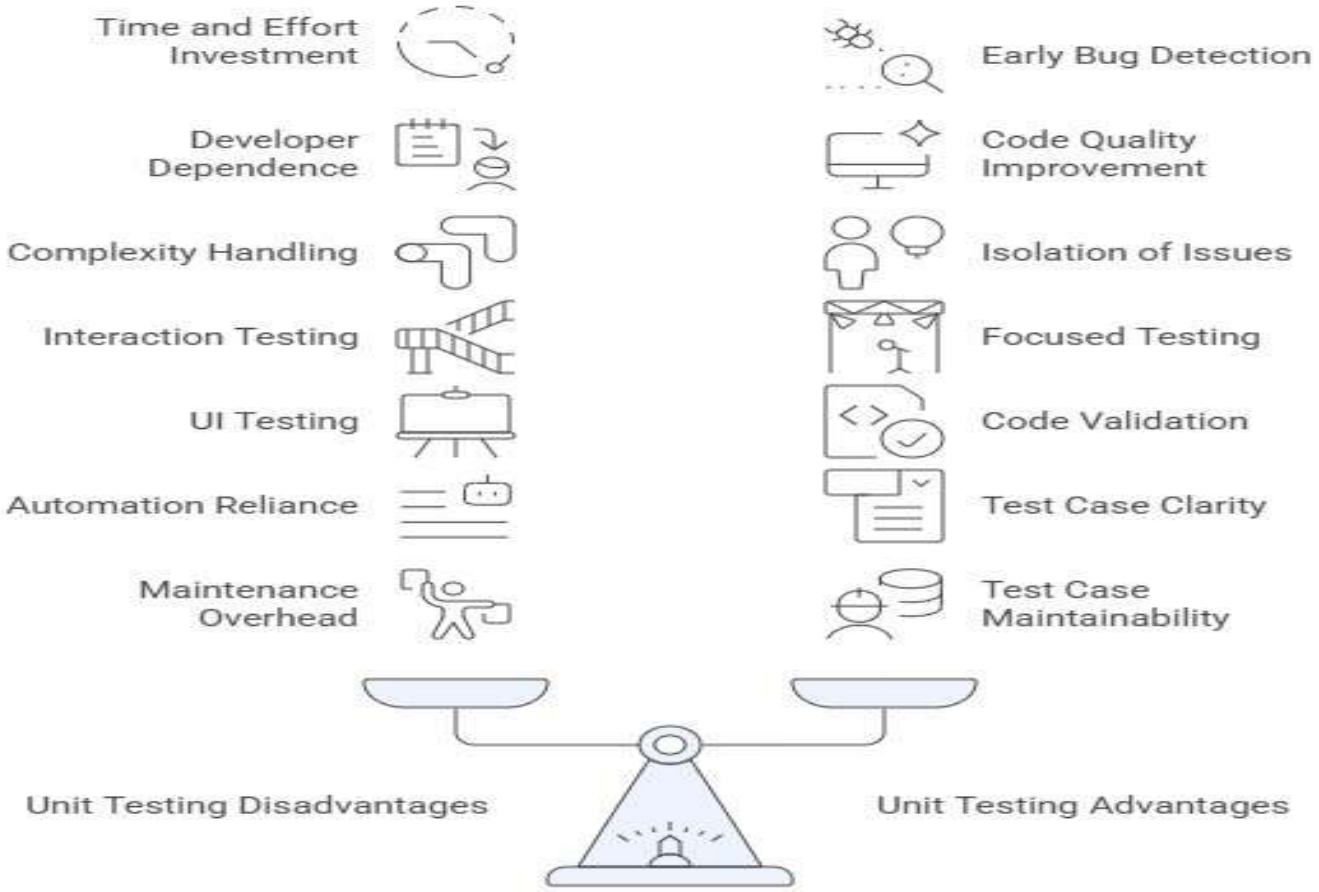


```
   // Test for the 'subtract' method
   @Test
   public void testSubtract() {
      int result = calculator.subtract(5, 3);
      // Assert that the result of 5 - 3 is 2
      Assert.assertEquals(result, 2, "Subtraction result is incorrect");
   }
}
```

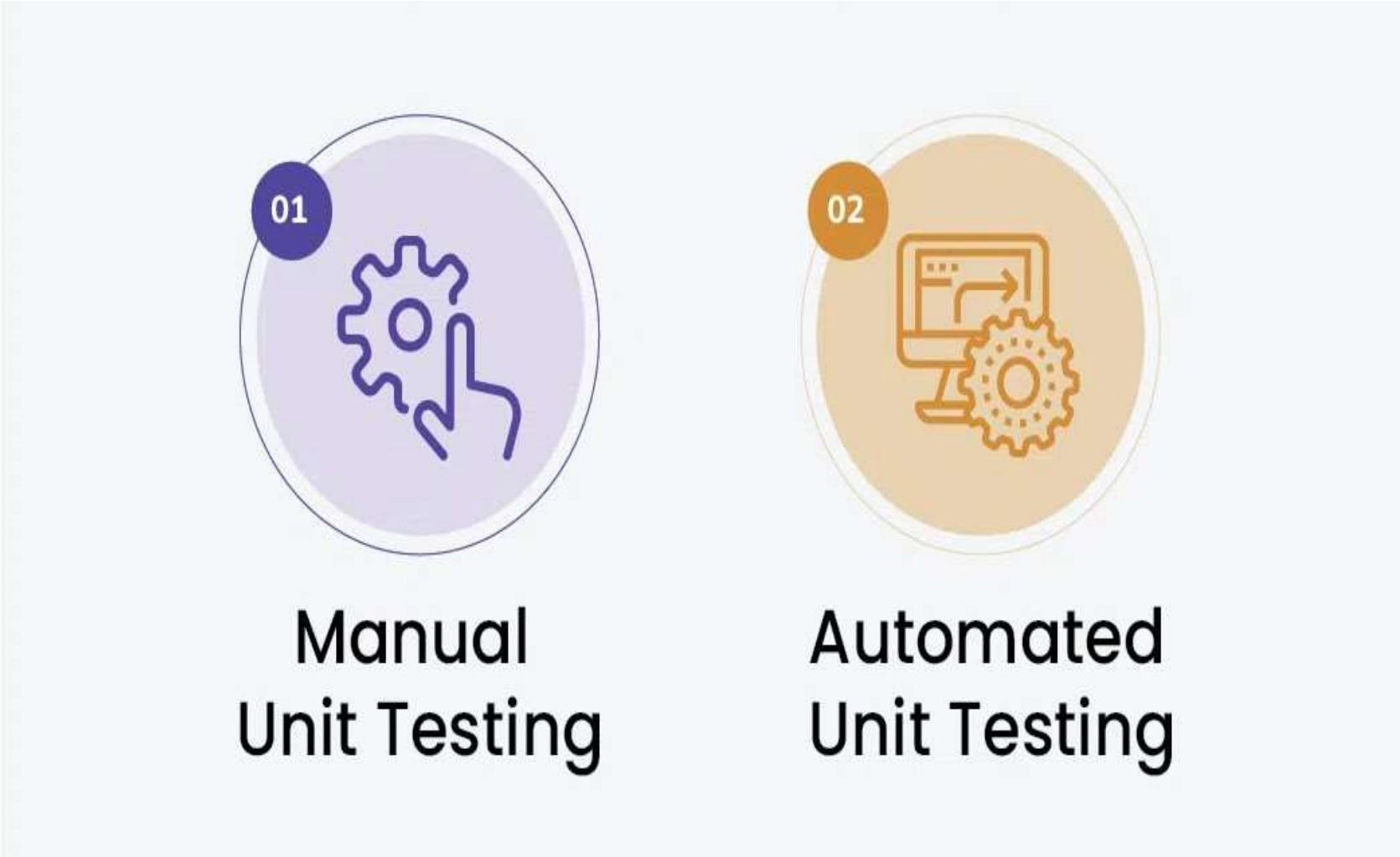

Run All
7 public class CalculatorTest {
8
9 private Calculator calculator;
10
11 // This method runs before each test method
12 @BeforeMethod
13 public void setUp() {
14 calculator = new Calculator();
15 }
16
Problems
Javadoc
Declaration
Console
<terminated> CalculatorTest [TestNG] C:\Program Files\Java\jdk-21\bin\javaw.exe (25-Feb-2025, 10:53:07 am – 1
for further details.
PASSED: com.example.tests.CalculatorTest.testAdd
PASSED: com.example.tests.CalculatorTest.testSubtract
===
Default test
Tests run: 2, Failures: 0, Skips: 0
===
Results of running class CalculatorTest
Search:
Passed: 2
Failed: 0
All Tests
Failed Tests
Summary
Default suite (2/0/0/0) (0.028 s)
Default test (0.028 s)
com.example.tests.CalculatorTest
testAdd (0.026 s)
testSubtract (0.002 s)

Benefits of Unit Testing

Unit Testing: Balancing Disadvantages and Advantages



Types of Unit Testing



Activity

Activity: Need for Levels of Testing

🧩 **Activity Name: “Testing a Food Delivery App”**

Objective:

To understand why different levels of testing are required.

📝 **Scenario Given to Students:**

You are developing a **Food Delivery Application** with features:

- Login
- Add to cart
- Payment
- Order tracking

Workflow of Unit Testing

MCQ

Part A: Need for Levels of Testing – MCQs

1. Why are different levels of testing required?

A) To increase development time

B) To reduce documentation

C) To detect defects at different stages

D) To avoid coding

✅ **Answer:** C

2. Which of the following is the correct order of testing levels?

A) System → Unit → Integration → Acceptance

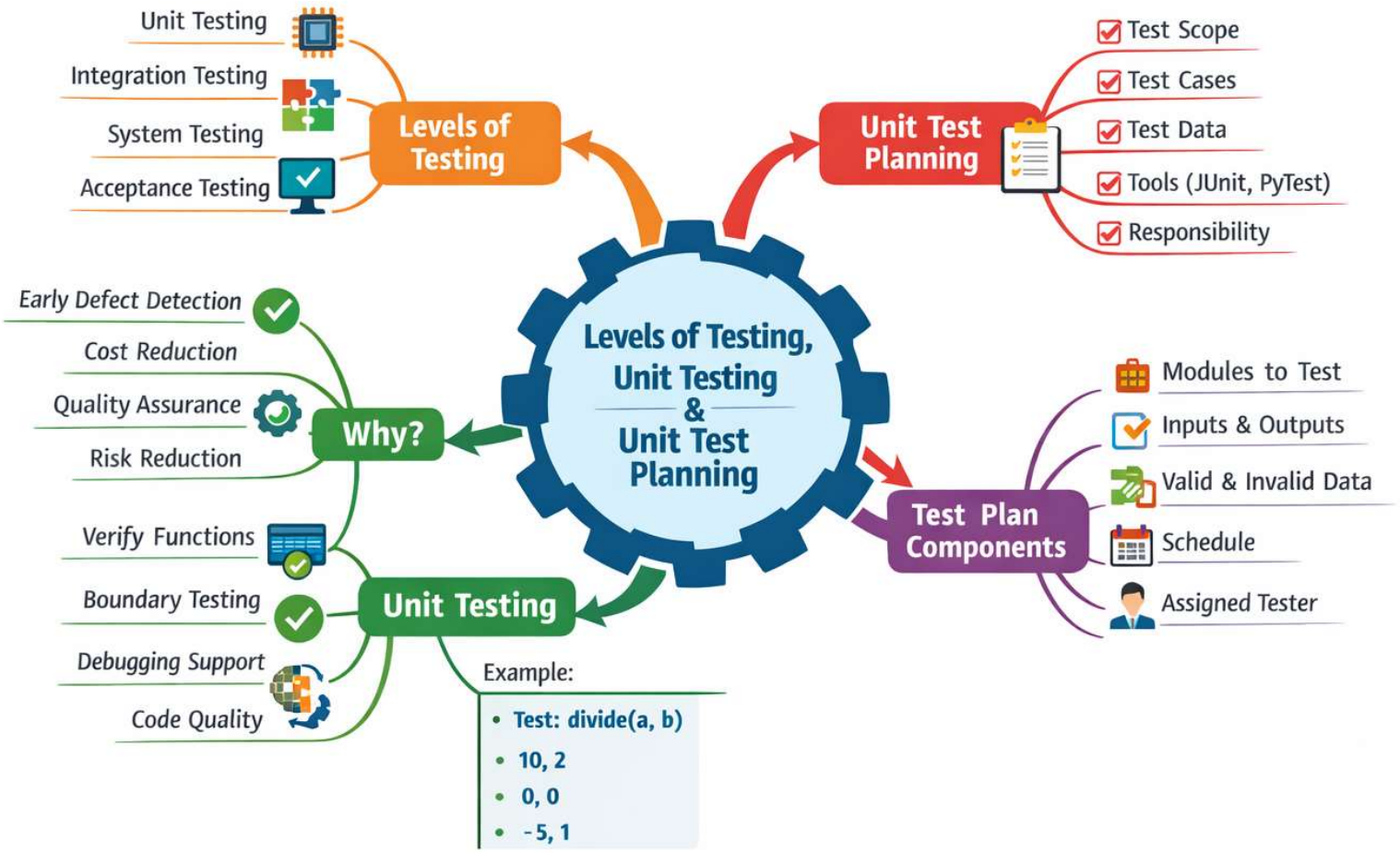
B) Unit → Integration → System → Acceptance

C) Acceptance → Unit → System → Integration

D) Integration → Unit → Acceptance → System

✅ **Answer:** B

MINDMAP


Levels of Testing, Unit Testing & Unit Test Planning
Levels of Testing
Unit Testing
Integration Testing
System Testing
Acceptance Testing
Unit Test Planning
Test Scope
Test Cases
Test Data
Tools (JUnit, PyTest)
Responsibility
Why?
Early Defect Detection
Cost Reduction
Quality Assurance
Risk Reduction
Unit Testing
Verify Functions
Boundary Testing
Debugging Support
Code Quality
Example:
Test: divide(a, b)
10, 2
0, 0
-5, 1
Test Plan Components
Modules to Test
Inputs & Outputs
Valid & Invalid Data
Schedule
Assigned Tester

TEXT BOOKS	
1.	Srinivasan Desikan and Gopalaswamy Ramesh, ―Software Testing – Principles and Practices, Pearson Education, 2006.
REFERENCES	
1.	Ilene Burnstein, ―Practical Software Testing, Springer International Edition, 2003
2.	Edward Kit, Software Testing in the Real World – Improving the Process‖, Pearson Education, 1995
3.	Boris Beizer, Software Testing Techniques – 2nd Edition, Van Nostrand Reinhold, New York, 1990.
4.	Aditya P. Mathur, ―Foundations of Software Testing _ Fundamental Algorithms and Techniques, Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.

THANK YOU!

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