

# Software Testing

## Manual Testing

### 1. Introduction to Software Testing

- What is Software Testing?
- Importance of Software Testing
- Software Development Life Cycle (SDLC)
- Software Testing Life Cycle (STLC)
- Verification vs. Validation

### 2. Types of SDLC

- Waterfall model
- V-Model
- Agile Methodology

### 3. Types of Testing

- Functional Testing
  - Unit Testing
  - Integration Testing
  - System Testing
  - User Acceptance Testing (UAT)
- Non-Functional Testing
  - Performance Testing
  - Security Testing
  - Usability Testing
  - Compatibility Testing
  - Load Testing
  - Stress Testing
- Regression Testing
- Smoke Testing & Sanity Testing
- Exploratory Testing
- Ad-hoc Testing

### 4. Testing Methodologies

- Black Box Testing
- White Box Testing
- Grey Box Testing

### 5. Test Documentation

- Test Plan
- Test Case Design
- Test Scenario

- Test Data Preparation
- Test Summary Report

## **6. Defect Management**

- What is a Defect?
- Defect Life Cycle
- Severity vs. Priority
- Defect Reporting and Tracking

## **7. Agile and Testing**

- Agile Testing Process
- Scrum & Kanban Framework
- Test-Driven Development (TDD)
- Behavior-Driven Development (BDD)

## **8. Test Management Tools**

- JIRA
- TestRail

## **9. API Testing (Basic Concepts)**

- What is API Testing?
- Understanding REST & SOAP
- Using Postman for API Testing

# **Core Java**

## **1. Introduction to Java**

- Features of Java
- JDK, JRE, and JVM
- Java Compilation Process
- Differences between JDK 8, 11, 17, etc.

## **2. Basics of Java**

- Data Types and Variables
- Operators and Expressions
- Control Statements (if-else, switch)
- Loops (for, while, do-while)

## **3. Object-Oriented Programming (OOPs)**

- Class and Object
- Constructor and Constructor Overloading
- Inheritance (Single, Multilevel, Hierarchical, Multiple via Interface)
- Method Overloading & Method Overriding
- Abstraction (Abstract Class & Interface)
- Encapsulation
- Polymorphism
- 'super' and 'this' Keyword

#### **4. Java Strings**

- String, StringBuilder, and StringBuffer
- String Methods

#### **5. Java Collections Framework (JCF)**

- List (ArrayList, LinkedList, Vector, Stack)
- Set (HashSet, LinkedHashSet, TreeSet)
- Map (HashMap, LinkedHashMap, TreeMap)
- Iterators & Streams in Collections

#### **6. Exception Handling**

- try, catch, finally
- throw vs throws
- Checked vs Unchecked Exceptions

#### **7. Multithreading & Concurrency**

- Thread Class and Runnable Interface
- Thread Lifecycle
- Synchronization (Locks, Volatile, Atomic Variables)

#### **8. Input/Output (I/O) in Java**

- File Handling (FileReader, FileWriter, BufferedReader)
- Serialization & Deserialization

#### **9. Functional Programming in Java**

- Lambda Expressions
- Method References
- Functional Interfaces (Predicate, Consumer, Supplier, Function)
- Streams API (map, filter, collect, forEach)
- Optional Class

#### **10. Java 8+ Features**

- Default & Static Methods in Interface
- Streams API
- New Date and Time API (LocalDate, LocalTime, LocalDateTime)

## **Automation Testing**

### **1. Introduction to Selenium**

- What is Selenium?
- Features of Selenium
- Advantages and Limitations of Selenium
- Selenium Components (Selenium IDE, WebDriver, Grid)

### **2. Selenium WebDriver Basics**

- Architecture of WebDriver
- Setting up Selenium with Java
- Installing WebDriver (Chrome, Firefox, Edge, etc.)
- Launching Browsers in Selenium

### **3. Locators in Selenium**

- ID
- Name
- Class Name
- Tag Name
- Link Text & Partial Link Text
- CSS Selector
- XPath (Absolute & Relative)

### **4. WebElement and WebDriver Methods**

- sendKeys(), click(), getText(), getAttribute()
- isDisplayed(), isEnabled(), isSelected()
- getTitle(), getCurrentURL(), getPageSource()
- navigate().to(), navigate().back(), navigate().forward()

### **5. Handling Web Elements**

- Handling Text Boxes, Buttons, Checkboxes, and Radio Buttons
- Handling Dropdowns (Select Class)
- Handling Alerts (JavaScript Pop-ups)
- Handling Frames & iFrames
- Handling Browser Windows & Tabs
- Handling Web Tables

### **6. Handling Dynamic Elements**

- Implicit and Explicit Waits
- Fluent Wait
- WebDriverWait
- Expected Conditions

## **7. Actions Class in Selenium**

- Mouse Hover
- Drag & Drop
- Right Click (Context Click)
- Double Click
- Keyboard Actions (sendKeys, KeyUp, KeyDown)

## **8. JavaScript Executor in Selenium**

- Scrolling the Page
- Clicking Hidden Elements
- Getting & Setting Values

## **9. Capturing Screenshots**

- Full Page Screenshot
- Element-Specific Screenshot

## **10. Test Framework Integration**

- Selenium with TestNG
  - TestNG Annotations (@Test, @BeforeMethod, @AfterMethod, etc.)
  - Parallel Test Execution
  - Data-Driven Testing (DataProvider)
- Selenium with JUnit
- Assertions in TestNG & JUnit

## **11. Page Object Model (POM) and Page Factory**

- Why POM?
- Creating Page Classes
- Using @FindBy Annotation
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## **12. Handling Captcha & Authentication Pop-ups**

- AutoIT for Windows Authentication
- Bypassing Captcha Techniques

## **13. Continuous Integration with Selenium**

- Selenium with Jenkins
- Running Selenium Tests in CI/CD Pipeline