UNIT-IV
Testing Strategies and Metrics

Unit IV Syllabus

- Testing Strategies
- Black-box Testing
- White-box Testing
- Validation Testing
- System Testing
- Debugging
- Software Metrics

Introduction to Software Testing

- Testing is the process of executing software to identify defects and ensure quality.

Objectives of Software Testing

- Detect defects
- Verify requirements
- Improve reliability
- Enhance quality

Strategic Approach to Software Testing

- Testing progresses from Unit → Integration → Validation → System Testing.

Software Testing Life Cycle (STLC)

- Requirement Analysis
- Test Planning
- Test Design
- Test Execution
- Closure

Test Strategies for Conventional Software

- Unit Testing
- Integration Testing
- Validation Testing
- System Testing

Unit Testing

- Tests individual modules/components in isolation.

Integration Testing

- Tests interaction between integrated modules.

Integration Testing Approaches

- Top-Down Testing
- Bottom-Up Testing
- Sandwich Testing

Black-Box Testing

- Focuses on functionality without knowledge of internal code.

Black-Box Testing Techniques

- • Equivalence Partitioning
- • Boundary Value Analysis
- • Cause-Effect Graphing

Advantages of Black-Box Testing

- User perspective
- No programming knowledge required.

White-Box Testing

- Tests internal logic and code structure.

White-Box Testing Techniques

- Basis Path Testing
- Condition Testing
- Loop Testing

Advantages of White-Box Testing

- Code optimization
- Complete path coverage.

Black-Box vs White-Box Testing

- Comparison of objectives, techniques, and coverage.

Validation Testing

- Ensures software satisfies customer requirements.

Validation Testing Activities

- Alpha Testing
- Beta Testing
- Acceptance Testing

System Testing

- Tests complete integrated software in operational environment.

Types of System Testing

- Recovery, Security, Stress, Performance Testing

Performance Testing

- Evaluates response time, throughput, and scalability.

Security Testing

- Identifies vulnerabilities and ensures data protection.

The Art of Debugging

- Process of locating and correcting software defects.

Debugging Strategies

- Brute Force
- Backtracking
- Cause Elimination

Software Measurement

- Quantitative indication of software process and product attributes.

Software Metrics

- Measures used to estimate quality, productivity, and performance.

Process Metrics

- Used to improve software development processes.

Product Metrics

- Used to assess software product characteristics.

Metrics for Software Quality

- Defect Density
- Reliability
- Maintainability
- Efficiency

Case Study: Google Pay Testing

- Unit, Integration, Security, UAT, Performance Testing.

Real-Time Example: Banking Software Testing

- Ensuring secure and reliable transactions.

Summary

- Review Unit IV testing strategies and metrics.