

3S03 Midterm Notes

Ahmad Allabadi, February 2025

Module 1

Testing Types

- **Dynamic Testing:** Execute code.
- **Static Testing:** Review code, requirements, design.
- **Black-Box Testing:** No implementation knowledge.
- **Grey-Box Testing:** Some implementation knowledge.
- **White-Box Testing:** Full implementation knowledge.
- **Functional Testing:** Check specific functionality.
- **Non-Functional Testing:** Assess non-functional aspects.

Key Concepts

- **Fault:** Potential error source.
- **Error:** Incorrect internal state.
- **Failure:** Incorrect external state.

Testing Levels

- **Unit Testing:** Test smallest program parts.
- **System Testing:** Test entire system.
- **Integration Testing:** Test component interactions.
- **Acceptance Testing:** Validate user needs.
- **Smoke Testing:** Quick major feature check.
- **Regression Testing:** Verify unchanged behavior post-modification.

Module 2

Testing Strategies

- **Exploratory Testing:** Unscripted, on-the-go tests.
- **Specification-Based Testing:** Against specifications.

- **Model-Based Testing:** Against expected behavior model.
- **Fuzz Testing:** Random inputs.
- **Test Oracle:** Reference for test validation.

Partition Testing

- Partition input domain into equivalence classes.
- Types: Strong/Normal, Strong/Robust, Weak/Normal, Weak/Robust.
- **Boundary Testing:** Test domain boundaries.

Coverage Testing

- **Statement, Branch, Path Coverage.**
- **Fault Injection:** Introduce faults, test robustness.

Module 3

Coverage Concepts

- **Exhaustive Testing:** All inputs covered.
- **Combinatorial Coverage:** All condition combinations.
- **MC/DC:** Minimal important combinations.
- **Source vs Code Coverage:** Ensure coverage at both levels.

Structural Testing

- **Criteria Subsumption:** Higher criteria cover lower.

Module 4

Review and Analysis

- Types: Ad-hoc, Peer deskcheck, Pair Programming, Walk-through, Team Review, Formal Inspection.
- **Mutation Testing:** Introduce syntax changes, re-test.

Test Doubles

- **Dummy, Fake, Stubs, Spies, Mock.**