VSR://EDU/SSE

Software Service Engineering

WS 2025/2026 – 1. Tutorial

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Task 1

Get informed about Unit Testing and Test Driven Development (TDD). Answer the following questions:

- What are the advantages and disadvantages of writing unit tests?
- What is the difference between unit, integration and system tests?
- What is the lifecycle of TDD?

Unit Testing

- Technique to programmatically verify expected code behaviour
- Automatic check of system integrity at any time
- Facilitates clean design and separation of concerns
- But:
  - Tests are code and thus should be maintained as well
  - Testing tests is hard

Types of Tests

- Unit Tests
  - Testing of isolated code parts
- Integration Tests
  - Testing of integrated components
- System Tests
  - Verification of the system compliance with specified requirements (incl. usability, security, scalability etc.)

Test Driven Development

- A process of writing code starting from a test:
  1. Write a test that describes the behaviour of a function under the test
  2. Make sure the test **fails** (the function doesn't exist or is not implemented yet)
  3. Implement the function (do not change or edit other code)
  4. Make sure the test **passes**
  5. Perform refactoring (if needed)
  6. Make sure the test still passes

Task 2

Implement a simple *Calculator* application in the TDD manner. The application should enable the following computations:

- Multiplication of two floating numbers
- Division of two floating numbers

Task 3

Inform yourself about when Mock Objects should be used.

Extend the *Calculator* class from the Task 2 to write the result of the computation to a file on a local hard drive.

Use TDD and Mock Objects to simulate exceptional situations (e.g., drive is not ready, or file is locked)

Mock Objects

- Simulate behaviour of real objects if they:
  - Are slow (e.g. database connections or networks)
  - Do not yet exist
  - Provide results which are not predictable or hard to reproduce (network errors)
  - Avoid placing test data into real objects

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Your feedback on today's session:

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Questions?

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