Projektowanie oprogramowania systemów
System software design

Politechnika Gdańska

Katedra systemów multimedialnych

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PLAN OF THE COURSE AND ASSESSMENT

- Lecture:
  - first half of semester
  - finished by exam
- Project
  - second half of semester
- Assessment:
  - exam – 50%
  - project – 50%

Agenda

- System Development Life Cycle (SDLC)
- Business Analysis
- Analysis – methods
- Solutions Architecture
  - What is IT architecture
  - Architecture development method
  - Architecture governance
  - Reference models
  - Content metamodel
- Specific dedicated solutions
  - Mobile
  - Cloud
- DevOPS
- Developers tools
- Project management
- **Design patterns, tests**

Testing

It is the process used to identify the correctness, completeness and quality of developed computer software.

It is the process of executing a program/application under positive and negative conditions by manual or automated means.

It checks for the :

- Specification
- Functionality
- Performance

Testing

- Uncover as many as errors (or bugs) as possible in a given product.
- Demonstrate a given software product matching its requirement specifications.
- Validate the quality of a software testing using the minimum cost and efforts.
- Generate high quality test cases, perform effective tests, and issue correct and helpful problem reports

Testing - terms

Error, Bug, Fault & Failure

- Error : It is a human action that produces the incorrect result that produces a fault.
- Bug : The presence of error at the time of execution of the software.
- Fault : State of software caused by an error.
- Failure : Deviation of the software from its expected result. It is an event.

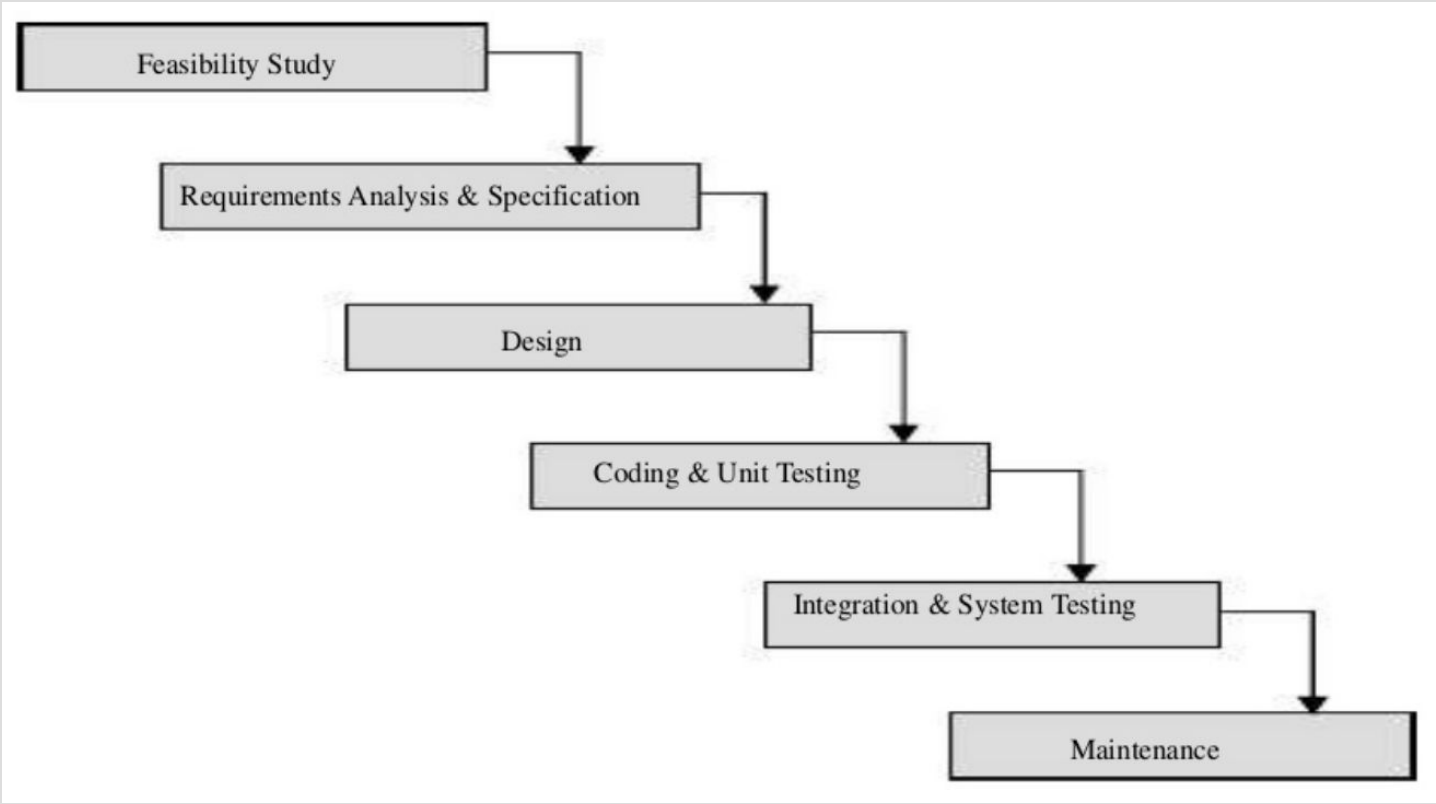
Testing - process

SDLC(Software Development Life Cycle)

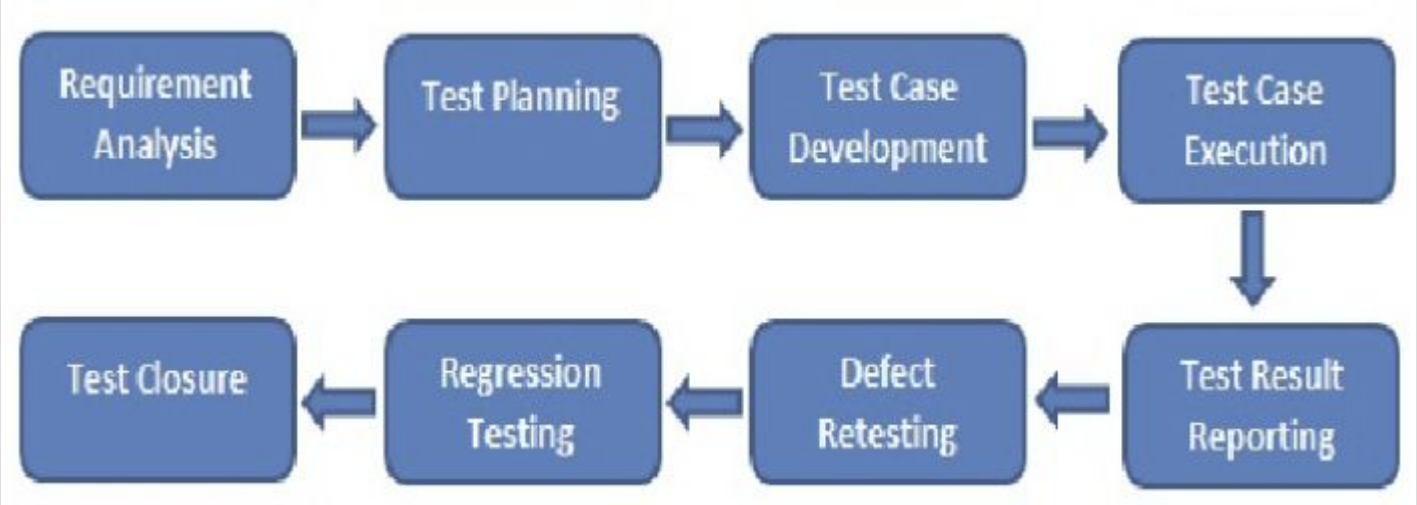
- Standard model used world wide to develop a software.
- A framework that describes the activities performed at each stage of a software development project.
- Necessary to ensure the quality of the software.
- Logical steps taken to develop a software product.

Testing - proces

Waterfall model



Testing - proces



Testing - process

Test Plan

- It is a systematic approach to test a system i.e.software. The plan typically contains a detailed understanding of what the eventual testing workflow will be.

Testing - process

Test Case

- It is a specific procedure of testing a particular requirement.
  It will include:
  - Identification of specific requirement tested
  - Test case success/failure criteria
  - Specific steps to execute test
  - Test data

Testing - process

Verification vs Validation

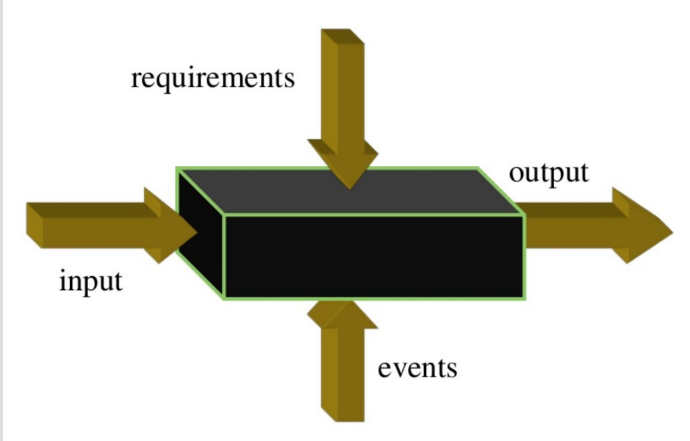
- Verification: The software should confirm to its specification (Are we building the product right?)

- Validation: The software should do what the user really requires (Are we building the right product?)

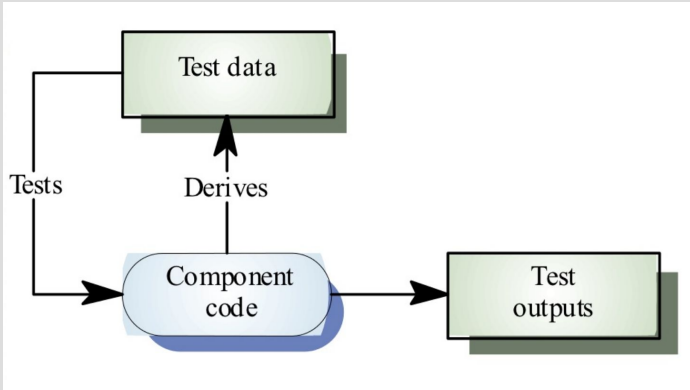
Testing - process

Testing methodologies

- **Black box testing** No knowledge of internal program design or code required. Tests are based on requirements and functionality.



- **White box testing** Knowledge of the internal program design and code required. Tests are based on coverage of code statements, branches, paths, conditions.



Testing - process

Testing Levels

- **UNIT TESTING** Tests each module individually. Follows a white box testing (Logic of the program). Done by developers.
- **INTEGRATION TESTING** Once all the modules have been unit tested, integration testing is performed. It is systematic testing. Produce tests to identify errors associated with interfacing.
  Types:
  - Big Bang Integration testing
  - Top Down Integration testing
  - Bottom Up Integration testing
  - Mixed Integration testing
- **SYSTEM TESTING** The system as a whole is tested to uncover requirement errors. Verifies that all system elements work properly and that overall system function and performance has been achieved.
  - Types: Alpha Testing, Beta Testing, Acceptance Testing Performance Testing

Testing - process

Types of Performance Testing:

- Stress Testing
- Volume Testing
- Configuration Testing
- Compatibility Testing
- Regression Testing
- Recovery Testing
- Maintenance Testing
- Documentation Testing
- Usability Testing

Testing - process

Test or not test - that's the question

- In order to be cost effective, the testing must be concentrated on areas where it will be most effective.

- The testing should be planned such that when testing is stopped for whatever reason, the most effective testing in the time allotted has already been done.

- The absence of an organizational testing policy may result in too much effort and money will be spent on testing, attempting to achieve a level of quality that is impossible or unnecessary.