COMP 4004/5104
Quality in OO Software Development
Course Outline
Learning Objectives

- Understand the pros and cons of TDD and of refactoring in Java
- Gain a basic understanding of metrics, xUnit patterns and Model Based Testing (MBT)
- Gain experience with JUnit and Cucumber AND some other testing tools
- Understand the pros and cons of state-based MBT
- Understand the basics of scenario testing and the challenges concurrency introduces...
Activities, Process, and Models
Phase 1:
Creation of models, test models, and code
(LHS is top-down)

Phase 2:
Execution of test cases
(RHS is bottom up)
Waterfall Development

Activities carried out one after the other as steps

"The Big Bang approach to software development"
The Spiral Model

Incremental-Iterative Development

Requirements Capture

Testing

Analysis

Design

Implement

Can have macro and micro iterations but needs to converge towards a solution
Aiming for Traceability

- Traceability is required to achieve convergence:
  - We must document the *continuity* that must exist between the work-products of different activities.
    - At least required for regression testing (ie what used to work still does)
  - In turn, continuity enables completeness and consistency checks.

- Within a particular activity, the work-products must be *consistent*:
  - e.g., the structural, scenario and behavior models must be consistent
    - For example, if an interaction diagram shows an object receiving a message, then the FSM of this object must reflect this possibility

- Work-products must also be *complete* with respect to the current requirements.
A Scenario Driven Modeling Approach

- Problem Description
  - Use Case 1
    - MSC
    - Inter-scenario relationships
    - FSMs and/or code
  - UCMs
  - Reqs

- Use Case 2
  - MSC
  - Reqs

- Use Case 3
  - MSC

Is it traceable?
The Agile Manifesto—a statement of values

- Individuals and interactions over Process and tools
- Working software over Comprehensive documentation
- Customer collaboration over Contract negotiation
- Responding to change over Following a plan

Source: www.agilemanifesto.org
Some Core Principles

- Assume Simplicity
- Expect Incremental Change
- Enabling the Next Effort is Your Secondary Goal
- Model With a Purpose
- Use Multiple Models
- Maximize Stakeholder Investment
- **Value Quality first**
- Get Rapid Feedback
- **Software Is Your Primary Goal**

Some Core Practices

- Active Stakeholder Participation
- Apply the Right Artifact(s)
- **Collective Ownership**
- Create Several Models in Parallel
- Create Simple Content
- Depict Models Simply
- Display Models Publicly
- **Model in Small Increments**
- Model With Others
- **Prove it With Code**
- Use the Simplest Tools
Scrum

Sprint goal
Return
Cancel
Coupons
Gift wrap
Product backlog
Sprint backlog

Sprint 2-4 weeks

24 hours

Potentially shippable product increment