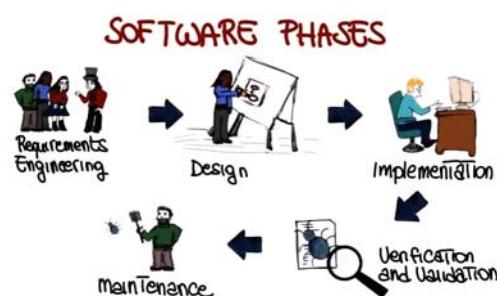




DA-IICT

IT 314: Software Engineering

Software Process Models – RUP/XP/TDD



SOFTWARE PHASES

- Requirements Engineering
- Design
- Implementation
- Maintenance
- Verification and Validation

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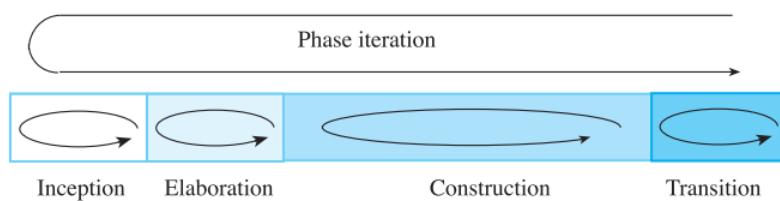
 **RUP – Rational Unified Process**

- Life Cycle model proposed by Booch, Jacobson, and Rumbaugh ("The three Amigos") derived from the work on UML
- Rational Unified Process (RUP) uses Unified Modeling Language (UML) as core notation
- Described from 3 perspectives
 - A dynamic perspective that shows phases over time;
 - A static perspective that shows process activities;
 - A practice perspective that suggests good practice.
- Unified Process is distinguished by being
 - Use-case driven
 - Architecture-centric
 - Iterative and incremental

RUP – Rational Unified Process

- RUP proposes a phase model that identifies four discrete phases in the software process
- **Inception**
 - Establish the business case for the system
 - Decide to cancel or continue the project
- **Elaboration**
 - Develop an understanding of the problem domain and the system architecture.
- **Construction**
 - System design, programming and testing.
- **Transition**
 - Deploy the system in its operating environment.

Iterative Phase Model



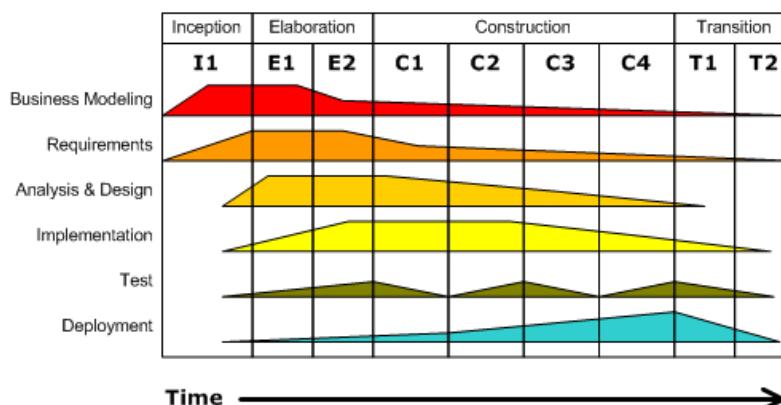
- Each phase may be enacted in an iterative way with the results developed as increments
- The whole set of phases may also be enacted incrementally
Whole set = cycle (later on..)
- An iteration represents a set of activities for which there is a milestone ("well-defined intermediate event")
- The scope and results of the iteration are captured via discrete work products called artifacts.

Artifact sets

- Each artifact set has a different intention and uses different notations to capture the relevant artifacts.
- Management Set:
 - Notation: Ad hoc text, graphics, textual use cases
 - Goal: Capture plans, processes, objectives, acceptance criteria.
- Requirements set:
 - Notation: Structured text, models in UML (Use Case, Class, Sequence)
 - Goal: Capture the problem in the language of the problem domain
- Design set:
 - Notation: Structured text, models in UML
 - Goal: Capture the engineering blueprints
- Implementation set:
 - Notation: Programming language
 - Goal: Capture the building blocks of the solution domain in human-readable format.
- Deployment set:
 - Form: Machine language
 - Goal: Capture the solution in machine-readable format.

RUP

Iterative Development
Business value is delivered incrementally in time-boxed cross-discipline iterations.



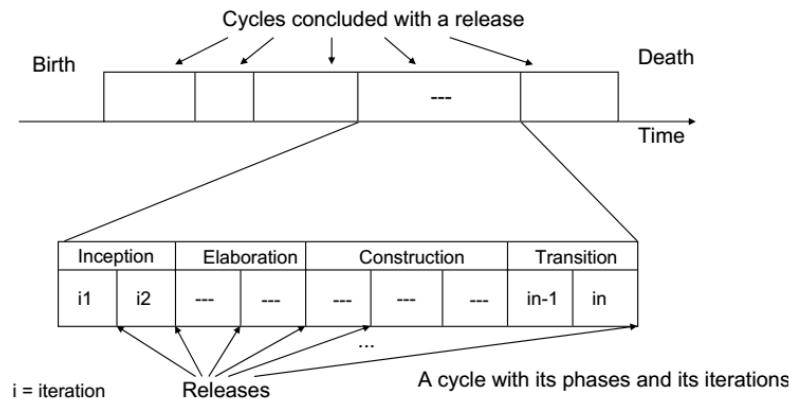
Life of a Unified Process

- Unified Process repeats over a series of cycles each concluding with a product release (increment) to the users
- Cycles have no specific name but characterize the stage of maturity of the software system (like "birth" → "death")
- Each cycle has four phases (each with a number of iterations)
 - Inception, Elaboration, Construction & Transition
 - Phases have goals (→ result in artifacts or models)
- Delivered products will be described by related models each with "trace" dependencies which chain backwards and forwards
 1. Use Case Model
 2. Analysis Model
 3. Design Model
 4. Deployment Model
 5. Implementation Model
 6. Test Model

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Life of a Unified Process



RUP - Summary

- The RUP is not a suitable process for all types of development but it does represent a new generation of generic processes
 - Most important innovation:
 - Combination of many views
 - Deployment of software is part of the process (almost ignored in other process models)
 - Based on standards
 - Object-oriented Modeling
 - Unified Modeling Language

XP (Extreme Programming)

XP is a lightweight methodology for small to medium sized teams developing software in the face of vague or rapidly changing requirements.

Kent Beck

Agile

WHAT IS XP?



DEVELOPING IS LIKE DRIVING

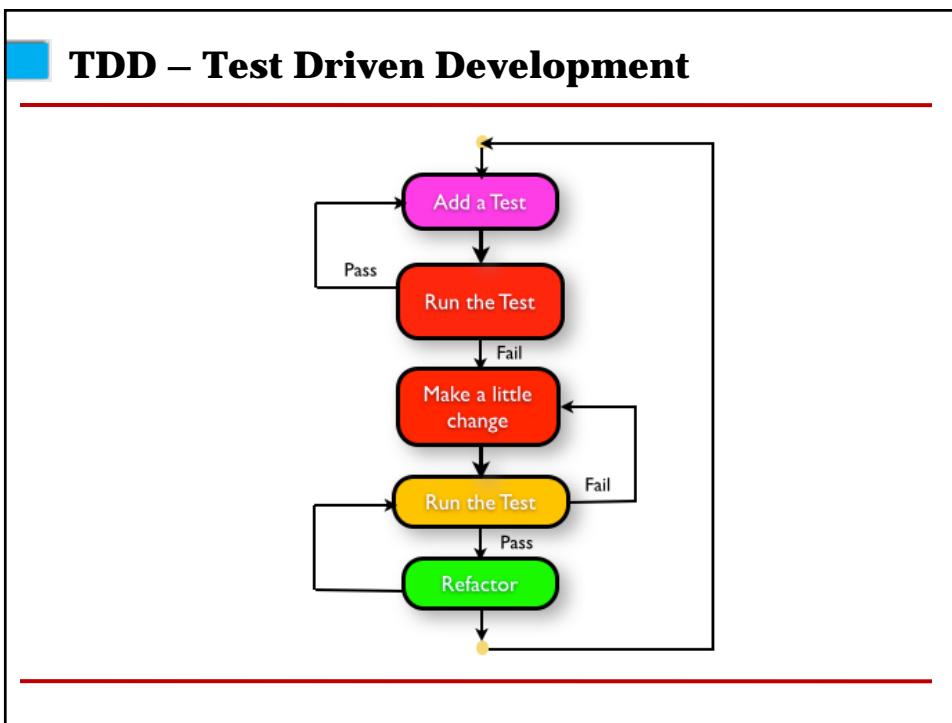
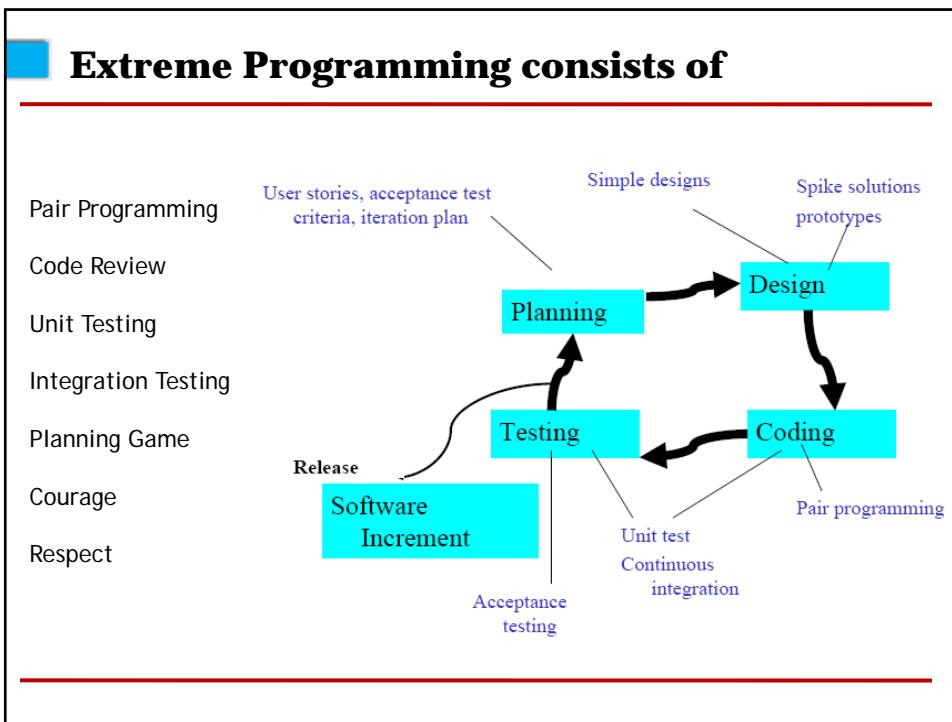


MENTALITY OF SUFFICIENCY

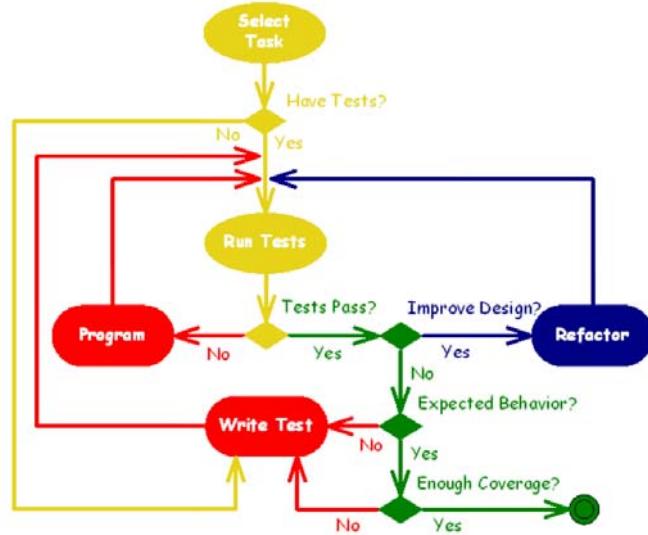
How would you program if you had all the time in the world?



- Write tests
- Restructure often
- Talk with fellow programmers and with the customer often



TDD – Test Driven Development



TDD – Test Driven Development

Test-driven development is not about testing.

Test-driven development is about development (and design), specifically improving the quality and design of code.

Cycle:

- Write the test
- Run the test (there is no implementation code, test does not pass)
- Write just enough implementation code to make the test pass
- Run all tests (tests pass)
- Refactor
- Repeat

TDD – Test Driven Development

Ensures quality

Keeps code clear, simple and testable

Provides documentation for different team members

Repeatable tests

Enable rapid change

Questions???

Next Lectures...
[Feasibility Studies...](#)