Agenda

- Announcements
- Lecture
 - Software Processes

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Announcements

- · No lecture on Tuesday
- · For Thursday, read "No Silver Bullet"
- DCS Mentorship Program
 - Application deadline November 15
 - http://www.cs.toronto.edu/dcs/mentorship

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Software Process

- A Software Process Model is a simplified representation of the software process, presented from a specific perspective.
 - General and abstract
- Software Process is a set of activities whose goal is the development or evolution of software
 - Specific and enacted
- Like the difference between class and object/instance

Software Process Models

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Dimensions of Variation

- · Phased or incremental
- Plan-based or iterative
- · Continuous testing or late testing
- Feedback
- Risk management

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Diagram © Steve Easterbrook, University of Toronto CSC301, Winter 2013 Week 9, Slide 6

Waterfall Model

Waterfall Model

- Points in Favor
 - Some things must occur before others in the process, it makes sense to have code before test, requirements before design etc.
 - It works as a model because it's essentially true
- Points Against
 - No project or design has ever proceeded this way
 - Very difficult to lock down details before proceeding to next step

Evolutionary Model Incremental development integrate design code test O&M (each release adds more functionality) code test integrate O&M release . O&M code test integrate release 4 O&M design code test integrate code test integrate O&M reqts design lessons learnt regts design code integrate O&M **Evolutionary development** (each version incorporates reqts design code integrate new requirements) Diagram © Steve Easterbrook, University of Toronto CSC301, Winter 2013 Week 9. Slide 8

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Evolutionary Model

- Points in Favor
 - Accommodates throw-away prototyping
 - Allows for lessons from each version to be incorporated into the next
- Points Against
 - Hard to plan for versions beyond the first
 - Lessons may be learned too late
 - Process is not visible
 - Systems are often poorly structured
 - Special tools and techniques may be required

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Spiral Model

- Points in Favor
 - Incorporates prototyping and risk analysis
- Points Against
 - Cannot cope with unforeseen changes (e.g. new business objectives)
 - Not clear how to analyze risk

Spiral Model Determine goals, Evaluate alternatives, alternatives constraints and risks oncept of validated Develop Plan and implementation plan acceptance test Diagram © Steve Easterbrook, University of Toronto CSC301, Winter 2013 Week 9, Slide 10

Question

What is the difference between iterative and incremental?

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Rational Unified Process

- RUP is a software (development | design) process that is:
 - Use case-driven
 - Architecture-centric
 - Iterative and incremental

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UP Phases

- Inception
 - Approximate vision, business case, scope, vague estimates
- Elaboration
 - Refined vision, iterative implementation of the core architecture, resolution of high risks, identification of most requirements and scope, more realistic estimates
- Construction
 - Iterative implementation of lower risk and easier elements, preparation for deployment
- Transition
 - Beta tests, deployment

Rational Unified Process Elaboration Inception Construction Transition Disciplines **Business Modeling** Requirements Analysis and Design Implementation Deployment Supporting Disciplines Configuration and Change Management Project Management Environment iter preliminary iter iter iter #2 #n #n+1 | #n+2 #m+1 CSC301, Winter 2013 Week 9, Slide 14

Manifesto for Agile Software Development

We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:

Individuals and interactions over processes and tools
Working software over comprehensive documentation
Customer collaboration over contract negotiation
Responding to change over following a plan

That is, while there is value in the items on the right, we value the items on the left more.

Kent Beck Mike Beedle Arie van Bennekum Alistair Cockburn Ward Cunningham Martin Fowler James Grenning
Jim Highsmith
Andrew Hunt
Ron Jeffries
Jon Kern
Brian Marick

Robert C. Martin Steve Mellor Ken Schwaber Jeff Sutherland Dave Thomas

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Agile is not entirely new

- Iterative and incremental process models have existed for a long time
 - Spiral model by Barry Boehm (1985)
- · Evolutionary software development
 - Mentioned by Fred Brooks in "No Silver Bullet" (1987)
- Frequent deliveries and feedback
 - EVO by Tom Gilb (1985)

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Popularity

- Initiated by software developers
- Now taken up by executives
- New Techniques and Tools
 - Test-driven development
 - Refactoring
 - User stories
- Growing Community with Shared Terminology
- Infrastructure
 - Coaches, training, certification, courses, conferences

Current Differences

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Current Reasons for Popularity

- Effectiveness
- Results
- · Compatibility with web applications
- Cool factor



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