CSci 8801
Advanced Software Engineering

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Topics for Today

• Course overview
  • Instructor and teaching model
  • Introduction
  • What you should already know
• What to expect
  • Assignments
• Questions

Professor

• Professor Mats Heimdahl
  • Office: EE/CS 6-201
  • Email: heimdahl@cs.umn.edu
  • Office hour: Tuesday and Thursday 2:30-3:30

• Class information
  • Class web page available from Professor Heimdahl’s web page
  • www.cs.umn.edu/~heimdahl/csci8801
Communicating with Instructor

• Problems with homework and assignments
  • Contact Dr. Heimdahl
  • Contact each other
• Problem with Dr. Heimdahl
  • Contact CS front office and they will help you

Prerequisites

• You ought to have an introductory software engineering class
  • CSci 4081, CSci 5801, or old CSci 5180
• Some background in discrete mathematics
• Interest in learning things that are more advanced than what is industry practice
  • What you learn here you may not be able to use when you get a job
  • But, you can be part of changing the world

Learning Modes

Lecture  
Textbooks  
Class Discussions and Class Presentations  
Homework
Assignments and Grading

- Homework assignment
- Student presentations
- Semester projects
  - A research proposal

Syllabus and Schedule

- Review syllabus
- Review schedule
  - Schedule is still under development
  - Topics will just take the time it takes

Lecture Plan

- Requirements engineering
  - 2 weeks
- Formal modeling
  - X weeks
- Analysis techniques
  - Y weeks
- Testing
  - Z weeks
Questions?

Introduce yourselves

Domain of Concern

How we Develop Software
Model-Based Development

- Visualization
- Analysis
- Testing
- Prototyping
- Specification Model
- Code

Model-Based Development Tools

- Commercial Products
  - Esterel Studio and SCADE Studio from Esterel Technologies
  - SpecTRM from Safeware Engineering
  - Rhapsody from I-Logix
  - Simulink and Stateflow from Mathworks Inc.
  - Rose Real-Time from Rational
  - Etc. Etc.

Research Tools (many):
RSML* and Nimbus

Simulations of environment
RSML* Formal Models (~20 running concurrently)
How we Will Develop Software

ROI with Model Based Development

A Simplified Development Model
Benefits of SCADE™:
From V to Y Cycle

Manual coding
Use of a “regular” automatic code generator
Use of the qualifiable code generator as a verification tool
Use of the qualifiable code generator as a development tool
Use of proof technology

Source: Esterel Technologies

Ongoing Research

Problems…
Perfection is **Not** Necessary

- Tools and models only need to be better than manual processes...
  - **How do we demonstrate this?**
  - Empirical studies are of great importance

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We Have Learned

- What CSci 8801 is all about (sort of)
- What is expected from you
  - Prerequisites
- A quick view of model-based development
- Next time
  - SE Fundamentals