What is software engineering? Why do we need it?

Dr. Kosta Damevski
CMSC 355 - Software Engineering: Spec and Design
Fall 2015

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Welcome to CMSC 355

- My name: Kosta (Kostadin) Damevski

- My office: East 4253

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- My office hours: Mondays 1:00pm - 3:00pm

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Course Organization

- Online Presence

  - Course schedule and slides

    - http://damevski.github.io/cmsc355

  - Assignments, assignment submission, grades, etc.

    - on Blackboard

  - Discussions

    - on Piazza

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Grading is Simple

- 50% - Team Project

- 30% - Final Exam

- 20% - Midterm

Team Project

- A semester long, agile, development project intended to illustrate concepts from class

  - Project grade is about many other aspects other than writing code

  - There will be project presentations by each team at the end of the semester

- Theme: Android Apps (Java)

- Team size: 4-5 students

- More on this very soon…

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Grading the Team Project

- Individual effort

  - Some thresholds of lines of code written and issues completed ensure that things are getting done

- Group effort

  - Anonymous ratings of fellow group members at the end of each iteration

    - Can reduce iteration grade but not improve it

    - First iteration will be a warning

- Grades at the end of each iteration

- Grades on the completed project (includes presentation)

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Course Plan

- Class will be for lectures, mostly
  - Cover a variety of software engineering topics
    - Some of them will be part of the team project
    - All of them will be (fair game) for the exams
  - I will likely spend a few lectures on Android
    - Things that everyone would benefit from
    - But, there is a lot you will need to learn on your own

Piazza

- For Q and A, and for team forming

  - Teaching staff and fellow students answer questions

  - If you are active on Piazza, there will be bonus points that can help you if you have a borderline grade

- Before e-mailing a question to the teaching staff, make sure it hasn't been answered on Piazza

  - Consider asking the question on Piazza

    - unless it's about grading or other personal stuff

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Questions

- Does the course organization make sense?

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Why do we study software engineering?

- A computer is a programmable device
  - So programming it is a fundamental activity
- We ask a lot from our software
  - Complexity
  - Heterogeneous tasks
    - inside a car vs. inside a server
- Managing that complexity requires more than just programming skill

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What should you expect to learn in this course?

- Methodologies

- Techniques

- Tools

- …to build high-quality software that fits budget

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Software Development Effort

Size	Example	
10^2 LOC	Class Exercise	Programming Effort
10^3 LOC	Small Project	
10^4 LOC	Term Project	
10^5 LOC	Business Application	Software Engineering Effort
10^6 LOC	Word Processor	
10^7 LOC	Operating System	

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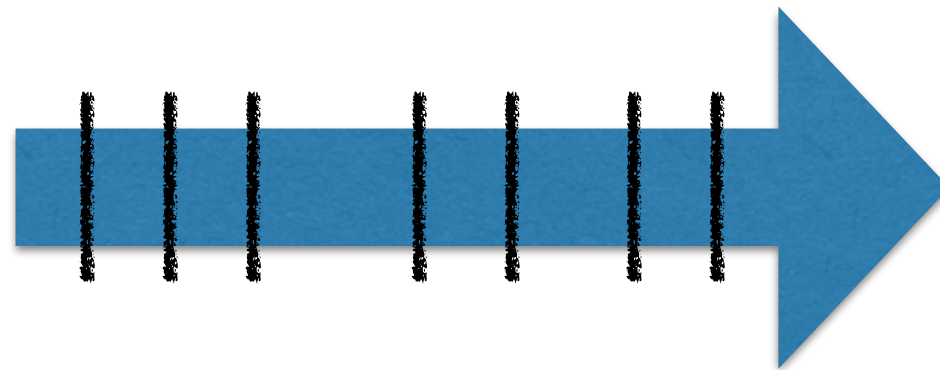School of Engineering | Computer Science

Engineering SW is different from engineering HW

- Q: Why so many SW disasters and no HW disasters?

    - Ariane 5 rocket explosion

    - Therac-25 lethal radiation overdose

    - Mars Climate Orbiter disintegration

    - FBI Virtual Case File project abandonment

- A: Nature of the two media and subsequent cultures that developed

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Engineering SW is different from HW

- Cost of field update
  - On hardware it's very large
    - Hardware designs have to be finished before they are shipped
    - Bugs => return hardware => lost $$$
  - On software it's very small
    - Expect software to get better over time
    - Bugs => wait for an upgrade
- HW decays slowly, while software can be long lasting

Software Development

The SW engineering task is split into multiple steps according to a ***software development process***

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Software Development Processes

- Waterfall vs. Spiral vs. Agile

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Summary

- We need software engineering to manage the complexity of designing software

  - A set of scientific principles and best practices

  - We will discuss these in the lectures

  - We will experience some of them in our team project

- Your task now

  - Log in to Piazza and Blackboard

  - Assignment 1 is on Blackboard

Questions

- Any parting questions?