

Lecture 1
Course Overview



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Course Overview

- ▶ Instructor: Zvonimir Rakamarić
- ▶ Office: MEB 3424
- ▶ Class: Mon, Wed; 3:00-4:20
 - ▶ Attendance is mandatory
- ▶ Canvas course page
 - ▶ Course schedule
 - ▶ Announcements (make sure you get those promptly)
 - ▶ Homework assignments and due dates
- ▶ Public git repo hosted on github
 - ▶ For submitting code deliverables

Course Communication

- ▶ Announcements on canvas
- ▶ Discussion board on canvas
- ▶ Email: zvонimir@cs.utah.edu
 - ▶ Private questions (related to your grade and such)
- ▶ No fixed office hours
 - ▶ Catch me after class
 - ▶ Find me in my office
 - ▶ Email me

Course Workload

▶ Lectures

- ▶ Several traditional lectures covering basic material
- ▶ Lots of interactive sessions requiring your participation
 - ▶ Code reviews
 - ▶ Discussions
 - ▶ Analysis of tools
 - ▶ Coding exercises in class

▶ Homework assignments

- ▶ Hands-on exercises accompanying presented material
- ▶ Programming assignments in C

Prerequisites

- ▶ Solid C programming skills
- ▶ Git
- ▶ Make
- ▶ Scripting (python?)
- ▶ Dealing with unspecified or underspecified problems
- ▶ Dose of independence and motivation for explorations

Grading

- ▶ 80% homework assignments
 - ▶ Every 2 weeks or so on average
 - ▶ Each assignment is worth the same
- ▶ 20% class participation
 - ▶ In-class discussions
 - ▶ Canvas discussion board

Collaboration vs Cheating

- ▶ Discussing homework solutions at high-level is fine and encouraged
- ▶ Working in teams is discouraged
- ▶ Basing your code/write-up on any other code/write-up is cheating
 - ▶ do not copy solutions from another student
 - ▶ do not copy solutions from the internet
 - ▶ do not even look at solutions from another student
 - ▶ do not ask for solutions on online forums
 - ▶
- ▶ Acknowledge appropriately any outside materials you used or rely on

Late Policy

- ▶ Late homework assignments will not be accepted unless you contact me before the deadline and have a good excuse



VS

Worst Software Bugs (Wired, 2005)

[<http://www.wired.com/software/coolapps/news/2005/11/69355>]

- ▶ 1962: Mariner I space probe
- ▶ 1982: Soviet gas pipeline
- ▶ 1985-87: Therac-25 medical accelerator
- ▶ 1988: Berkeley Unix finger daemon
- ▶ 1988-96: Kerberos Random Number Generator
- ▶ 1990: AT&T Network Outage
- ▶ 1993: Intel Pentium floating point divide
- ▶ 1995-96: The Ping of Death
- ▶ 1996: Ariane 5 Rocket
- ▶ 2000: Cancer institute's therapy planning software

Ariane 5 Rocket

- ▶ June 4, 1996: Ariane 5 Flight 501 crash
- ▶ Working code for the Ariane 4 rocket is reused in the Ariane 5
 - ▶ Ariane 5's faster engines trigger an overflow condition in an arithmetic routine inside the rocket's flight computer
- ▶ Flight computer crashes
 - ▶ The rocket explodes 40 seconds after launch



Automotive Industry

[<http://www.embedded.com/electronics-blogs/break-points/4025634/Total-Recall>]

- ▶ 2003: A BMW trapped a Thai politician when the computer crashed. The door locks, windows, A/C and more were inoperable. Responders smashed the windshield to get him out.

Course Overview

- ▶ Concepts and techniques
 - ▶ Testing
 - ▶ Debugging
 - ▶ Code Reviews
 - ▶ Specifications
- ▶ Hands-on exercises and homework assignments
 - ▶ Coding
 - ▶ Trying out available tools

First Homework: Triangle Classifier

- ▶ Discuss possible specification
 - ▶ Inputs?
 - ▶ Outputs?
 - ▶ Scalene vs isosceles vs equilateral
 - ▶ Acute vs obtuse vs right
- ▶ Reasonable tests