CSCI 136:
Data Structures
and
Advanced Programming

Lecture 1

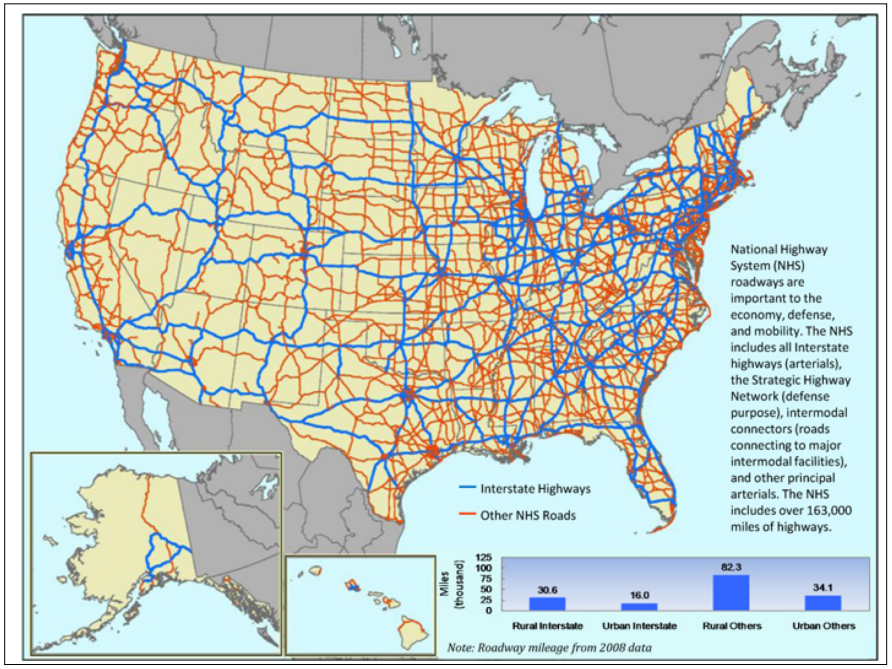
Instructor: Dan Barowy

Williams

About me

Outline

1. Course preview
2. Course bureaucracy
3. Java crash course, Part 1



By avoiding left turns whenever possible, UPS estimates to save:

10 million gallons of fuel a year

6 to **8** fewer miles driven per route

100,000 metric tons of CO_2 emissions a year

(equivalent to **21,000** cars taken off the road)

Source: UPS estimates for 2016, related to the deployment of the ORION routing system on US routes.

A study on crash factors in intersection-related accidents from the US National Highway Traffic Safety Association shows that turning left is one of the leading "critical pre-crash events" … About 61 percent of crashes that occur while turning or crossing an intersection involve left turns, as opposed to just 3.1 percent involving right turns.

source: cnn.com

Finding Shortest Paths

Data: road segments

- road segment: (source, destination, length)

Input: source, destination

Output: shortest path

- path: (segment$_1$, …, segment$_n$)

The Algorithm: Dijkstra's Algorithm

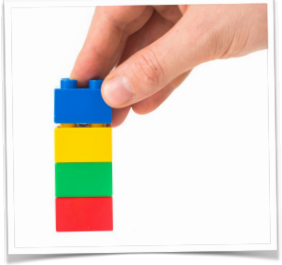
Data structures:

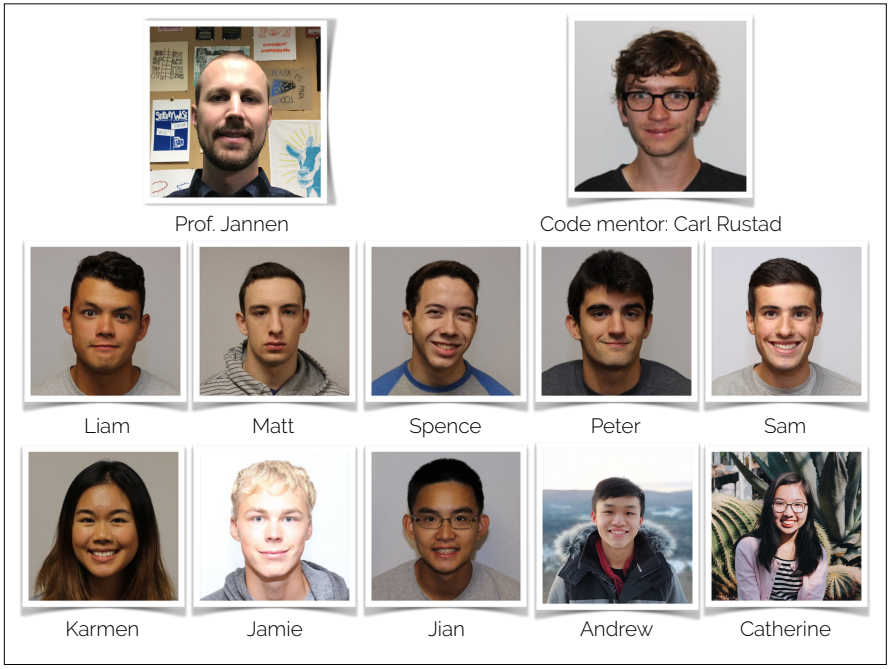
- graph: essential representation of a "road network"
- priority queue: ordered set of next roads to try
- also uses: lists, arrays, stacks, …

Demo

You already know how to program.

This course is about: “good” programs





Administrivia

- Class roster: Who's here?
  - And who's trying to get in?
- Handout: Class syllabus
- Lecture location: Schow 030A
- Lab: Wed 12-2 or 2-4 (go to assigned lab!)
- Lab location: TCL 216 (Barowy) & 217a (Jannen)
- Lab entry code: 64-64-04 (memorize now!)

Course Webpage:
https://williams-cs.github.io/cs136s19-www/

Syllabus

How to contact us

Instructor	Prof. Daniel Barowy
Office	TCL 307
Email	dbarowy@cs.williams.edu
Instructor (Lab)	Prof. Bill Jannen
Office	TCL 306
Email	jannen@cs.williams.edu
Lectures	MWF 11:00-11:50am (Barowy) in Schow 030A

Course textbook

Java Structures

Data Structures in Java for the Principled Programmer

The $\sqrt{7}$ Edition
(Software release 33)

Duane A. Bailey

Williams College
September 2007

Weekly activities

- Reading the text: 12-15 pages, on average, per lecture
- Preparing for weekly pop quizzes
- Preparing for the weekly programming labs
- Completing the weekly labs
- Studying for the mid-term and final exam

Yes, pop quizzes

- Look for the "quiz prompt" on the reading
- These are not very difficult.
- But you won't know the answer unless you do the reading.
- One quiz per week.
- Which day is *totally random* (even I don't know).

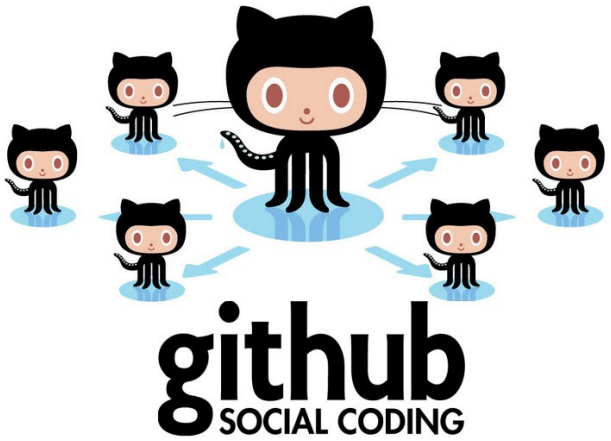
Lab Assignments

- Assigned: Sunday
- Lab: Wednesday
- Pre-lab: sometimes work due *before* Wed
- Due: Sunday no later than 11:50pm

Lab Assignments

- Assigned: Sunday
- Lab: Wednesday
- Pre-lab: work often due *before* Wed (design)
- Due: Sunday no later than 11:50pm

Assignments submitted using GitHub



Code reviews

Carl Rustad

- Carl will do 10 one-on-ones per week.
- You get full credit by showing up; no credit if you skip it.
- This is a great opportunity to pick the brain of an experienced programmer. (Carl was the 2018 Ward Prize winner)
- Sign up is voluntary.
- (Unless Carl gets < 10 signups)

Late days

- 3 late days per semester allowed.
- Up to 2 for a single assignment.
- See syllabus for instructions.
- Use them wisely.

Resubmissions

- 2 resubmissions per semester allowed.
- For all assignments except last assignment and final exam.
- Yes, you may resubmit your midterm.
- Gain up to 50% of points back.
- *You cannot resubmit an unsubmitted assignment!*
- Due two weeks after feedback given.
- See syllabus for instructions.
- Use them wisely.

Tips for success

- Come to lab and lecture on time
- Read assigned material before class and lab
- Bring textbook to lab (or be prepared to use PDF)
- Bring paper/pencil to lab for brain-storming, …
- **Come to lab prepared**
- Bring design docs for program
- 1 Prof + 1TA == help for you: take advantage of this
- Ask questions!
- Your work should be your own. Unsure? Ask!
- Participate

Accounts and Passwords

- Mandatory: Before the first lab
- Talk to Mary Bailey about your CS account
- Mary manages our systems. She will be available

Mon, Feb 4: 10 - 11:30, 3 - 4:30
Tues, Feb 5: 10:30 - 11:30, 3 - 4:30
Wed, Feb 6: 10 - 11:30

- Her office is in the 3rd floor CS lab (TCL 312)
- Get this sorted out before lab on Wednesday!

Honor Code

We take this very seriously.

It is much better to have a conversation with me than it is to copy someone else's work.

If you copy work, we will catch you.

Most problems can be avoided if…

Life skill #1: … you use a planner.

Planner Activity

Fill in class meeting times.

Give yourself 10-12 extra hours for this course.

Ditto your other courses.

Don't schedule all your time in one big chunk.

Be sure to leave time for meals, sleep, FUN…

Java Crash Course, Part 1

Everything you ever wanted to know about Hello World but were afraid to ask

Recap & Next Week

Today we learned:

- What this course is about.
- Course policy.
- A little bit of Java

Next week:

- More Java
- Version control
- Program design