CSCI 136:
Data Structures
and
Advanced Programming

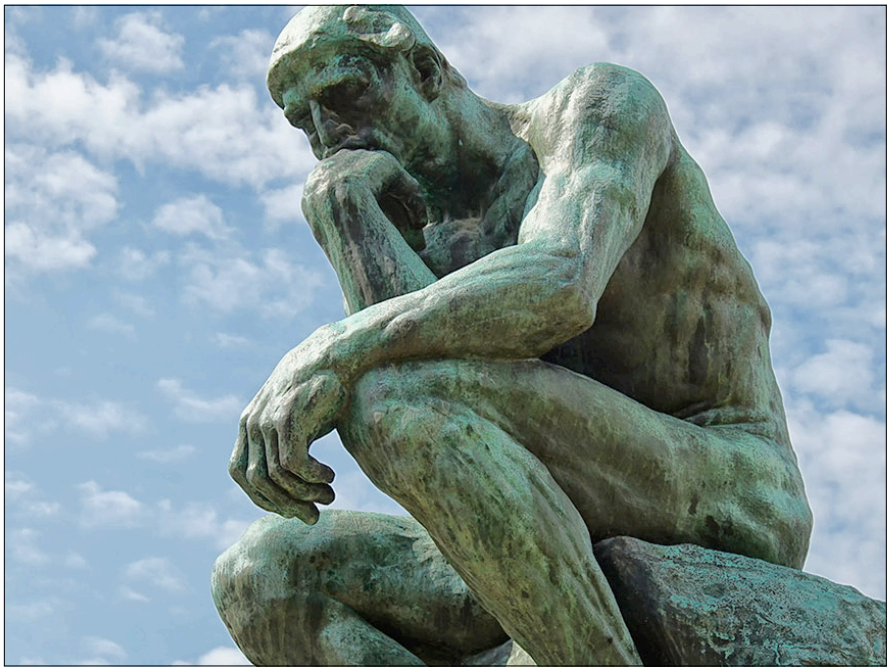
Lecture 1

Welcome

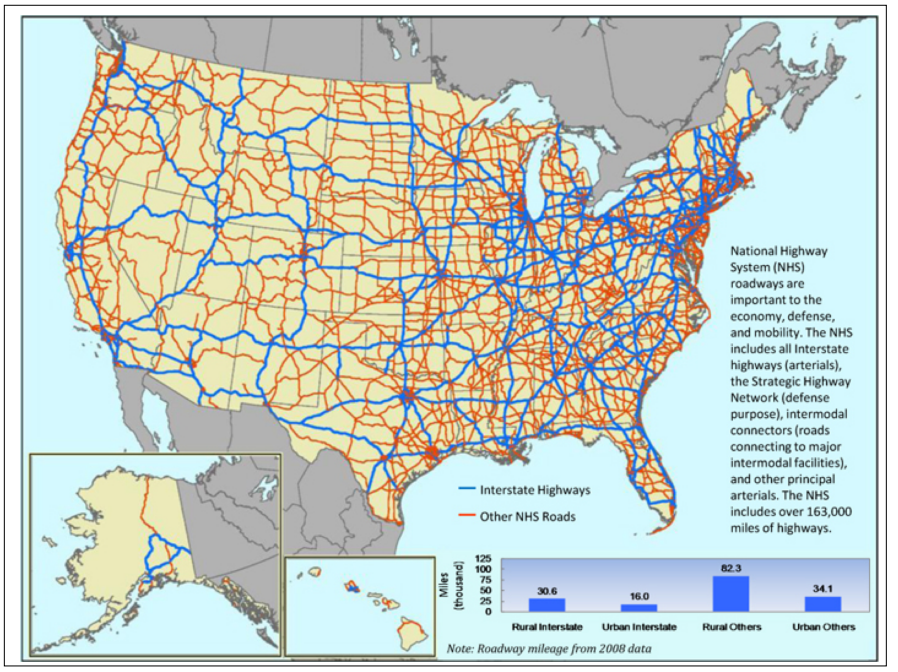
Instructor: Dan Barowy

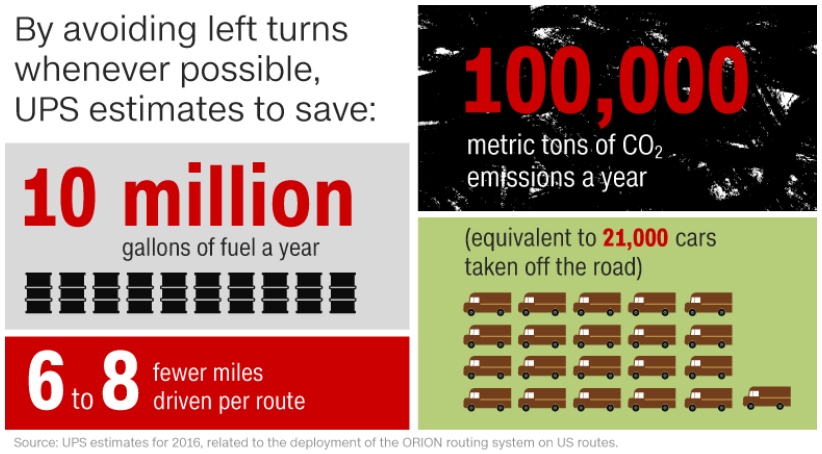
Williams

About me




ups
Worldwide Services


Interstate Highways
Other NHS Roads
National Highway System (NHS) roadways are important to the economy, defense, and mobility. The NHS includes all Interstate highways (arterials), the Strategic Highway Network (defense purpose), intermodal connectors (roads connecting to major intermodal facilities), and other principal arterials. The NHS includes over 163,000 miles of highways.
Miles (thousand)
125
100
75
50
25
0
30.6
16.0
82.3
34.1
Rural Interstate
Urban Interstate
Rural Others
Urban Others
Note: Roadway mileage from 2008 data



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: ($segment_1$, …, $segment_n$)

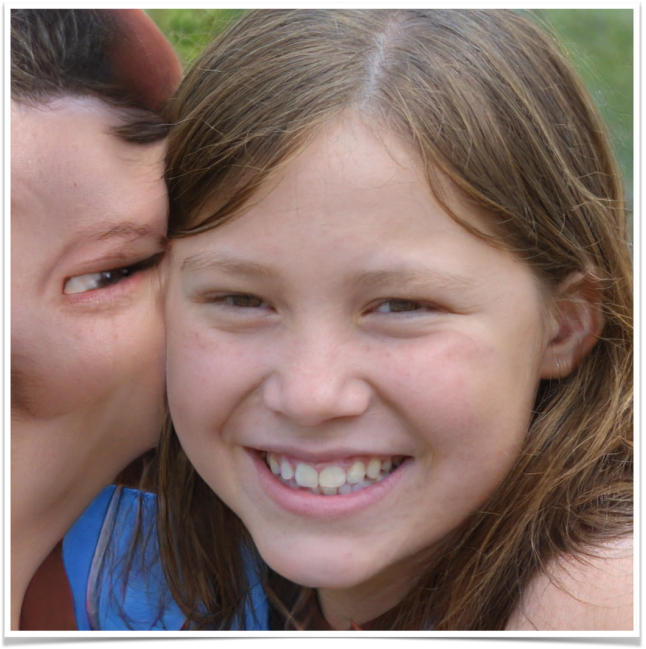
The Algorithm: Dijkstra's Algorithm

Data structures:

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

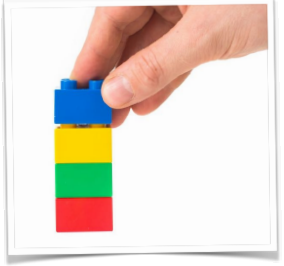
Demo

StyleGAN2



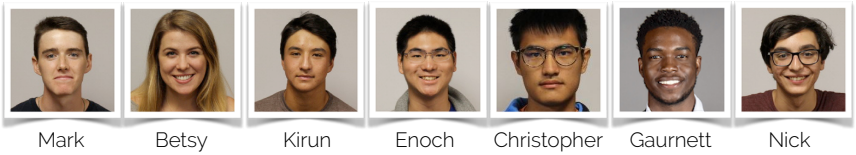
You already know how to program.

This course is about: "good" programs


Prof. Jannen ('09)


Code mentor: Lida Doret ('02)


Mark, Betsy, Kirun, Enoch, Christopher, Gaurnett, Nick


Tai, Jihong, Petros, Trang, Vy, Angela, Sam

Outline

1. ~~Course preview~~
2. Course bureaucracy
3. Homework due Monday
4. Java refresher

Administrivia

- Class roster: Who's here?
  - And who's trying to get in?
- Handout: Class syllabus
- Lecture location: Schow 030B
- Lab: Wed 12-2 or 2-4 (go to assigned lab!)
- Lab location: TCL 216 (Barowy) & 217a (Jannen)
- Lab entry code: 1-2-4-8-16 (quick, memorize this!)
- Course Webpage:
  https://www.cs.williams.edu/~cs136

Course webpage!

https://www.cs.williams.edu/~cs136

Syllabus

How to contact us

Section 1 Instructor	Prof. Daniel Barowy
Office	TCL 307
Email	dbarowy@cs.williams.edu
Section 2 Instructor	Prof. Bill Jannen
Office	TCL 306
Email	jannen@cs.williams.edu
Lab Instructor	Lida Doret
Office	TCL 205
Email	lpd2@williams.edu
Lectures	MWF 9:00-9:50am (Section 1; Barowy) in Schow 030B MWF 10:00-10:50am (Section 2; Jannen) in Schow 030B
Labs	W 12–2pm, 2–4pm

Course textbook

Java Structures

Data Structures in Java for the Principled Programmer

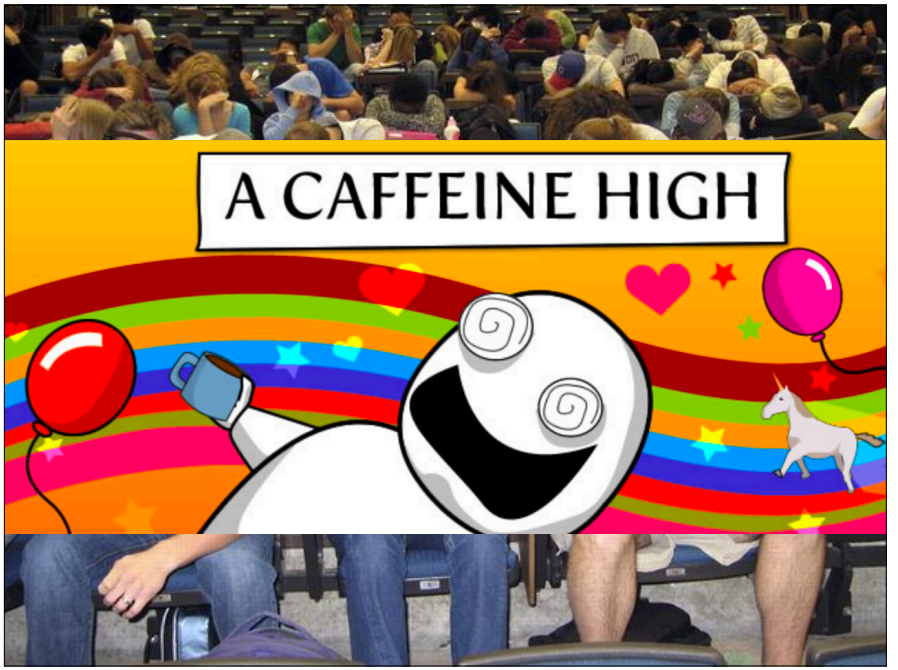
The $\sqrt{7}$ Edition
(Software release 33)

Duane A. Bailey

Williams College
September 2007

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



Weekly activities

- Reading the text: 12-15 pages, on average, per lecture
- Preparing for weekly quizzes
- Preparing for the weekly programming labs
- Completing the weekly labs
- Studying for the midterm and final exams

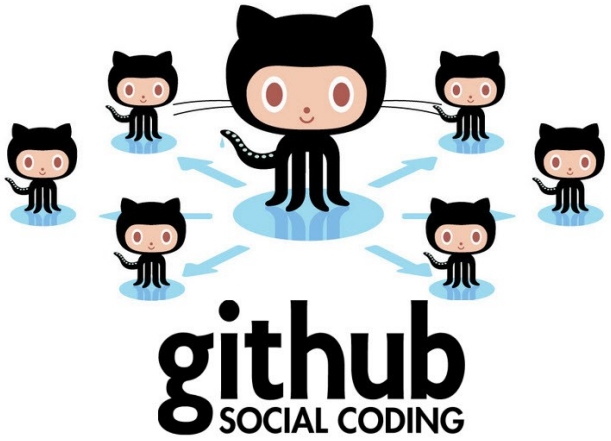
Yes, quizzes

- Two quizzes per week.
- The first quiz (usually on Monday) is a "practice" quiz.
- The second quiz (usually on Friday) is the real quiz.
- Prepare for quizzes by doing the reading.
- No make-up quizzes, but…
- The two lowest quiz grades will be dropped.

Lab Assignments

- Assigned: Sunday
- Lab: Wednesday
- Pre-lab: sometimes work due *before* Wed
- Due: Monday no later than 8pm

Assignments submitted using GitHub



Code reviews

Lida Doret '02

- Lida will do 5-6 meetings 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. (Lida was a scientific programmer after graduation!)
- Sign up is voluntary.
- (Unless she gets < 5 signups)

Resubmissions

- No late assignments allowed in this course.
- 2 resubmissions allowed.
- For all assignments except last lab and final exam.
- Yes, you may resubmit your midterm.
- Gain up to 50% of points back.
- *You cannot resubmit an unsubmitted assignment!*
- Due by the end of the semester.
- See syllabus for instructions.
- Use them wisely.

Accounts and Passwords

- Mandatory: Before the first lab
- Talk to Mary Bailey about your CS account
- 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.

It is much better to get partial credit than it is to copy someone else's work.

We know when you copy work.

Most problems can be avoided with planning.

Homework for Monday

Homework for Monday

PRE-LAB Step 0: Version Control Systems and GitHub

Please complete PRE-LAB Step 0 by *Monday at 4pm*. This part is worth 2 basis points of your Lab 1 grade.

- Review what a version control system is and why you might want to use one. We will talk about these more in the lecture and the lab.
- Sign up for a GitHub account by following the GitHub Getting Started guide on the course webpage. Please choose your username thoughtfully—students often use a GitHub account for years and like to show their work to prospective employers!
- Complete the Hello World guide. We will be using the features discussed throughout the semester.
- After you've registered, please fill out this Google Form, and be sure to include your GitHub username. This form is how we know that you completed PRE-LAB Step 0.

Homework for Monday

Read the syllabus.

There will be a quiz on the syllabus.

Recap & Next Week

Today we learned:

- What this course is about.
- Course policy.

Next week:

- Java!
- Program design
- Our first data structure