CSCI 136: Data Structures and Advanced Programming

Lecture 1
Welcome

Instructor: Dan Barowy Williams

Please stop me to ask questions!

Toyota Production System

Any worker can stop the line!

Toyota Production System

Stop me if you feel like something is missing!
About me
By avoiding left turns whenever possible, UPS estimates to save:

10 million gallons of fuel a year

(100,000 metric tons of CO₂ emissions a year)

6 to 8 fewer miles driven per route

Source: UPS estimates for 2015, 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: (segment₁, ..., segmentₙ)

**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

Lab instructor: Lida Doret ('02)

Outline

1. Course preview
2. Course bureaucracy
3. Pre-lab due Thursday
4. Java refresher
Administrivia

• Class roster: Who’s here?
  • And who’s trying to get in?
• “Handout”: Class syllabus
• Lecture location: Schow 030B
• Lab:
  Thur 9:55-11:10am (sec 4),
  Thur 1:10-2:25pm (sec 5 & 7),
  Thur 2:35-3:50pm (sec 6 & 8)
  (please go to assigned lab!)
• Lab locations: TCL 216 & 217a (to be posted soon)

Lab entry code: 3-9-27-81 (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
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Email
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Section 2 & 3 Instructor
Prof. Samuel McCauley
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Lab Instructor
Lida Doret
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Lectures
MWF 9:00-9:50am (Section 1; Barowy) in Schow 30b
MWF 10:00-10:50am (Section 2; McCauley) in Schow 30b
MWF 11:00-11:50am (Section 3; McCauley) in Schow 30b

Labs
Th 9:55-10:10am, 1:10-2:25pm, 2:55-3:50pm (Due Tuesday before 10pm)

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

Course textbook

Java Structures

Data Structures in Java for the Principled Programmer

The 4th Edition
(2016, 3rd printing)

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 paper/pencil to lab for brain-storming, …
• Come to lab prepared
• Bring design docs for program
• 1 Prof + 1 TA == 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

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.

Lab Assignments

• Assigned: Tuesday
• Lab Meeting: Thursday
• Pre-lab: sometimes work due *before* Thursday
• Due: Tuesday no later than 10pm

Assignments submitted using GitLab
Late Days

- **3 late days total**
  - A “late day” means that you can submit an assignment one day later
  - You must tell us that you are using a late day, otherwise your assignment will be sent to the graders as-is.
- You may use up to two late days on a single assignment.
- Use these wisely.

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

- If you’ve taken 134, you probably do not need to do this. Otherwise…
- 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 seriously.

It is much better to reach out to me, Sam, or Lida when you’re having difficulties 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.
- There is never a penalty for asking for help.
  - We know when you copy work.
  - The consequences are severe.
- Most problems can be avoided with planning.
Homework for Monday

Read the syllabus.

There will be a quiz on the syllabus.

Homework for Thursday

PRE-LAB: Design Documents

Read through this lab handout and sketch out a design for your Silver Dollar Game program. You should use the sample Dice Design Document as a guide. Each week your design document will account for a small portion of your lab grade, so please bring it to lab, be prepared to discuss it with a partner, and be prepared to submit it. For the first lab, it is OK if the design is rough; we are not going to deduct points for correctness. The purpose is to ensure that you think about the lab in advance.

Homework for Monday

To refresh your memory about Java, read the “Java for Python Programmers” handout.
Recap & Next Week

**Today:**

- What this course is about.
- Course policy.

**Next class:**

- Java!
- Program design
- Our first data structure