Data Structures and Algorithms
CSCI 2270

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July 8, 2014
Lecture 1

University of Colorado
Boulder

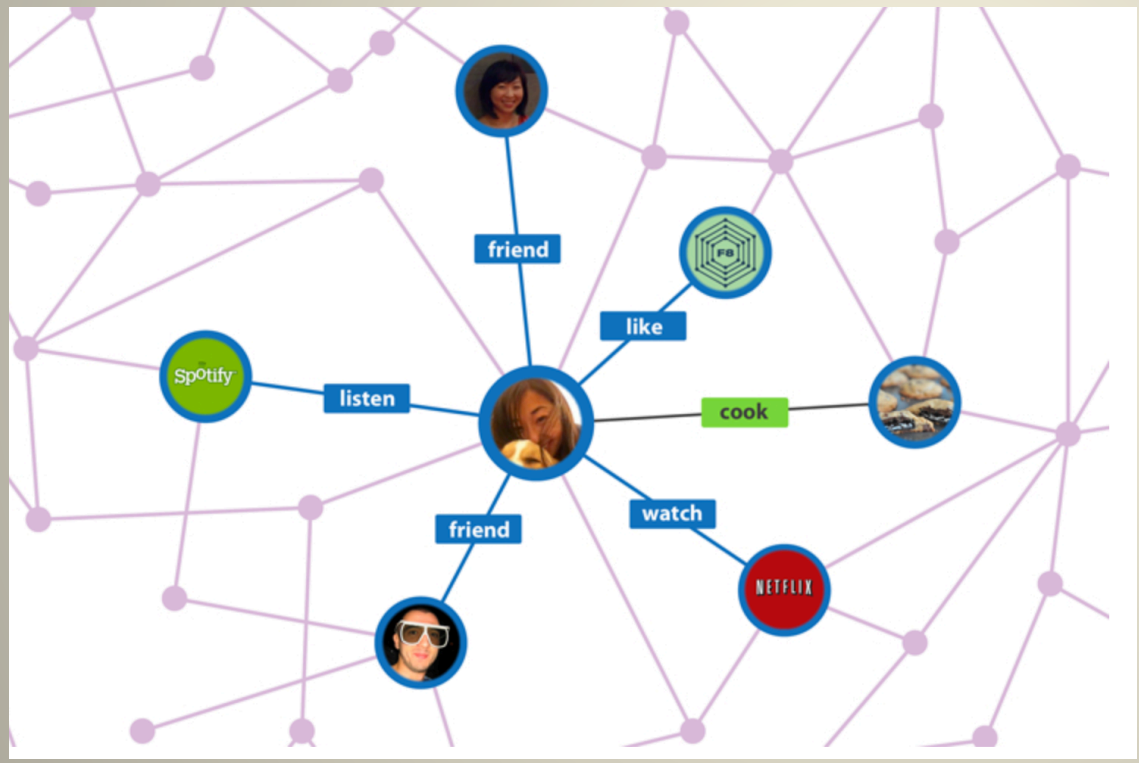
Why care about data structures…

- CSCI1300 introduced computing
  - Potential
  - Applications
  - Programming demystified
  - Comfort
  - Python and Java

- CSCI 2270 gives you deeper understanding
  - Advanced programming
    - C++
    - Looks more closely at details
  - Relations in data, complexity of algorithms
  - Useful in job interviews

CSCI 2270 – Data Structures

- Complex variables with connections and order



Example: Network (graph)

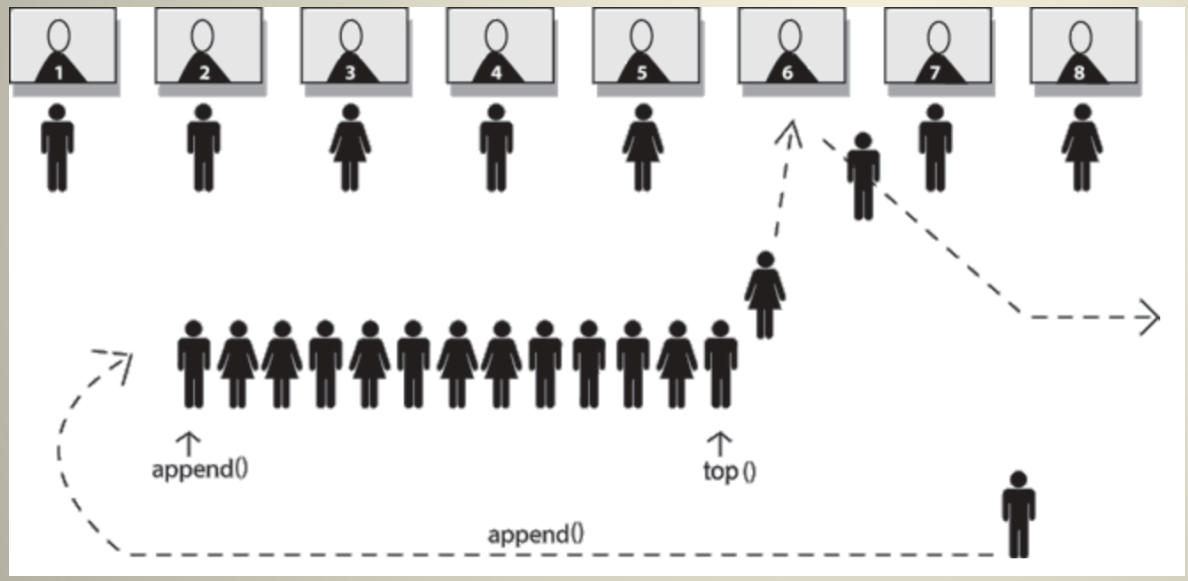
- Objects with connecting edges

Study how to:

- Search
- Sort
- Remove
- Traverse

CSCI 2270 – Data Structures

- Other data structures:
  - Stacks, queues, linked lists, trees
    - Searching and sorting
    - Algorithmic complexity

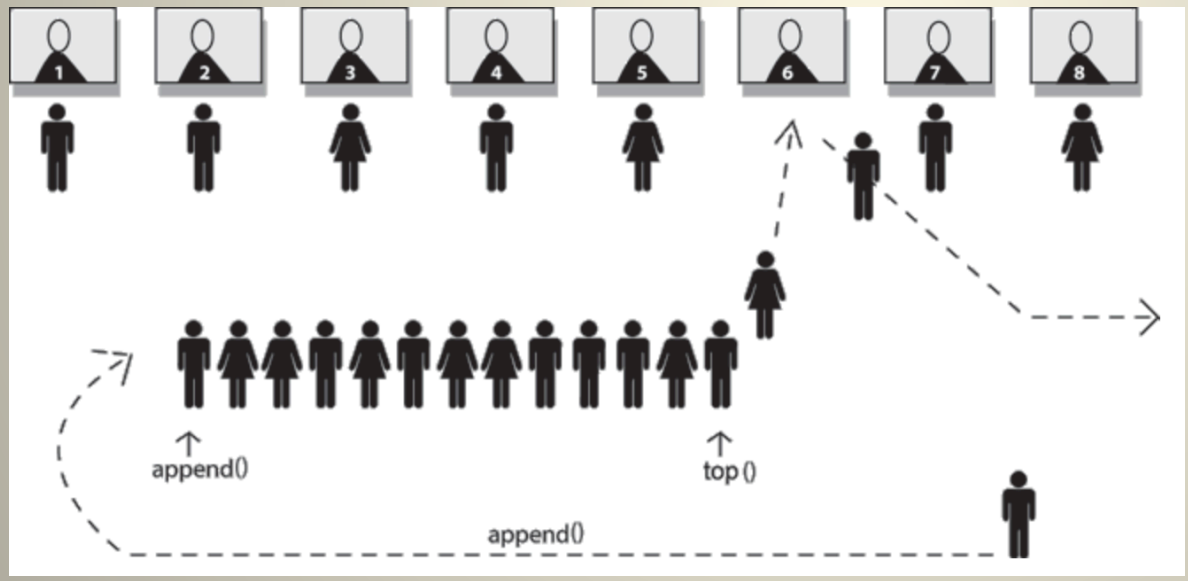


Example: Queue

- Line at the store
- Jobs on a processor

CSCI 2270 – Algorithms

- Searching and sorting
  - How long does it take search/sort a list
    - Number of operations
  - How does an algorithm grow with data size
  - When does it matter, not matter



Administrative details

Course syllabus on Moodle
http://moodle.cs.colorado.edu/
CSCI 2270 – Hoenigman – Data Structures
Enrollment key: csci2270

Class times:
MTWTh 8-10:30am

Recitation:
In class everyday.
Lecture for approx. 1 – 1.5 hours, then recitation lab.

Lab due by 7pm on day it is assigned. Spend the time to understand the material.

Administrative details

TA:
Ian Smith: (Ian.Smith-1@colorado.edu)

LAs:
Michael Swisher (Michael.V.Swisher@colorado.edu)
Michelle Soult (Michelle.Soult@colorado.edu)
Erik Eakins (Erik.Eakins@colorado.edu)

Office hours:
Office Hours: Engineering Center in CSEL (ECCS 128).
Official schedule on the Moodle and in syllabus

Ian will have office hours 12-5 everyday this week.

Grading policy

Labs 25%
- Daily
- Due by 5pm on day assigned

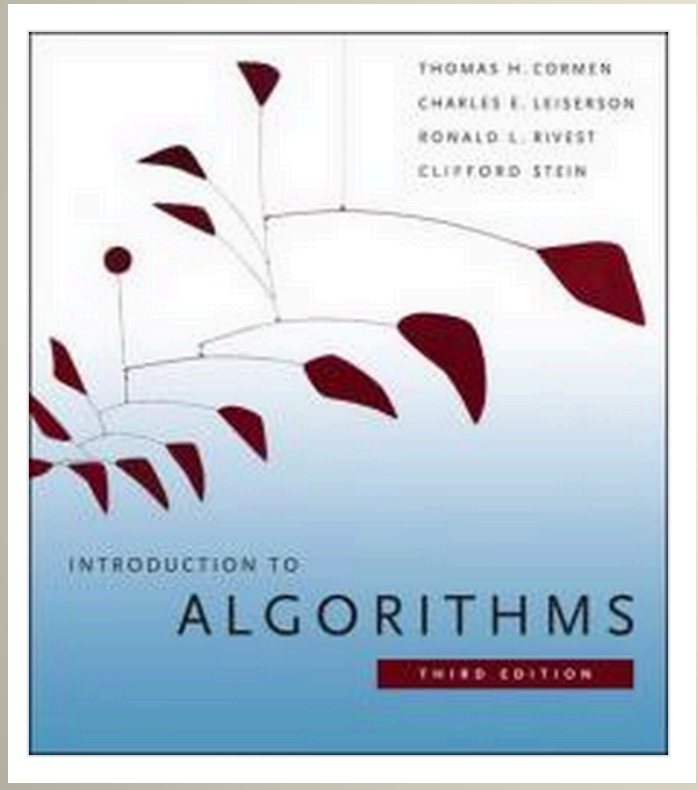
Homework 25%
- Weekly assignments
- Assigned on Thursday
- Due Sunday by 5pm

Project 10%
- End of semester

Exams (midterm and a final, equally weighted) 40%
- Must get a 70% on final to pass the class
- Final offered multiple times in last two weeks
- Can take it multiple times

Textbook

- Cormen, Leiserson, Rivest, and Stein: Introduction to Algorithms, third edition
- Various online C++ resources



Classic computer science reference book.

Only has pseudocode

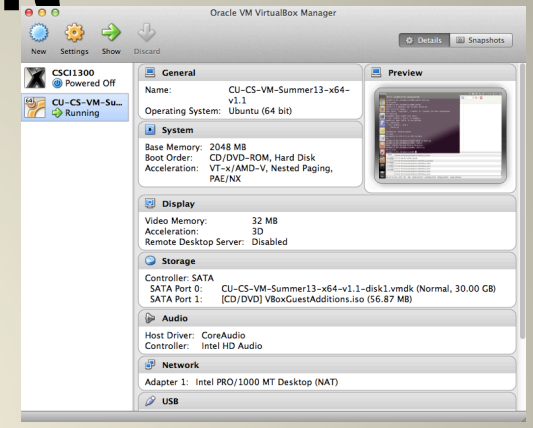
Part of this class will be learning to read this book

“We’re using CLRS” at your next party with computer scientists.

Lecture format

- **Bring your laptop to class everyday**
  - I have a few laptops I can loan out. Email me
- Lecture notes posted on Moodle before class
  - Review them before coming to class
- Lecture notes are code files and hand-written
  - Write code in class
  - Theory notes written on chalkboard

Virtual machine development environment



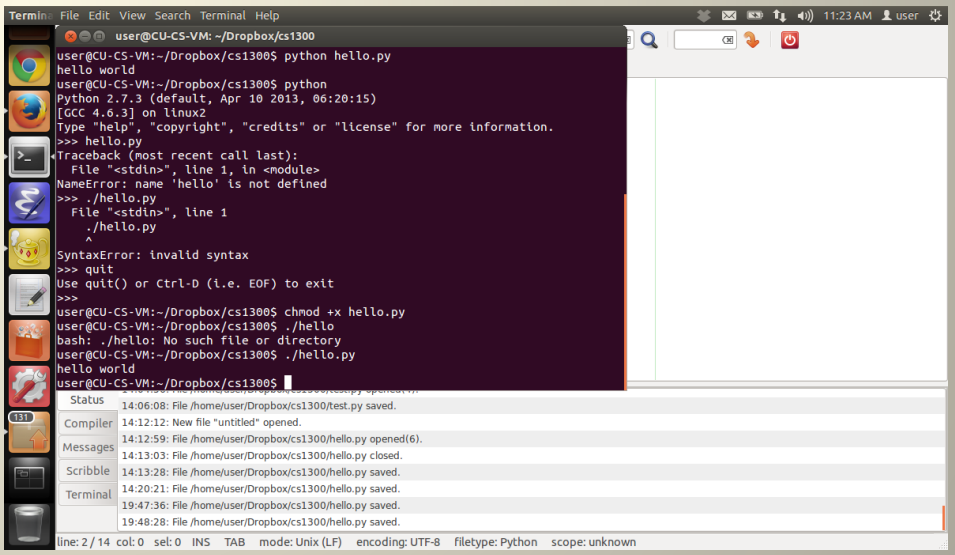
Lots of different operating systems

- They all work differently.
- Debugging code on every OS is a nightmare.

The virtual machine is another “pretend” computer running on your computer, regardless of your OS.

Provides consistency.
Uses a Virtual Machine, and
An image (OS, programs)

Start here:
http://foundation.cs.colorado.edu/sde/



Today…

- Enroll in Moodle course
  - Enrollment key: csci2270
  - moodle.cs.colorado.edu
- Introduction to C++
  - Variables, control structures, classes
- Install the VM and summer image
- Lecture1 Introduction to C++ notes on Moodle
- Lab 1 – the beginnings of a battleship game
  - Due at 7pm today