Motivation for CS 202

Computation is revolutionizing daily life
• Change how we live, work, learn, and communicate
• Increases productivity
• Drive advances in nearly all other fields

What is Computer Science?

Computer science studies algorithms
1. Their formal and mathematical properties
2. Their hardware realizations
3. Their linguistic realizations
4. Their applications

What is an algorithm?
• Procedure for solving a problem in a finite number of steps
• Step-by-step method for accomplishing a task

Misconceptions about Computer Science (CS)

What is Computer Science?
Is it the study of...

1. ... Computers?
   No: Computers are just a tool

2. ... Uses and applications of computers?
   No: CS specifies, designs, builds, tests those applications

3. ... How to program computers?
   No: Important, but program is just means to an end

What is an algorithm?
• Procedure for solving a problem in a finite number of steps
• Step-by-step method for accomplishing a task
Topics for CS 202

Computation is powerful
- Simple algorithms can solve complex problems quickly
- Criteria for good algorithms (correct, fast, ...)
- Experience with automating solutions yourself (in Scratch)

How modern computers work
- Hardware: How to go from bits (1s and 0s) to CPU and Memory?
- Operating Systems: How to run multiple applications?
- How to send messages?
- Distributed systems: How does Google work?

Interesting conceptual problems in Computer Science
- More complex algorithms
- Security, Artificial Intelligence, Robotics

New Language for Beginners: Scratch

Scratch Demo

Easy to create many interesting programs
- Animations with Music
- Interesting Graphic Effects
- Educational Software
- Simulations
- Logic and Strategy Games
- Video Games

Administrative Details

Instructor:
- Professor Andrea Arpaci-Dusseau
dusseau@cs.wisc.edu
- Office: Computer Sciences 7375
- Office Hours: TBA

Two TAs: Help with programming in Scratch
- David Guild: guild@cs.wisc.edu
- Pratima Kolan: pratimak@cs.wisc.edu
- Office Hours: TBA
Course Grading

Homework (~10 assignments): 35%
• Approximately 1/week (due Wednesdays)
• Simple programs, pencil+paper analysis, short essays
Scratch Projects (~3): 35%
• Open-ended, show some creativity, significant effort
• Create interactive art and games
• Instructor and TAs happy to give advice
• No late assignments
Exams: 30%
• Two in-class exams; One final exam
• Closed book, closed notes
Attendance in class is expected: No laptops!

Resources

Course Web Page:
http://pages.cs.wisc.edu/~dusseau/Classes/CS202/

Detailed syllabus
• Slides from lecture (after)
• Readings:
  – Course Pack from Bob’s Copy Shop ($17)
  – Books on reserve at library
• Code samples from class

Homework assignments

Homework 1

Purpose: Investigate Scratch website and projects
  • http://scratch.mit.edu/
1. Create new user account, upload picture of self
   • User name should be FirstnameLastname
2. Find 3 interesting existing projects
   • Recommend Featured, Top Viewed, Top Loved
   • Make Gallery named something like “Assignment 1”
   • Place 3 projects in your gallery
   • In comments (of Gallery, not Projects) write 1 paragraph per project about why picked each
3. Request to be friends with Instructor and TA
   • http://scratch.mit.edu/users/dusseau

Today’s Overview

Contents of CS 202: Introduction to Computation
1. Experience solving problems with computation (algorithms + programming)
2. Understand how computers work (hardware and software)
3. Exposure to challenging problems in computer science

Scratch: Excellent language for beginners

Administrative items:
• Check out course web site
• Fill out survey
• Homework 1 Available; Due 1 week