CMSC 110: Introduction to Computing

Administrivia

CMSC 110: Introduction to Computing
Fall 2013

Course Website: http://www.cs.brynmawr.edu

Instructor: Jia Tao, Ph.D. (jtao@cs.brynmawr.edu)

Lectures
MW 2:30p to 4:00p in Park 338

TA-Support
>20 hrs/week in Park 231

Open Labs (Optional)
Wed 10:00pm to Noon in Park 231

Office Hours
Mondays 4pm-6pm
Thursdays 3:45pm-5:45pm

Grading
- 7 Assignments: 56%
- Exam 1: 18%
- Exam 2: 26%
- Total: 100%

Software

Processing 2.x
- Already installed in the CS Lab
- Also available for your own computer @ www.processing.org
- Processing == Java

Book

Creative Coding & Generative Art in Processing 2
by Ira Greenberg, Dianna Xu, Deepak Kumar, friendsofEd/APress, 2013. Available at the Campus Bookstore or amazon.com or other vendors.

Class Lottery

- Make sure to sign-in your name.
- If you are not “in” the lottery, indicate that.
  We will contact you by e-mail as soon as we have confirmation from other students.

Computing: Your Parent’s View

What is Computing?
Computing: internet, e-mail, network...


Computing: Digital Photography

Computing: Entertainment...

Computing: Entertainment...

“Computer science is no more about computers than astronomy is about telescopes”

· Edsger Dijkstra

Cutting Edge Computer Science
Google’s Autonomous Car

- Nevada made it legal for autonomous cars to drive on roads in June 2011
- California introduced a similar bill in Aug 2012

2011 Jeopardy!

- In February 2011, IBM Watson bested Brad Rutter (biggest all-time money winner) and Ken Jennings (longest winning streak)
- IBM is currently applying Watson’s technology to medical diagnosis and legal research

Robot Soccer

RoboCup International Robotics Competition
http://www.roboncup.org/

Areas in Computer Science

- Artificial Intelligence
- Robotics
- Human-Computer Interaction
- Computer Graphics
- Computer Vision
- Operating Systems
- Computer Networking
- Databases
- Computer Security
- Ubiquitous Computing

Art
What is Computer Science?

Computer science is the study of solving problems using computation
— Computers are part of it, but the emphasis is on the problem solving aspect

Computer scientists work across disciplines:
- Mathematics
- Biology (bioinformatics)
- Chemistry
- Physics
- Geology
- Geoscience
- Archeology
- Psychology
- Sociology
- Cognitive Science
- Chemistry
- Biology (bioinformatics)
- Mathematics
- Physics
- Geology
- Geoscience
- Archeology
- Psychology
- Sociology
- Cognitive Science
- Medicine/Surgery
- Engineering
- Linguistics
- Art

Huge Growth in Computing-Related Jobs

Total Annual U.S. STEM Jobs Thru 2020 vs College Grads

Computing is important

Computing is Consistently Ranked Among the Best Occupations

Huge Growth in Computing-Related Jobs

CS-Related Jobs Highlighted in Red

CS Careers Rank Highly In:
- Job satisfaction
- Salary
- Work/life balance
- Growth potential
- Employment rate
- Work environment

Strong Earnings Potential

Average Individual Annual Income

Salaries of Bryn Mawr Graduates
- Computer Science Dept
- All Science Depts
- College Average

...many different companies need to hire computer scientists. They aren't tied to one particular industry.
**Creative Introduction to Computing**

**Programming**

**Computing**

**Visualization**

**Aesthetics & Art**

**Processing/Java**

**Computational Media**

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**Algorithms**

An *algorithm* is an effective method for solving a problem expressed as a finite sequence of instructions. For example,

Put on shoes
left sock
right sock
left shoe
right shoe

---

**Programming = Writing Apps**

Programming is the process of designing, writing, testing, debugging / troubleshooting, and maintaining the source code of computer programs. This source code is written in a programming language.

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**A program**

```java
int areaOfCircle(int radius) {
    return PI*radius*radius;
}

r = 10;
area = areaOfCircle(r);
```

---

**Programming Languages**

<table>
<thead>
<tr>
<th>Programming</th>
<th>Python</th>
</tr>
</thead>
</table>

---

**A more interesting program...**

```java
int areaOfCircle(int radius) {
    return PI*radius*radius;
}

r = 10;
area = areaOfCircle(r);
```
Our Goal

• Use computing to realize works of art

• Explore new metaphors from computing: images, animation, interactivity, visualizations

• Learn the basics of computing

• Have fun doing all of the above!

Creative
Introduction to Creative Computing

Computing

Programming

Visualizations

Aesthetics & Art

Algorithms

Processing/Java

Computational Media

Examples

Shepard Fairey

Shepard Fairey
Abstract Art

Summertime

And the livin' is easy
Fish are jumpin'
And the cotton is high
Your daddy's rich
And your mamma's good-lookin'
So hush little baby
Don't you cry
One of these mornings
You're going to rise up singin'
Then you'll spread your wings
And you'll take to the sky
But till that morning
There's a'nothing can harm you
With daddy and mamma standing by
Your daddy's rich
And your mamma's good-lookin'
So hush little baby
Don't you cry

Lyrics by George Gershwin
Box Office Earnings

Our Goal

- Use computing to realize works of art
- Explore new metaphors from computing: images, animation, interactivity, visualizations
- Learn the basics of computing
- Have fun doing all of the above!

Let’s get started...

Administrivia

Software

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Homework

- Go the CS Computer Lab (Room 231 PSB)
- Log in
- Start the Processing application
  (Make sure it is Version 2.x)
- In a web browser, go to the Tutorials section of processing.org
  http://www.processing.org/tutorials/gettingstarted/
- Read the Getting Started tutorial (by Casey Reas & Ben Fry) and try out the two examples of simple Processing programs presented there
- If you’d like, install Processing 2.x on your own computer
- Read Chapter 1 (Read pages 1-12, skim 12-32)