CMSC 110
Introduction to Computing

Administrivia
CMSC 110: Introduction to Computing
Spring 2014

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

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

Lectures
TuTh 2:25PM-3:45PM in Park 338

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

TA-Support
>20 hrs/week in Park 231

Open Labs (Optional)
TuTh 4:00pm - 6pm in Park 231

Administrivia

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...

“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.robocup.org/
Bryn Mawr Robot Soccer Team (Mexico 2012)

Areas in Computer Science

- Artificial Intelligence
- Robotics
- Human-Computer Interaction
- Computer Graphics
- Computer Vision
- Operating Systems
- Computer Networking
- Databases
- Computer Security
- Ubiquitous Computing
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
- Geology
- Physics
- Geoscience
- Psychology
- Sociology
- Linguistics
- Art
- Cognitive Science

Computing is important

Huge Growth in Computing-Related Jobs

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

<table>
<thead>
<tr>
<th>Job Category</th>
<th>2009</th>
<th>2012</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computing</td>
<td>2000</td>
<td>2200</td>
<td>2400</td>
</tr>
<tr>
<td>Engineering</td>
<td>1800</td>
<td>2000</td>
<td>2200</td>
</tr>
<tr>
<td>Physical Sciences</td>
<td>1200</td>
<td>1400</td>
<td>1600</td>
</tr>
<tr>
<td>Life Sciences</td>
<td>800</td>
<td>900</td>
<td>1000</td>
</tr>
<tr>
<td>Mathematics</td>
<td>500</td>
<td>600</td>
<td>700</td>
</tr>
</tbody>
</table>

Computing is Consistently Ranked Among the Best Occupations

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

Strong Earnings Potential

Salaries of Bryn Mawr Graduates

- Computer Science Dept
- All Science Depts
- College Average

Average Individual Annual Income

- Computer Science Dept: $72,000
- All Science Depts: $60,000
- College Average: $52,184

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

- Visualizations
- Programming
- 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
```

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**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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**Programming Languages**

<table>
<thead>
<tr>
<th>Processing</th>
<th>Python</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>setup()</code></td>
<td><code>def areaOfCircle(radius):</code></td>
<td>Create new objects.</td>
</tr>
<tr>
<td><code>draw()</code></td>
<td><code>r = 10; area = areaOfCircle(r);</code></td>
<td>Integrate objects.</td>
</tr>
</tbody>
</table>

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**A program**

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

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

---

**A more interesting program...**
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

Examples

Shepard Fairey
Abstract Art

Summertime
And the livin' is easy
Fish are jumpin' high
Your daddy's rich
And your mamma's good-lookin'
So hust little baby
Don't you cry

One of these mornings
You're going to rise up singing
Then you'll spread your wings
And you'll take to the sky
But till that mornin'
There's a'nothing can harm you
With daddy and mamma standing by

Your daddy's rich
And your mamma's good-lookin'
So hust little baby
Don't you cry

Lyrics by George Gershwin

World Cloud

President’s Inaugural Addresses

Map-based
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