Administrivia

CMSC110: Introduction to Computing
Fall 2014

Course Website: http://cs.brynmawr.edu/Courses/cs110/fall2014sck/
Instructor:
Sonu Chopra Khullar, (schopra@cs.brynmawr.edu or sonukhullar.bmc@gmail.com)

Lectures
Mon/Weds 11:40p to 1p in Park 278

TA-Support
>20 hrs/week in Park 231

Labs when I will be present (Optional)
Weds 2:30pm to 4:30pm in Park 231

Grading
- 7 Assignments 56%
- In-class Quizzes 4%
- Exam 1 18%
- Exam 2 26%
Total 100%

Office Hours:
Mon/Weds 10am-11am in Park 231 or by appointment

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.

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

Computing: Digital Photography

Computing: Entertainment...


Computing: Entertainment...
Cutting Edge Computer Science

Google’s Autonomous Car

• Nevada made it legal for autonomous cars to drive on roads on March 1, 2012
• California, Florida, and Michigan as well by 12/2013

Google Driverless Car
May 2014

• If video doesn’t play, click here: https://www.youtube.com/watch?v=CqSDWoAhvLU

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
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
- Medicine/Surgery
- Engineering
- Linguistics
- Art

"Computer science is no more about computers than astronomy is about telescopes"
- Edsger Dijkstra

Crowd Sourcing and 2013 App Of The Year

Mobile and Language Teaching
**Creative Introduction to Computing**

**Algorithms**

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

1. Left sock
2. Right sock
3. Left shoe
4. Right shoe

**A program**

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

**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.
Programming Languages

<table>
<thead>
<tr>
<th>Processing</th>
<th>Python</th>
<th>Lisp</th>
</tr>
</thead>
</table>
| int areaOfCircle(int radius){
  return PI*radius*radius;
} | def areaOfCircle(radius):
  return PI*radius*radius; |
| setq r 10 |
| setq area (areaOfCircle r) |

A more interesting program...

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

```
def areaOfCircle(radius):
  return PI*radius*radius;
```

```lisp
(setq r 10)
(setq 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 Computing

Examples

Shepard Fairey
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

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

Lyrics by George Gershwin
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Book

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Homework

- Go to 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)

Processing 2.0 IDE

- Menu bar
- Tool bar
- Tab strip
- Text editor
- Display Window
- Message area
- Console

Primitive 2D Shapes

- point
- line
- triangle
- rect (rectangle)
- quad (quadrilateral, four-sided polygon)
- ellipse
- arc (section of an ellipse)
- curve (Catmull-Rom spline)
- bezier (Bezier curve)

Anatomy of a Function Call

Function name
Parentheses
Arguments
Statement terminator

```
line( 10, 10, 50, 80 );
```

Coordinate System

(0, 0)

+X

+Y
Pixels

Processing Canvas

```plaintext
size( width, height );
Set the size of the canvas.

background( [0..255] );
Set the background grayscale color.
```

Drawing Primitives

```plaintext
point( x, y );
line( x1, y1, x2, y2 );
triangle( x1, y1, x2, y2, x3, y3 );
quad( x1, y1, x2, y2, x3, y3, x4, y4 );
rect( x, y width, height );
ellipse( x, y width, height );
```

Colors

Composed of four elements:
1. Red
2. Green
3. Blue
4. Alpha (Transparency)

Why 0 .. 255?
Shape Formatting

1. Fill color
2. Line thickness
3. Line color

*These are properties of your paintbrush, not of the object you are painting.*

Fill Color

```javascript
fill(gray);
fill(gray, alpha);
fill(red, green, blue);
fill(red, green, blue, alpha);
noFill();
```

Stroke (Line) Color

```javascript
stroke(gray);
stroke(gray, alpha);
stroke(red, green, blue);
stroke(red, green, blue, alpha);
noStroke();
```

strokeCap()

```javascript
smooth();
strokeWeight(12.0);
strokeCap(ROUND);
line(20, 30, 80, 30);
strokeCap(SQUARE);
line(20, 50, 80, 50);
strokeCap(PROJECT);
line(20, 70, 80, 70);
```

strokeWeight()

```javascript
smooth();
strokeWeight(1); // Default
line(20, 20, 80, 20);
strokeWeight(4); // Thicker
line(20, 40, 80, 40);
strokeWeight(10); // Beastly
line(20, 70, 80, 70);
```

ellipseMode

```javascript
ellipseMode(CENTER);
ellipse(35, 35, 50, 50);
ellipseMode(CORNER);
fill(102);
ellipse(35, 35, 50, 50);
```

rectMode

```javascript
rectMode(CENTER);
rect(35, 35, 50, 50);
rectMode(CORNER);
fill(102);
rect(35, 35, 50, 50);
```