CMSC110
Introduction to Computing
Deepak Kumar

Administrivia
CMSC110: Introduction to Computing
Fall 2014

Course Website: http://cs.brynmawr.edu/Courses/cs110/fall2014dk/
Instructor:
Deepak Kumar, (dkumar@cs.brynmawr.edu)

Lectures
TuTh 2:15p to 3:45p in Park 338

TA-Support
>20 hrs/week in Park 231

Open Labs (Optional)
Wed 10:00a to 12:00noon in Park 231

Office Hours
Available by appointment. Walk-ins are welcome!

Grading
• 7 Assignments 56%
• In-class Quizzes 4%
• Exam 1 18%
• Exam 2 26%
Total 100%
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.
What is Computing?

Computing: Your Parent’s View
Computing: internet, e-mail, network...

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=CqSDWoAhyLU

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
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
- 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
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.
A program

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

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

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;
| (defun areaOfCircle (radius)
    (return (* PI radius radius))) |
| r = 10;             | r = 10
| area = areaOfCircle(r); | area = areaOfCircle(r) | (setq r 10)
|                     | (setq area (areaOfCircle r)) |
A more interesting program...

```java
Eye e1, e2, e3, e4, e5;
void setup()
{
  size(200, 200);
  smooth();
  noStroke();
  e1 = new Eye( 50, 16, 80);
  e2 = new Eye( 64, 85, 40);
  e3 = new Eye( 90, 200, 120);
  e4 = new Eye(150, 44, 40);
  e5 = new Eye(175, 120, 80);
} // setup()
void draw()
{
  background(102);
  e1.update(mouseX, mouseY);
  e2.update(mouseX, mouseY);
  e3.update(mouseX, mouseY);
  e4.update(mouseX, mouseY);
  e5.update(mouseX, mouseY);
  e1.display();
  e2.display();
  e3.display();
  e4.display();
  e5.display();
} // draw()

class Eye{
  int ex, ey;
  int size;
  float angle = 0.0;
  Eye(int x, int y, int s) {
    ex = x;
    ey = y;
    size = s;
  } // Eye()
  void update(int mx, int my) {
    angle = atan2(my - ey, mx - ex);
  } // update()
  void display() {
    pushMatrix();
    translate(ex, ey);
    fill(255);
    ellipse(0, 0, size, size);
    rotate(angle);
    fill(153);
    ellipse(size/4, 0, size/2, size/2);
    popMatrix();
  } // display()
} // class Eye
```

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!
Examples
Shepard Fairey
Summertime

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 singing
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
President’s Inaugural Addresses

Map-based
Box Office Earnings

nytimes.com
February 23, 2008
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Let’s get started...
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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)