

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%

Administrivia


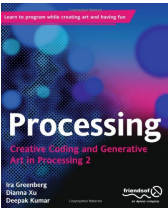
Software

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: Digital Photography

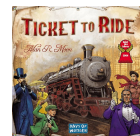
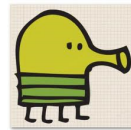


<http://www.alanzeyes.com/2009/02/hdr-photography.html>

Computing: Entertainment...



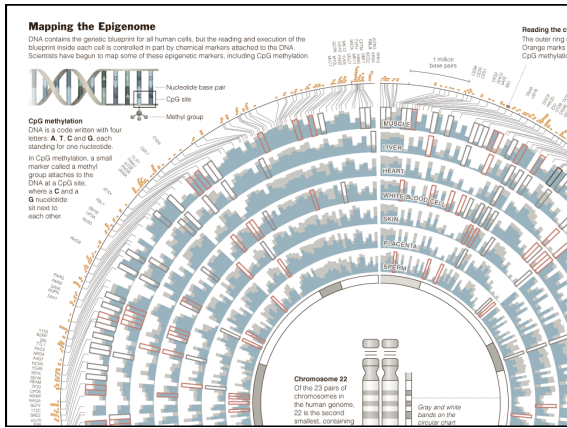
Computing: Entertainment...



“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

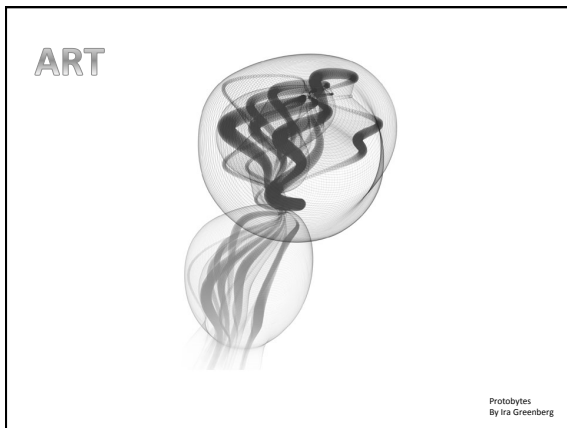
2011 Jeopardy!

- 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.robotcup.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

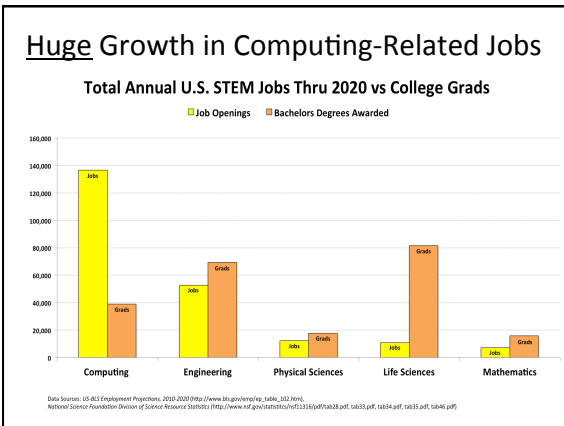
- Computers are part of it, but the emphasis is on the problem solving aspect



Computer scientists work across disciplines:

Mathematics	Geoscience	Medicine/Surgery
Biology (bioinformatics)	Archeology	Engineering
Chemistry	Psychology	Linguistics
Physics	Sociology	Art
Geology	Cognitive Science	...

Computing is important



Computing is Consistently Ranked Among the Best Occupations

CS-Related Jobs Highlighted in Red

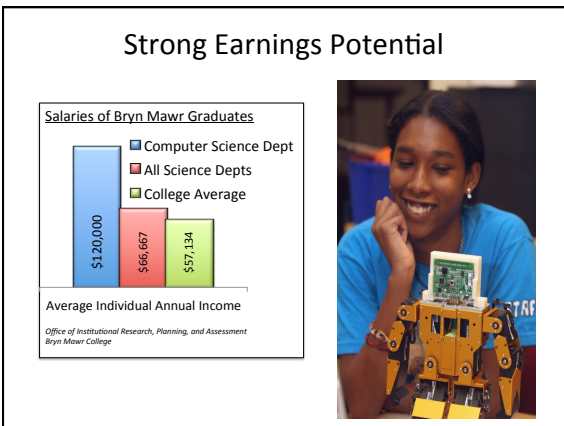
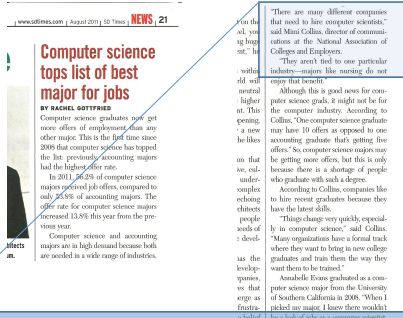


CS-Related Jobs Highlighted in Red:

- #1 Registered Nurse
- #2 Software Developer
- #3 Pharmacist
- #4 Medical Assistant
- #5 Database Administrator
- #6 Web Developer
- #7 Computer Systems Analyst
- #8 Physical Therapist
- #9 Computer Programmer
- #10 Occupational Therapist

CS Careers Rank Highly In:

- Job satisfaction
- Salary
- Work/life balance
- Growth potential
- Employment rate
- Work environment

Computer science tops list of best major for jobs

Computer science graduates get more offers of employment than any other major. This is the first time since 2008 that computer science has topped the list, previously accounting majors had the highest offer rate.

In 2011, 36.6% of computer science majors received job offers, compared to only 25.8% of accounting majors. The offer rate for computer science majors increased 13.8% this year from the previous year.

Computer science and accounting majors are in high demand because both are needed in a wide range of industries.

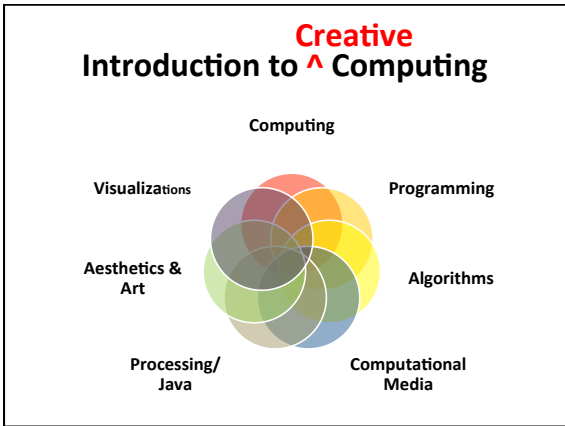
“There are many different companies that need to hire computer scientists,” said Matt Collins, director of communications at the National Association of Colleges and Employers. “They aren’t tied to one particular industry—major like nursing do not enjoy that benefit.”

Although this is good news for computer science grads, it might not be for the computer industry. According to Collins, “One computer science graduate may have 10 offers as opposed to one accounting graduate being getting five offers.” So computer science majors may be getting more offers, but this is only because there is a shortage of people who graduate with such a degree.

According to Collins, companies like to hire recent graduates because they have the latest skills. “Things change very quickly, especially in computer science,” said Collins. “Many organizations have a formal track where they want to bring in new college graduates and train them the way they want them to be trained.”

Annabelle Evans graduated as a computer science major from the University of Southern California in 2008. “When I picked my major, I knew there wouldn’t be a lot of other computer science graduates in my class.”


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



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

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

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

Programming Languages

Processing	Python	Lisp
<pre>int areaOfCircle(int radius){ return PI*radius*radius; } r = 10; area = areaOfCircle(r);</pre>	<pre>def areaOfCircle(radius): return PI*radius*radius r = 10 area = areaOfCircle(r)</pre>	<pre>(defun areaOfCircle (radius) (return (* PI radius radius))) (setq r 10) (setq area (areaOfCircle r))</pre>

A more interesting program...

```
Eye e1, e2, e3, e4, e5;

void setup()
{
  size(200, 200);
  smooth();
  noStroke();
  e1 = new Eye(50, 16, 80);
  e2 = new Eye(54, 18, 40);
  e3 = new Eye(60, 200, 120);
  e4 = new Eye(150, 44, 40);
  e5 = new Eye(175, 100, 80);
  // setup()
}

void draw()
{
  background(100);

  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()

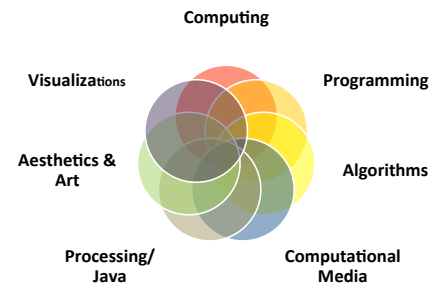
  void update(int mx, int my) {
    angle = atan2(my-ey, mx-ex);
  } // update()

  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

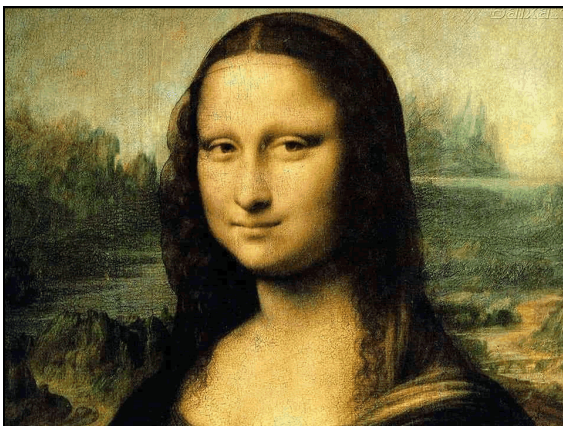
- Use computing to realize works of art
- Explore new metaphors from computing: images, animation, interactivity, visualizations
- Learn the basics of computing
- Have fun doing all of the above!

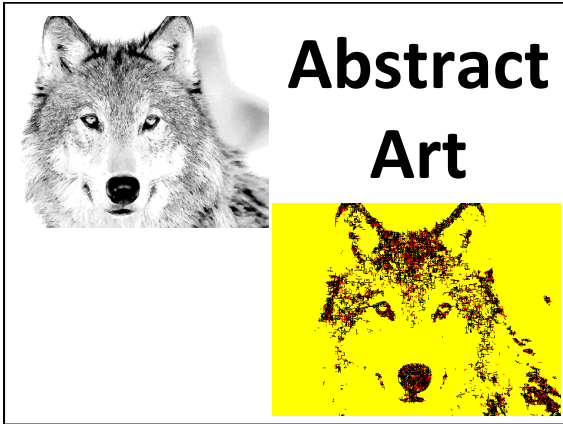
Introduction to ^{Creative} Computing



Examples

Shepard Fairey





Abstract Art

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

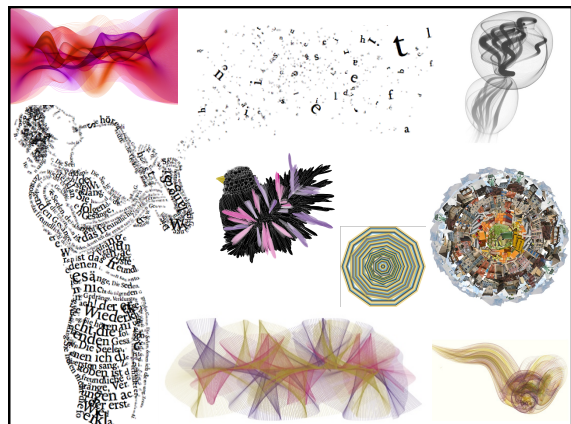
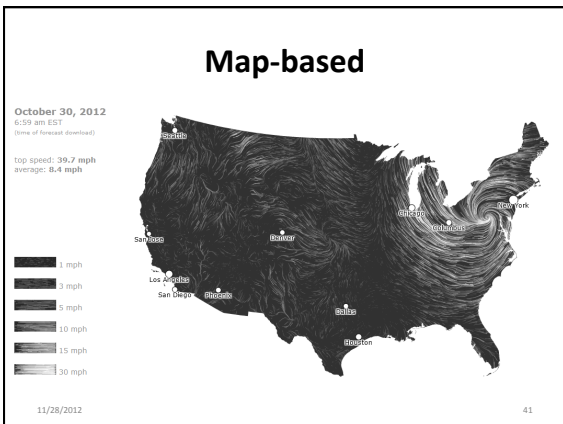
Word Cloud

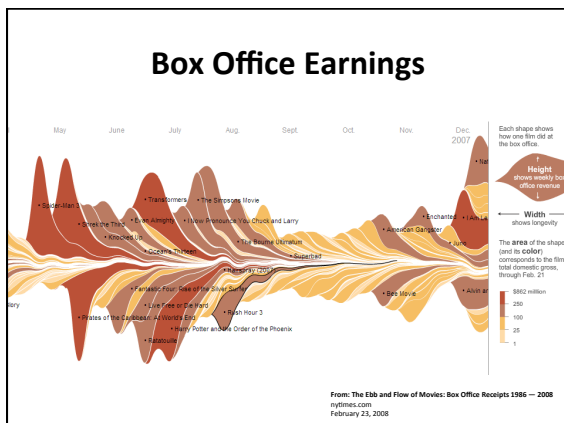
rise easy
mamma livin cotton little hush
cry morning daddy baby lookin wings
jumpin a'nothing standing One
high good Summertime
take daddy's till singing mornings
rich Fish harm going spread
sky

Created using: wordle.net

World Cloud

President's Inaugural Addresses





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

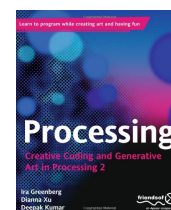
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Book

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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)