CMSC 110
Introduction to Computing
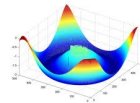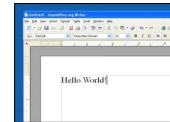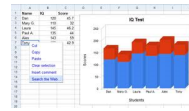### Section 01

Dianna Xu

What is Computing?

Computing: Web, e-mail, social...

Computing: Productivity...

Computing: Digital Photography

Computing: Entertainment...

Computing: Gaming…

ART

Protobytes
By Ira Greenberg

Mapping the Epigenome

DNA contains the genetic blueprint for all human cells, but the reading and execution of the blueprint inside each cell is controlled in part by chemical markers attached to the DNA. Scientists have begun to map some of these epigenetic markers, including CpG methylation.

Chromosome 22
Of the 23 pairs of chromosomes in the human genome, 22 is the second smallest, containing only about 2

Computing is important.

Fastest Growing Occupations

Table 1.3 Fastest growing occupations, 2008 and projected 2018
(Numbers in thousands)

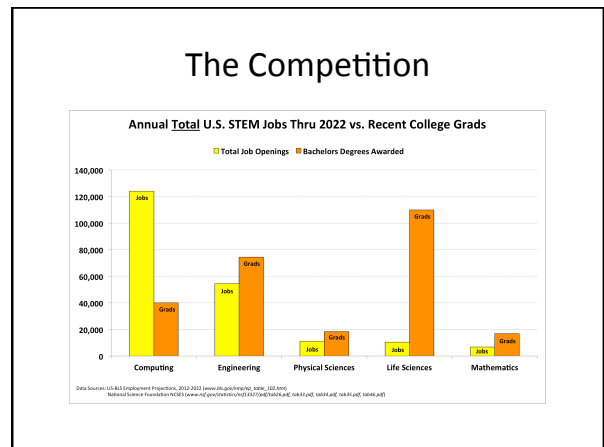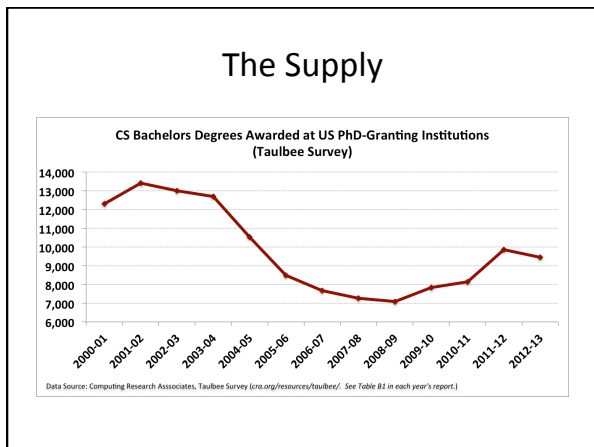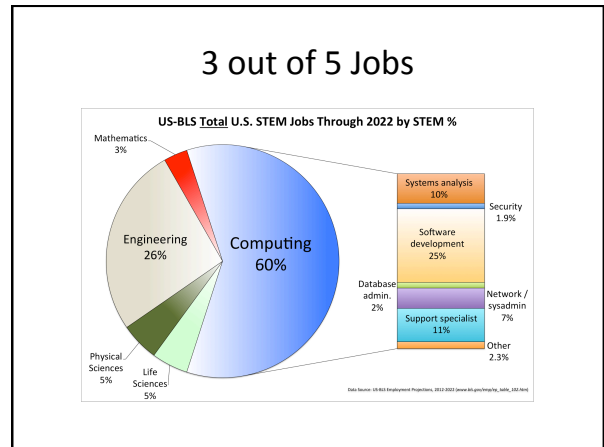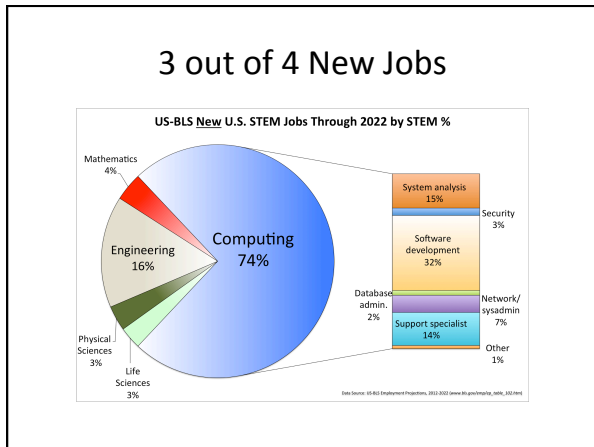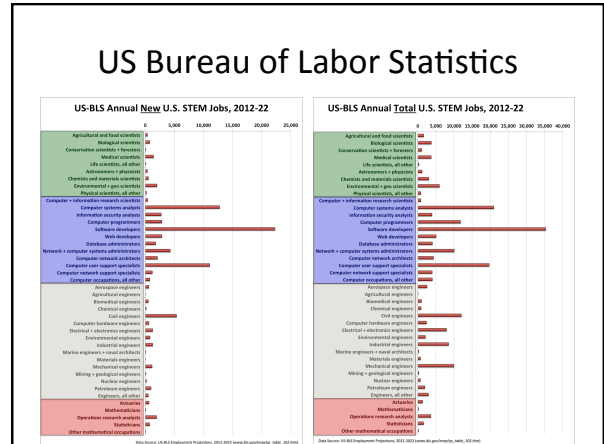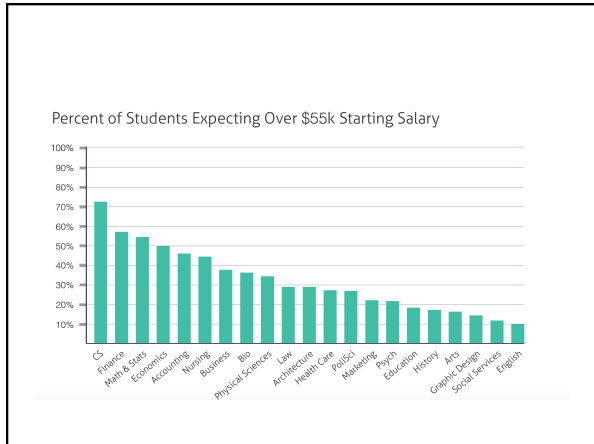| 2008 National Employment Matrix title and code	Employment		Change, 2008-18		Median Annual wage quartile, 2008
	2008	2018	Number	Percent	
Network systems and data communications analysts	292.0	447.8	155.8	53.36	VH
Computer software engineers, applications	514.8	689.9	175.1	34.01	VH
Computer software engineers, systems software	394.8	515.0	120.2	30.44	VH
Source: Employment Projections Program, U.S. Department of Labor, U.S. Bureau of Labor Statistics					

Occupational Outlook Handbook, 2010-11 Edition, http://www.bls.gov/emp/ep_table_103.htm

2015 Survey of 50,000 College Grads

- 54.6% of the class of 2014 are unemployed

- Of those that do have jobs...

https://www.looksharp.com/blog/what-50000-students-have-to-say-about-college-recruiting

Percent of Students Expecting Over $55k Starting Salary

US Bureau of Labor Statistics

US-BLS Annual New U.S. STEM Jobs, 2012-22

US-BLS Annual Total U.S. STEM Jobs, 2012-22

3 out of 4 New Jobs

US-BLS New U.S. STEM Jobs Through 2022 by STEM %

3 out of 5 Jobs

US-BLS Total U.S. STEM Jobs Through 2022 by STEM %

The Supply

CS Bachelors Degrees Awarded at US PhD-Granting Institutions (Taulbee Survey)

Data Source: Computing Research Associates, Taulbee Survey (cra.org/resources/taulbee/. See Table B1 in each year's report.)

The Competition

Annual Total U.S. STEM Jobs Thru 2022 vs. Recent College Grads

Data Sources: US-BLS Employment Projections, 2012-2022 (www.bls.gov/emp/ep_table_102.htm)
National Science Foundation NCSES (www.nsf.gov/statistics/infbrief/nsf15327/)
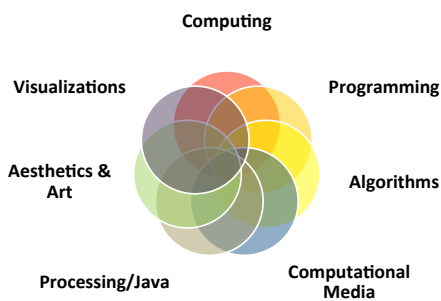
What can be programmed?

Autonomous Driving

How do you program?

What is a Computer Program?

A collection of human readable statements that can be translated to machine instructions and executed by a computing device.

Introduction to ^ Computing
Creative

- Computing
- Visualizations
- Programming
- Aesthetics & Art
- Algorithms
- Processing/Java
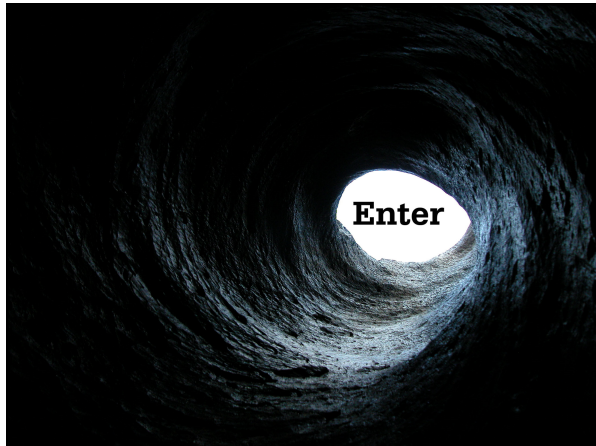- Computational Media

Our Goal

- Use computing to realize works of art

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

- Learn the basics of computing

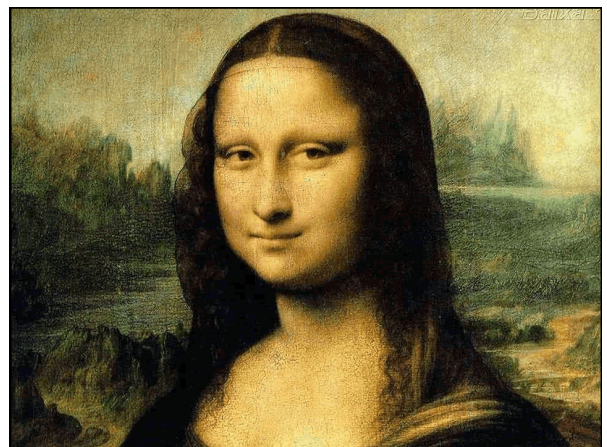- Have fun doing all of the above!

Why?

KEEP this GATE CLOSED AT ALL TIMES

Enter

Examples

Shepard Fairey

HOPE

Obamicons

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
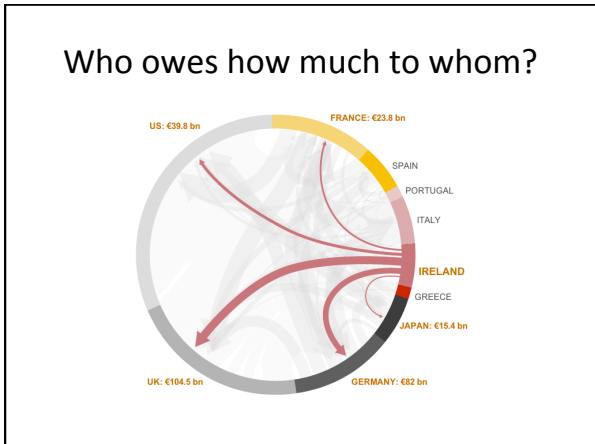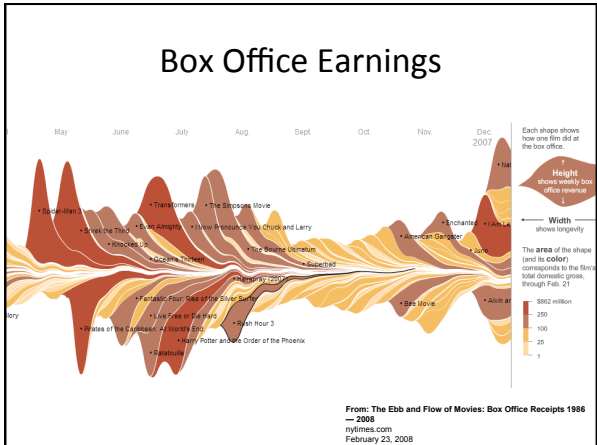There's a'nothing can harm you
With daddy and mamma standing by

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

Created using: wordle.net

Box Office Earnings

From: **The Ebb and Flow of Movies: Box Office Receipts 1986 — 2008**
nytimes.com
February 23, 2008

Who owes how much to whom?

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

Book
  Processing: Creative Coding & Generative Art in Processing 2 by Friends of ed, 2013.

Menu bar
Tool bar
Tab strip
Text editor
Display Window
Message area
Console
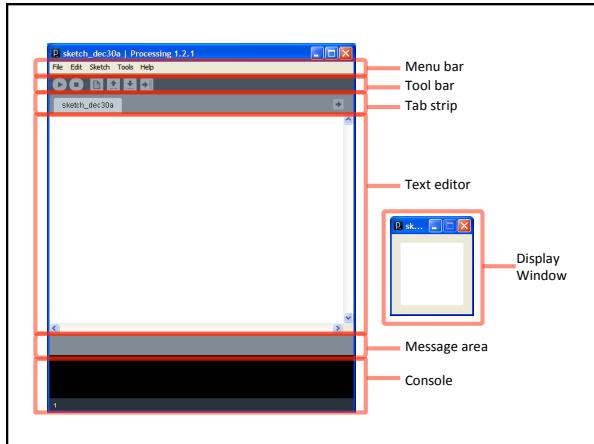
Primitive 2D Shapes

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

---

http://processing.org/reference/
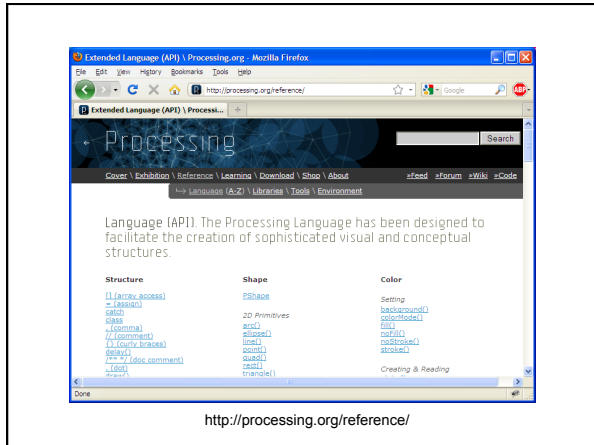
Anatomy of a Function Call

Function name   Parentheses

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

Arguments   Statement terminator

Coordinate System

(0, 0)   +x

+y

Pixels

Processing Canvas

size(*width***,** *height* **);**
> Set the size of the canvas.

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

Drawing Primitives

`point( x, y );`

`line( x1, y1, x2, y2 );`
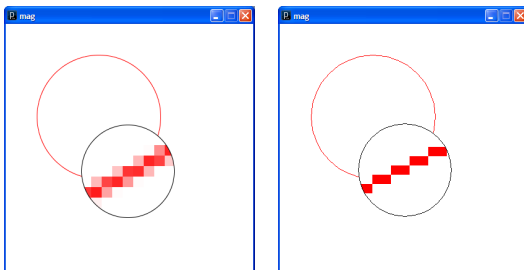
`triangle( x1, y1, x2, y2, x3, y3 );`

`quad( x1, y1, x2, y2, x3, y3, x4, y4 );`

`rect( x, y, width, height );`

`ellipse( x, y, width, height );`
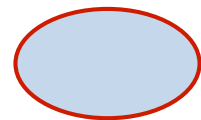
---

smooth() vs. noSmooth()

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

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

noFill();
```

Stroke (Line) Color

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

noStroke();
```

strokeCap()

```
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()

```
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);
```

http://processing.org/reference/strokeCap_.html
http://processing.org/reference/strokeWeight_.html

ellipseMode

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

rectMode

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

http://processing.org/reference/ellipseMode_.html
http://processing.org/reference/rectMode_.html

Dropbox

• https://www.dropbox.com/