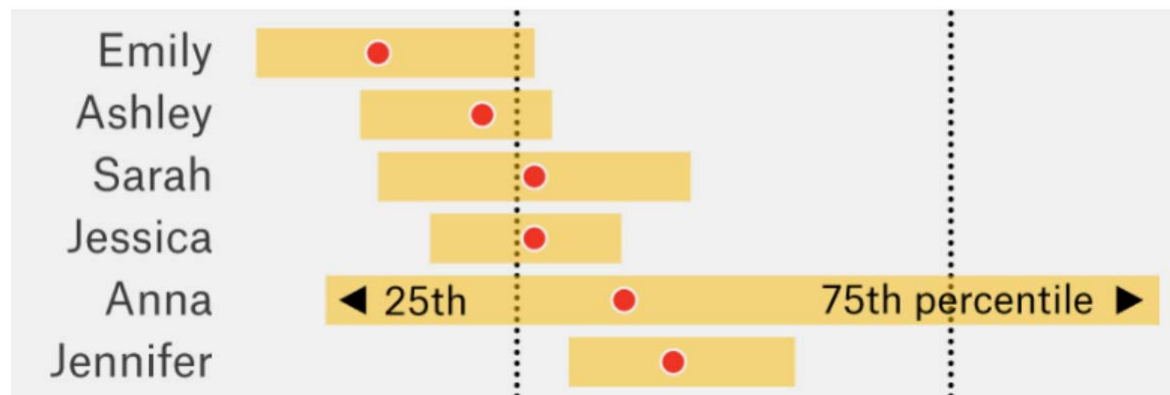# CompSci 101
Introduction to Computer Science

Aug 31, 2017

Prof. Rodger

Announcements

- Reading for next time on calendar page
  - RQ 2 due Tuesday
- Assignment 1 due Tuesday
  - Have fun with Blockly

- Plan for Today:
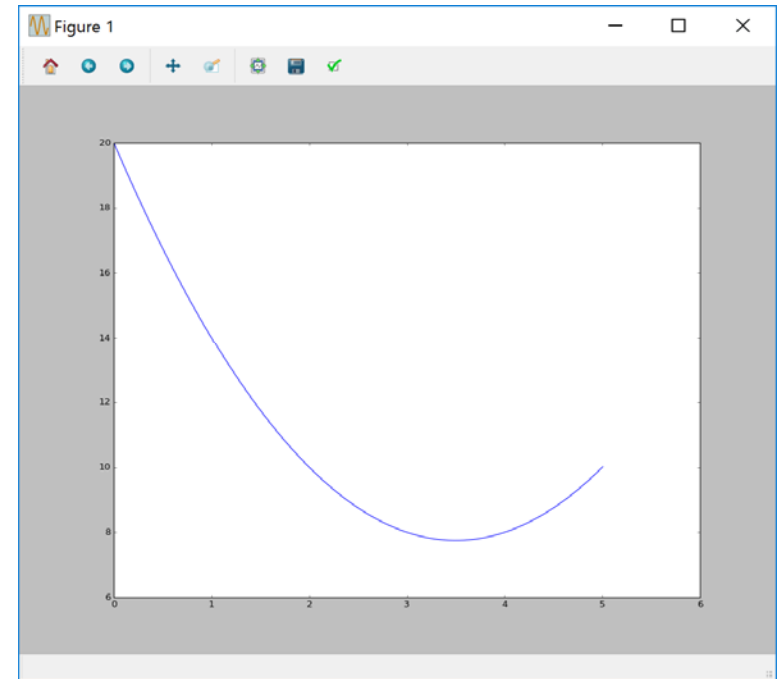 - Algorithms, Problem Solving and Python

Tips on Using the VM

- Each netid only one VM
- Kill the tab you are in when you are done!
- On Windows 10? Try Microsoft Edge
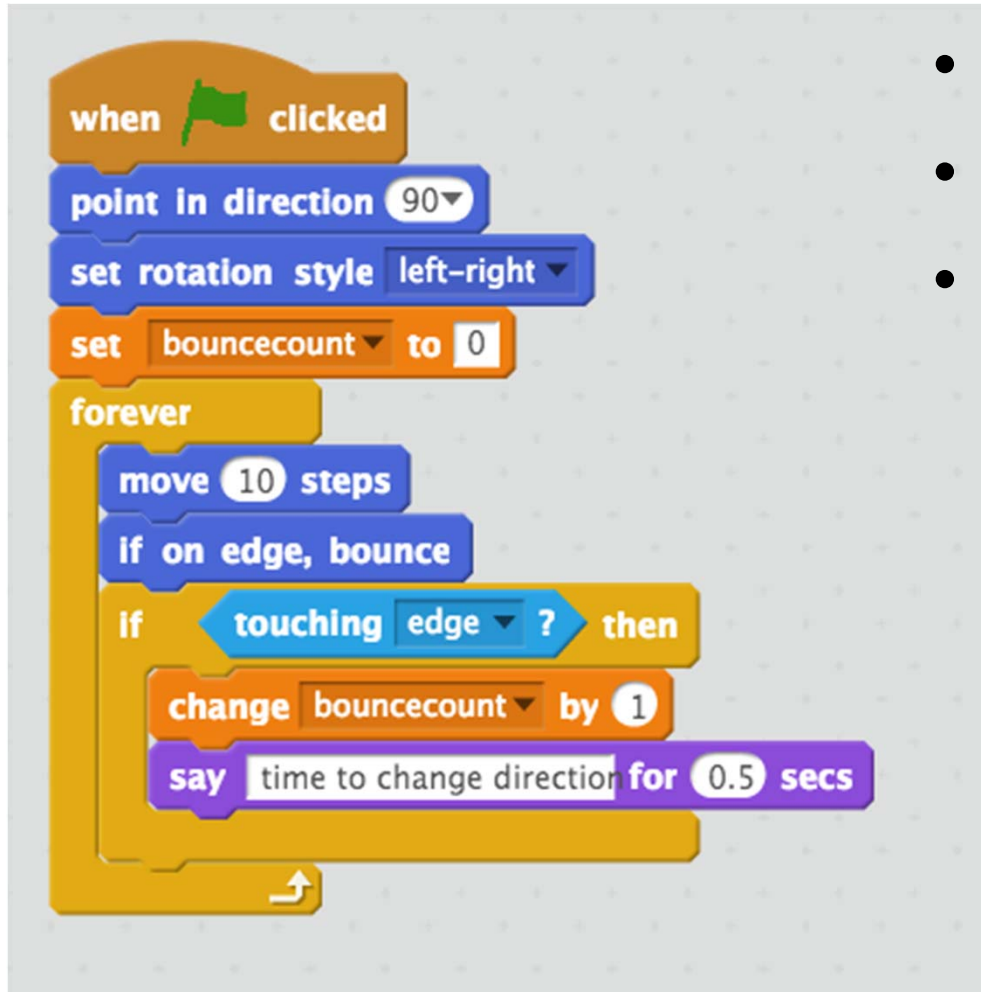- OIT is making available a local VM

Software Failure

Lab 1 This Week Done!

- Run the VM
- Modify Python program
- Scratch program for fun
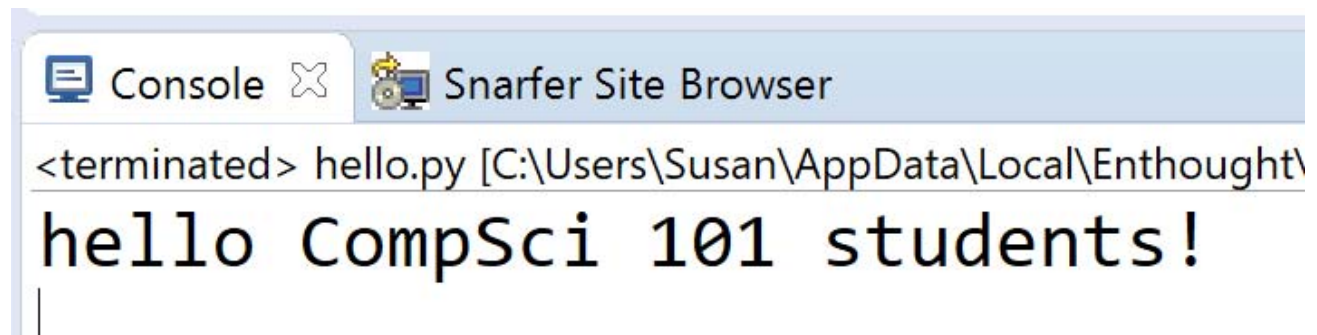
Last Time Scratch program

- "Hello World"
- Scratch Program
- Colors
  - Duke blue: motion
  - Mustard: control
  - Light blue: sensing
  - Orange: data
  - Purple: looks

Python code
hello.py

```
1  '''
2  Created on Aug 28, 2017
3
4  @author: Susan
5  '''
6  print "hello CompSci 101 students!"
```

Console ✕ Snarfer Site Browser

<terminated> hello.py [C:\Users\Susan\AppData\Local\Enthought\

hello CompSci 101 students!

Python data reading code

```python
f = open("kjv10.txt")
st = f.read()
total = len(st)
zc = st.count('z')
print "total # chars = ",total
print "number of z's",zc
for ch in 'aeiou':
    print ch, st.count(ch)
```

Explain Python data reading code
bit.ly/101f17-0831-1

```python
f = open("kjv10.txt")
st = f.read()
total = len(st)
zc = st.count('z')
print "total # chars = ",total
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for ch in 'aeiou':
    print ch, st.count(ch)
```

Daphne Koller, AI Pioneer, Educator

Computers learn to diagnose breast cancer? And more? *The Data Scientist on a Quest to turn Computers into Doctors*

- http://bit.ly/koller-cancer
- http://wrd.cm/1E9zFqy

On Coursera: "But to practice problem-solving, a student must first master certain concepts. By providing a cost-effective solution for this first step, we can focus precious classroom time on more interactive problem-solving activities that achieve deeper understanding — and foster creativity."

Coursera Founder, NY Times, December 5, 2011

Our Programming Environment

- Install 5 items or just use VM!
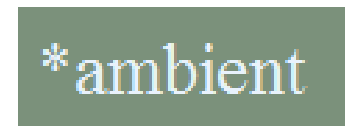
- Why Java? – not using

- Eclipse – platform for development

- Python – programming language
 - Pydev – Python IDE for Eclipse

- Canopy – python libraries

- Ambient – turnin/snarf files to/from Duke

compsci 101 fall 2017

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How does one get help in CompSci 101?

- Consulting hours
  - Sunday-Thursday 7:30-11:30pm
- Office hours (prof, TAs)
- Collaborate with other students
- Piazza
  - Ask questions
  - Do not post your code and ask what is wrong!
  - Post error message and line of code for error message
  - If added class late, may need to add yourself

15
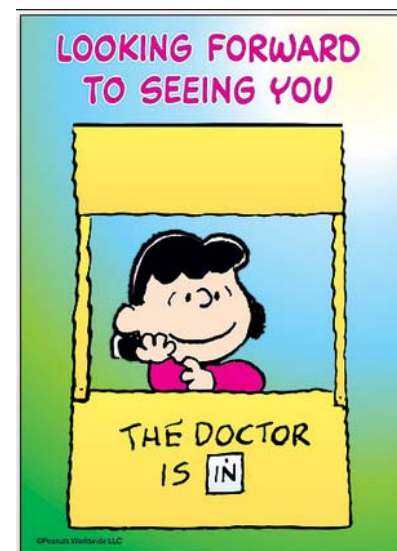
How to succeed in Compsci 101

- Start assignments early, they'll take longer than you think

- Read the book, we'll build on it in class

- Collaborate well, but be sure you can do work on your own!

- Be curious, work hard at beginning, think carefully

Your goal is to …

- Get all assignments completed and turned in on time.

AND…

Algorithm

- Recipe
- Sequence of steps that constitute instructions
- Step-by-step procedure for calculations

Biscuits

Cookie Sandwich

Write an algorithm for making a cookie sandwich
bit.ly/101f17-0831-2

Cookie Sandwich should look like:

Here are your supplies:

Algorithm

- Recipe
- Sequence of steps that constitute instructions
- Step-by-step procedure for calculations

How do Netflix and Amazon know me?

- Compsci101 project: capable of implementation as a program, but much more basic

What does Nate Silver do?

http://53eig.ht/1tZy909

More on algorithms:

http://moreintelligentlife.com/content/features/anonymous/slaves-algorithm

Algorithm – Nate Silver and others
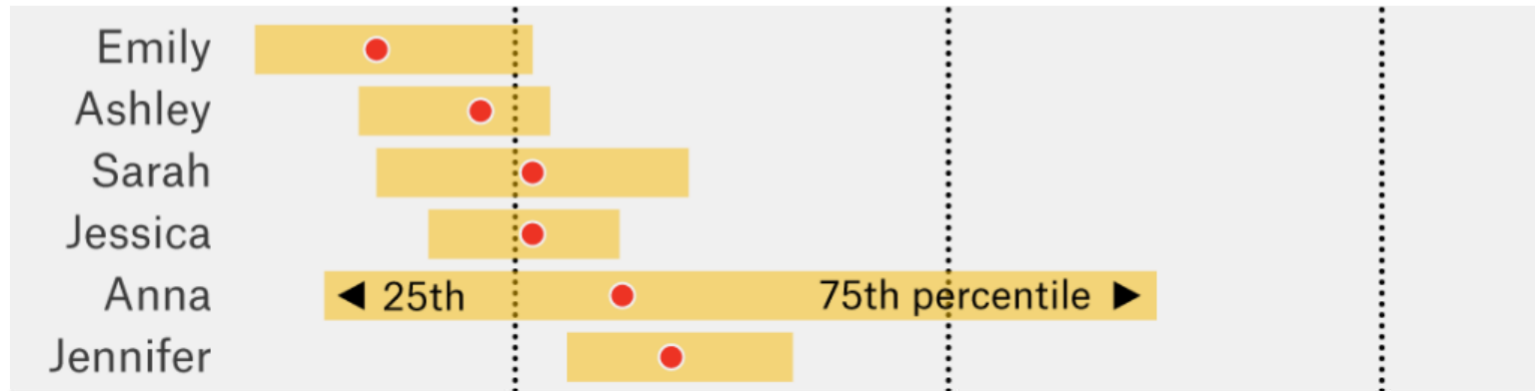
Who will win the presidency?

Chance of winning

Hillary Clinton
73.8%

Donald Trump
26.1%

50%	90
CLINTON	
TRUMP	
TIPPING POINTS	◯
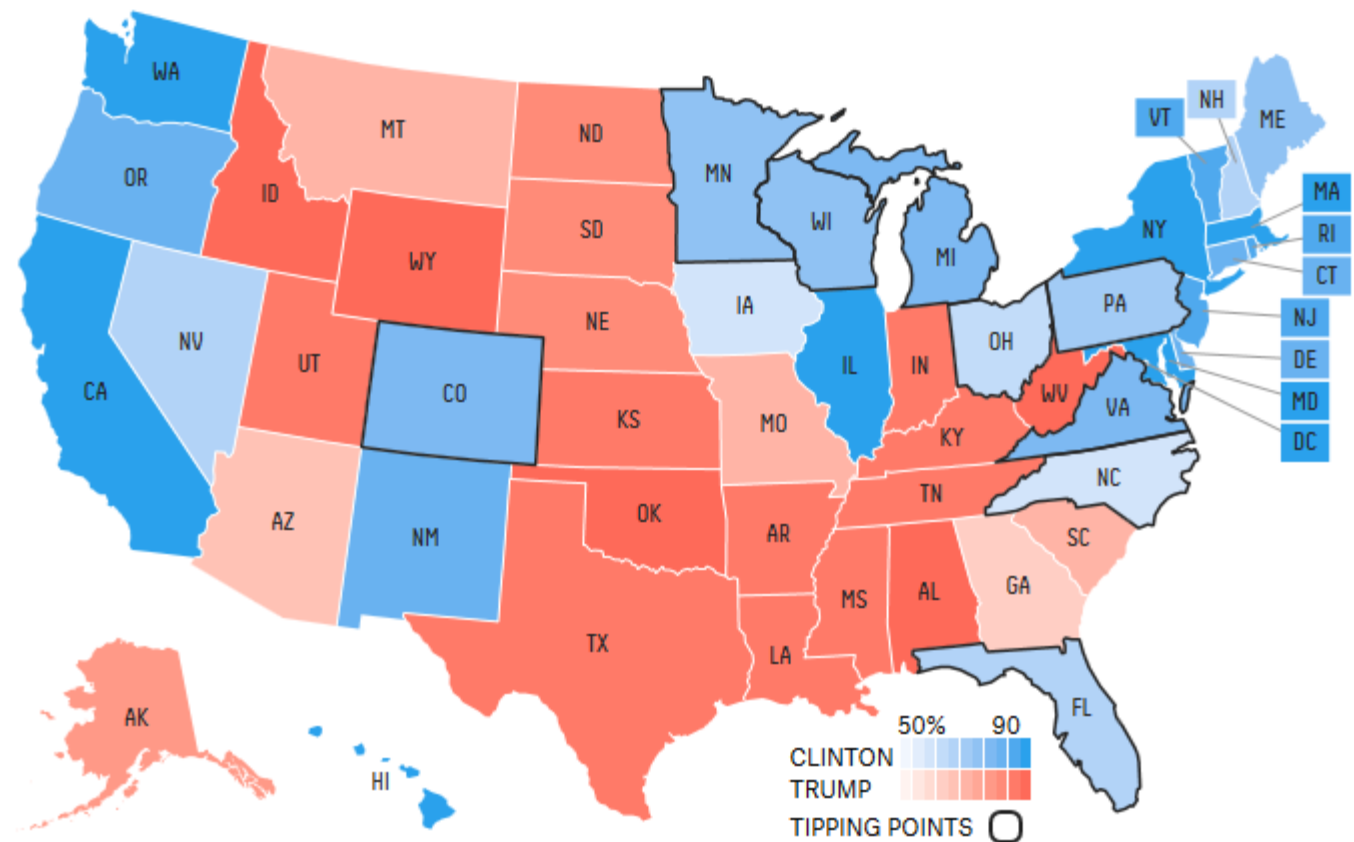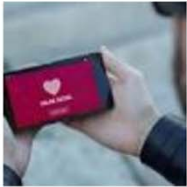
Google Algorithm – with News

Google | algorithm | 🔍 |

All   **News**   Images   Books   Videos   More   Settings   Tools

About 558,000 results (0.40 seconds)

Online dating: Can an **algorithm** really match you with your dream ...
Hindustan Times - 2 hours ago
A new research questioned whether data and **algorithm** can predict attraction
between two people who have never met. Here's what they found ...

This genius **algorithm** turns your name into an awesome musical ...
Classic FM - Aug 30, 2017
Ever wondered what your name would sound like as a musical motif? You can now
find out using Clarallel, an **algorithm** that reveals your ...

Algorithm could predict Alzheimer's risk years before symptoms occur
Medical News Today - Aug 27, 2017
In the new study, Dr. Rosa-Neto and team describe the development of an **algorithm**
that could predict a patient's likelihood of progressing from ...

Amazon has an **algorithm** that designs clothes by replicating human ...
Quartz - Aug 25, 2017
At its core, Amazon's goal is to remove as much friction as possible from a customer
finding what they want, ordering it, and having it land on ...

Algorithms that scale: An example

- Human Genome Project
  - Multiple approaches, relying heavily on computational power and algorithms
  - Combine reads of DNA sequences, we'll look at an illustrative example
- These combine bio/chemistry techniques with computational techniques to recreate the sequencing, e.g., CGATTCCG… from "live data", actual DNA.

Eugene (Gene) Myers

- Lead computer scientist/software engineer at Celera Genomics, then at Berkeley, now at Janelia Farms Research Institute (HHMI)

"What really astounds me is the architecture of life. The system is extremely complex. It's like it was designed." … " There's a huge intelligence there."

- BLAST and WG-Shotgun

Whole Genome Shotgun with words

olve problems.
ratively, create,
compsci101 we get t
01 we get to work colla
vely, create, and
s. In compsci1
y, create, and s
e get to work collabo
…

http://bit.ly/101f17-0831-3

- Creation algorithm
  - Take a phrase
  - Replicate it four times
  - Chop into "chunks"
    - 15-22 characters

- How to recreate original phrase?