CompSci 101
Introduction to Computer Science

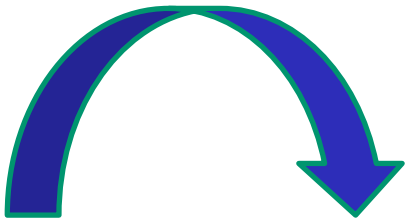
www.cs.duke.edu/courses/fall17/compsci101

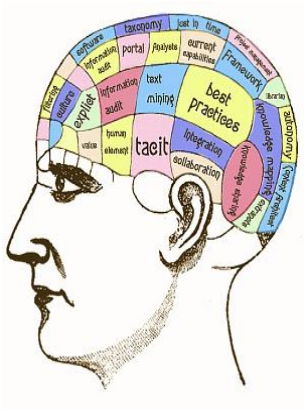
Aug 29, 2017

Prof. Rodger

CompSci 101
Data into Information and Knowledge

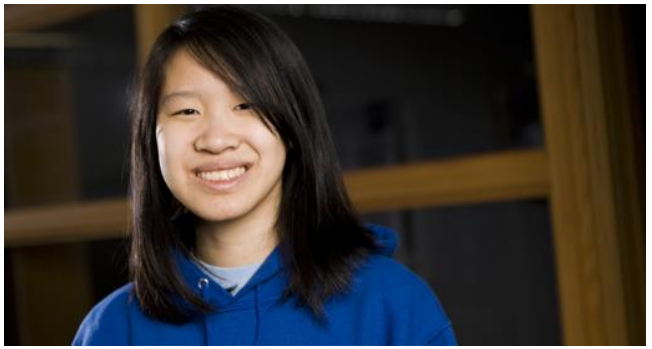
Computer Science





Prerequisites for Compsci 101

Who has taken CompSci 101?



Announcements

- See assigned reading on course web page
  - Reading Quiz 1 (RQ1) online on Sakai (out today)
  - due by 1:25pm Thurs, Aug 31.
- Labs start this week! Aug 30-31! (Wed/Thur)
- Assignment 1 out today! Due Sept 5!
- Try out course software - VM
  - Try to run it before going to lab
  - If you get frustrated, get help or wait til go to lab!

- Today: Introduce Computer Science

About Prof. Rodger

How do you keep your sanity?

Sea turtles hatching

- https://www.youtube.com/watch?v=sZYd0-egqbc

What is Computer Science?

http://bit.ly/101f17-0829-1

Just ask Siri (or Bing?)

https://www.bing.com/search?q=what+is+computer+science&qs=HS&sc=8-0&cvid=C80E71D615F5404298E579A938ACCA3F&FORM=QBLH&sp=1

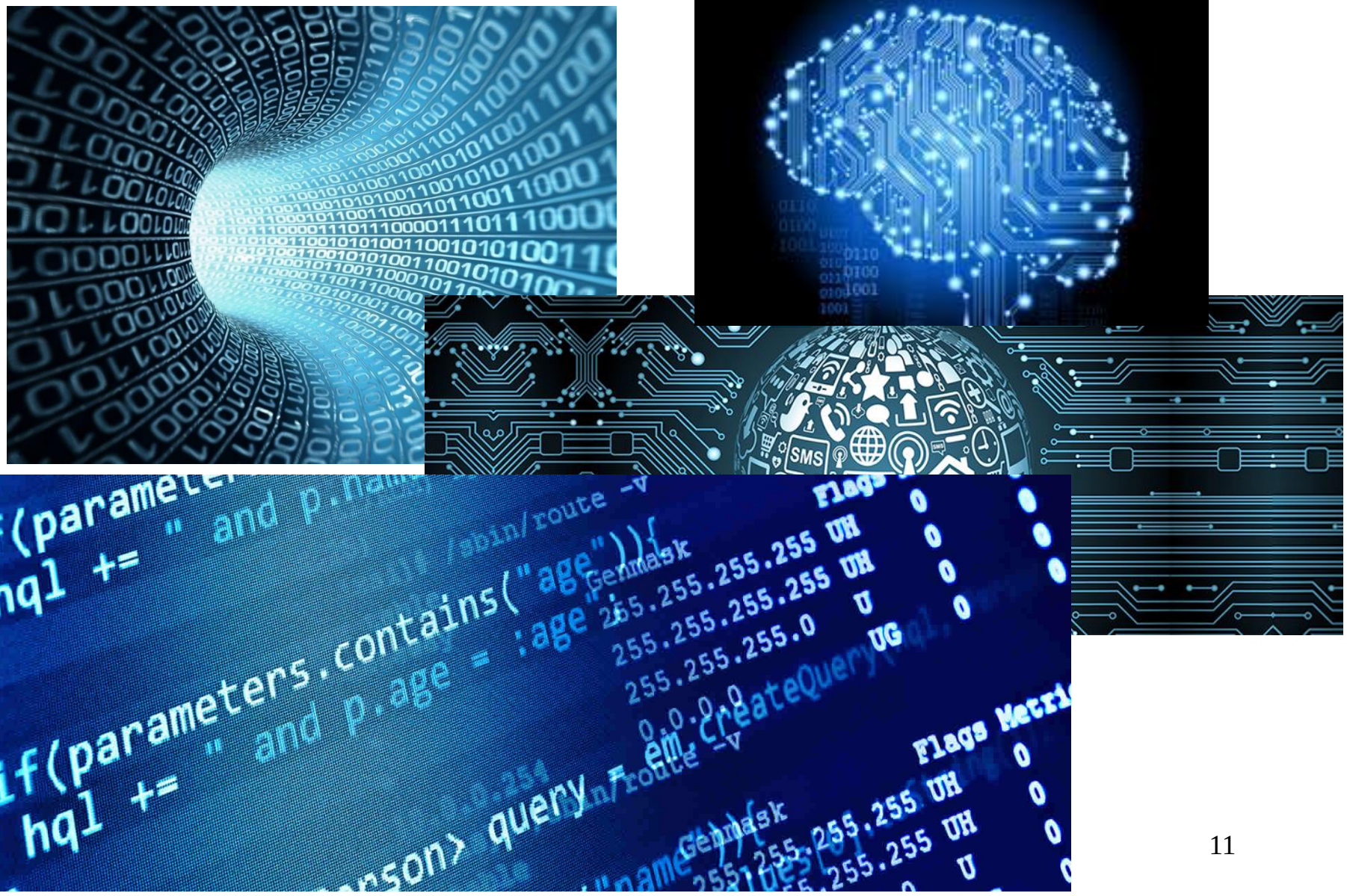
Ask Google - Anatomy of a search query

https://www.google.com/search?q=what+is+computer+science&ie=utf-8&oe=utf-8

What are the parameters to the query?

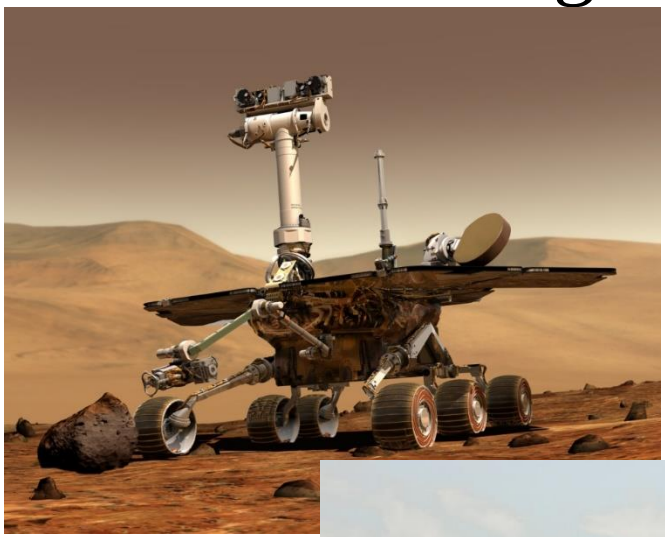
- What changes, what stays the same?

Images for Computer Science

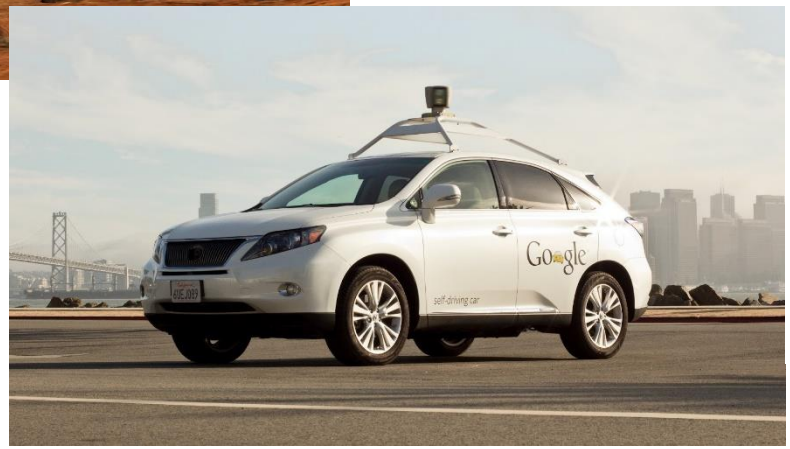


What is Computer Science?

- Artificial Intelligence



Spirit,
Mars Rover



Self-driving car

Roomba

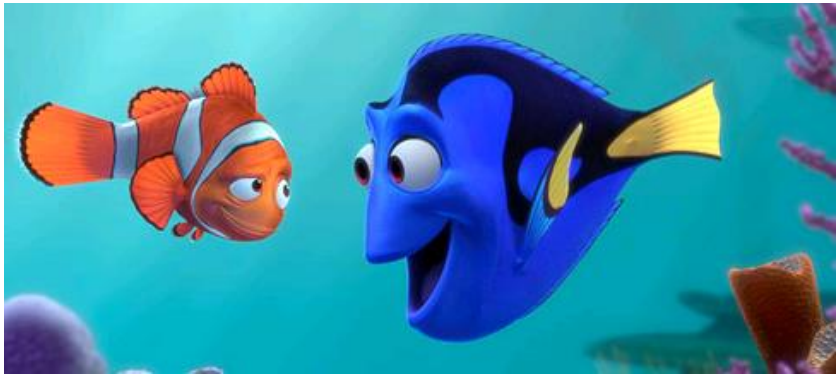
Personal Robot

What is Computer Science?

- Medicine, Genomics

What is Computer Science?

- Animation



Who are all these people?
bit.ly/101f17-0829-2

1

2

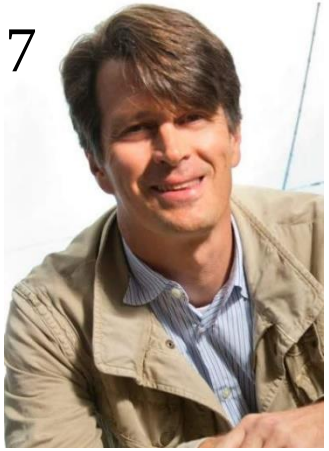
3

4

5

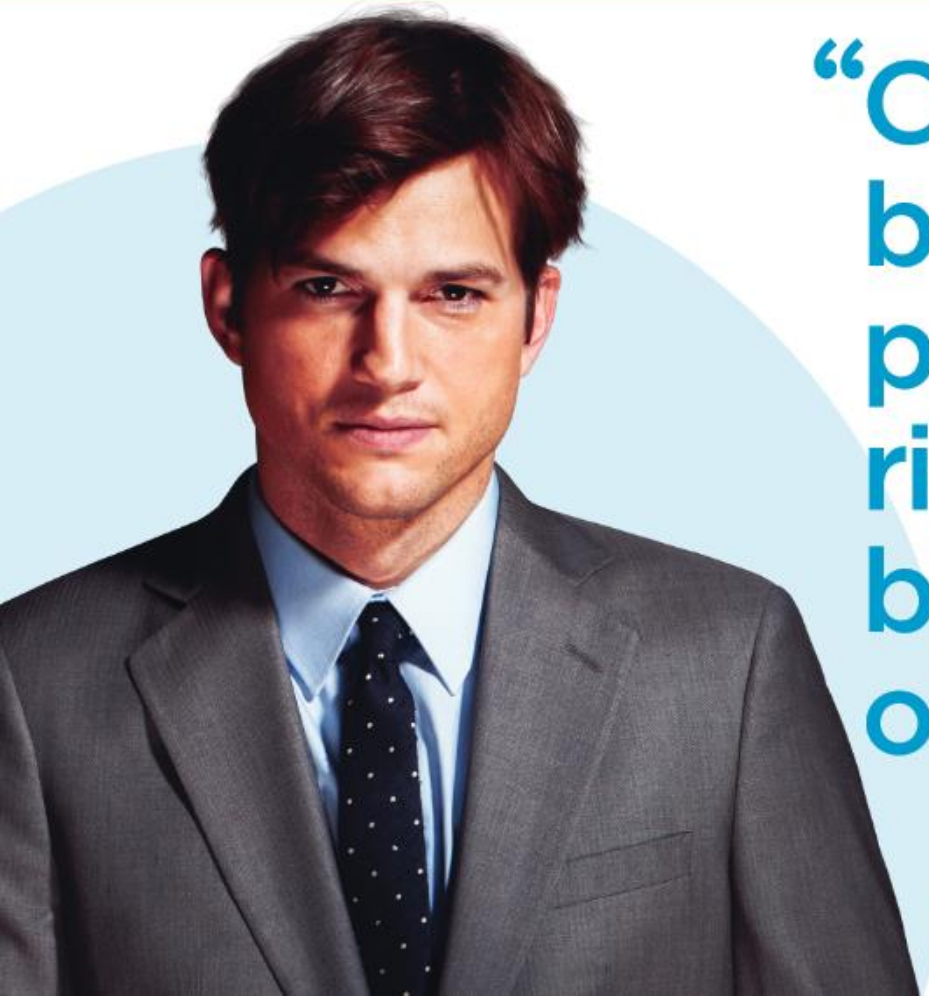
6

7



"Don't just play on your phone, program it."

— President Barack Obama



"Computer science belongs in every public school, right next to biology, chemistry, or algebra."

— Ashton Kutcher

"I always did something I was a little not ready to do. I think that's how you grow."

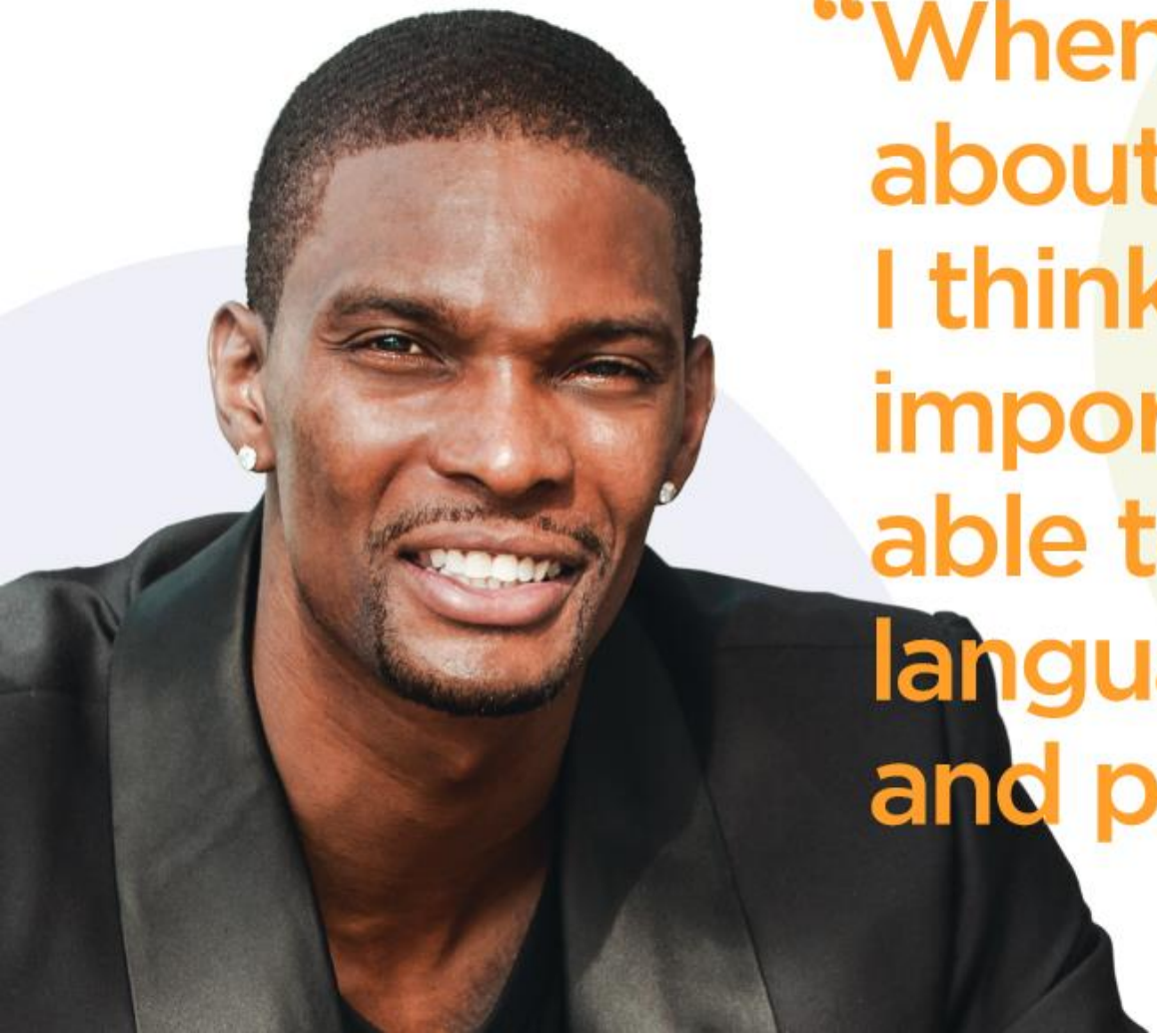
— Marissa Mayer, CEO, Yahoo!

"In fifteen years we'll be teaching programming just like reading and writing…and wondering why we didn't do it sooner."

— Mark Zuckerberg

"From phones to cars to medicine, technology touches every part of our lives. If you can create technology, you can change the world."

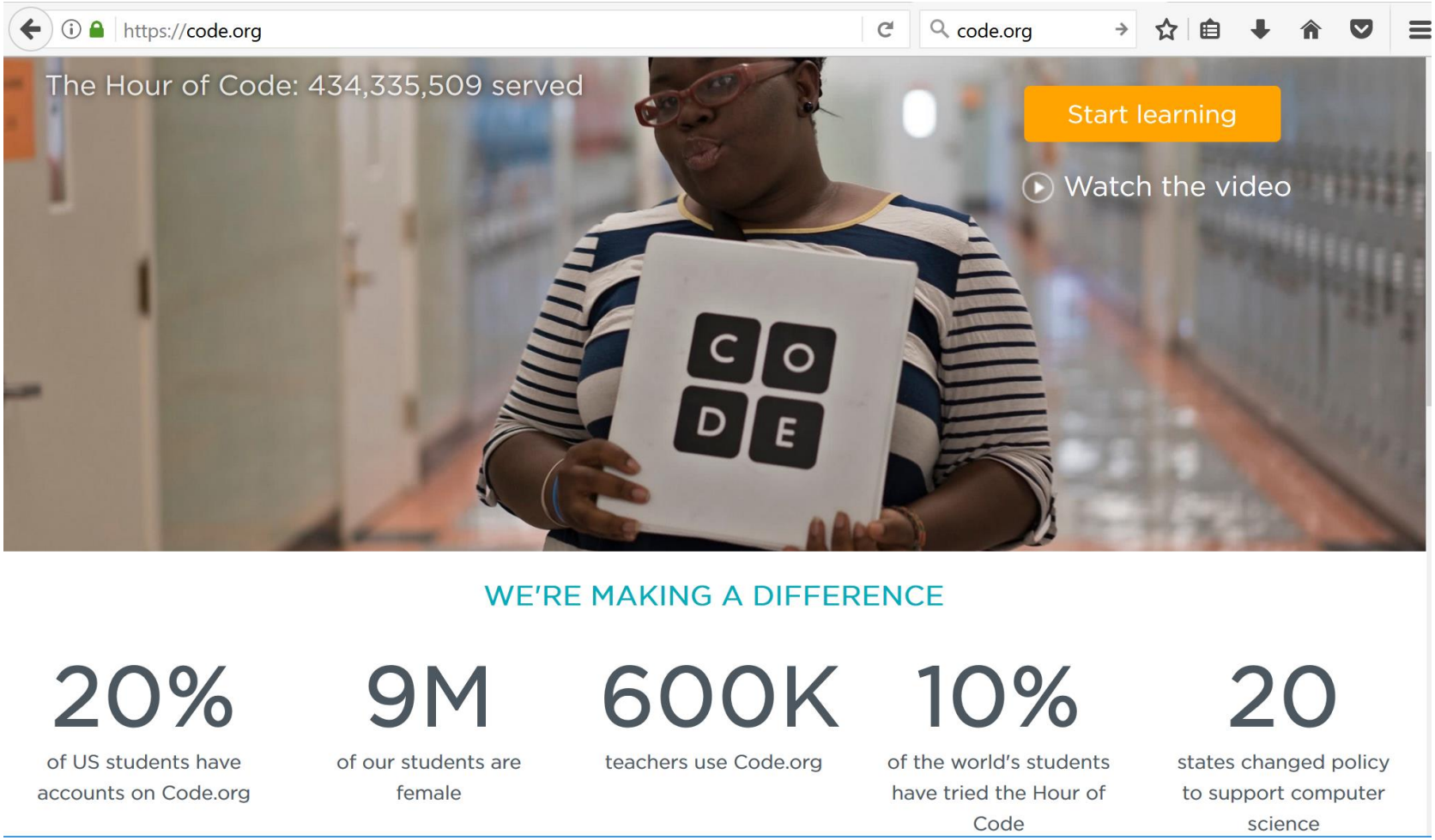
— Susan Wojcicki, CEO, YouTube



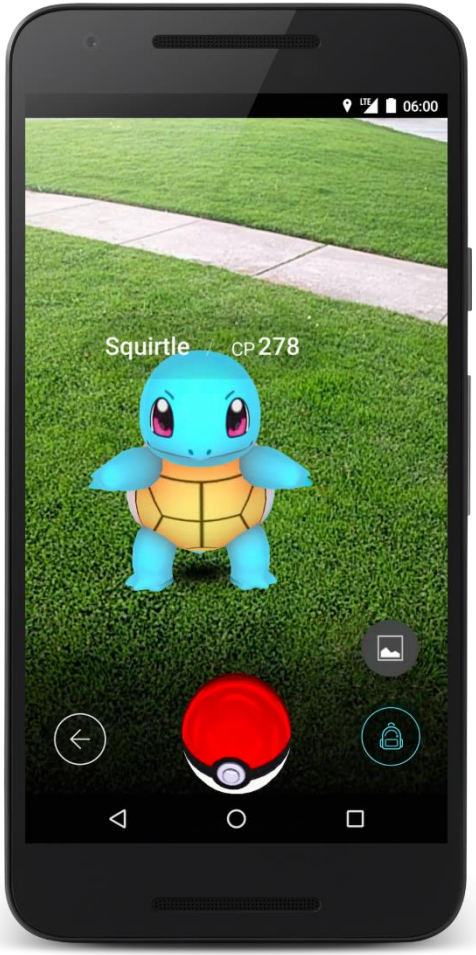
"When you think about the future… I think it's very important to be able to learn the language of coding and programming."

— Chris Bosh

Those quotes are all from Code.org



John Hanke, ‘Pokemon Go’

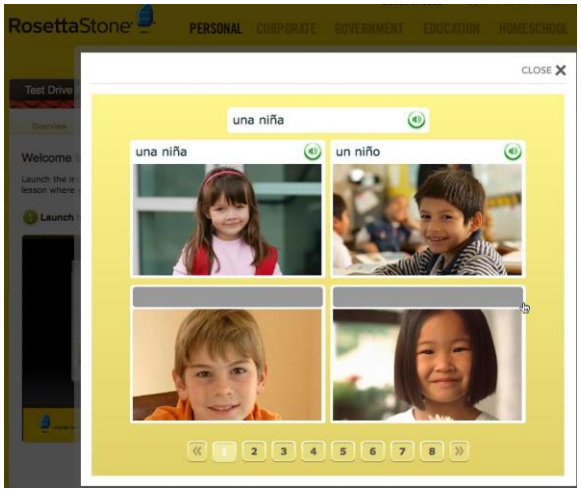


Questions about Computer Science

What is it that distinguishes it from the separate subjects with which it is related? What is *the linking thread* which gathers these disparate branches into a single discipline? My answer to these questions is simple --- it *is the art of programming a computer*. It is the art of designing efficient and elegant methods of getting a computer to solve problems, theoretical or practical, small or large, simple or complex.

How will you learn to 'speak'?

- http://www.rosettastone.com/personal/demo
- http://duolingo.com



How will you learn to program?

- You learn more than programming
- Coding, Algorithms
  - UX/UI: User Experience, User Interface
  - Data Analytics, Software Engineering

- A course, a way of thinking, a set of skills and practice that can lead to more or …

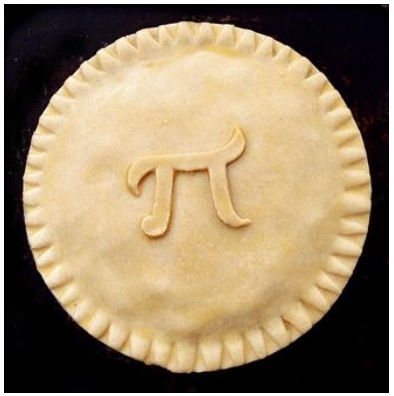
What language will we learn?

- http://www.python.org/
- Python is a *multi-paradigm* language
  - Procedural
  - Functional
  - Object-Oriented
- Simple, libraries, widely used
- Guido von Rossom is BDFL

Why is it called Python?

A

B



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C

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$9.8\ m/sec^2$

Who are you?

- Let's look at survey to see who is taking Compsci 101 in Spring 2017
  - Do you recognize yourself?
  - Is there a stereotypical Compsci 101 student?
  - Is there a stereotypical computer scientist?

- Everyone can succeed! Ideally you won't have lots of experience programming

Course Overview: Is this the right one?

- Work by yourself and collaboratively on solving problems that programming
  - Analyze the problems, think about solving them
  - Create, Collaborate, Persist, Problem-Solve
- Why should you come to class?
  - Learn things, participate in a community
  - Provide help, get help, wonder, dance, think
- Why is this course so great?
  - Because you're in it

What's in Compsci 101?

- Learning about computing, computer science, and programming
  - Vocabulary of Python and programming
  - *Power of automation*, *repetition*, *scale*
  - Understanding and changing the world
- Programming using Python
  - Tools: Eclipse, EPD, Libraries, …
  - Using mathematical and scientific techniques
  - Art *and* science of programming

Course overview, logistics

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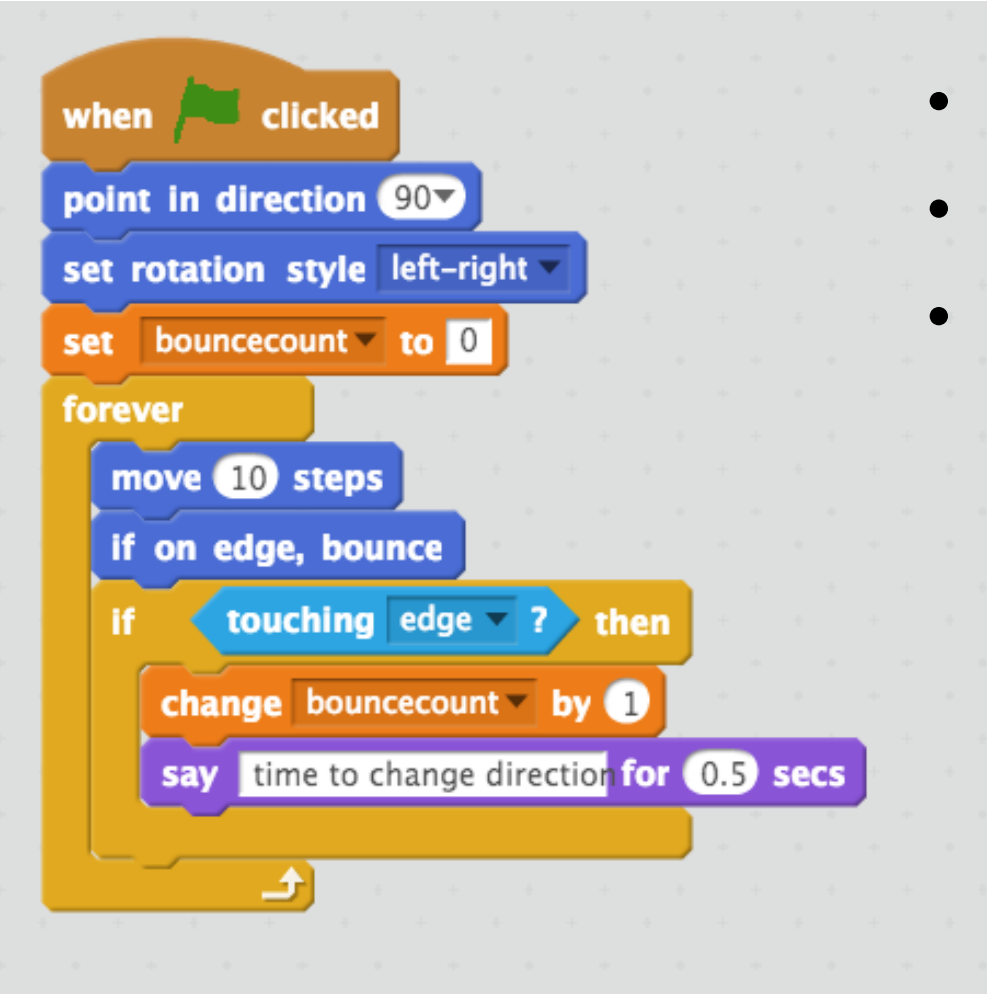
- Programming assignments: APTs and Assignments
  - Acknowledge assistance, to learn to program …
  - Be aware of late policy
- Exams: midterms and final: paper-based, different
  - All old midterms available
- Class work/attendance
  - Examples today, benefits hopefully clear



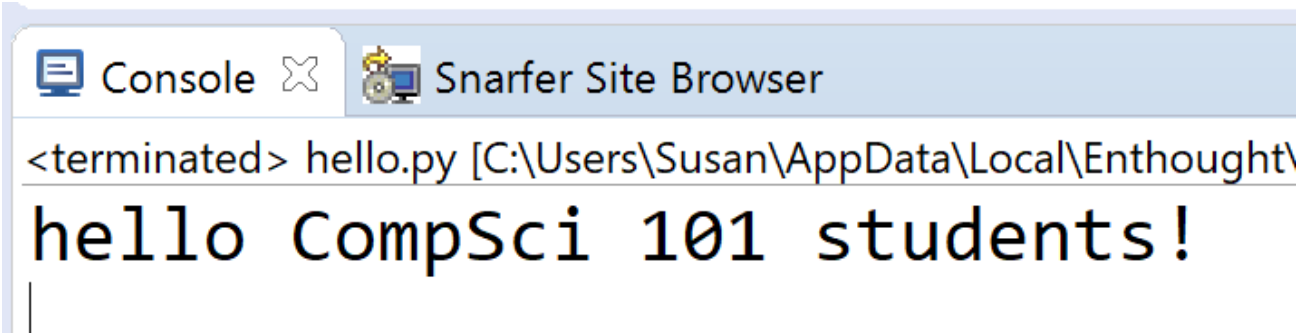
- "Hello World"
- Scratch Program
- Colors
  - Duke blue: motion
  - Mustard: control
  - Light blue: sensing
  - Orange: data
  - Purple: looks

Analyze this Scratch Program?

http://bit.ly/101f17-0829-3

Python code
hello.py

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



Python data reading code

```
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)
```

Duke Connection: Fred Brooks '53

- What Would FB Say?

"The most important single decision I ever made was to change the IBM 360 series from a 6-bit byte to an 8-bit byte, thereby enabling the use of lowercase letters. That change propagated everywhere."

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Why is programming fun?

Fred Brooks

- First is the sheer joy of making things
- Second is the pleasure of making things that are useful
- Third is the fascination of fashioning complex puzzle-like objects of interlocking moving parts
- Fourth is the joy of always learning
- Finally, there is the delight of working in such a tractable medium. The programmer, like the poet, works only slightly removed from pure thought-stuff.