

CompSci 101

Introduction to Computer Science

www.cs.duke.edu/courses/fall16/compsci101



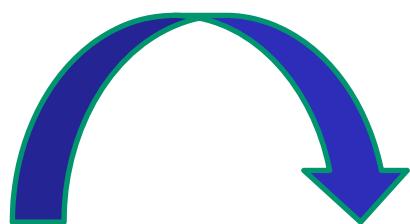
August 30, 2016

Prof. Rodger

CompSci 101

Data into Information and Knowledge

Computer Science



Prerequisites for CompSci 101



Who has taken CompSci 101?



compsci 101 fall 2016



What is Computer Science?

<http://bit.ly/101f16-0830-1>

Just ask Siri (or Bing?)

<http://www.bing.com/images/search?q=computer+science&go=Submit&qs=n&form=QBR&pq=computer+science&sc=8-16&sp=-1&sk=>



Anatomy of a search query

https://www.google.com/search?q=what+is+computer+science&espv=2&source=lnms&tbo=isch&sa=X&ei=Ib77U_09CtDhsAT07YDABA&sqi=2&ved=0CACQ_AUoAg&biw=1293&bih=861

- What are the parameters to the query?
 - What changes, what stays the same?

What is Computer Science?

- Artificial Intelligence



Spirit, Mars Rover

compsci 101 fall 2016



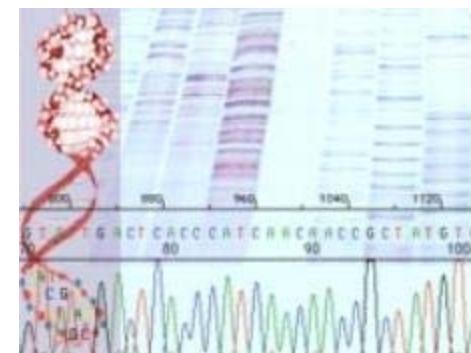
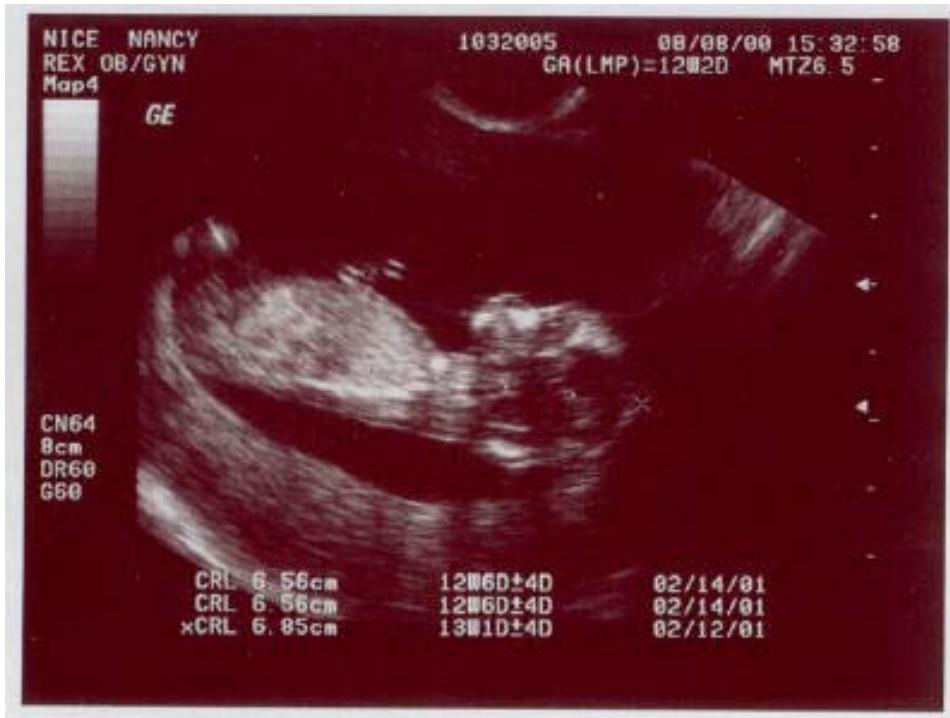
Roomba



CMU's Sandstorm

What is Computer Science?

- Medicine, Genomics



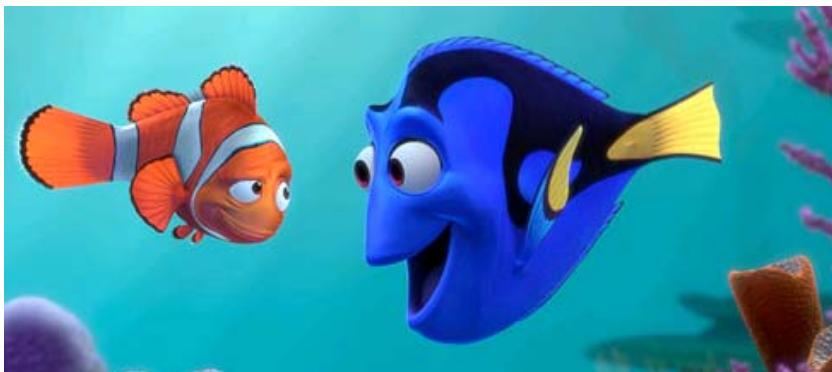
What is Computer Science?

- Devices



What is Computer Science?

- Animation



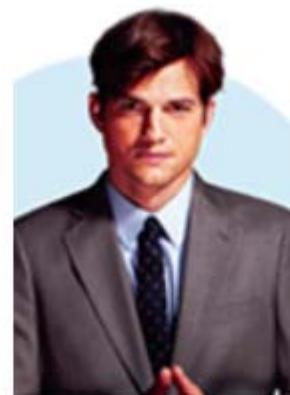
Who are all these people?

bit.ly/101f16-0830-2

1



2



3



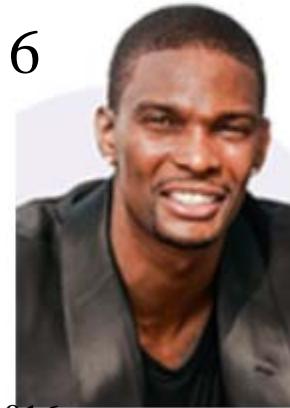
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5



6



7



Questions about Computer Science

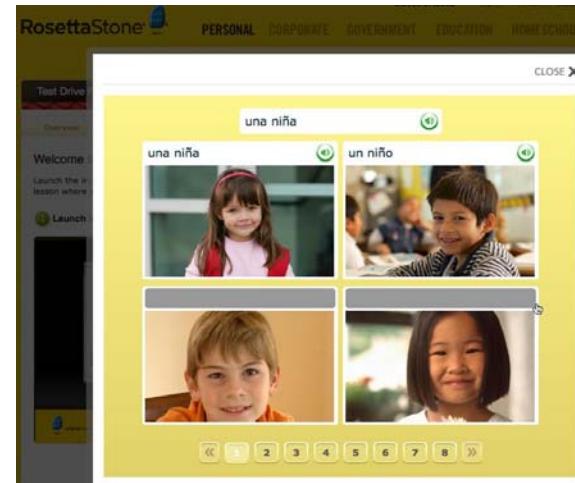
What is it that distinguishes it from the separate subjects with which it is related?

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.

C.A.R. (Tony)Hoare
compsci 101 fall 2016

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 ...

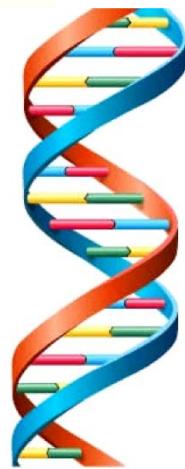
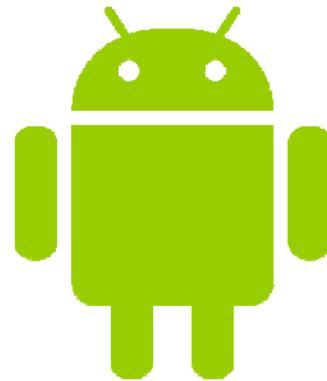
What language will we learn?

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



Why is it called Python?





Yellow ← A
Green → T
Blue C C
Red → G



Who are you?

- Let's look at survey to see who is taking CompSci 101 in Fall 2016
 - 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

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

Course overview, logistics

www.cs.duke.edu/courses/fall16/compsci101

- 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

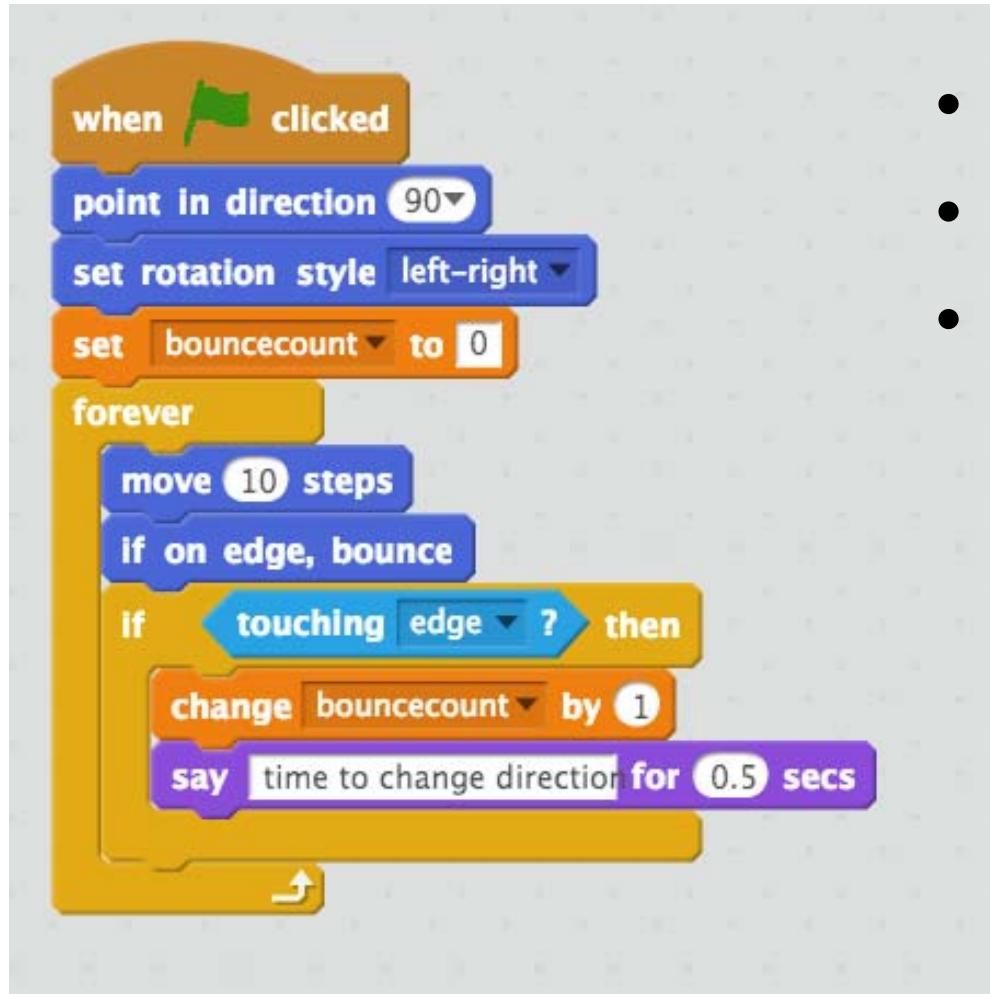
Course Overview:

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*



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

Analyze this Scratch Program?

<http://bit.ly/101f16-0830-3>

Python code

hello.py

```
'''  
Created on Jan 14, 2016  
@author: Susan  
'''  
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)
```

Announcements

- See assigned reading on course web page
 - Reading Quiz 1 (RQ1) online on Sakai (out today)
 - due by 10am Thurs, Sept 1.
- Labs start this week! (Wed/Thur)
- Assignment 1 out – Due Sept 6
- Install course software
 - Try to install before going to lab
 - If you get frustrated, get help!
- Today: Introduce Computer Science

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.

