

CompSci 101

Introduction to Computer Science

`www.cs.duke.edu/courses/spring17/compsci101`



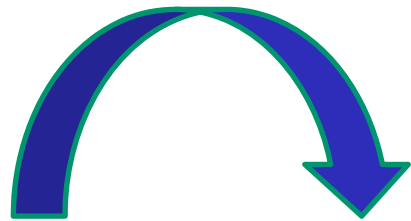
Jan 12, 2017

Prof. Rodger

CompSci 101

Data into Information and Knowledge

Computer Science



Prerequisites for Compsci 101



Course overview, logistics

www.cs.duke.edu/courses/spring17/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

Announcements

- See assigned reading on course web page
 - Reading Quiz 1 (RQ1) online on Sakai (out today)
 - due by 10am Tues, Jan 17.
- Labs start next week, Jan 18-19! (Wed/Thur)
- Assignment 1 out – Due Jan. 19
- Install course software
 - Try to install before going to lab
 - If you get frustrated, get help!
- Today: Introduce Computer Science

What is Computer Science?

<http://bit.ly/101s17-0112-1>

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>

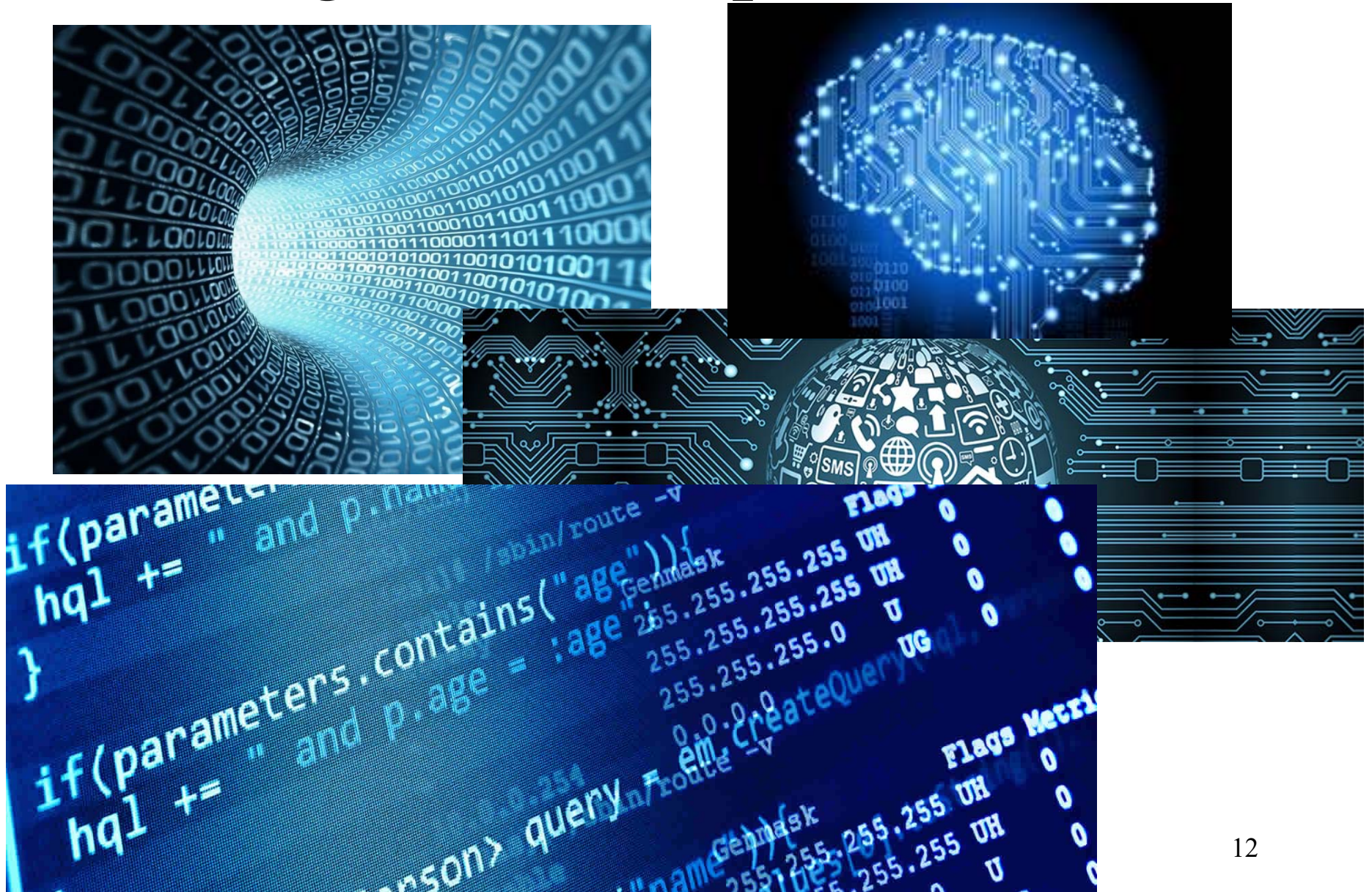
Ask Google - Anatomy of a search query

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

What are the parameters to the query?

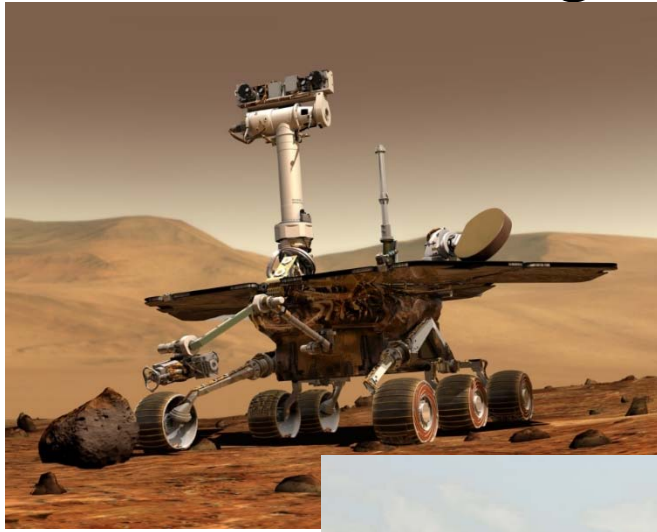
➤ What changes, what stays the same?

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/101s17-0112-2

1



2



3



7



4



5



6



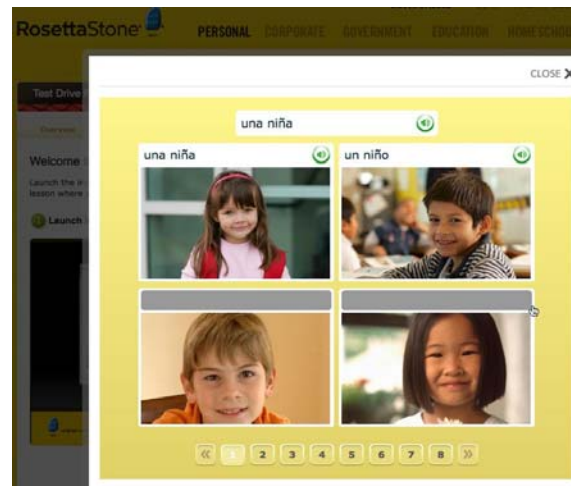
Questions about Computer Science

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

How will you learn to 'speak'?

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



How will you learn to program?

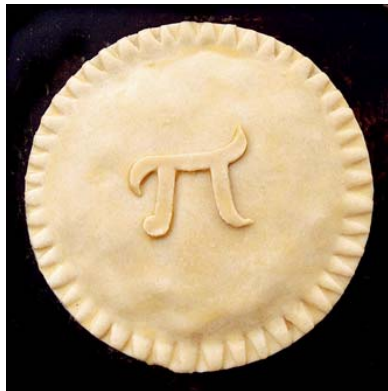
- You learn more than programming
- Coding, Algorithms
 - UX/UI: User Experience, User Interface
 - Data Analytics, Software Engineering
- A course, a way of thinking, a set of skills and practice that can lead to more or ...

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 Rossum is BDFL



Why is it called Python?



+



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C
9.8 m/sec²

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

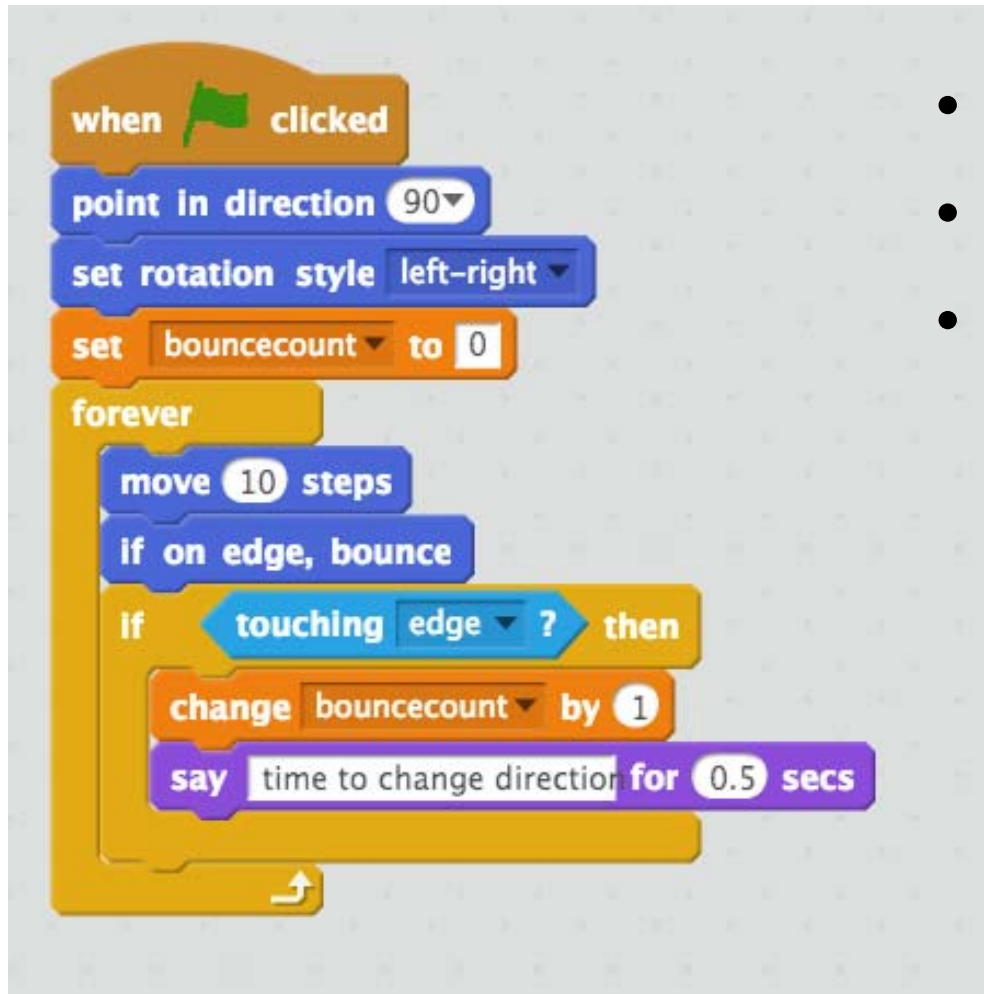
Course Overview:

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



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

Analyze this Scratch Program?

<http://bit.ly/101s17-0112-3>

Python code hello.py

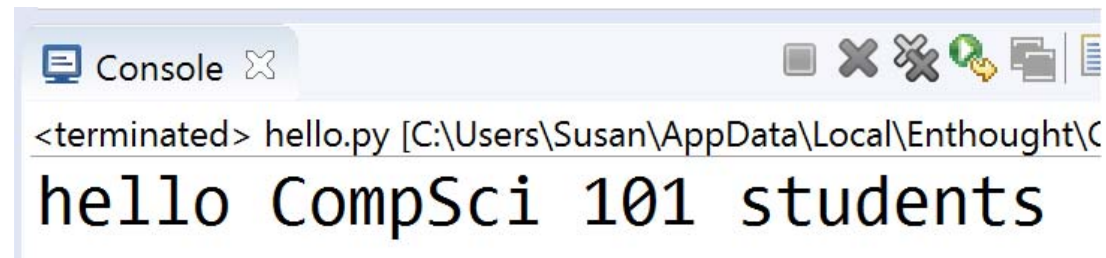
'''

Created on Jan 11, 2017

@author: *Susan*

'''

```
print "hello CompSci 101 students"
```



The screenshot shows a Windows-style console window titled "Console". The window contains the text: "<terminated> hello.py [C:\Users\Susan\AppData\Local\Enthought\C" followed by the output "hello CompSci 101 students".

Python data reading code

```
f = open("kjev10.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."

- "Fred Brooks" by Copyright owned by SD&M (www.sdm.de) - Request for picture sent by email to Fred Brooks by uploader (Mark Pellegrini; user:Raul654) Fred sent this photo back, along with contact information for Carola Lauber at SD&M, who gave copyright permission.. Licensed under CC BY-SA 3.0 via Wikimedia Commons - https://commons.wikimedia.org/wiki/File:Fred_Brooks.jpg#/media/File:Fred_Brooks.jpg



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.

