CompSci 101
Introduction to Computer Science

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

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Prof. Rodger

Prerequisites for Compsci 101

Who has taken CompSci 101?
What is Computer Science?


Just ask Siri (or Bing?)

http://www.bing.com/images/search?q=computer+science&go=Submit&qs=n&form=QBR&R&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&tbm=isch&sa=X&ei=Ib77U_O9CtDhsAT07YDABA&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

Roomba

Spirit, Mars Rover

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
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://www.rosettastone.com/personal/demo) 
- [http://duolingo.com](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/](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?

A + B - C

9.8 m/sec²

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://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?

Python code

```python
# hello.py
Created on Jan 14, 2016
@author: Susan

print "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)
```

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."

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.