CompSci 101
Introduction to Computer Science

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

Prerequisites for CompSci 101

• 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, logistics

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


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?
What is Computer Science?

- Artificial Intelligence
- Medicine, Genomics

What is Computer Science?

- Animation
Who are all these people?
bit.ly/101s17-0112-2

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://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 von Rossom is BDFL

Why is it called Python?

Why is it called Python?


A [Monty Python's Personal Best](https://www.youtube.com/watch?v=KsU3QMMcQ2c)

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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?


Python code

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

Created on Jan 11, 2017

@author: Susan
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)
```

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."