Compsci 101
Introduction to Computer Science
Part 1 of 3

www.cs.duke.edu/courses/spring21/compsci101

Susan Rodger
Nicki Washington
January 21, 2021

CompSci 101 Professor

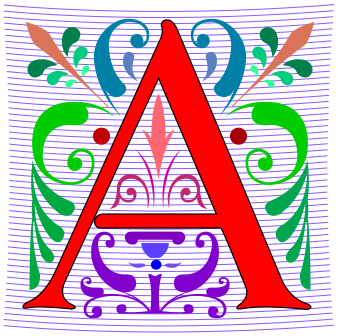
Prof. Nicki Washington

Prof. Susan Rodger

Yesenia Velasco

- Teaching Associate
- Right-hand woman - Handles logistics, substitute lectures, and much more!
- Handles accommodations
  - Email her your accommodation letter
  - yvelasco@cs.duke.edu

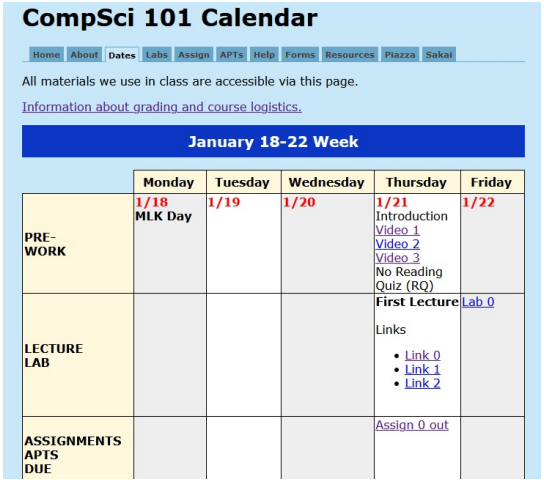
A is for …



- **Algorithm**
  - Step-by-step instructions realized in a program
- **Abstraction**
  - Hiding things is powerful
  - “What” vs “How”
- **APT**
  - Algorithmic Problem-solving
    Testing
- **API**
  - Application Programming
    Interface - using Libraries

Announcements

- **Check out the calendar on the course website**
  - PRE-WORK – what you must do before the lecture
  - LECT/LAB – will put notes/videos here from the live lecture or for the lab
  - DUE – what is due each week.
  - What has been updated?



CompSci 101 Calendar

Home | About | Dates | Labs | Assign | APTs | Help | Forms | Resources | Piazza | Sakai

All materials we use in class are accessible via this page.

Information about grading and course logistics.

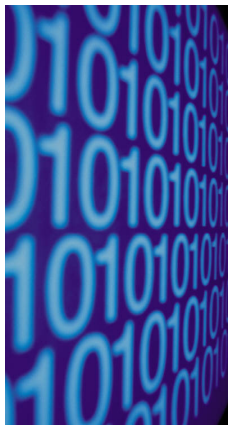
January 18-22 Week

	Monday	Tuesday	Wednesday	Thursday	Friday
PRE-WORK	1/18 MLK Day	1/19	1/20	1/21 Introduction Video 1 Video 2 Video 3 No Reading Quiz (RQ)	1/22
LECTURE LAB				First Lecture Links • Link 0 • Link 1 • Link 2	Lab 0
ASSIGNMENTS APTS DUE				Assign 0 out	

- **Assignment 1 is already out!**
- **You will see a link to this video!**

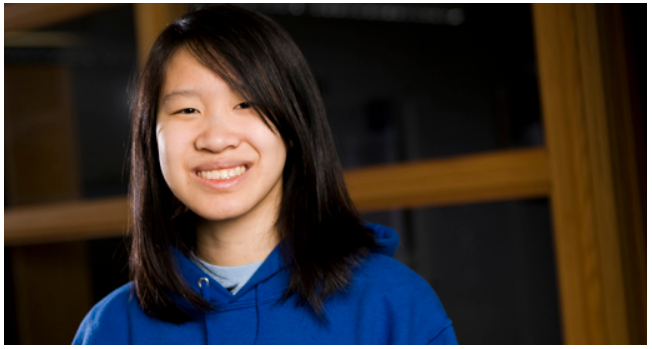
CompSci 101
Data into Information and Knowledge

Computer Science



Prerequisites for Compsci 101

Who has taken CompSci 101?



Compsci 101
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Part 2 of 3

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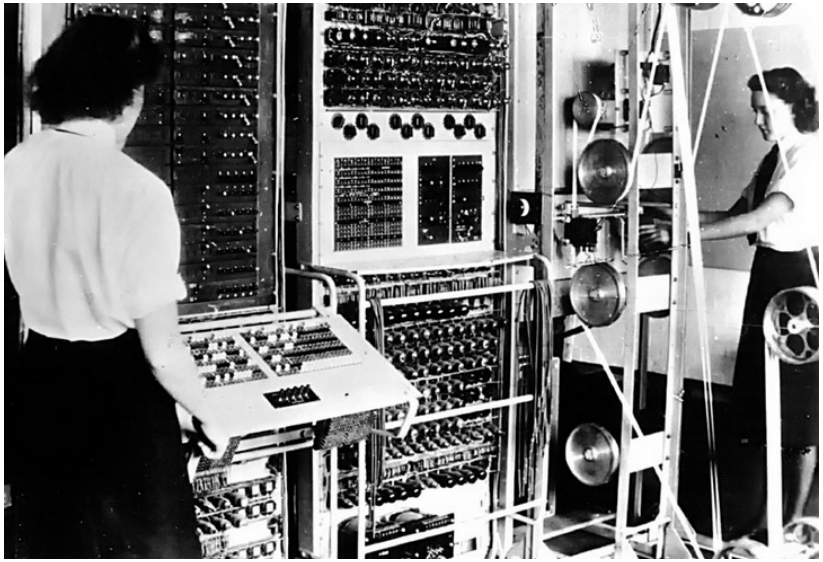
How it Started



How it's Going

Vacuum Tubes 1906

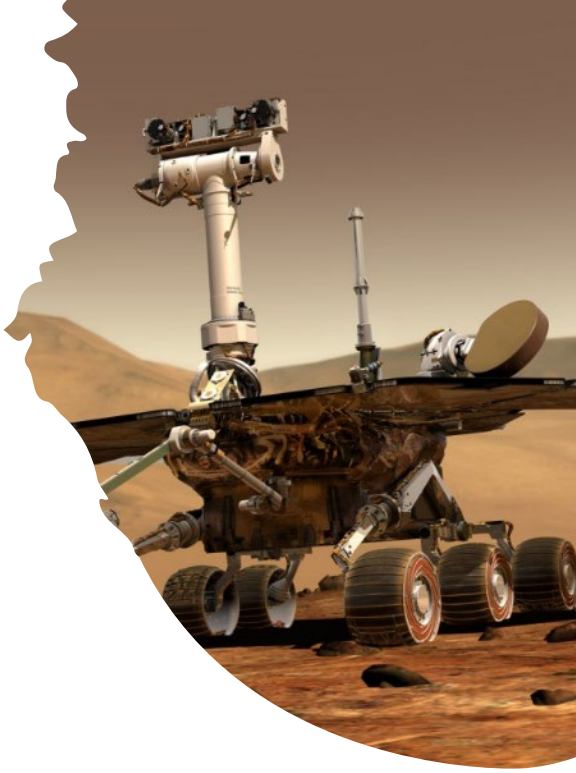
- Control electric current using the vacuum
- Can be used to start/stop, or change the flow based on the current

- Off/On→0/1
- 00000011

The Original Computers

Apple I and II

Where the Magic Happens: Computer Science



Artificial Intelligence

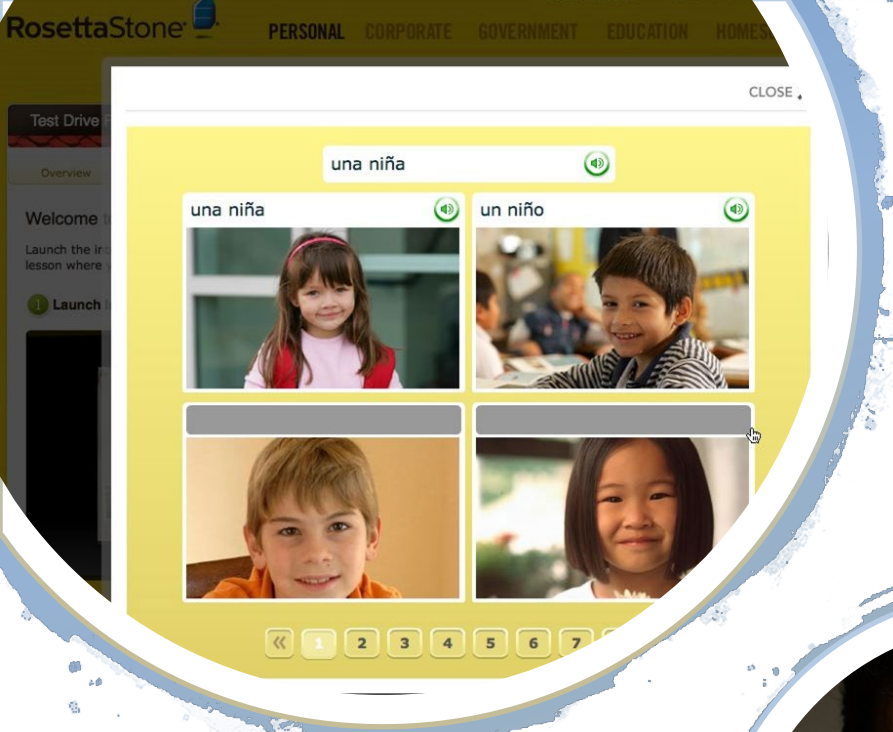
Medicine, Genomics

Animation

What is Computer Science?

- Definition 1:
  - *"The study of computers and computational systems."*
- Definition 2:
  - *"The study of computers and computing, including their theoretical and algorithmic foundations, hardware and software, and their uses for processing information."*
- Definition 3:
  - *"The study of how computers can be used to solve a wide range of problems."*

How We Communicate with Computers



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

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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

Course Overview: The Right Course?

- 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: PyCharm, Libraries, …
  - Using mathematical and scientific techniques
  - Art *and* science of programming

Course overview, logistics

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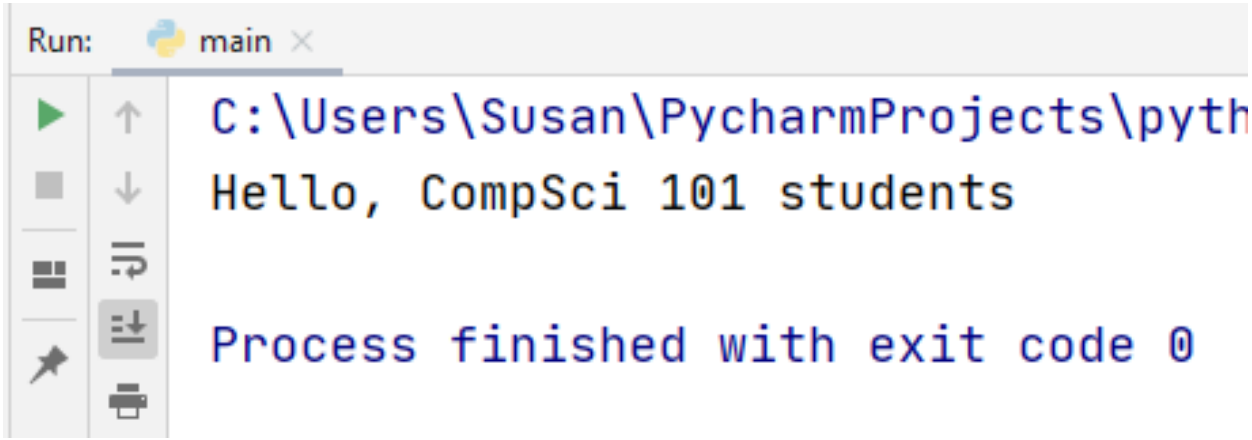
- Programming assignments: APTs and Assignments
  - Acknowledge assistance, to learn to program …
  - Be aware of late policy
- Exams: 3 exams and a final exam
  - All old exams are available, but no final exams
- Classwork/attendance
  - Attend the live lecture - participate
  - If you can't attend you must watch it and participate within 24 hours

Python code
hello.py

```
7   def print_hello(name):
8       print(f'Hello, {name}')
9
10
11  if __name__ == '__main__':
12      print_hello('CompSci 101 students')
```



Duke Connection: Fred Brooks '53

- Turing award winner
  - Developing IBM 360 computers
  - Software engineering
- 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.