CompSci 101 Introduction

Susan Rodger

January 11, 2023

CompSci 101, Spring 2023 Home

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

Write code in Python 3.6

```
1  def greeting(name):
2      greeting = "Hi " + name
3      if name=="Susan":
4        return greeting + ", old friend"
5      return greeting + ", nice to meet!"
6
7  print(greeting("Helen"))
8  print(greeting("Susan"))
9
```

Print output

```
Hi Helen, nice to meet!
Hi Susan, old friend
```

Compsci 101: Introduction to Computer Science

Course Description

Introduction to practices and principles of computer science and programming and their impact on and potential to change the world. Algorithmic, problem-solving, and programming techniques in domains such as art, data visualization, mathematics, natural and social sciences. Programming using high-level languages and design techniques emphasizing abstraction, encapsulation, and problem decomposition. Design, implementation, testing, and analysis of algorithms and programs. No previous programming experience required. For this version of the course, you will learn the programming language Python 3.

Due Dates

- **Sakai Quizzes on Prework (reading in textbook)**: due 10:15am on Lecture days. Take quizzes in Duke Sakai.
- **Labs**: weekly on Fridays, finish and submit by Sunday night - see labs page
- **APTs and APT Quizzes** : see APT page
- **Assignments**: See assignment page

Course Announcements

- January 10, 2023
  - First lecture is Thursday, January 12.

Every lecture:
DO NOT SIT IN THE LAST 5 FULL ROWS

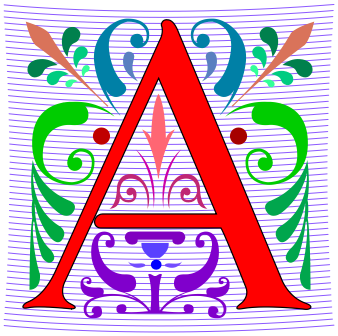
or the small 2 seater row at the top!

Prof. Yesenia Velasco

- Handles logistics, substitute lectures, and much more!
- Will teach some lectures, teaching this course next semester
- Handles accommodations
  - Email her your accommodation letter
  - yvelasco@cs.duke.edu

Learn the CS Alphabet

A is for …



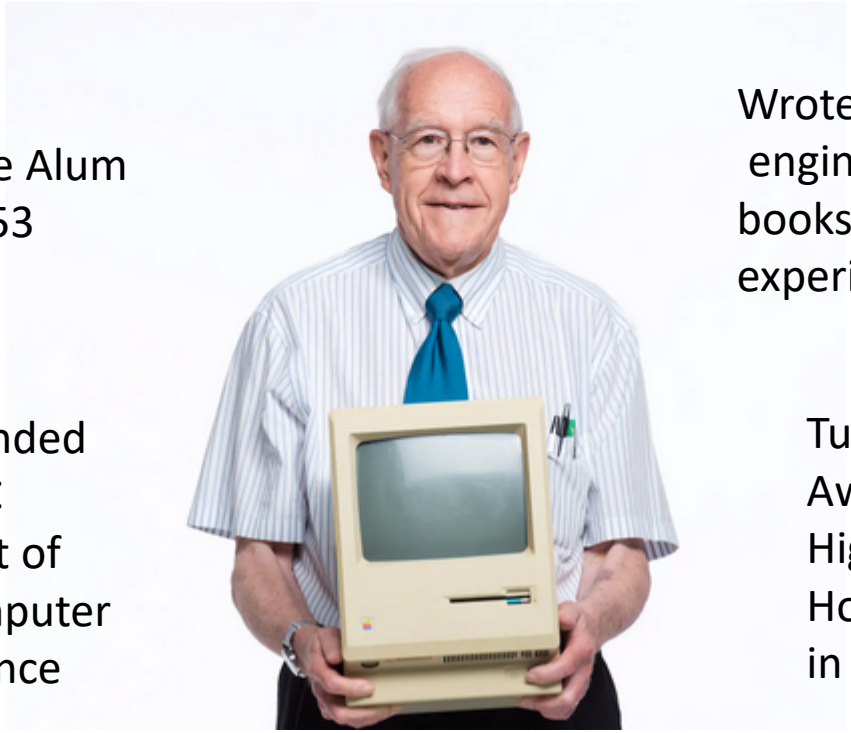
- **Algorithm**
  - Step-by-step instructions realized in a program
- **Abstraction**
  - Hiding things is powerful
  - “What” vs “How”
- **APT**
  - Algorithmic Problem-solving
    Testing
- **API**
  - Application Programming
    Interface - using Libraries

Feature someone related to CS in every lecture

The New York Times

Frederick P. Brooks Jr., Computer Design Innovator, Dies at 91

He was a lead designer of the computers that cemented IBM's dominance for decades. He later wrote a book on software engineering that became a quirky classic.

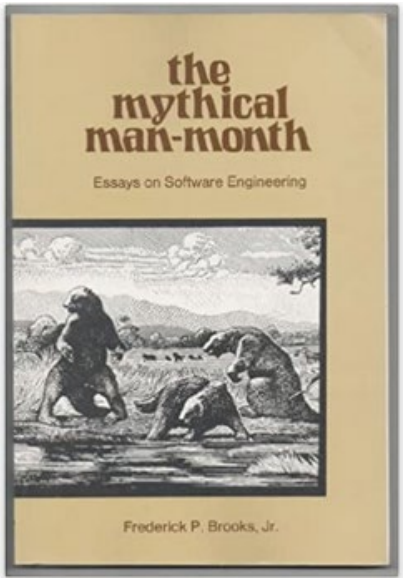


Duke Alum
BS '53

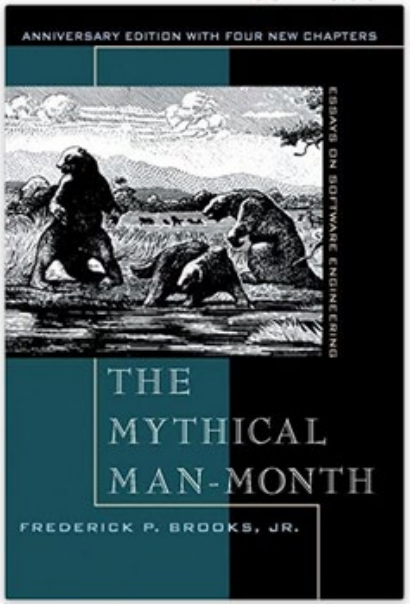
Founded
UNC
Dept of
Computer
Science

Wrote Software
engineering
books on his
experience

Turing
Award –
Highest
Honor
in CS



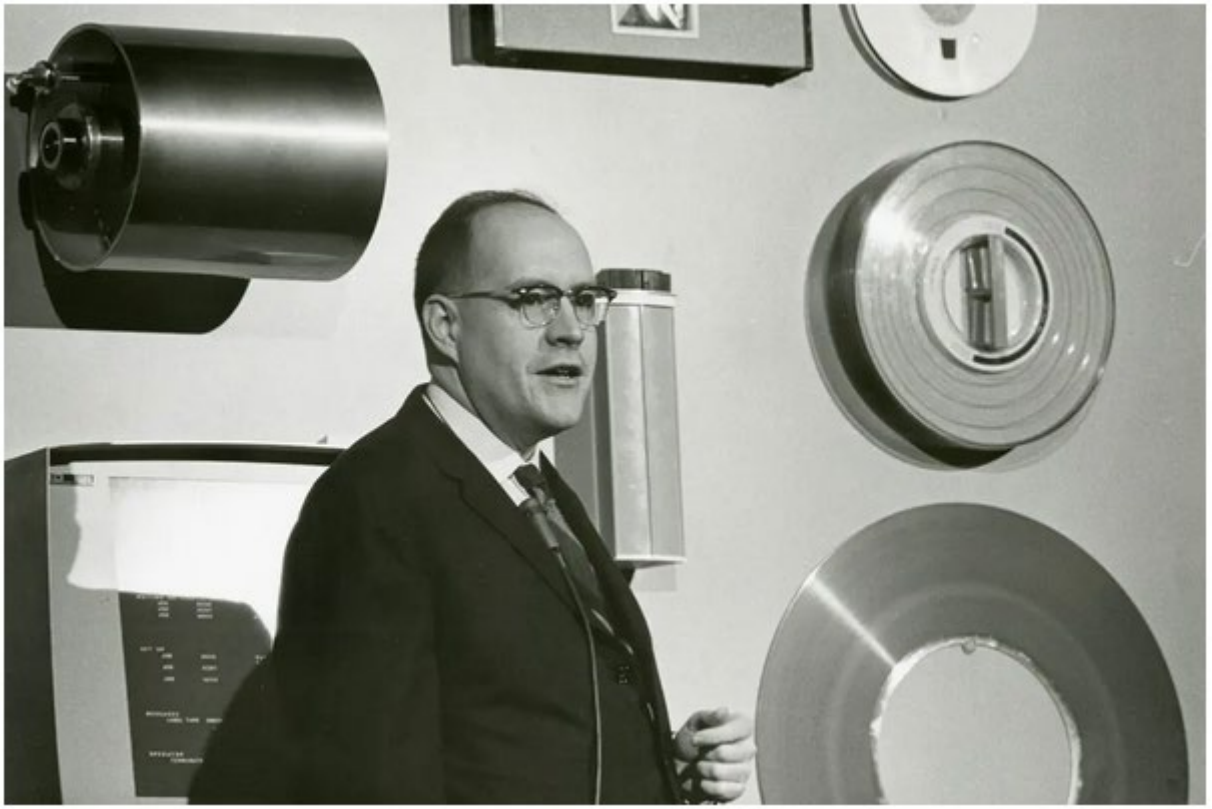
1975



1995

Brooks – Technical Leader of IBM's 360 computer project

- **1964 – 360 was a family of six compatible computers**



Duke Connection: Fred Brooks '53

- What Would FB Say?

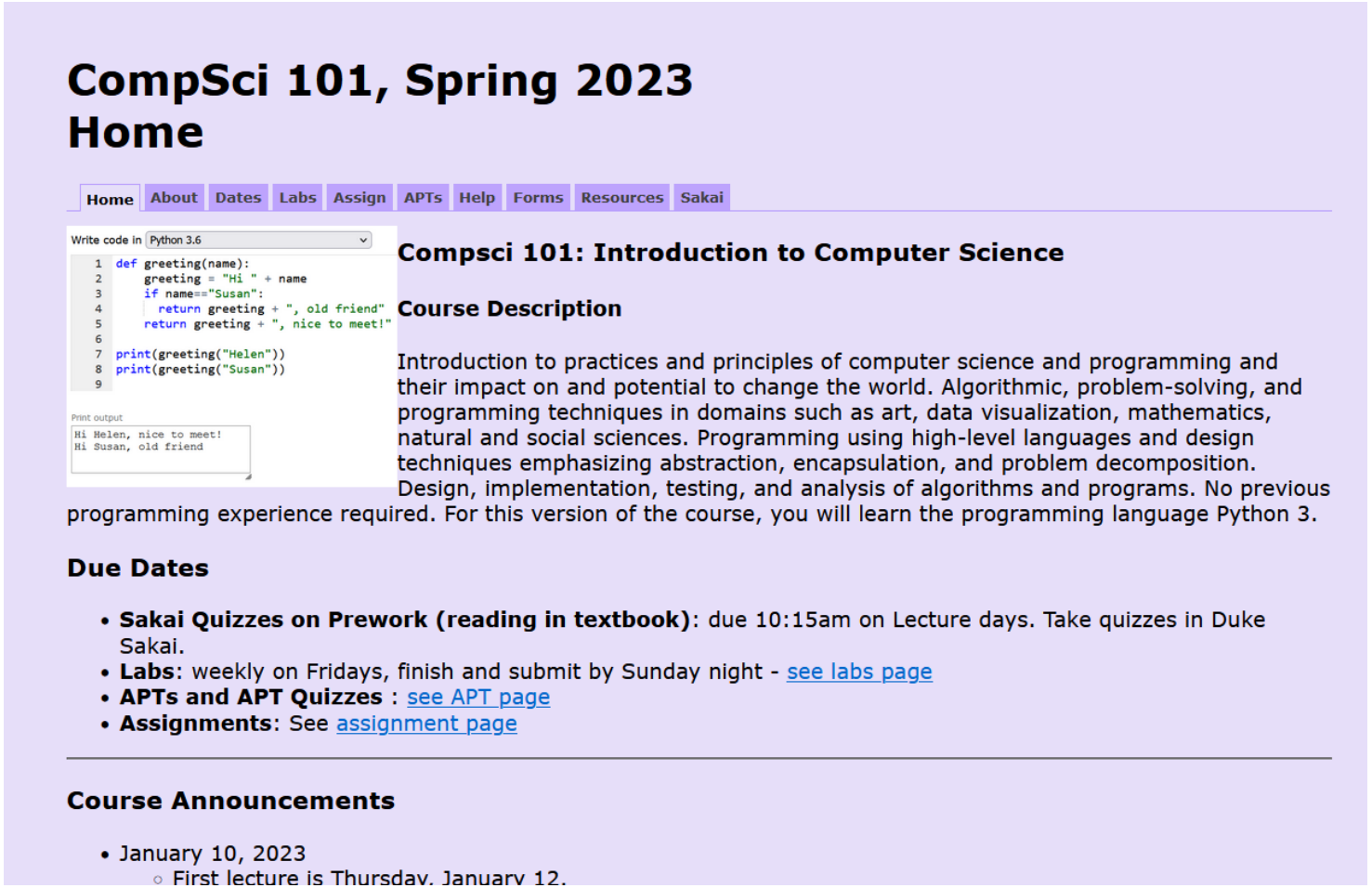
"The most important single decision I ever made was to change the IBM 360 series from a 6-bit byte to an 8-bit byte, thereby enabling the use of lowercase letters. That change propagated everywhere."

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.**

Go over CompSci 101 webpages



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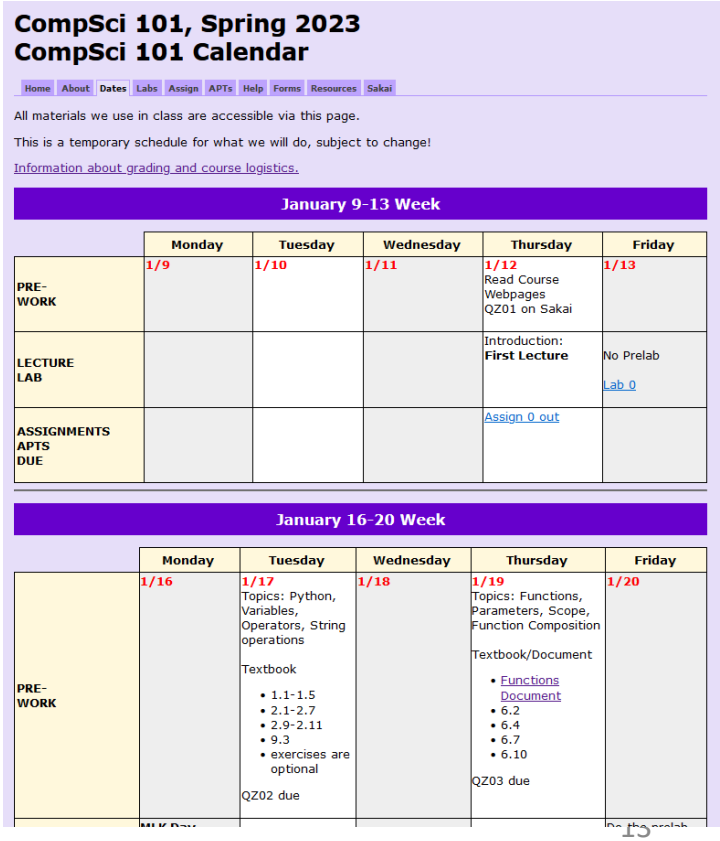
Announcements

- **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, Spring 2023
CompSci 101 Calendar

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

This is a temporary schedule for what we will do, subject to change!

Information about grading and course logistics.

January 9-13 Week

	Monday	Tuesday	Wednesday	Thursday	Friday
PRE-WORK	1/9	1/10	1/11	1/12 Read Course Webpages QZ01 on Sakai	1/13
LECTURE LAB				Introduction: **First Lecture**	No Prelab Lab 0
ASSIGNMENTS APTS DUE				Assign 0 out	

January 16-20 Week

	Monday	Tuesday	Wednesday	Thursday	Friday
PRE-WORK	1/16	1/17 Topics: Python, Variables, Operators, String operations Textbook • 1.1-1.5 • 2.1-2.7 • 2.9-2.11 • 9.3 • exercises are optional QZ02 due	1/18	1/19 Topics: Functions, Parameters, Scope, Function Composition Textbook/Document • Functions Document • 6.2 • 6.4 • 6.7 • 6.10 QZ03 due	1/20

- **Assignment 0 is already out!**
- **Lab 0 on Friday**
- **Prelab for Lab1 (install Python)**
- **You will see a link to this video!**

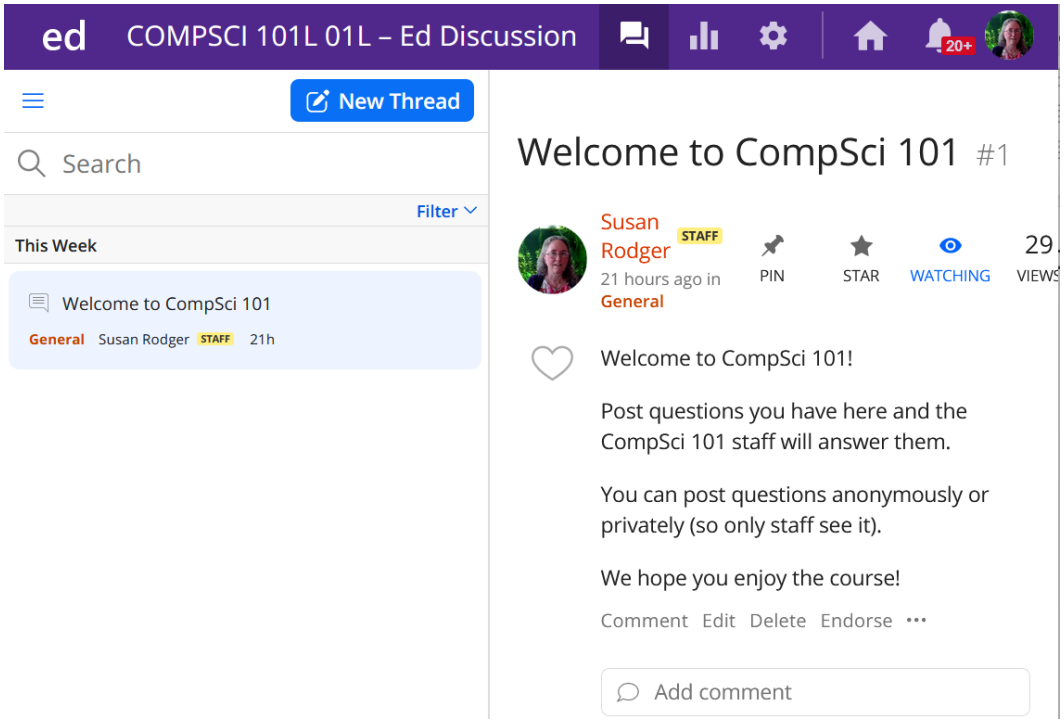
Course overview, logistics

www.cs.duke.edu/courses/spring23/compsci101

- **Programming assignments: APTs and Assignments**
  - Acknowledge assistance, to learn to program …
  - Be aware of late policy
- **Labs**
  - Attend each Friday
- **Lecture - Classwork**
  - Attend the live lecture - participate
  - If you can't attend you must watch it and participate within 24 hours
- **Exams: 3 exams and final**
  - All old exams available

Questions?

- **Don’t send us email!!!!!!!!!!**
- **Post your questions on Ed Discussion**
  - We will answer them there!
  - You should try to answer them too
    - Want to be a UTA one day? Answer questions!
- **Post Questions during lecture!**



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

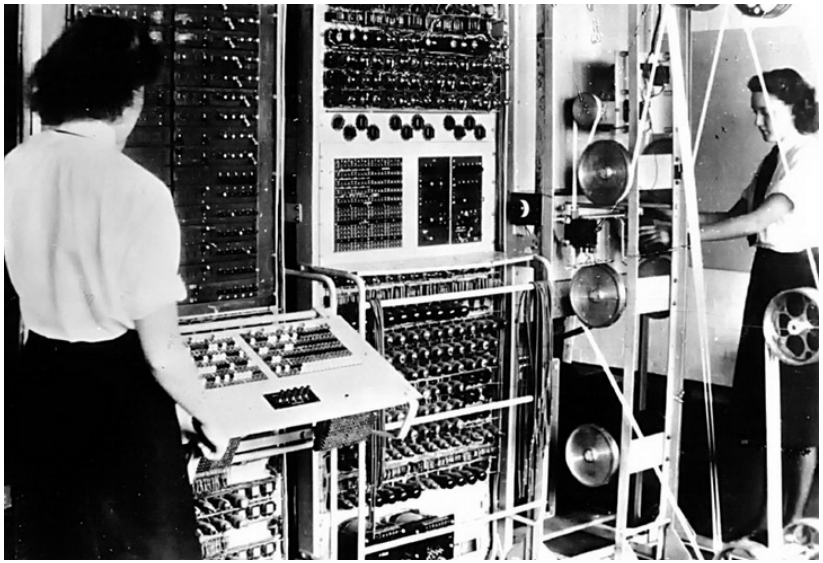
WOTO – Working Together

http://bit.ly/101s23-0112-1

Discuss with others, then everyone fills out their own form.

What is Computer Science?

How it started



How it’s going

Computers speak in 0's and 1's

1906

- **In old computers**
  - Control electric current using the vacuum
- **Nowadays, use switches**
  - A switch that is "on" or "closed" represents 1
    - Passes electrical current through
  - A switch that is "off" or "open" represents 0
    - Blocks electrical current
  - Express 0's and 1's, called bits
  - 8 bits are a byte and represent a symbol
- **What letter is 01000001 ?**

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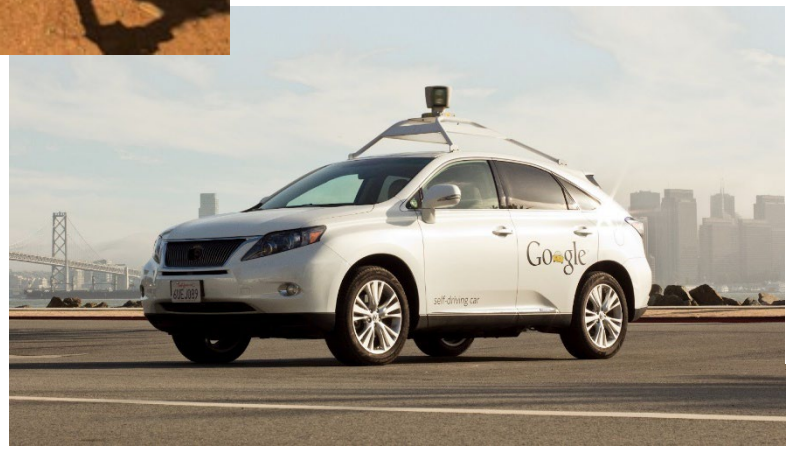
  - Express 0's and 1's, called bits
  - 8 bits are a byte and represent a symbol
- **What letter is 01000001 ?** A

What is Computer Science now?

- **Artificial Intelligence**

Roomba

Perseverence Mars Rover



Self-driving car

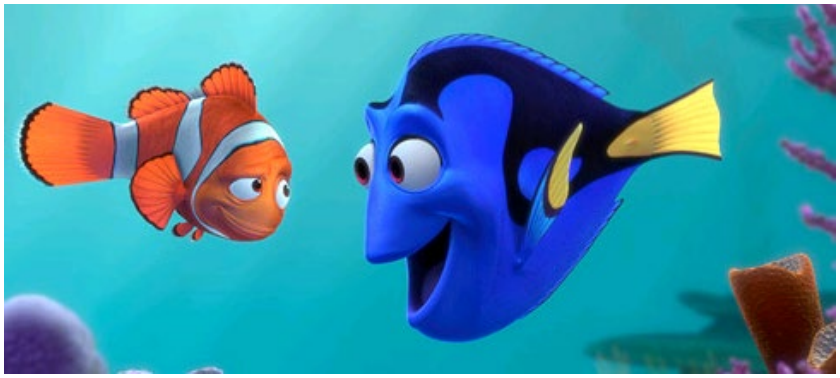
Personal Robot

What is Computer Science?

- **Medicine, Genomics**

What is Computer Science?

- **Animation**

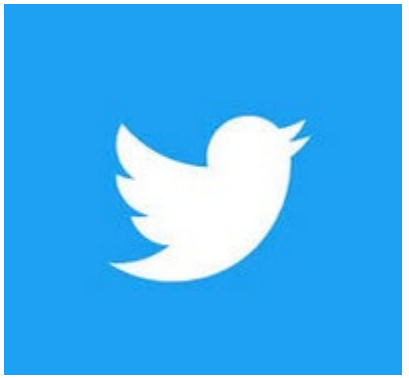


What is Computer Science?

- **The Organization of Data, Sharing, and Searching**







Prerequisites for Compsci 101

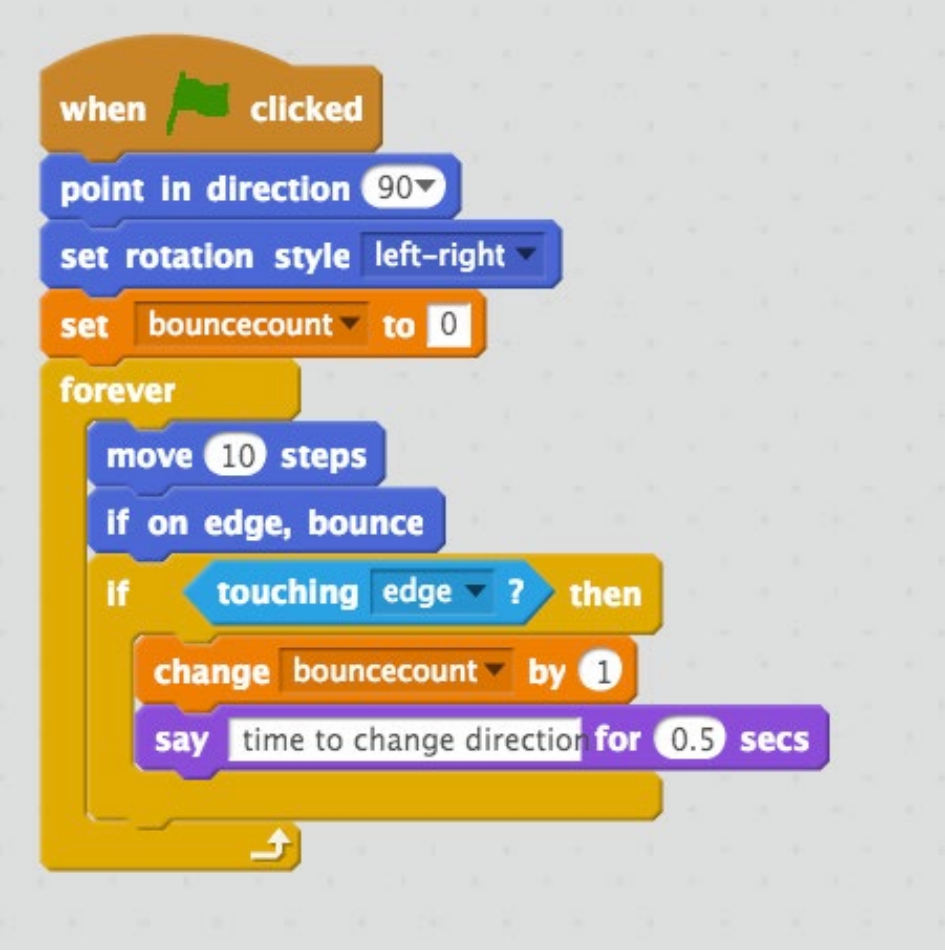
Who has taken CompSci 101?

Who are you?

- **Let's look at survey to see who is taking Compsci 101 in Spring 2023**
  - 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**

What does this program do?



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

WOTO: WOrking TOgether

http://bit.ly/101s23-0112-2

Analyze this

Scratch Program?

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

Python code
hello.py

```
1   """
2   Created on 1/6/2022
3
4   @author: Susan H. Rodger
5   """
6
7   if __name__ == '__main__':
8       print("Hello CompSci 101!")
```

OUTPUT:

Python Code, second program

```
6   def greeting(name):
7       print("Hello " + name)
8
9   if __name__ == '__main__':
10      greeting("CompSci 101!")
11      greeting("Beenie, Keeah and Moe")
```

OUTPUT: