

# CompSci 101 Introduction

**CompSci 101, Spring 2023**  
**Home**

Home About Dates Labs Assign APTs Help Forms Resources Sakai

```
Write code in Python 3.8
1 def greet(name):
2     greeting = "Hi, " + name
3     if name == "Susan":
4         return greeting + ", old friend!"
5     return greeting + ", nice to meet!"
6
7 print(greet("Susan"))
8 print(greet("Susan"))
```

**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 Pework (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.



Susan Rodger  
January 12, 2023

# 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](mailto: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.

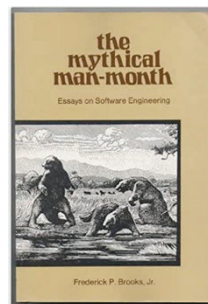
Duke Alum  
BS '53

Founded  
UNC  
Dept of  
Computer  
Science

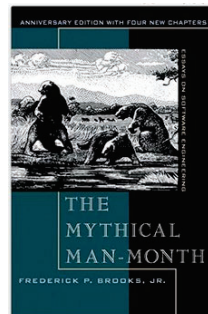


Wrote Software engineering books on his experience

Turing Award – Highest Honor in CS



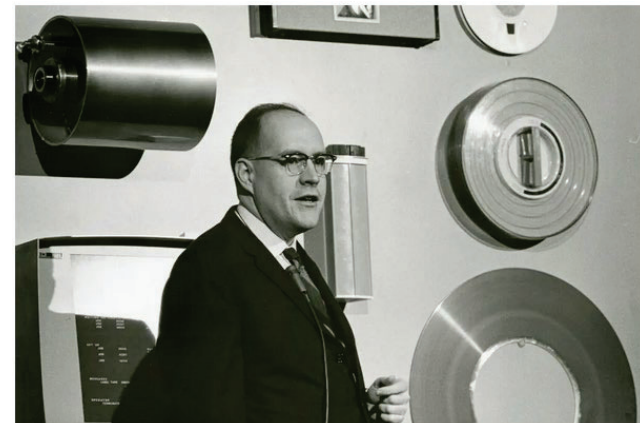
1975



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."

- "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](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.

## Go over CompSci 101 webpages

**CompSci 101, Spring 2023 Home**

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7 print(greeting("Malin"))
8 print(greeting("Susan"))
9

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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?

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

**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 ( webpage on Sakai)	1/13
LECTURE/LAB				Introduction: First Lecture	No Prelab
ASSIGNMENTS/APTs/DUE				Assignment 0 due	Lab 0

January 16-20 Week					
	Monday	Tuesday	Wednesday	Thursday	Friday
PRE-WORK	1/16	1/17 Topics: Python, Variables, Operators, String operations Textbook	1/18	1/19 Topics: Functions, Parameters, Scope, Function Composition Textbook/Document	1/20
ASSIGNMENTS/APTs/DUE		• 1.1-1.5 • 2.1-2.7 • 2.8-2.11 • 3.2 • exercises are optional Q202 due		• 4.2 • 4.7 • 6.10 Q203 due	

# 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

1/12/23

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# 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*

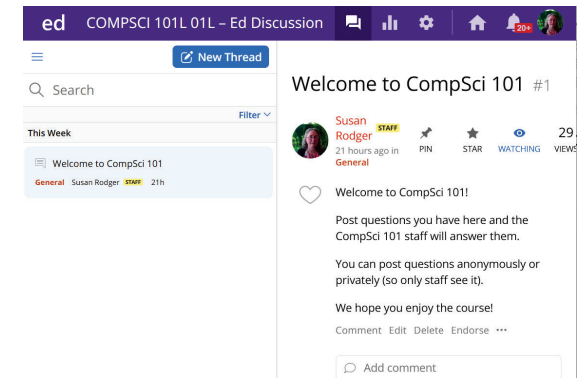
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# Questions?

- **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!**



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# WOTO – Working Together

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

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

# What is Computer Science?

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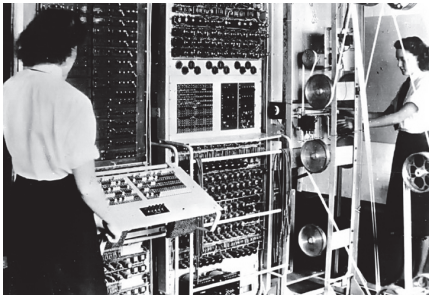
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# Computers speak in 0's and 1's

## How it started

## How it's going



- **In old computers** 1906
  - 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 ?**



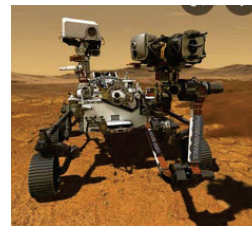
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  - 8 bits are a byte and represent a symbol
- **What letter is 01000001 ?** **A**



# What is Computer Science now?

- **Artificial Intelligence**

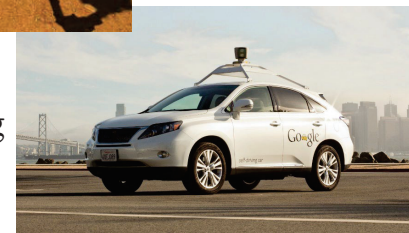


Perseverance Mars Rover



Roomba

Self-driving car



Personal Robot

# What is Computer Science?

- **Medicine, Genomics**



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# What is Computer Science?

- **Animation**



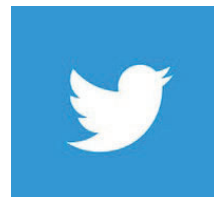
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# What is Computer Science?

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



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# Prerequisites for Compsci 101

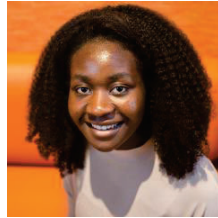


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# Who has taken CompSci 101?



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# Who are you?

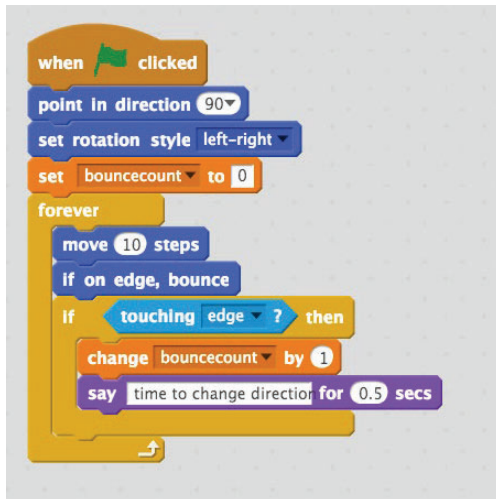
- Let's look at survey to see who is taking CompSci 101 in Spring 2023
  - Do you recognize yourself?
  - Is there a stereotypical CompSci 101 student?
  - Is there a stereotypical computer scientist?
- Everyone can succeed! Ideally you won't have lots of experience programming

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# What does this program do?



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

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WOTO: WORKing TOgether  
<http://bit.ly/101s23-0112-2>

Analyze this  
 Scratch Program?

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# What language will we learn?

- <http://www.python.org/>
- Python is a *multi-paradigm* language
  - Procedural
  - Functional
  - Object-Oriented
- Simple, libraries, widely used
- Guido van Rossum



## 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!")  
9
```

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: