CompSci 101
Introduction

Every lecture:
DO NOT SIT IN THE
LAST 5 FULL ROWS
or the small 2 seater row at the top!

About Prof Rodger

A long time ago, back in 1979....
NC State

B.S. Computer Science and Mathematics

- My first semester, my first course in programming - PL/I

Decisions? Industry? Grad School?

- Systems Programmer
  - NCSU, University Systems Control Center

- Undergraduate Research
  - Cleanup data from buoys in the water
  - Last minute decision
    - IBM Summer job
    - Go to Grad School

- MS. 1985, Ph.D. 1989

- New Data Structure
  Dynamic contour search tree

Assistant Professor

- Continued research in algorithms

- CAREER CHANGE....

- Got more interested in education
Started developing education tools
Changed area to Visualization Tools
and CS Education

- Tool – NPDA - to experiment with pushdown automata

1994 – Moved to Duke University
Professor of the Practice

- Position focuses on Education in the Discipline
- Focused on designing educational software
  - JFLAP – tool for experimenting with theoretical CS concepts

How I Keep my Sanity

- 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

Prof. Yesenia Velasco

How do you keep your sanity?
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

Fred

- Duke Alum
- BS '53
- Founded UNC Dept of Computer Science
- Wrote Software engineering books on his experience
- Turing Award – Highest Honor in CS
- Founded UNC Dept of Computer Science
- Turing Award – Highest Honor in CS

*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.
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
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!

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!

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

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

What is Computer Science?

Computers speak in 0’s and 1’s

- 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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- What letter is 01000001? A
What is Computer Science now?
- Artificial Intelligence
  - Perseverence Mars Rover
  - Roomba
- Self-driving car

What is Computer Science?
- Medicine, Genomics
- The Organization of Data, Sharing, and Searching
- Animation
  - Monsters Inc.
  - Cars
  - Finding Nemo
  - eBay
  - Amazon
  - Google
  - YouTube
  - Snapchat
  - Facebook
Prerequisites for Compsci 101

After taking this course you will be able to ....

• Write a program for Wordle
• Write a word finder to help someone solve Wordle
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
Scratch Program

- If you want to experiment with this scratch program, here is the link:

  https://scratch.mit.edu/projects/94064630/

  You don’t have to understand this yet!!

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 Rossum
Why is it called Python?

Python code

```python
if __name__ == '__main__':
    print("Hello CompSci 101!")
```

OUTPUT:

C:\Users\Susan\AppData\Local\Programs\Python\Python310\hello.py

You don’t have to understand this yet!!
```python
def greeting(name):
    print("Hello " + name)

if __name__ == '__main__':
    greeting("CompSci 101!")
    greeting("Beenie, Keeah and Moe")
```

OUTPUT:
```
C:\Users\Susan\AppData\Local\F
Hello CompSci 101
Hello Beenie, Keeah and Moe
```