Programming Modalities !

Modalities of Programming

- In 2020, there are three prevalent modalities you're likely to program in:

1. Interactive Programming
   - You type in a command, press enter, and it is evaluated immediately.
2. Stored Programs
   - You write a program in a text editor, save it to file(s), then it is translated or compiled, and run separately in whole.
3. Notebooks
   - A productive combination of interactive and stored programs, with the addition of writing prose in the code. Popular in scientific computing and data analysis.

Interactive Programming - Demo 0

- After installing the software, open a Terminal in VSCode and run **`python`**
  - You can now write **Python** code *interactively*!

- Try entering some lines such as:
  - `110`
  - `x = 110`
  - `x + 101`
  - `pid = type your 9-digit unc PID here`
  - `pid % 5`
  - `nums = [1, 2, 3]`
  - `sum(nums)`

- Congrats, you've written your first lines of Python "code"!

Interactive Programming - Demo 1

- In a Terminal in VSCode and run **`python`**
  - You can now write **Python** code *interactively*!

- Try entering some lines such as:

```
import turtle
turtle.color("deep pink")
style = ("Courier", 30)
turtle.write("hello, world", font=style)
turtle.forward(300)
```

- We will play with Python's turtle graphics more in the near future!

Interactive "REPL" vs. Stored Programs (1 / 2)

- We just wrote code *interactively* in a REPL console. REPL is short for:
  - **Read** - when you press enter the computer "reads" your input
  - **Evaluate** - it then takes your input and interprets it as Python code
  - **Print** - when entering an expression, its evaluated value prints automatically
  - **Loop** - you can type in another command and the process repeats

- Programming in a REPL is wonderful for learning and tinkering

- When you **`quit()`** the Python REPL, though, the work in it is lost
  - If you wanted to recreate it, you'd have to type it out all over again

Interactive "REPL" vs. Stored Programs (2 / 2)

- We will primarily **"Stored Programs"** saved in files
- A **stored program is a text file of lines of code** like you'd write in a REPL
- However, the code in your **stored program is not immediately evaluated**
- When you **save** and **execute** your program, the computer works through each line of code as though you typed every line into the REPL.
- Stored programs enable larger programs you can reuse and share
  - When you restart your program, all your **saved** code is reevaluated from scratch.