CS 1340:Fall 2020:Lecture 02

Intro to Python for CS and Data Science

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Reminders

- Slack
- Zybooks (hopefully you did the assignment due before class today?)
- Anaconda?

Getting Started

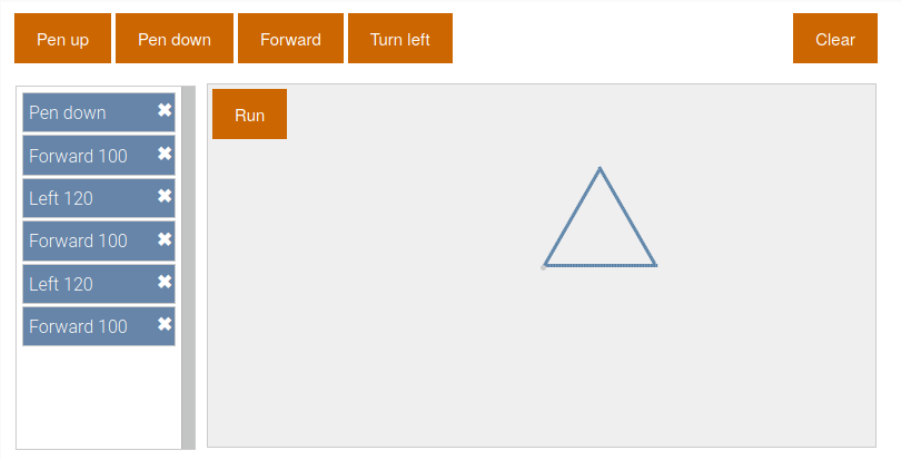
All computer programs have …

1. Input -

2. Processing -

3. Output -

Drawing with the Turtle



1. What's the input?
2. What's the processing?
3. What's the output?

Challenge on your own time ..

Can you draw 'SMU' (block letters of course) with the Turtle?

Humans vs. Computers

- Humans don't understand long strings of 1's and 0's
- Computers don't understand

```
print('Hello 1340')
```

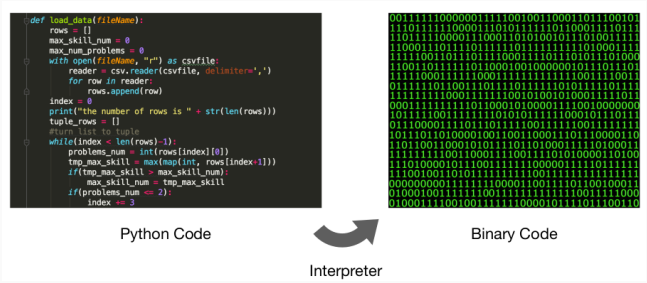
So what do we do???

General *Algo* for Programming

1. You write source code in a code editor or IDE (Integrated Development Environment)
2. Save it with a file extension of `.py`. Example: `project01.py`
3. Use the Python interpreter to execute the source code.
   - `python project01.py`
   - OR could be `python3 project01.py`
4. Back to Step 1 to add more code.

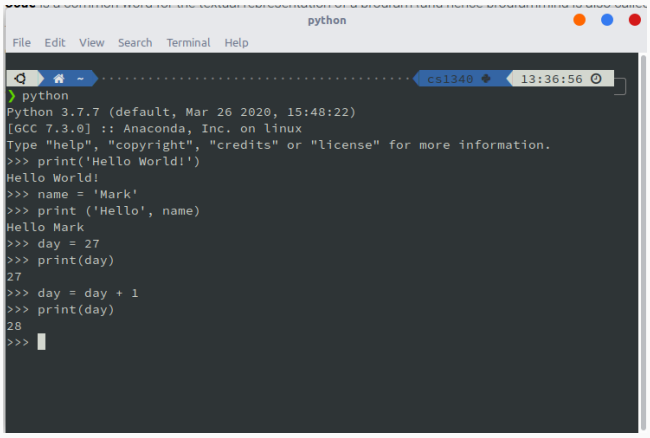
Converting Python Code to Machine Code

- Python is an **interpreted** language
  - as your program is running, the Python Interpreter / Runtime is converting source code to machine code one line by line.
  - The alternative is a **compiled** language which converts all the source code to machine code before you run your program.



Interactive Python

- `python somescript.py` - runs the code inside somescript.py
- `python` - Starts the **interactive interpreter**
  - each line of code is interpreted right after you type it.



Elements of Python Code

- **statement** -
- **variable** -
- **expression** -
- **assignment** -

Some Python Code

```
def advance_cars():
    """Calculate new positions of the cars"""
    global car1_speed, car1_location
    global car2_speed, car2_location
    car1_speed += car1_acceleration
    car1_speed = car1_top_speed if car1_speed > car1_top_speed else car1_speed
    car1_location += car1_speed

    car2_speed += car2_acceleration
    car2_speed = car2_top_speed if car2_speed > car2_top_speed else car2_speed
    car2_location += car2_speed
```

Basic Output

```
print(...)
```

- Notice:
  - printed in mono-spaced font
  - ... means other stuff will be put there
  - () indicate a method or function call

```
print('Hello')
print('World')
print('Hello World')
```

`'Hello'`, `'World'` are called **string literals**.

`print(...)`

```
name = 'Mark'
print(name)
```

- You can print **string literals** OR values contained in variables.
- What is the variable in this example?

```
print('Hello', end='')
print('World', end='')
```

- What will this print?

Can you do it?

Use print statements to draw a diamond shape.

Use print statements to draw a heart shape.