
Owen Chase and Óscar Chávez Ortiz

# Review

- Create a new text file and write about a thing (or things) we have learned so far
- Turn to someone near you and discuss what you wrote. Did they focus on the same thing or something different?
- Prepare to briefly share

# Learning Objectives

At the end of the class you will be able to…

- describe the role of a high level programming language.
- explain why we use Python instead of Bash or Assembly.
- use the Python environment as a calculator.
- write and run a .py file.

# Is Python installed?

In terminal type which python

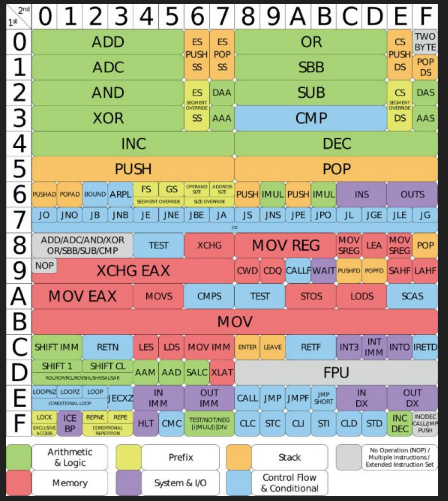
# Computer Architecture Crash Course

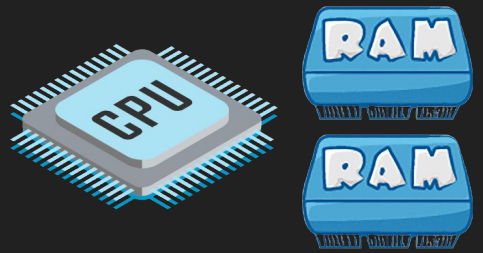
Python, Bash, etc

```
11  _start:
12      movia       sp, LAST_RAM_WORD
13      movi        r2, '\n'
14      call        PrintChar
15      movia       r2, MSG
16      call        PrintString
17  _end:
18      br          _end
19
20  PrintChar:
21      subi        sp, sp, 8
22      stw         r3, 4(sp)
23      stw         r4, 8(sp)
24      movia       r3, JTAG_UART_BASE
25  pc_loop:
26      ldwio       r4, STATUS_OFFSET(r3)
27      andhi       r4, r4, WSPACE_MASK
28      beq         r4, r0, pc_loop
29      stwio       r2, DATA_OFFSET(r3)
30      ldw         r3, 4(sp)
31      ldw         r4, 8(sp)
32      addi        sp, sp, 8
33      ret
34
35  PrintString:
36      subi        sp, sp, 12
37      stw         ra, 8(sp)
38      stw         r3, 4(sp)
39      stw         r2, 8(sp)
40      mov         r3, r2
41  ps_loop:
42      ldb         r2, 0(r3)
43      beq         r2, r0, end_ps_loop
44      call        PrintChar
45      addi        r3, r3, 1
46      br          ps_loop
47  end_ps_loop:
48      ldw         ra, 8(sp)
49      ldw         r3, 4(sp)
50      ldw         r2, 0(sp)
51      addi        sp, sp, 12
52      ret
```

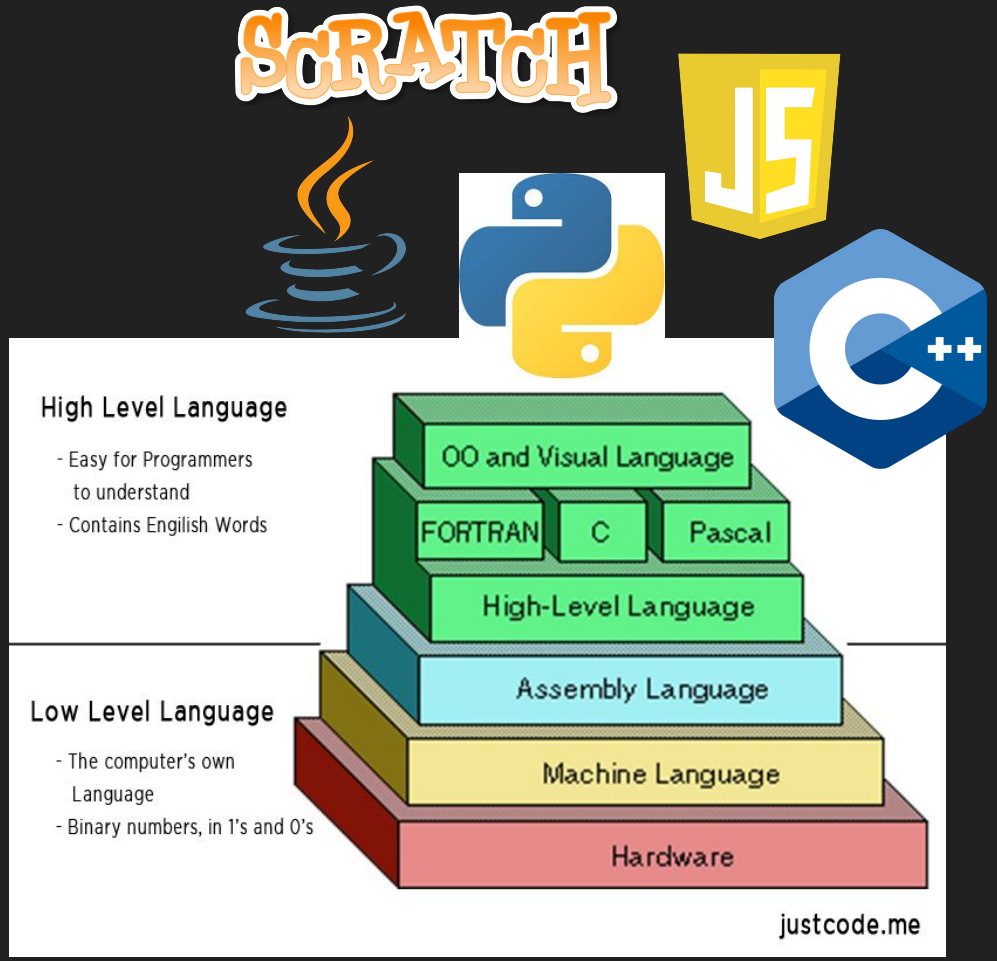
Assembly

x86, ARM, etc.



- More machine independent
- Slower



# Python or Bash?

2+3

echo $((2 + 3))

# Open Python!

run python in the terminal

# Basic Math

Try using the four basic math operations:
+, -, *, /

Add in some () to test order of operations.
What happens if you use [] or {} instead?

Here are some other operations. What do they do?
**, %, //

Do these operations work with decimals?
Challenge: What do & and | do?

# Variables

To assign a value to a variable, use =
Ex: a = 5
View the variable's value using its name

Try using some variables. How do they work in expressions?
What happens if we do something like a = 2 + 3?
What about b = a?

What happens if I use the same variable on both sides, e.g. a = a + 5
In Python, we can do +=, -=, *=, /=
What do those mean?

# Basic Math +

How can we write large numbers?
1,000,000? 1x10^6?

In Python we'd write:
1_000_000 or 1*10**6 or 1e6 or 1E6

Check for equality with ==
Try the other comparisons: >, <, >=, <=

What happens when I do 0.1 * 3 == 0.3?

# Strings

We'll talk about data types later, but for now just know that to use text data in Python, we need to indicate it using "" or ''

Try typing hi then "hi"

Try doing math with numbers like '5'

Try using +, -, *, / on strings

Try doing 'string' * int

# Python files

We usually don't want to write and execute a program line-by-line, or we want to be able to share/rerun it without typing it all out again.

We can save our Python programs in files!
(To show output we need to use print() now)

Write some python code to a file and save it.
Canonically your code would be: print("Hello, World")

Run it with python filename

You should generally save Python files with a .py extension, but remember, none of Linux, bash, or the python executable care about extensions. The .py is just good practice!

# One more thing

If you want to give input to your program at runtime, you can use the input() function to prompt the user for input.

Ex:

```
a = input(“Enter a number”)

print(a)
```

# Exercises

Level 1: Write a python program that adds two numbers supplied by the user

Level 2: Write a python program that converts Fahrenheit to Celsius

Level 3: Write a python program that can convert Fahrenheit to Celsius or the reverse based on user input