



**MAHIDOL
UNIVERSITY**
Wisdom of the Land

[SCPY204]

Computer Programming for Physicists

```
# Hello, World!  
print "I am your lecturer for SCPY204 (first half)"  
  
# Puwis Amatyakul  
  
IF "contact needed" THEN  
    print "email: puwis.ama@mahidol.ac.th"  
    print "office: P621"  
  
END
```

Happy New Year
2023



What we are going to do...

Lecture

- Getting to know each others.
- Sure! First lecture: “**Computer and programming basics**”.

Lab

- Setup programming environment.
- Write your (first) program (in Matlab, Python and C).

**Can you write
a computer program?**

“The goal of the course”

You are able to program.

“The goal of the course”

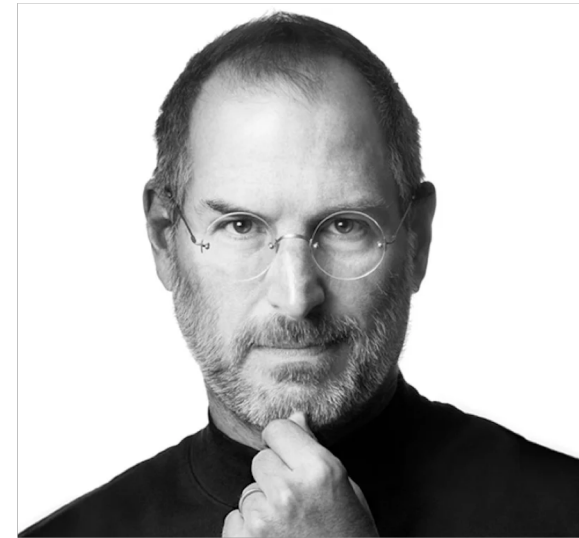
Creator,

User → Developer



“Everybody in this country should learn to program a computer, because it teaches you how to think”

— *Steve Jobs*



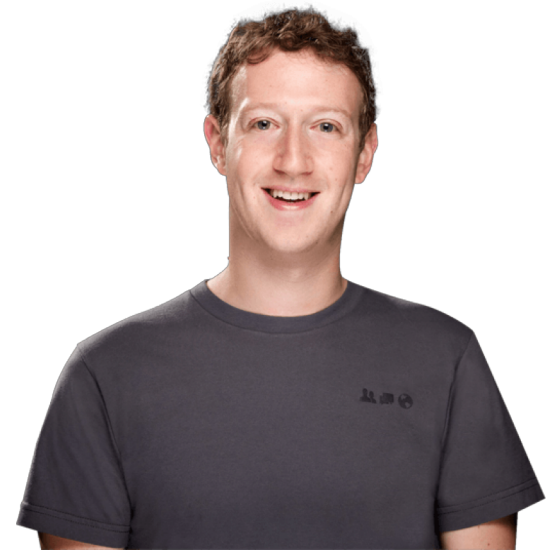
“Learning to write programs stretches your mind, and helps you think better, creates a way of thinking about things that I think is helpful in all domains”

— **Bill Gates**



“All of my friends who have younger siblings who are going to college or high school - my number one piece of advice is:
You should learn how to program”

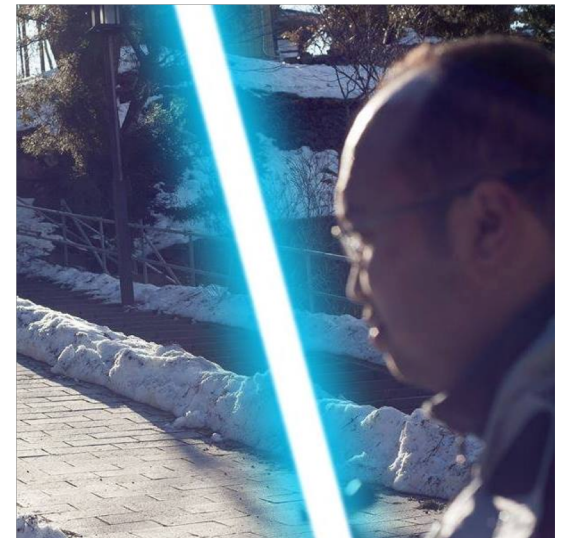
— *Mark Zuckerberg*



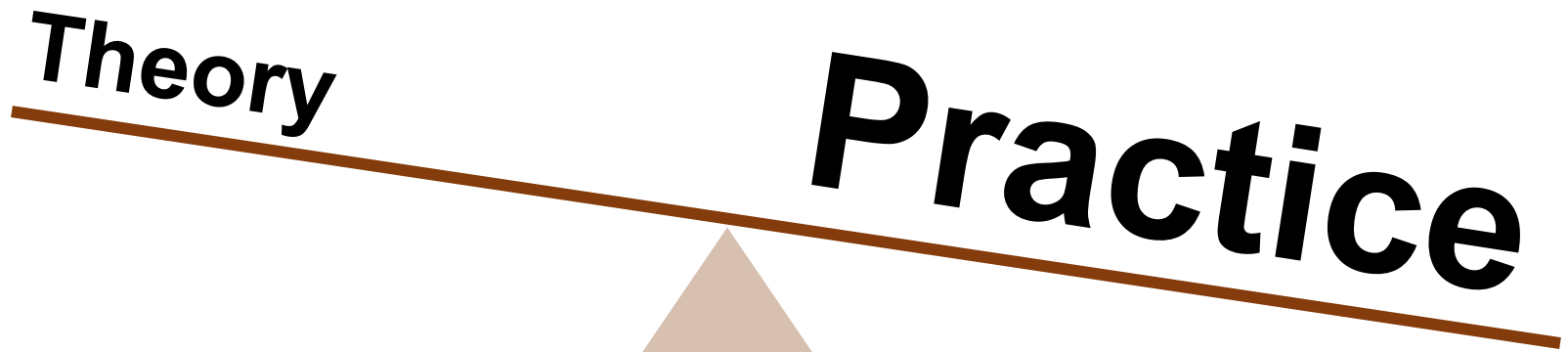
“As a physicist, being able to program
expands your fruitful possibilities”

Trust me! I am a (computational) physicist.

— *Your Lecturer*



How to ~~survive~~ have fun with this course?

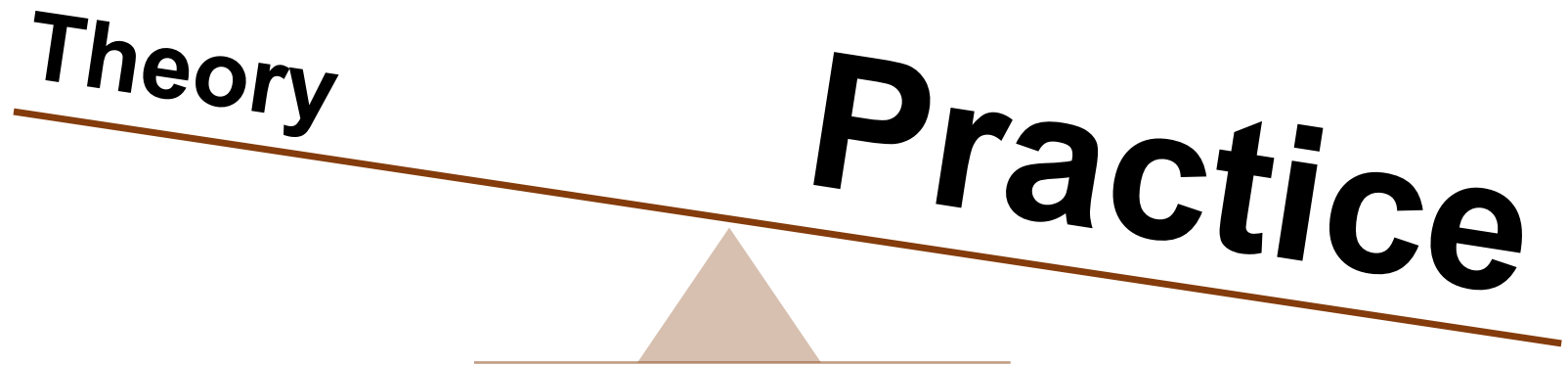


I will

guide
demonstrate
encourage
support

you

How to ~~survive~~ have fun with this course?



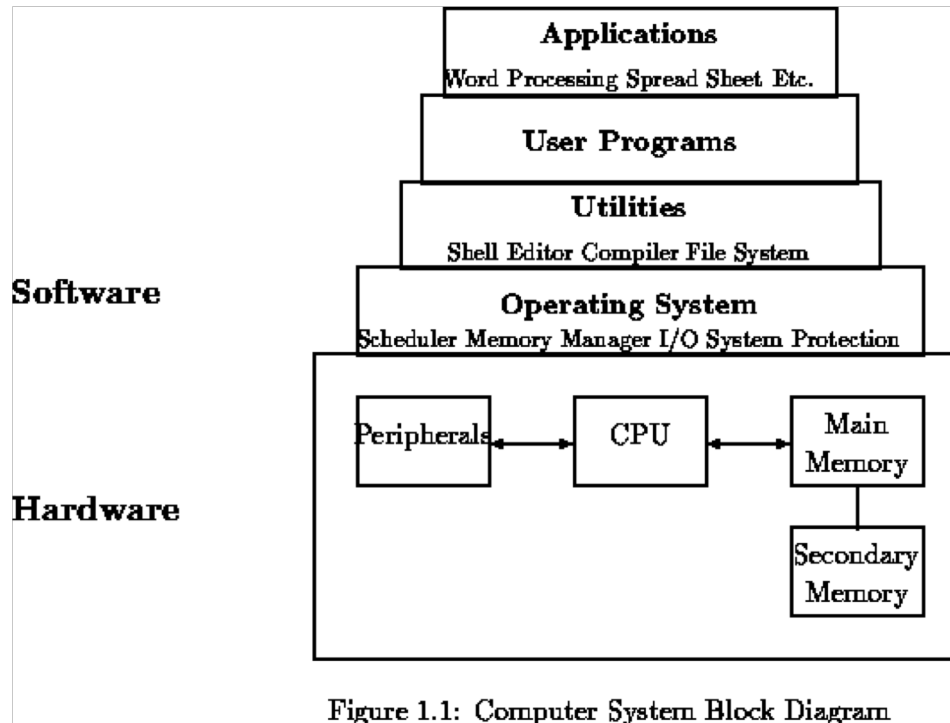
Grading criteria

Assignment	Mid-term	Final	Attendance
20%	30%	?%	?%

Computer

A **computer** is a device that can be instructed to carry out an arbitrary set of arithmetic or logical operations automatically.

The ability of computers to follow a sequence of operations, called a **program**, make computers very flexible and useful.



History

Computer and hardware

Software and language

Networking and the web

I found that

<http://www.computerhistory.org/timeline/>

<http://www.explainthatstuff.com/historyofcomputers.html>

provide really great references.

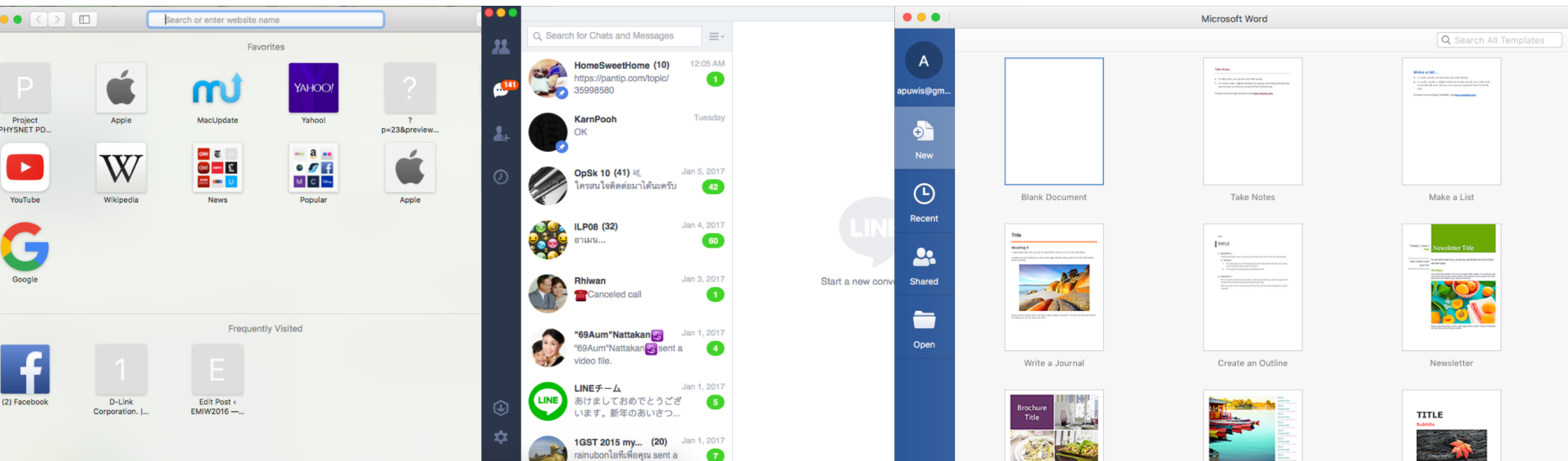
Introduction to

Programming

What is Programming?

“A computer program is a set of instructions.”

Every computer program is a series of instructions. A sequence of separate small commands, one after the other. This is to serve a purpose.



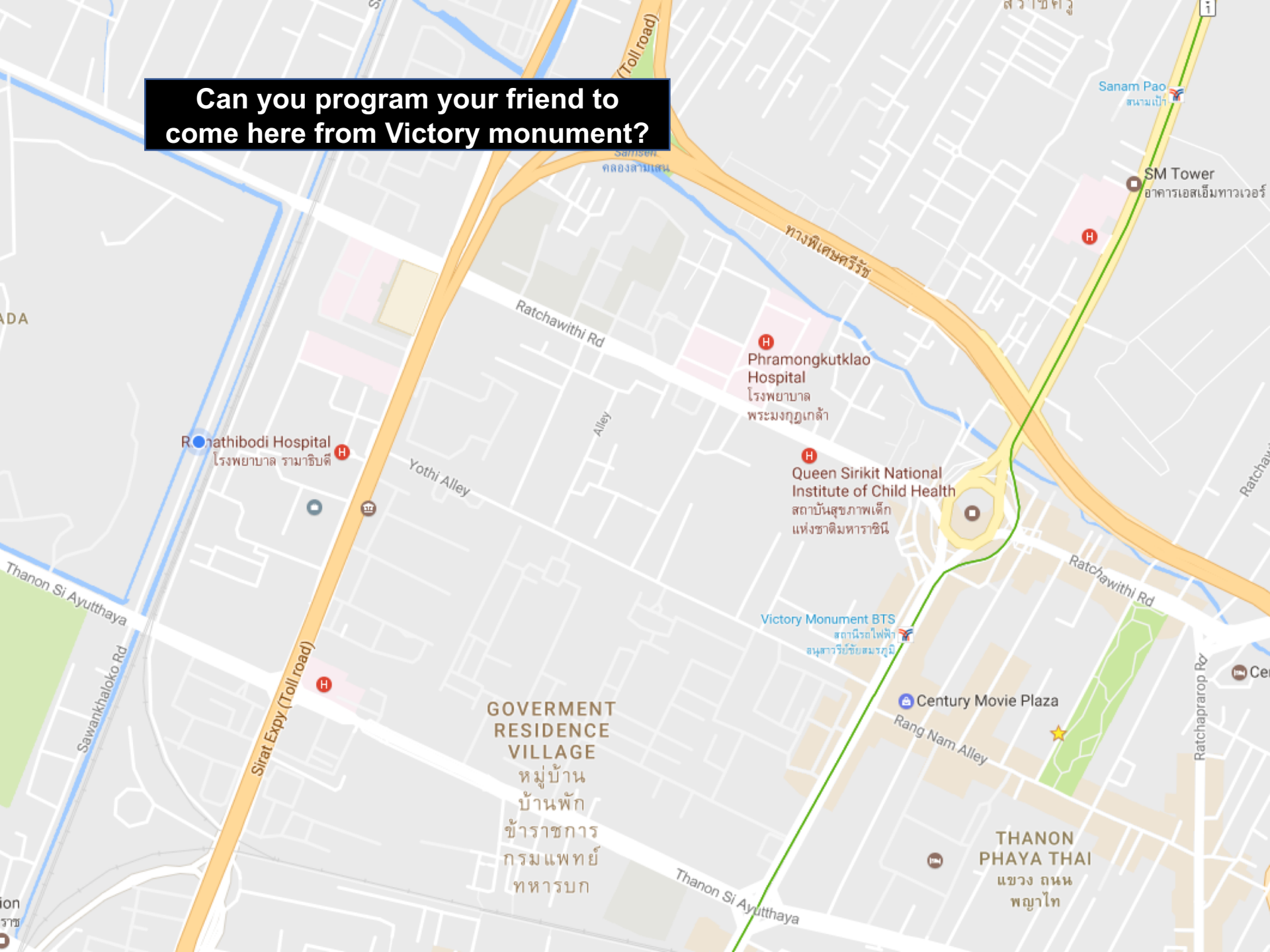
What is Programming?

**An idea or
a project**

Individual steps

Programming language

Can you program your friend to come here from Victory monument?



ถามเล่น ๆ

> อ.ภู อยากจะทราบเหลือเกินว่า ถ้า อ. นำเงิน 100,000.00 บาท ไปลงทุนในกองทุนรวมที่มีดอกเบี้ยทบต้นปีละ 3% เมื่อ อ. ภูอายุ 60 ปี เงินก้อนนี้จะมีมูลค่าเป็นเท่าไร

> แล้วถ้ากองทุนสัญญาว่าบริหารให้ดอกเบี้ยจะเพิ่มขึ้น 1% ในทุก ๆ 5 ปี เมื่อ อ. ภูอายุ 60 ปี เงินก้อนนี้จะมีมูลค่าเป็นเท่าไร

Programming language

Statement - sentence

Syntax- grammar/format

C

```
// My first C program#include
<stdio.h>int main()
{
    printf("Hello, World!\n");
    // displays Hello, World! on the screen
    return 0;
}
```

Python

```
print("Hello, World!")
```

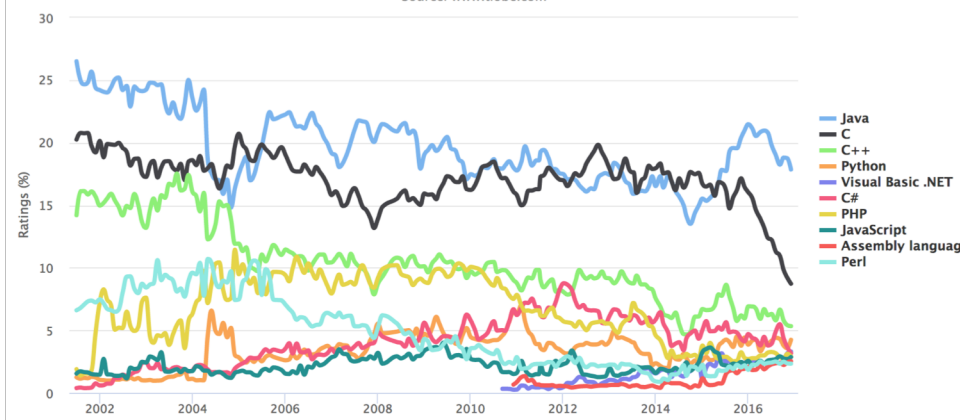
Source code

Worldwide, Jan 2019 compared to a year ago:

Rank	Change	Language	Share	Trend
1	↑	Python	25.95 %	+5.2 %
2	↓	Java	21.42 %	-1.3 %
3	↑	Javascript	8.26 %	-0.2 %
4	↑	C#	7.62 %	-0.4 %
5	↓↓	PHP	7.37 %	-1.3 %
6		C/C++	6.31 %	-0.3 %
7		R	4.04 %	-0.2 %
8		Objective-C	3.15 %	-0.8 %
9		Swift	2.56 %	-0.7 %
10		Matlab	2.04 %	-0.3 %

TIOBE Programming Community Index

Source: www.tiobe.com

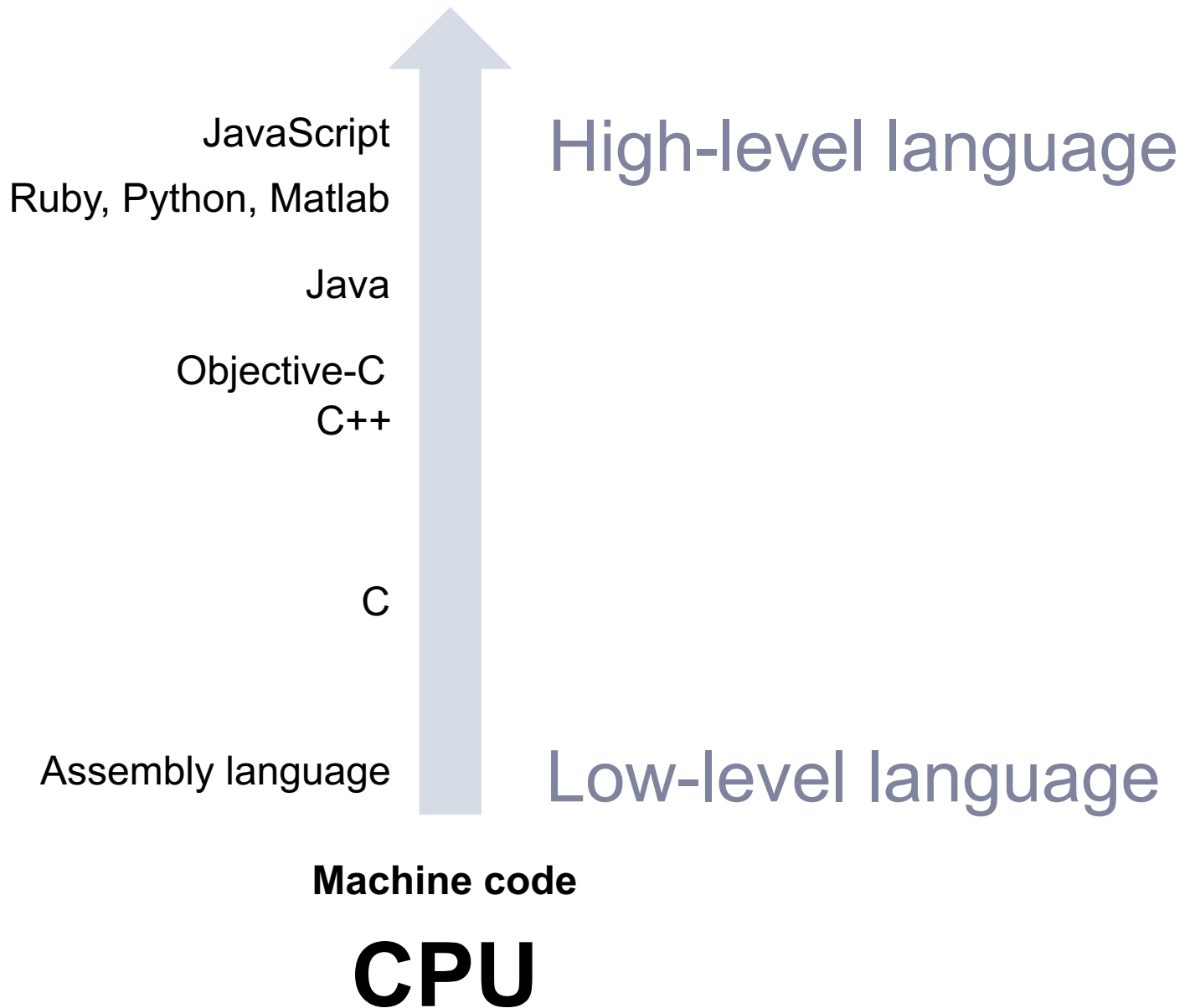


<http://spectrum.ieee.org/computing/software/the-2016-top-programming-languages>

Try: <http://pypl.github.io/PYPL.html>

Jan 2019	Jan 2018	Change	Programming Language	Ratings	Change
1	1		Java	16.904%	+2.69%
2	2		C	13.337%	+2.30%
3	4	↑	Python	8.294%	+3.62%
4	3	↓	C++	8.158%	+2.55%
5	7	↑	Visual Basic .NET	6.459%	+3.20%
6	6		JavaScript	3.302%	-0.16%
7	5	↓	C#	3.284%	-0.47%
8	9	↑	PHP	2.680%	+0.15%
9	-	↑↑	SQL	2.277%	+2.28%
10	16	↑↑	Objective-C	1.781%	-0.08%
11	18	↑↑	MATLAB	1.502%	-0.15%
12	8	↓↓	R	1.331%	-1.22%

Try: <http://www.tiobe.com/tiobe-index/>



We will use (for scientific research)

C and Python
also Matlab

* Other languages is also fine, if preferred.

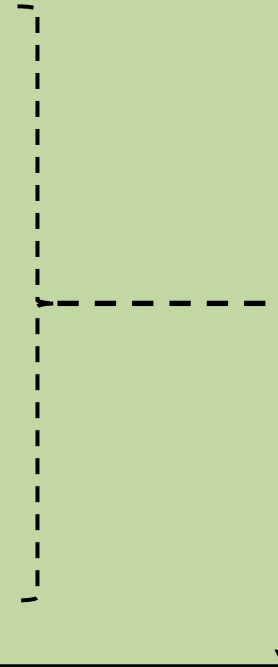
Get Started...

Setting up
programming
environment

See: www.programiz.com

What do you need for your first program

- A computer (with an OS)
- A preferred programming language
- Text (code) editor
- A compiler or an interpreter
- Lines of code
- A debugger
- A display



Online coding engine

<https://repl.it>

<https://www.tutorialspoint.com/codingground.html>

IDE

(integrated development environment)

See you next
week...