

# Introduction to Coding in Python

Fermilab - TARGET 2017  
Week 1



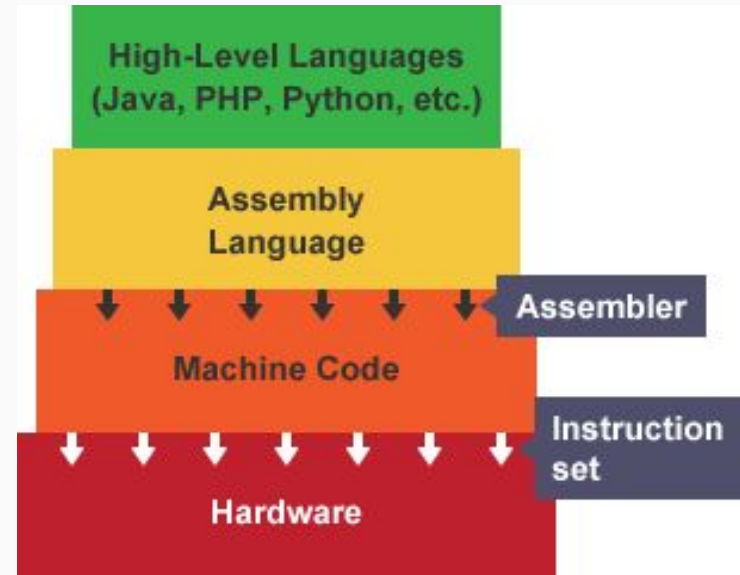


# Low to High Level Programming Languages

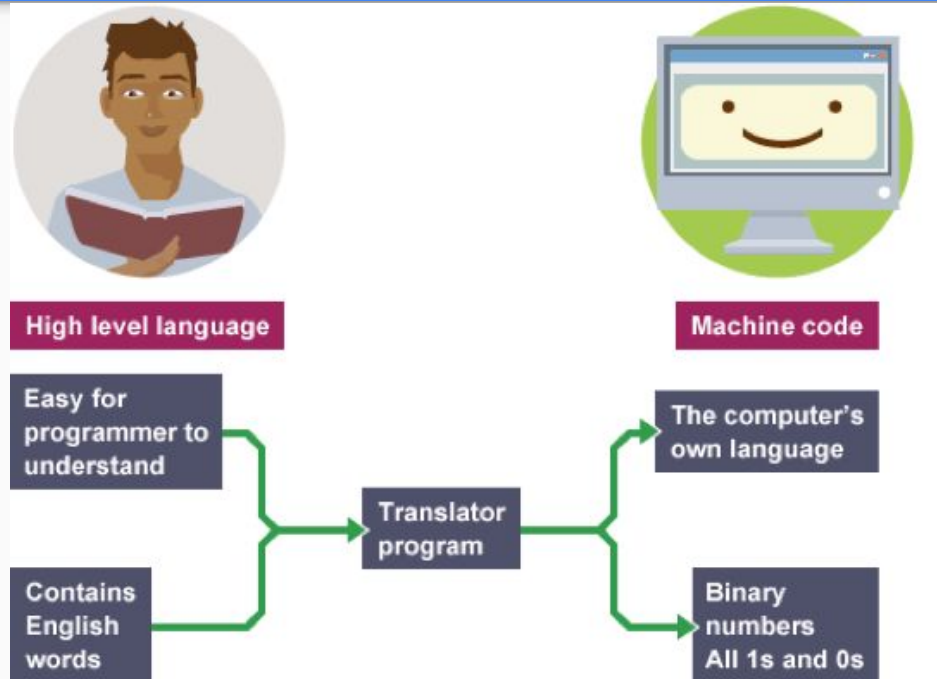
Machine code - computers hardware understand binary numbers

Assembly - 1 to 1 mapping to computer instructions

(High level) Programming language - simpler and more understandable, need to be translated for the computer



# Compiler or Interpreter



# Programming language

A programming (or coding) language is a set of syntax rules that define how code should be written and formatted.

- Python
- Java
- Scala
- JavaScript
- SQL
- Swift
- C, C++, C#
- FORTRAN

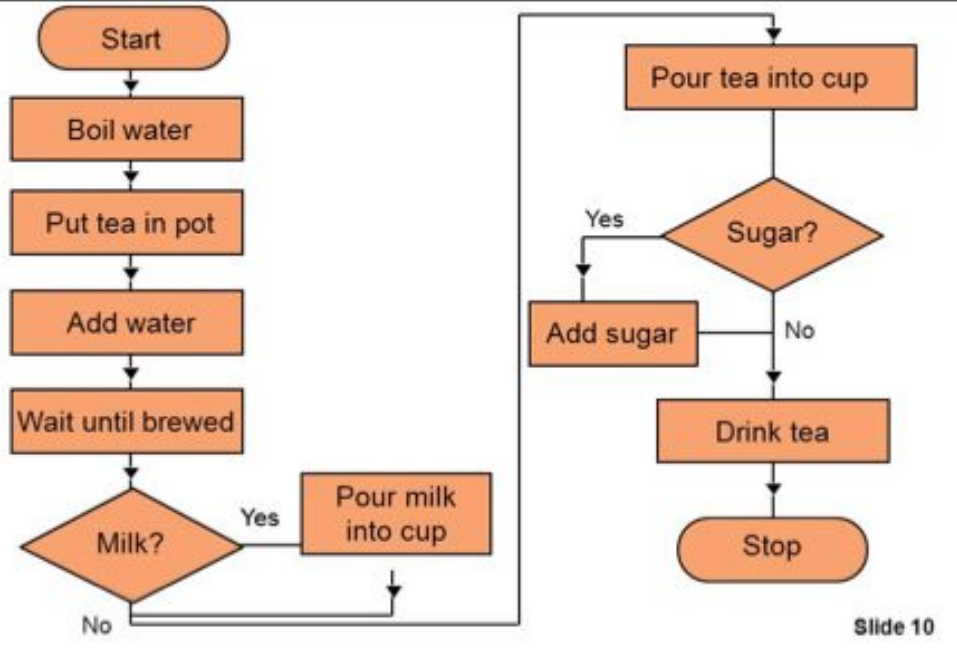


# Algorithm

Self-contained step-by-step set of operations to be performed to solve a specific problem or a class of problems



# Algorithm: Flowchart and Pseudocode



Start

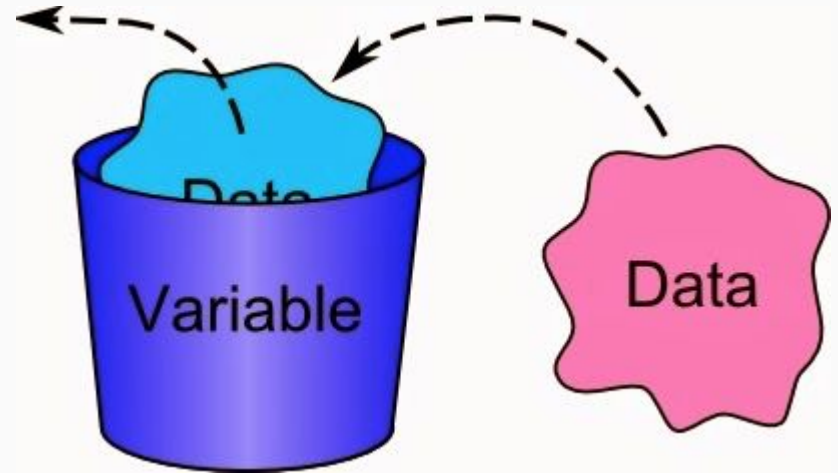
```
| Boil water  
| Put tea in a pot  
| Add water  
| Wait until brewed  
| If (Milk?)  
| | Pour milk into cup  
| EndIf  
| Pour tea into cup  
| If (Sugar?)  
| | Add sugar  
| EndIf  
| Drink tea
```

Stop

# Variable

Variables are used to store information to be referenced and manipulated in a computer program

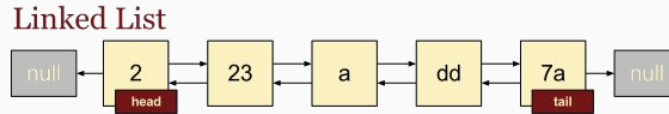
Variables have a name, value, representation, a type



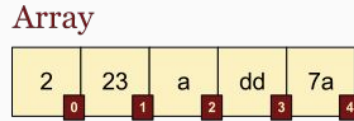


# (Complex) Data Structures

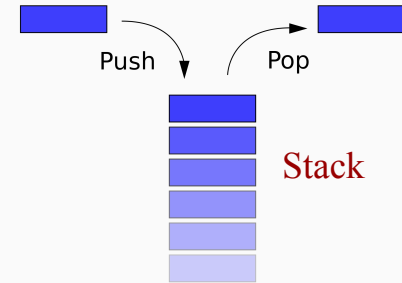
List



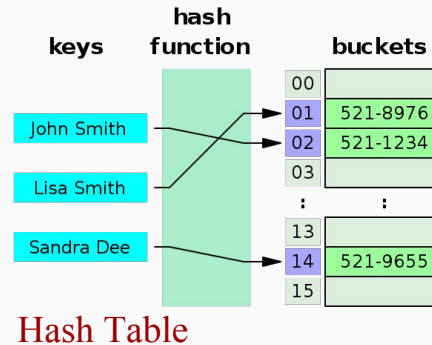
Array



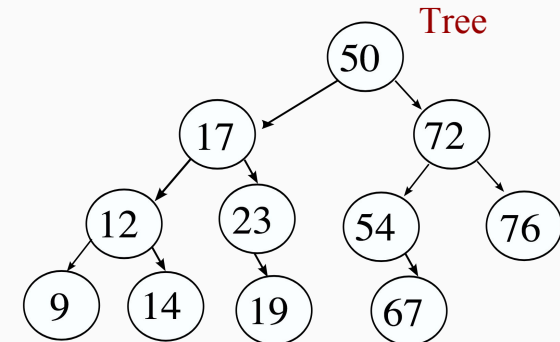
Stack



Hash Table (Map/Dictionary)



Tree



Software - Global term for all the components (programs) distinct to hardware that tell a device what to do and how to behave

Application - A type of software that does a certain task. Intended for a particular platform or device. Often needs user interaction to function

Program - (algorithm + data structures) Sequence of instructions that comply the rules of a specific programming language, written to perform a specified task with a computer

# If you have an idea for an Application then

- Write down the algorithm to sketch out your ideas
- Use your own words
- Think about data structures
- Select a programming language
- Only then write the code (and remember to test it, deploy it, document it and use it!)

# Why Python

- You Can Use Python for Pretty Much Anything
- Python Is Beginner Friendly and can adapt to your style
- Python Saves Time (batteries are included!)
- Python is a requested skill and pays well
- Is the 2nd most popular programming language in the world
- Python Is Widely Used in Data Science
- All the Big Names use Python (major tech companies like YouTube, IBM, Yahoo, Dropbox, Quora, Mozilla, Instagram, and others)
- We use Python a lot at Fermilab

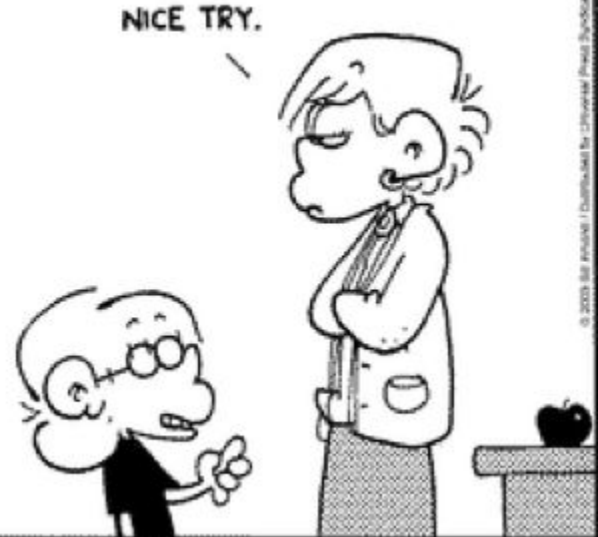
# Let's code!

```
#include <stdio.h>
int main(void)
{
    int count;

    for (count = 1; count <= 500; count++)
        printf("I will not throw paper airplanes in class.");

    return 0;
}
```

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# Acknowledgements

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Thanks to Pythonbytes, Indeeds, Dice, PYPL for news about Python popularity