# Programming Basics

## What is programming?

Before getting into computer programming, let us first understand computer programs and what they do. A computer program is a sequence of instructions written using a Computer Programming Language to perform a specified task by the computer. The two important terms that we have used in the above definition are: Sequence of instructions  Computer Programming Language To understand these terms, consider a situation when someone asks you about how to go to a nearby KFC. What exactly do you do to tell him the way to go to KFC?

You will use Human Language to tell the way to go to KFC, something as follows:

```
First go straight, after half kilometer, take left from
the red light and then drive around one kilometer and you
will find KFC at the right.
```

Here, you have used English Language to give several steps to be taken to reach KFC. If they are followed in the following sequence, then you will reach KFC:

```
1. Go straight
2. Drive half kilometer
3. Take left
4. Drive around one kilometer
5. Search for KFC at your right side
```

Now, try to map the situation with a computer program. The above sequence of instructions is actually a Human Program written in English Language, which instructs on how to reach KFC from a given starting point. This same sequence could have been given in Spanish, Hindi, Arabic, or any other human language, provided the person seeking direction knows any of these languages.

Now, let's go back and try to understand a computer program, which is a sequence of instructions written in a Computer Language to perform a specified task by the computer.

Following is a simple program written in Python programming Language:

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

```
Output :

Hello, World!
```

And yes we don’t require semicolon ” ; ” in python ! Although if you put a semicolon it will not cause any error ,but its not required.

The above computer program instructs the computer to print "Hello, World!" on the computer screen.

- A computer program is also called a **computer software**, which can range from two lines to millions of lines of instructions.
- Computer program instructions are also called program source code and computer programming is also called **program coding**.
- A computer without a computer program is just a dump box; it is programs that make computers active.

As we have developed so many languages to communicate among ourselves, computer scientists have developed several computer-programming languages to provide instructions to the computer (i.e., to write computer programs). We will see several computer programming languages in the subsequent chapters.

## Algorithm

From programming point of view, an algorithm is a step-by-step procedure to resolve any problem. An algorithm is an effective method expressed as a finite set of well-defined instructions. 9 Thus, a computer programmer lists down all the steps required to resolve a problem before writing the actual code.

Following is a simple example of an algorithm to find out the largest number from a given list of numbers:

```
1. Get a list of numbers L1, L2, L3....LN
2. Assume L1 is the largest, Largest = L1
3. Take next number Li from the list and do the following
4. If Largest is less than Li
5. Largest = Li
6. If Li is last number from the list then
7. Print value stored in Largest and come out
8. Else repeat same process starting from step 3
```

## Why Python ?

Python is a powerful high-level, object-oriented programming language created by Guido van Rossum.

It has simple easy-to-use syntax, making it the perfect language for someone trying to learn computer programming for the first time.

Python is a general-purpose language. It has wide range of applications from Web development (like: Django and Bottle), scientific and mathematical computing (Orange, SymPy, NumPy) to desktop graphical user Interfaces (Pygame, Panda3D).

### Numbers in python

- Numbers in Python have two main forms
  - Integers
  - Floating Point Numbers
- Integers are whole numbers, floating point numbers have a decimal in them
  - Integer: 23 Floating Point: 23.5

While Declaring you must not specify the data type because it will give you a syntax error.

### Strings

- Strings in Python are used to hold text information and are indicated with the use of single or double quotes.
- They are a sequence of characters, meaning they can be indexed using bracket notation.

### Lists

- Lists are Python’s form of Arrays.
- They behave very similarly to a Javascript Array.
- Let’s begin to understand their important features with Python!

## Dictionary

- Dictionaries are Python’s version of Hash Tables (Objects back in Javascript)
- They allow us to create a “mapping” with key-value pairs.
- They don’t retain any order!
- Let’s get started!

## Some Basic Syntaxes For Python ::

### Comments

These are lines code that are not executed while running that is these are the which are completely ignored by the python interpreter.Hence comments are generally used for documenting the code.
For example comments in python are written as :

```
# This is a one-line Python comment - code blocks are so useful!


"""This type of comment is used to document the purpose of functions and classes."""
```

### Declaration/Initialization

```
# Remember values, not variables, have data types.
# A variable can be reassigned to contain a different data type.
```

```
answer = 42


answer = "The answer is 42."
```

## Data Types

```
boolean = True
number = 1.1
string = "Strings can be declared with single or double quotes."
list = ["Lists can have", 1, 2, 3, 4, "or more types together!"]
tuple = ("Tuples", "can have", "more than", 2, "elements!")
dictionary = {'one': 1, 'two': 2, 'three': 3}
variable_with_zero_data = None
```

## Taking Input

```
# For taking input as strings

a=input(“Enter the String : “)

#For taking input as Int

a=int(input(“Enter Integer : “)

#For taking input as floats

a=float(input(“Enter Integer : “)

#For taking input as Boolean(True and False)

a=bool(input(“Enter Integer : “)
```

### Conditionals

```
if cake == "delicious":
    return "Yes please!"
elif cake == "okay":
    return "I'll have a small piece."
else:
    return "No, thank you."
```

### Loops

```
for item in list:
    print item

while (total < max_val):
    total += values[i]
    i += 2
```

### Functions

```
def divide(dividend, divisor):
    quotient = dividend / divisor
    remainder = dividend % divisor
    return quotient, remainder

def calculate_stuff(x, y):
    (q, r) = divide(x,y)
    print (q, r)
```

### HAPPY CODING

Hope this was helpful, if you still have doubts about anything you can ask me anytime !