**My python basic notes**

P[ython](https://www.geeksforgeeks.org/python-programming-language/) is a widely used general-purpose, high level programming language. It was created by Guido van Rossum in 1991 and further developed by the Python Software Foundation. It was designed with an emphasis on code readability, and its syntax allows programmers to express their concepts in fewer lines of code.

Python is a programming language that lets you work quickly and integrate systems more efficiently. There are two major Python versions: **Python 2 and Python 3**. Both are quite different.

**Reason for increasing popularity**

1. Emphasis on **code readability, shorter codes**, ease of writing
2. Programmers can express logical concepts in **fewer lines**of code in comparison to languages such as C++ or Java.
3. Python supports **multiple** programming paradigms, like object-oriented, imperative and functional programming or procedural.
4. There exists inbuilt functions for almost all of the frequently used concepts.
5. Philosophy is “Simplicity is the best”.

**LANGUAGE FEATURES**

* **Interpreted**
  + There are no separate compilation and execution steps like C and C++.
  + Directly *run* the program from the source code.
  + Internally, Python converts the source code into an intermediate form called bytecodes which is then translated into native language of specific computer to run it.
  + No need to worry about linking and loading with libraries, etc.
* **Platform Independent**
  + Python programs can be developed and executed on multiple operating system platforms.
  + Python can be used on Linux, Windows, Macintosh, Solaris and many more.
* **Free and Open Source;**Redistributable
* **High-level Language**
  + In Python, no need to take care about low-level details such as managing the memory used by the program.
* **Simple**
  + Closer to English language;Easy to Learn
  + More emphasis on the solution to the problem rather than the syntax
* **Embeddable**
  + Python can be used within C/C++ program to give scripting capabilities for the program’s users.
* **Robust**:
  + Exceptional handling features
  + Memory management techniques in built
* **Rich Library Support**
  + The Python Standard Library is very vast.
  + Known as the**“batteries included”** philosophy of Python ;It can help do various things involving regular expressions, documentation generation, unit testing, threading, databases, web browsers, CGI, email, XML, HTML, WAV files, cryptography, GUI and many more.
  + Besides the standard library, there are various other high-quality libraries such as the Python Imaging Library which is an amazingly simple image manipulation library.
* **Extendable :** Python is often referred to as a "glue" language, meaning that it is capable to work in mixed-language environment. The Python interpreter is easily extended and can add a new built-in function or modules written in C/C++/Java code.

EXAMPLE :

 simple program written in C++, C, Java and Python. All program prints "Hello world".

**Python Program:**

|  |
| --- |
| print ( "Hello World") |

**Java Program:**

|  |
| --- |
| public class Hello  {  public static void main(String argv[])  {  System.out.println(“Hello, World!”);  }  } |

**C++ Program:**

|  |
| --- |
| #include <iostream>  int main()  {  std::cout << "Hello World" << std::endl;  return 0;  } |

**C Program:**

|  |
| --- |
| #include <stdio.h>  int main(int argc, char \*\* argv)  {  printf(“Hello, World!\n”);  } |

**Major uses of python :**

* ystem utilities (system admin tools, command line programs).
* Web Development.
* Graphical User Interfaces (Tkinter, gtk, Qt).
* Internet scripting.
* Embedded scripting.
* Database access and programming.
* Game programming.
* Rapid prototyping and development.
* Distributed programming

**Organizations using Python :**

1. Google(Components of Google spider and Search Engine)
2. Yahoo(Maps)
3. YouTube
4. Mozilla
5. Dropbox
6. Microsoft
7. Cisco
8. Spotify
9. Quora

# Differences between Python 2.x and Python 3.x with examples

* 1. **print function**

This is the most well-known change. In this, the **print** keyword in Python 2.x is replaced by the **print()** function in Python 3.x. However, parentheses work in Python 2 if space is added after the **print** keyword because the interpreter evaluates it as an expression.   
 As we can see, if we use parentheses in python 2.x then there is no issue but if we don’t use parentheses in python 3.x, we get SyntaxError.

* 1. **Unicode:**

In Python 2, an implicit str type is ASCII. But in Python 3.x implicit str type is Unicode.

* 1. **Xrange**

xrange() of Python 2.x doesn’t exist in Python 3.x.

* 1. **Error Handling:**

There is a small change in error handling in both versions. In python 3.x, ‘as’ keyword is required.

# Python Variable

* A variable is a memory location where a programmer can store a value. Example : roll\_no, amount, name etc.
* Variables are created when first assigned.Variables must be assigned before being referenced.The value stored in a variable can be accessed or updated later.
* No declaration required. The type (string, int, float etc.) of the variable is determined by Python
* The interpreter allocates memory on the basis of the data type of a variable.

In other programming languages like *C, C++, and Java*, you will need to declare **the type of variable**s but **in Python you don’t need to do that**. Just type in the variable and when values will be given to it, then it will *automatically know whether the value given would be an int, float, or char or even a String.*

*EX: a = 3*

*A = 4*

*print (a) ; print (A)*

Python Variable Name Rule :

* Must begin with a letter (a - z, A - B) or underscore (\_)
* Other characters can be letters, numbers or \_
* Case Sensitive.Can be any (reasonable) length
* There are some reserved words which you cannot use as a variable name because Python uses them for other things.

**SYNTAX :**

<variable> = <expr>

**# MULTIPLE**

var1=var2=var3...varn= = <expr>

OR

var>, <var>, ..., <var> = <expr>, <expr>, ..., <expr>

## Global and Local Python Variables

**Local variables-**are the ones that are defined and declared inside a function. We can not call this variable outside the function

**Global variables-**  are the ones that are defined and declared outside a function, and we need to use them inside a function..

## Global keyword in Python

Global keyword is a keyword that allows a user to modify a variable outside of the current scope. It is used to create [global variables](https://www.geeksforgeeks.org/global-local-variables-python/) from a non-global scope i.e inside a function. Global keyword is used inside a function only when we want to do assignments or when we want to change a variable. Global is not needed for printing and accessing.

solve simple program on variable :

# Python Data Type

Type represents the kind of value and determines how the value can be used. All data values in Python are encapsulated in relevant object classes. Everything in Python is an object and every object has an identity, a type, and a value. To determine a variable's type in Python you can use the type() function. The value of some objects can be changed. Objects whose value can be changed are called mutable and objects whose value is unchangeable (once they are created) are called immutable

built-in data type of Python:

* [Numeric](https://www.geeksforgeeks.org/python-numbers/)- Iintegers, floating numbers, and complex numbers
* Sequence Type
* [Boolean](https://www.geeksforgeeks.org/boolean-data-type-in-python/)
* [Set](https://www.geeksforgeeks.org/sets-in-python/)
* [Dictionary](https://www.geeksforgeeks.org/python-dictionary/)

Iintegers, floating point numbers, and complex numbers. Integers represent negative and positive integers without fractional parts whereas floating point numbers represents negative and positive numbers with fractional parts

Ex :print("Type of a: ", type(5))

print("\nType of b: ", type(5.0))

c = 2 + 4j

print("\nType of c: ", type(c))

**Sequence Type**

In Python, a sequence is the ordered collection of similar or different data types. Sequences allow storing multiple values in an organized and efficient fashion. There are several sequence types in Python –

* **String**
* **List**
* **Tuple**

1. **String:** A string is a collection of one or more characters put in a single quote, double-quote or triple quote. In python there is no character data type, a character is a string of length one. It is represented by str class. Strings in Python can be created using single quotes or double quotes or even triple quotes.

#Creation of String  :

|  |
| --- |
| # String with single quotes  print('Welcome to the Geeks World')    # String with double quotes  print("I'm a Geek")    # String with triple quotes  print('''I'm a Geek and I live in a world of "Geeks"''' |

* [Boolean](https://www.geeksforgeeks.org/boolean-data-type-in-python/)(bool)

The simplest build-in type in Python is the bool type, it represents the truth values False and True