CHAPTER 1 [8M]

INTRODUCTION0 TO SYNTAX OF PYTHON PROGRA0MMING

TOPICS TO LEARN :-

1.1 Features of Python - Interactive, Object-oriented, Interpreted, Platform independent.

1.2 Python building blocks - Identifiers, Keywords, Indentation, Variables, Comments.

1.3 Python environment setup - Installation and working of IDE

1.4 Running Simple Python scripts to display 'welcome' message.

1.5 Python Data Types: Numbers, String, Tuples, Lists, Dictionary. Declaration and use of data types.

WHAT IS PYTHON ?

Python is a general-purpose, high-level, object-oriented programming Language that is used to build software, websites, and conduct data analysis. It was originally released in 1991.

1.1 FEATURES OF PYTHON :-

- Interactive –

  You can actually sit at a Python prompt and interact with the interpreter directly to write your programs.

- Object-Oriented -

  Python supports object oriented language and concepts of classes and objects come into existence.

- Interpreted -

  Python is an interpreted language i.e. interpreter executes the code line by line at a time. This makes debugging easy and thus suitable for beginners.

- Platform Independent -

  Python can run equally on different platforms such as Windows, Linux, Unix and Macintosh etc. So, we can say that Python is a portable language.

APPLICATIONS OF PYTHON :-

- Building a Dynamic Website -

  This is a very important application, as the new coder gets a chance to connect the logic with the web and hence displays the same in a coded and dynamic platform.

- Game Programming -

  Especially the logic ones: python is always the best platform for gaming, be it the snake and ladder or be it other highly interactive games.

- Implementing Color Detection Software -

  Python, if linked with the web can also put a check on the web programs and functions. This will helps to maintain your site with the best content

- Machine Learning -

  Python can be easily coded for flying bots and machines as well. It knows the easy maths to make work practical objects such as machines.

Some other Applications of Python are:

- WebScraping
- Automating a web browser
- DataAnalysis of bulk files
- Perform Scripting and series

1.2 Python Building Blocks :-

1. IDENTIFIERS :

A Python identifier is a name given to a function, class, variable, module or other objects that is used in Python program.

POINTS TO REMEMBER

1. An identifier can be combination of uppercase letters, lowercase letters, under scores and digits (0-9).
2. We can use underscores to separate multiple words in the identifier.
3. Identifier can be of any length.
4. We cannot use Python keywords as identifier.
5. Special character such as %, $, @ are not allowed within identifiers.

Ex.

Valid identifiers:

1. Var1
2. _var1
3. _1_var
4. Var_1

Invalid identifiers:

1. !var1
2. 1_var
3. var#1
4. var@1

2. VARIABLES:

A variable is nothing but a reserved memory location to store values. Variable is an entity to which the programmer can assign some values. Programmer choose the variable name which is meaningful.

POINTS TO REMEMBER

1. The variable names can be arbitrarily long.
2. They contain both letters and digits but they cannot start with a number.
3. Normally variable name should start with lower case letter.
4. The underscore character is allowed in the variable name.
5. Variable names must be meaningful

Ex.

VALID EXAMPLE:

```
# Variable 'x' stores the integer value 10
x = 5
# Variable 'name' stores the string "TANVI"
name = "TANVI"
```

INVALID EXAMPLE:

```
1name = "Error"  # Starts with a digit
class = 10       # 'class' is a reserved keyword
user-name = "Doe"  # Contains a hyphen
```

3. KEYWORDS :

The keywords are special words reserved for some purpose. For instance a variable name can not be from because it is a keyword.

List of Python Keywords				
and	as	assert	async	await
assert	class	assert	assert	del
elif	else	Except	Flase	finally
for	from	global	If	import
in	is	lambda	none	nonlocal
not	or	pass	raise	return
true	try	while	with	yield

REMEMBER ME

Keywords should not be used as a variable name, constant, function name or identifier in the program code.In Python keywords are case sensitive. keywords are used to define the syntax and structure of the programming language

4. INDENTATION :

Leading white space at the beginning of the logical line is called indentation. Python programs get structured through indentation, i.e. code blocks are defined by their indentation.Generally, four spaces are given to indent the statements which are a typical amount of indentation in python Indentation is the most used part of the python language since it declares the block of code.

The amount of indentation is up to us but it must be conisistent throughout the block.

If two statements are at the same indentation level, then they are the part of the same block.

Ex.

Indentation is Incorrect

```
if (condition){
print("...")
elif (condition){
print("...")
else{
print("...")
```

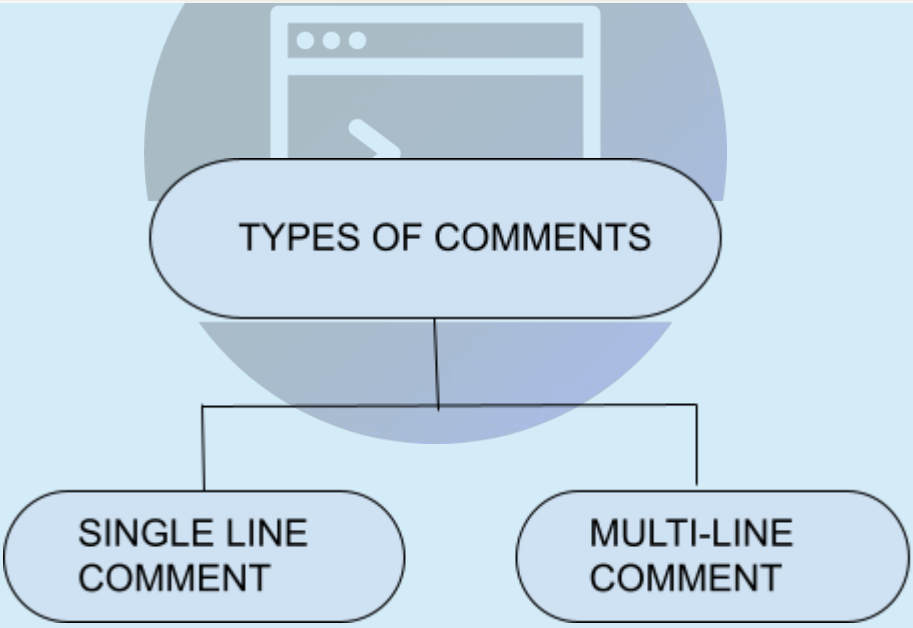
Indentation is Correct

```
if (condition){
    print("...")
elif (condition){
    print("...")
else{
    print("...")
```

5. COMMENTING :

Comments are the kind of statements that are written in the program for program understanding purpose. By the comment statements it is possible to understand what exactly the program is doing. Comments are generally used to explain the code.
We can easily understand the code if it has a proper explanation.

- In Python, we use the hash (#) symbol to start writing a comment.
- It extends up to the newline character.
- Python Interpreter ignores comment.



- **Single Line Comment (#):**

Single line comments are created simply by beginning a line with the hash (#) character, and they are automatically terminated by the end of line.

Ex.

```
# print is a statement
print( 'Hello Python? )
OR
print( 'Hello Python? )
# print is a statement
```

- **Multiple Line Comment (''')**:

Python does not provide the option for multiline comments. However, there are different ways through which we can write multiline comments. Another way of doing this is to use quotation marks (""""") or (''').

Ex.

```
''' this is multiple line comment
This is the program of python '''
print("hello world")
OR
print("hello world")
''' this is multiple line comment
This is the program of python '''
```

1.3 Python environment setup - Installation and working of IDE :

Downloading installing Python:

1. Go to www.python.org/downloads/
2. Download Python as per your system requirement

Installing python on windows:

1. Click on Python Releases for Windows, select the link for the latest Python3 Release – Python 3.x.x Installing python on Linux
2. Scroll to the bottom and select either Windows x86-64 executable Installer for 64-bit or Windows x86 executable installer for 32-bit

Installing python on Linux:

1. Open the Ubuntu Software Center folder
2. Select Developer Tools from the All Software drop-down list box
3. Double-click the Python 3.3.4 entry
4. Click Install
5. Close the Ubuntu Software Center folder

1.4 Running Simple Python scripts to display 'welcome' message :

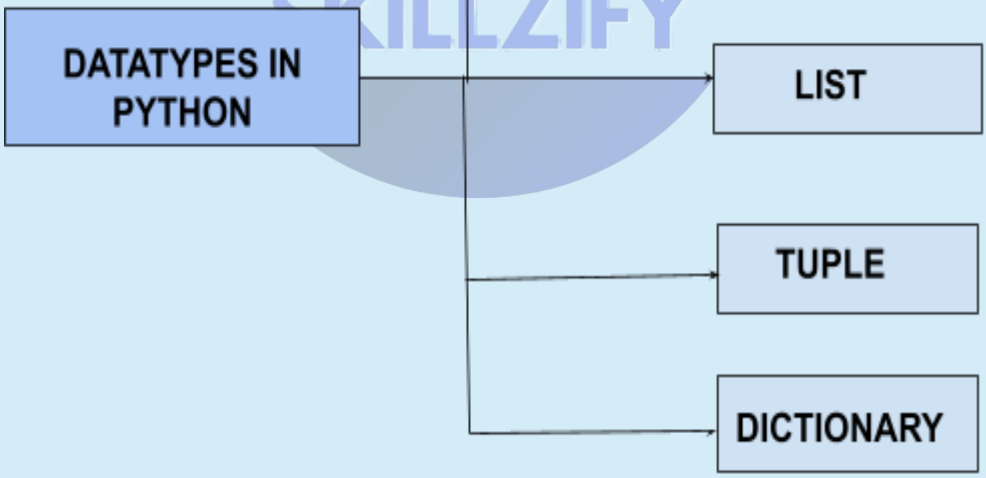
There are two modes for executing Python program namely Interactive mode Programming ang Script mode programming.

Unlike the other programming languages,
Python provides the facility to execute the code using few lines.
We can do this using one statement in Python.

LET'S RUN OUR FIRST PYTHON PROGRAM

1.5 DATATYPES IN PYTHON :

The type of data value that can be stored in an identifier/variable is known as its data type. In programming, data types is an important concept,variable can store data of different types and different types can do different things. Data types are used to define type of variable.



In Python there are five types of data type that are used commonly and those are :

1. NUMERIC :-
   Python numeric data type is used to hold numeric values.

- int- holds signed integers of non-limited length.
- long- holds long integers Introduction and Syntax of Python Program
- float- holds floating precision numbers and it's accurate upto 15 decimal places.
- complex- holds complex numbers.

Ex.

```
#creates a variable with integer value
a=5
print("Type of a:",type(a))

#creates a variable with float value
b=5.0
print("Type of b:",type(b))

#creates a variable with complex value
c=2+4j
print("Type of c:",type(c))
```

2. String :

String is a collection of characters.In Python, we can use single quote, double quote or triple quote to define a string. Any number, letter or symbol could be the part of string.

REMEMBER ME

- Once a string is created, it cannot be modified.
- Wecanuse two operators along with the string one is + and another is *.

Ex.

```
#String
str="Hello I'm Tanvi!"
print("String is ",str)
```


3. LIST:

It is similar to array in C or C++ but it can simultaneously hold different types of data in list. It is basically an ordered sequence of some data written using square brackets([]) and commas(,).

Ex.

```
#List of only Integers
a=[10,30,20,50]
print(a)
#List of only Strings
b=['tue','fri','mon']
print(b)
```

4. Tuple :

Tuple is a collection of elements and it is similar to the List. But the items of the tuple are separated by comma and the elements are enclosed in ( ) parenthesis.

Ex.

```
#Tuple of only integers
a=[10,30,20,50]
print(a)
#Tuple of only Strings
b=['tue','fri','mon']
print(b)
#Tuple of both Integers and Strings
b=['tue',1,'fri',4,7,'mon']
print(b)
```

5. DICTIONARY :

Dictionary is a collection of elements in the form of key:value pair. The elements of dictionary are present in the curly brackets. The dictionary data type is mutable in nature which means we can update modified any value in the dictionary.

> When we have the large amount of data, dictionary is used.

Ex.

```
a = {1: 'Red', 2: 'Blue', 3: 'Green'}
# Prints the keys and values
print(a)
# Prints the keys of the dictionary
print(a.keys())
# Prints the values of the dictionary
print(a.values())
```

Input through Keyboard :

In python it is possible to input the data using keyboard.
For that purpose, the function input() is used.

Syntax : input([prompt})

// where prompt is the string we wish to display on the screen. It is optional.

Ex.

```
a=input("Enter a Number")
Enter a Number: 10
a
```