

Unit I :- Introduction and Syntax of Python Program. - [8M]

Unit outcomes (UOS):-

- 1.a) Identify the given variables, keywords & constants in Python.
- 1.b) Use indentation, comments in the given program.
- 1.c) Install the given Python IDE and editor.
- 1.d) Develop the python program to display the given test.

* Python :-

- Python is an open source, object oriented, high level programming language.
- Developed by Guido van Rossum in 1990 to 1991.
- Python is used for web development software development, mathematics, System Scripting etc.
- Python works on different platforms (Windows, Mac, Linux, etc).

Application of python:-

- For developing desktop application

- For developing database Application

- For network programming

- For developing game

- For data analysis Application

- For Machine learning

- For developing AI application

- For IoT

CO-I Display message on screen using python script on IDE

1.1 * Features of Python :- + Lapbook 4M

① Simple :-

- Python is a simple programming language.

- When we read a python program we feel like reading a story book.

② Easy - to - learn :-

- Python uses very few keywords.

- its program use very simple structure, so developing programs in Python become easy.

③

Open - Source :-

- There is no need to pay for python software.

- Python can be freely downloaded from "www.python.org" website.

④

High level language :-

- A low level language uses machine code instructions to develop program.

- High level languages uses english words to develop programs. like COBAL, PHP or Java, Python also uses English words in its program and hence are called high level language.

⑤ Interactive :-

- Python is interactive.
- You can actually sit at python prompt and interact with interpreter directly to write your programs.

⑥ Object-oriented :-

- Python supports object-oriented language features such as classes, inheritance, object and overloading.

⑦ Interpreted :-

- Python programs are interpreted
- Interpreter executes code line by line at a time
- Python is processed at runtime by the interpreter
- You do not need to compile your program before executing it

(8) Platform independent:-

- Python programs can be developed and executed on multiple operating system platform.

(9) Integrated:-

- It can be easily integrated with language like c, c++, java, etc.

(10) Large standard library:-

- Python has large and broad library and provides rich set of modules and functions for rapid application development.

(11) GUI Programming Supports:-

- Graphical User interfaces can be made using a module such as PyQT5.

- PyQT5 is the most popular option for creating graphical apps with python.

(12) Portability:-

- Python language is portable language that is python code can run on any platform there is no need to change it.

1.2] Python Building Blocks:-

- These are following building blocks in Python programming:-

a) Identifier

b) Keywords

c) Indentation

d) Variable

e) Comments.

a) Identifier :-

- A python identifier is name used to identify a variable, function, class, module or other objects.

- An identifier starts with letters 'A' to 'Z' or 'a' to 'z' or an underscore (-) followed by zero or more letters, underscore and digits (0 to 9).

b) keywords :-

- Python keywords are special reserved words which convey a special meaning to the compiler / interpreter.

- Each keyword have special meaning and specific operation.

- following is the list of python keywords.

true	false	None	and	assert	as
def	class	continue	break	finally	else
elif	del	except	global	if	for
from	import	raise	try	class	or
pass	nonlocal	in	not	lambda	is

c) Indentation:-

- Most of programming languages like C, C++, Java uses braces {} to define block of code. Python uses indentation.

- Python uses whitespace (spaces and tabs) to define program blocks.

- The number of white spaces in the indentation is not fixed.

d) Variables:-

- A variable is a memory location where a programmer can store a value.

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- This means that when variable also known as identifiers and holds value.

e.g.: roll no, student name, etc...

- It is the basic unit of storage in a program.

Q4 Comments :-

- In python comment is begin with hash character (#).

- All characters after the hash (#) character and upto the end are part of the comment and the python interpreter ignores them.

1.34 Python environment Setup - Installation & working of IDE

- Installing Python on windows takes a series of few easy steps.

Step 01:- Select version of Python to Install.

- Python has various versions available with differences between the syntax and working of different versions of the language.

- There are different versions of Python 2 and Python 3 available.

Step 02 :- Download Python Executable Installer.

- On the web browser, in the official site of python (www.python.org) move to the Download for windows section.

- All the available versions of Python will be listed. Select the version required by you and click on download.

Step 03 :- Run Executable Installer.

- Suppose, we downloaded the python 3.9.1 windows 64 bit installer.

- Run the installer.

Step 04 :- Verify Python is installed on windows.

- To ensure if Python is successfully installed on your system. follow the given steps.

- ① Open the Command prompt
- ② Type 'python' & press enter
- ③ The version of the python which you have installed will be displayed if the python is successfully installed on windows

Step 05:- Verify Pip was installed:-

- Pip is a powerful package management system for python software packages.
- To verify if pip was installed, follow the given steps:-

① Open the Command prompt.

② Enter pip -v to check if pip was installed.

③ -

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

- Write a python program to print "Welcome to BSP".

Program:-

```
print("Welcome to BSP")
```

O/P =>

Welcome to BSP.

1.5) Python Data Types:-

- In programming, data type is an important concept.

- Python Data types are as follows.

a) Numbers

b) String

c) Tuples

d) Lists

e) Dictionary

a) Numbers:-

- Number stores numeric value.

e.g:-

Var.1 = 10 # integer

Var.2 = 2.5 # float

Var.3 = 1+2j # complex

- Var.1, Var.2 and Var.3 are numeric object in Python.

Program:-

Var.1 = 10

Var.2 = 2.5

Var.3 = 1+2j

print(type(Var.1))

print(type(Var.2))

print(type(Var.3))

O/P \Rightarrow

```
<class 'int'>
<class 'float'>
<class 'complex'>
```

Program 2 :-

```
a = 11          # int number
b = 123.56      # float number
c = 6j          # complex number
print ("Data type Number")
print ("Number data type as int =", a)
print ("Number data type as float =", b)
print ("Number datatype as Complex =", c)
```

O/P \Rightarrow

Data type Number

Number data type as int = 11

Number datatype as float = 123.56

Number datatype as Complex = 6j

by String :-

- String in Python are surrounded by either single quotation marks or double quotation marks.

- "Hello" and 'Hello' are same in python.

Program 3 :-

```
point ("hello")
point ('Hello')
```

O/P =>

hello

Hello.

Program 4:-

```
str = 'Welcome BSP !'
point (str)           # point complete string
point (str [0])       # point 1st character of str
point (str [2:5])     # point 3rd to 5th chae.
point (str [2:])      # Point starting from 3rd
point (str + "Test")  # point concatenated string
point (str * 2)        # point string 2 times.
```

O/P =>

Welcome BSP !

W

I

Come BSP !

Welcome BSP ! Test

welcome BSP ! Welcome BSP !

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Q9 List :-

- A list is a collection which is ordered and changeable.

- List is a group of comma separated values within square brackets and square brackets are mandatory (compulsory).

Program 5 :-

```
a = [10, 20, 30, 40, 50]
```

```
print(a)
```

```
print(type(a))
```

O/P :-

```
[10, 20, 30, 40, 50]
```

```
< class 'List' >
```

Program 6 :-

```
List1 = ['abcd', 786, 2.23, 'John', 70.2]
```

```
List2 = [123, 'John']
```

```
print(List1) # print complete list
```

```
print(List1[0]) # print 1st element of list
```

```
print(List1[1:3]) # print element starting from  
2nd till 3rd.
```

```
print(List1 + List2) # concatenate list
```

```
print(List2 * 2) # print List2 2 times.
```

O/P \Rightarrow

['abcd', 786, 2.23, 'John', 70.2]

abcd

[786, 2.23]

[2.23, 'Johan', 70.2]

['abcd', 786, 2.23, 'John', 70.2, 123,

'John']

[123, 'John', 123, 'John']

d) Tuples:-

- Tuple data type is exactly same as list data type except that it is immutable i.e. we can not change values.

- Tuple is read only version of list.

- We can represent tuple elements within parenthesis (round bracket) and parenthesis are not mandatory (compulsory).

e.g. $t = (10, 20, 30)$

$t_1 = 10, 20, 30,$

Program :-

$t = (10, 20, 30, 40)$

print(t)

print(type(t))

O/P:-

(10, 20, 30, 40)

< class 'tuple' >

Program 8:-

t = (10)

print(t)

print(type(t))

O/P =>

10

< class 'int' >

Program 9:-

t = (10,)

print(t)

print(type(t))

O/P:-

(10,)

< class 'tuple' >

Q) Dictionary:-

- A dictionary is a collection which is unordered, changeable and indexed.

- In python dictionary are written with in curly brackets , and they have keys and values .

Syntax:-

$d = \{ \text{key : value}, \text{key : value} \}$

Program 10:-

```
d = {'name': 'Rajiv', 'company': 'Siemens',  
      'age': 34}
```

print(d)

print(d['age']) # Print Complete Dic.

print(d.get('age')) # Print Age Value

print(d['company']) # Print Company Value

print(d['name']) # here get(). that will
O/P => be give same result.

```
{'name': 'Rajiv', 'company': 'Siemens', 'age': 34}
```

Siemens
Rajiv

classmate

Program 11:-

```
dict = { "brand": "Ford", "model": "Mustang",
         "year": 1964 }
print(dict)
```

O/P :-

```
{'brand': 'Ford', 'model': 'mustang', 'year': 1964}
```

Important Questions:-

- ① Enlist different features in python.
- ② Explain different features in python.
- ③ What are the significance of having indentation in python.
- ④ How to write comment statement in python.
- ⑤ List & explain different data types with example in python.