

Q1) What are the data types in Python? Explain

There are five types of Python:

- * Numbers
- * String
- * List
- * Tuple
- * Dictionary.

* Numbers:-

Integers, floating point numbers and complex numbers fall under Python numbers category. They are defined

as, int, float and complex classes in Python.

We can use the type() function to know which class a variable or a value belongs to.

Ex:- $a = 5$

```
print(a, "is of type", type(a))
```

```
a = 2.0  
print(a, "is of type", type(a))
```

```
a = 1+2j
```

```
print(a, "is complex number?", isinstance(1+2j, complex))
```

O/P: 5 is of type <class 'int'>

2.0 is of type <class 'float'>

(1+2j) is complex number? True.

* List:-

List is an ordered sequence of items. It is one of the most used datatype in Python and is very flexible. All the items in a list do not need to be of the same type ([]).

Ex:- $a = [5, 10, 15, 20, 25, 30, 35, 40]$

O/P:-

```
print("a[2] = ", a[2])
```

$a[2] = 15$

```
print("a[0:3] = ", a[0:3])
```

$a[0:3] = [5, 10, 15]$

```
print("a[5:] = ", a[5:])
```

$a[5:] = [30, 35, 40]$

* Tuple:
Tuple is an ordered sequence of items same as a list. The only difference is that tuples are immutable. Tuple once created cannot be modified. Tuples are used to write-protect data and are usually faster than lists as they cannot change dynamically. It is defined within parenthesis ()

Ex:- $t = (5, 'program', 1+3j)$

print("t[1] = ", t[1])

print('t[0:3] = ', t[0:3])

$t[0] = 10$.

O/P:- $t[1] = program$

$t[0:3] = (5, 'program', (1+3j))$

* Strings:

String is sequence of unicode characters. we can use single quotes or double quotes to represent strings. Multi-line strings can be denoted using triple quotes, """ or """.

Ex:- $s = "This is a string"$

print(s)

$s = """A Multiline String """$

print(s)

O/P:- This is a string

A Multiline

String

② Briefly explain history of Python?
The programming language Python was conceived on the late 1980s, and its implementation was started in December 1989 by Guido van Rossum at CWI in the Netherlands as a successor to ABC. Capable of exception handling and interfacing with the Amiga operating system.

Operating System.

Python 3.0, a major, backwards-incompatible release, was released on December 3, 2008 after a long period of testing. Many of its major features have also been backported to the backwards-compatible, while by now unsupported, Python 2.6 and 2.7.

③ Explain all the Operators in python?

Python Operators:-

Python Operators: These are used to perform mathematical operations like addition, subtraction, multiplication and division.

$$+ \rightarrow x+y, * \rightarrow x*y, // \rightarrow x//y, ** \rightarrow x**y, \\ - \rightarrow x-y, | \rightarrow x|y, \cdot \cdot \rightarrow x\cdot y$$

2. Relation Operator: These will compare the values. It either returns True or False according to the condition.

$$> \rightarrow x > y, == \rightarrow x == y, ! \Rightarrow x \neq y$$

3. Logical Operators: These perform logical AND, Logical OR, and Logical NOT operation.

\Rightarrow and \rightarrow x and y

$$\Rightarrow \alpha \rightarrow \chi \alpha \gamma$$

\Rightarrow not \Rightarrow not x

4. Bitwise Operators:- These operators acts on bits and performs bit by bit operation.

$$\& \rightarrow x \& y$$

$$| \rightarrow x | y$$

$$\sim \rightarrow \sim x$$

$$\wedge \rightarrow x \wedge y$$

$$\gg \rightarrow x \gg y$$

5. Assignment Operators: These are used to assign values to the variables.

$$\Rightarrow = \rightarrow x = y + z, \Rightarrow + = \rightarrow a + b \xrightarrow{a = a + b}$$

$$\Rightarrow - = \rightarrow a - b, \Rightarrow * = \rightarrow a * b \xrightarrow{a = a - b} \xrightarrow{a = a * b}$$

$$\Rightarrow / = \rightarrow a / b, \Rightarrow \% = \rightarrow a \% b \xrightarrow{a = a / b} \xrightarrow{a = a \% b}$$

$$\Rightarrow // = \rightarrow a // b, \Rightarrow ! = \rightarrow a! = b \xrightarrow{a = a // b} \xrightarrow{a = a! b}$$

$$\Rightarrow \& = \rightarrow a \& b \xrightarrow{a = a \& b}, \Rightarrow | = \rightarrow a! = b \xrightarrow{a = a! b}$$

$$\Rightarrow \wedge = \rightarrow a \wedge b \xrightarrow{a = a \wedge b}, \Rightarrow \gg = \rightarrow a \gg b \xrightarrow{a = a \gg b}$$

6. Special Operators:

These are some special type of operators like-
identify operators \rightarrow is, is not.

(4) Explain the features of Python?

1. Simple → The language is very easy to understand.
2. Easy to code → It is very easy to learn and code the program it is high level language.
3. Free and Open Source → It is freely available of official website and. This means that source code is also available to the public.
4. Object-Oriented language → One of the key features of python is OOPS programming. Python supports OOPS and concepts of classes, objects and encapsulation etc...
5. GUI Programming support → Graphical users interface can be made using a model such as pyqt5, wxpython or Tk in python.
6. High level languages → Python is high level language, when we write programs in python, we do not need to remember the system architecture, nor do we need to manage the memory.
7. Extensible feature → Python is extensible language we can write our some python code into C or C++ language.
8. Portable → Python is a portable language, A property of a program that can run on more than one kind of computer.
9. Interpreted language → Python is an interpreted language. because python code is executed line by line at a time

⑤ Justify why python is interactive interpreted language?

* Unlike c/c++ etc, python is an interpreted object oriented programming language.

Unlike C language, which is a compiled programming language. The compiler translates the whole code in one go rather than line by line. This is the reason why in C language all the errors are listed during compilation only.

An interpreter is a translator in computer language which translates the given code line by line in machine readable by terody

* Python is a interactive, when a python statement is entered, and is followed by the return key, if appropriate, the result will be printed on the screen, immediately in the next line.