

1. what the data types in python? Explain.

A. Data types are the classification of data items. Data types represent a kind of value which determines what operations can be performed on that data. Numeric, non-numeric and Boolean (true/false) data are the most used data types.

Python has the following standard or built-in data types:

→ Numeric :-

A numeric value is any representation of data which has a numeric value. Python identifies three types of numbers:

- Integer: positive (or) negative whole numbers (without a fractional part).
- Float: any real number with a floating point representation in which a fractional component is denoted by a decimal symbol (or) scientific notation.
- complex number: a number with a real and imaginary component represented as $x + yj$. x and y are floats and j is -1 (square root of -1 called an imaginary number).

→ Boolean :-

Data with one of two built-in values True (or) False. true and false are not valid booleans and python will throw an error for them.

→ Sequence type:-

A sequence is an ordered collection of similar (or) different datatypes. Python has the following built-in sequences data types:

- **String:** A string value is a collection of one (or) more characters put in single, double (or) triple quotes.
- **List:** A list object is an ordered collection of one or more data items, not necessarily of the same type, put in square brackets.
- **Tuple:** A tuple object is an ordered collection of one (or) more data items, not necessarily of the same type, put in parentheses.

→ Dictionary:-

A dictionary object is an unordered collection of data in a key: value pair form.

A collection of such pairs is enclosed in curly brackets. For example:

{1: "Charitha" 2: "Arha" 3: "Dream"}

Type() function

Python has an in-built function `type()` to ascertain the data type of a certain value. For example, enter `type(1234)` in Python shell and it will return `<class 'int'>`, which 1234 is an integer value. Try and verify the data type of diff values in Python shell.

as shown below.

→ class

`type(1234)`

<class 'int'>

`type(6+4j)`

<class 'complex'>

`type([1, 2, 3, 4])`

<class 'list'>

`type(55.50)`

<class 'float'>

`type("Hello")`

<class 'str'>

`type((1, 2, 3, 4))`

<class 'tuple'>

`type({})`

`type({1: "one", 2: "two", 3: "three"})`

<class 'dict'>

→ Mutable and immutable Objects :-

- Datatypes of the above types are stored in a computer's memory for processing. Some of these values can be modified during processing, but contents of others can't be altered once they are created in the memory.
- Number values, strings, tuple are immutable, which means their contents can't be altered after creation.
- On the other hand, collection of items in a list or Dictionary object can be modified. It is possible to add, delete, insert and rearrange items in a list or dictionary. Hence, they are mutable objects.

Q: Briefly explain history of python.

A: → Python is a general-purpose interpreted, interactive, object-oriented, and high-level programming language.

→ It was created by "Guido van Rossum" during 1985-1990. Python is named after a TV show called 'Monty Python's Flying Circus' and not after python-the snake.

→ It was mainly developed for emphasis on code readability, and its syntax allows programmers to express concepts in fewer lines of code.

→ Hence, you can use the programming language for developing both desktop and web applications. And also, you can use Python for developing complex scientific and numeric applications. Python is designed with features to facilitate data analysis and visualization.

→ Its accessible and versatile nature, Python is among the top five most popular languages in the world.

→ Python is used by Wikipedia, Google (where Van Rossum used to work), Yahoo!, CERN and NASA, among many other organizations. It is often used as "scripting language" for web applications.

→ Initially, it was developed in PHP. Later they rewrote the code in Python. "Python is a fast enough for our use and allows us to produce maintainable features in record time, with the minimum of developers," said "Cuong Do", Software Architect, Youtube.com. Python - most of the lines of code for Youtube are still in Python.

→ The Python programming language is widely used by companies around the world to build web apps, analyze data, automate operations via DevOps and create reliable, scalable enterprise applications.

→ Financial institutions, Python is widely-used across financial institutions, whether they are hedge funds, large banks or regulators. Python is used for data analysis, web application development or DevOps.

→ The Basic Data Types - Five types: strings, tuples, lists, dictionaries, and integers.

Operators - Python operators - basically, ways to do things. Flow control - By using Boolean expressions, flow control, and loops, you'll learn how to code logic into your program.

→ There are two major Python versions: Python 2 and Python 3. Both are quite different.

3. Explain all the operators in python.

A: 1. Arithmetic operators:

Arithmetic operators are used to perform mathematical operations like addition, subtraction, multiplication and division.

Operator	Syntax	Description
+	$x+y$	Addition: adds two operands
-	$x-y$	Subtraction: subtracts two operands
*	$x*y$	Multiplication: multiplies two operands
/	x/y	Division: divides the first operand by the second (float)
//	$x//y$	Division: divides the first operand by the second (floor)
%	$x\%y$	Modulus: returns the remainder when first operand is divided by the second
**	$x**y$	Power: Returns first raised to power second

2. Relational operators:

Relational operators compare the values. It either returns True or False according to the condition.

Operator	Syntax
>	$x > y$
<	$x < y$
=	$x == y$
!=	$x != y$
>=	$x >= y$
<=	$x <= y$

3. Logical operators:

Logical perform logical AND, logical OR and logical NOT operations.

Operator	syntax	Description
and	x and y	Logical AND: True if both the operands are true.
or	x or y	Logical OR: True if either of the operands is true.
not	not x	Logical NOT: True if operand is false.

4. Bitwise Operators:

Bitwise operators act on bits and performs bit by bit operation.

Operator	syntax	Description.
&	$x \& y$	Bitwise AND
	$x y$	Bitwise OR
~	$\sim x$	Bitwise NOT
^	$x \wedge y$	Bitwise XOR
>>	$x \gg y$ $x \gg$	Bitwise right shift
	$x \ll$	Bitwise left shift.

5. Assignment operators:

Assignment operators are used to assign values to the variables.

Operator	syntax	Description.
=	$x = y + z$	Assign value of right side of expression to left side operand.
+=		Add AND: Add right side operand with left side operand and then assign to left operand.
-=		Subtract AND: Subtract right side operand with left side operand and then assign to left operand.

$+=$ then assign to left operand
 $-$ subtract AND: ~~operand~~ operand
from right operand and
then operand from left
operand and then assign
to left operand.

$a += b$
 $a = a + b$
 $a -= b$
 $a = a - b$

$*=$ Multiply AND: multiply
right operand with left
operand and then assign
to left operand.

$a * = b$
 $a = a * b$

$/=$ Divide AND: Divide left
operand with right operand
and then assign to left
operand.

$a /= b$
 $a = a / b$

$\% =$ Modulus AND: Takes modulus
using left and right operands
and assign result to left
operand.

$a \% = b$
 $a = a \% b$

$// =$ Divide left operand with right
operand and then assign the
value (floor) to left operand.

$a // = b$
 $a = a // b$

$** =$ Exponent AND: calculate exponent
(raise power) value using operands
and assign value to left operand

$a ** = b$
 $a = a ** b$

$\& =$ performs Bitwise AND on operands
and assign value to left operand

$a \& = b$
 $a = a \& b$

$| =$ performs Bitwise OR on operands
and assign value to left operand

$a |= b$
 $a = a | b$

\wedge = Perform Bitwise XOR on operands and assign value to left operand $a \wedge b$
 $a = a \wedge b$

\gg = Perform Bitwise right shift on operands and assign value to left operand performs Bitwise left shift on operands and assign value to left operand.
 $a \gg b$
 $a = a \gg b$

6. Special Operators :-

There are some special type of operators like -

- Identity operators - is and is not are the identity operators both are used to check if two values are located on the same part of the memory. Two variables that are equal does not imply that they are identical.
- Membership operators - in and not in are the membership operators; used to test whether a value or variable is in sequence.

5. Justify why python is interactive interpreted language.

Python is interpreted oops language. By interpreted it is meant that each time a program is run the interpreter checks through the code for errors and then interprets the instructions into machine-readable bytecode. An interpreter is a translator in computer's language which translates the given code line-by-line in machine-readable bytecodes.

Python is 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. This is particularly advantageous in debugging process. Python is used in a similar way as the unix command line or the terminal. Python is very much helpful for the debugging purpose. It simply returns the prompt.

4. Explain the features of python.

A: There are many features in python, some of which are discussed below-

1. Easy to code:

Python is high level programming language. Python is very easy to learn language as compared to other language like C, C#, Java etc..

2. Free and open source:

It is freely available at official website and you can download it from the given python keyword.

3. Object-oriented language:

One of the key feature of python is object-oriented programming. Python supports also.

4. High level language:

Python is a 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.

5. Extensible:

Python is Extensible language. we can write our some python code into c or c++ language and also we can compile that code in c/c++ lang.

6. python is portable language,

python is also a portable language. for ex, if we have python code for windows and if we want to run this code on other platform such as linux, and Mac then we donot need to change it. we can run this code on any platform.