

Assignment - 2

321810306015

Q) What are the data types in Python? Explain.

A) 1) Numbers:- Number data types store numeric values. Number objects are created when you assign a value to them.

→ Numeric value can be integer, floating number or even complex numbers. These values are defined as int, float and complex class in Python.

2) Strings:- Strings in Python are identified as a contiguous set of characters represented in the quotation marks. Python allows either pair of single or double quotes. In Python, there is no character data type, a character is a string of length one. It is represented by str class.

Creating a string:- Strings in Python can be created using single quotes or double quotes or triple quotes.

Accessing elements of string:- In Python, individual characters of a string can be accessed by using the method of Indexing. Indexing allows negative address references to access characters from the back of the string.

Deleting / updating from a string :-

32181030605]

In python, updation or deletion of characters from a string is not allowed. This will cause an error because item assignment or item deletion from a string is not supported. This is because strings are immutable, hence elements of a string cannot be changed once it has been assigned.

3) Lists:- Lists are the most versatile of python's compound data types. A List contains items separated by commas and enclosed within square brackets ([]).

Creating a List:- List in python can be created by just placing the sequence inside the square brackets []. Unlike sets, list doesn't need a built-in function for creation of list.

Adding Elements to a List:- Elements can be added to the list by using built-in append function. Only one element at a time can be added to the list by using append() method.

Removing Elements to the List:- Elements can be removed from the list by using built-in remove() function but an error arises if element doesn't exist in the set. pop() function.

4) Tuples :- A tuple is another sequence data type that is similar to the list. A tuple consists of a no. of values separated by comma. Unlike lists, however, tuples are enclosed within parenthesis.

Creating a Tuple:-

In python, tuples can contain any no. of element and of any data type (like strings, integers, lists, etc---). Tuples can also be created with a single element, but it is a bit tricky.

Accessing element of a tuple :- In order to access the tuple items refer to the index number. use the index operator [] to access an item in a tuple. The index must be an integer.

Deleting/updating elements of a tuple:-

In python, deletion or updation of a tuple is not allowed. This will cause an error because updating or deleting from a tuple is not supported.

This is because tuples are immutable, hence elements of a tuple cannot be changed once it has been assigned.

5) Dictionary :- python dictionaries are kind of hash-table type. They work like associative arrays or hashes found in perl and consists

32181030605

of key-value pairs. A dictionary key can be almost any Python type, but are usually no numbers or strings. Values, on the other hand, can be any arbitrary Python object. Dictionaries are enclosed within curly braces.

- Q) Briefly explain ^{the features} history of Python?
- A) Python is developed by Guido van Rossum.

Guido van Rossum started implementing Python in 1989. Python is a very simple programming language so even if you are new to programming, you can learn Python without facing any issues.

Features of Python programming language

- 1) Readable:- Python is a very readable language.
- 2) Easy to Learn:- Learning Python is easy as this is a expressive and high level programming language, which means it is easy to understand the language and thus easy to learn.
- 3) Cross platform:- Python is available and can run on various operating system such as Mac, Windows, Linux, Unix etc.. This makes it a cross platform and portable languages.

4. Open Source:- Python is a open source programming language.

5. Large Standard Library:- Python comes with a large standard library that has some handy codes and functions which we can use while writing code in python.

6. Free:- Python is free to download and use. This means you can download it for free and use it in your application. See: open source python License. Python is an example of FLOSS, which means you can freely distribute copies of this software, read its source code and modify it.

7. Supports exception handling:- If you are new, you may wonder what is an exception? An exception is a event that can occur during program execution and can disrupt the normal flow of program.

Python supports exception handling which means we can write less error prone code and can test various scenarios that can cause an exception later on.

8. Advanced features:- Supports generators and list Comprehensions. we will cover these features later.

9. Automatic memory management:- Python supports automatic memory management which means the memory is cleared and freed automatically. you do not have to bother clearing the memory.

Q) Explain all the operators in python?

30/10/2024

A) i) Arithmetic operators :- Arithmetic operators are used to perform mathematical operations like addition, subtraction, multiplication and division.

<u>operator</u>	<u>Description</u>	<u>Syntax</u>
$+$	Addition	$x+y$
$-$	Subtraction	$x-y$
$*$	Multiplication	$x \cdot y$
$/$	Division	x/y
div	Divides the first operand by the second	x/y
$\%$	remainder returns the remainder when first operand is divided by the second	$x \% y$
$**$	Returns first raised to power second	$x ** y$

ii) Relational operators :- Relational operators compares the values. It either returns True or False according to the condition.

<u>operator</u>	<u>Description</u>	<u>Syntax</u>
$>$	Greater than	$x > y$
$<$	less than	$x < y$

= =

Equal to

3218103060151

!=

Operands are not equal

x != y

>=

Operand is greater than or equal to right

x >= y

<=

Operand is lesser than or equal to left

x <= y

3) Logical operators:- Logical operators perform Logical AND, Logical OR and Logical NOT operations

operator

Description

Syntax

And

Logical AND:

x and y

True if both the operands are true

OR

Logical OR: True

x or y

if either of the operands is true

not

Logical NOT:

not x

True if operand is false

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

<u>operator</u>	<u>Description</u>	<u>Syntax</u>
&	Bitwise AND	$x \& y$
	Bitwise OR	$x y$
~	Bitwise NOT	$\sim x$
^	Bitwise XOR	$x \wedge y$
>>	Bitwise right shift	$x >>$
<<	Bitwise left shift	$x <<$

5) Assignment operators :- Assignment operators are used to assign values to the variables.

<u>operator</u>	<u>Description</u>	<u>Syntax</u>
=	Assign value of right side of expression to left side operand	$x = x + z$
+=	Add right side operand with left side operand and then assign to left operand	$a += b$ $a = a + b$
-=	Subtract right operand from left operand and then assign to left operand	$a -= b$ $a = a - b$
*=	Multiply right operand with left operand and then assign to left operand	$a *= b$ $a = a * b$

Q) Briefly Explain the history of python? [321810306015]

A) Python is a widely used general-purpose, high level programming language. It was initially designed by Guido van Rossum in 1991 and developed by python Software Foundation. It was mainly developed for emphasis on code readability and its syntax allows programmers to express concepts in fewer lines of code. Python is named after a TV show called 'Monty Python's Flying Circus' and not after Python-the snake.

→ In the late 1980s, history was about to be written. It was that time when working on Python started. Soon after that, Guido van Rossum began doing its application based work in December of 1989 by at centrum wiskunde & informatica (CWI) which is situated in Netherland. It was started firstly as a hobby project because he was looking for an interesting project to keep him occupied during Christmas. The programming language which python is said to have succeeded is ABC programming Language, which had the interfacing with the Amoeba operating system and had the feature of exception handling.

5) Justify why python is interactive interpreted language?

A) Interpreted Python

unlike C/C++ etc... python is an interpreted object-oriented programming 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. And if any error is encountered it stops the translation until the error is fixed. 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.

Interactive python:-

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

321810306015

Screen, immediately, in the next line. This is particularly advantageous in the debugging process. In interactive mode of operation, python is used in a similar way as the Unix command line or the terminal.

→ Interactive Python is very much helpful for the debugging purpose. It simply returns the >>> prompt or the corresponding output of the statement if appropriate and returns error for incorrect statements. In this way if you have any doubts like: whether a syntax is correct, whether the module you are importing exists or anything like that, you can be sure within seconds using Python interactive mode.