20/06/20

Assignment - 01

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① what are the data types in python? Explain.

→ python has five standard data types:

- Numbers
- String
- List
- Tuple
- Dictionary

- Numbers:

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

1) Integer: positive or negative whole numbers (without a fractional part)

2) float: Any real number with a floating point representation in which a fractional component is denoted by a decimal symbol or the scientific notation

3) 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).

- String:

*Create String variables by enclosing characters in quotes. Python uses single quotes, double quotes and triple quotes to denote literal strings. only the triple quoted strings will automatically continue across the end of line statement.

* Strings can be accessed as a whole string, or a substring of

the complete variable using brackets [].

Ex:

```
var1 = 'Hello World'
var2 = 'Python'
print var1[0]
print var2[1:5].
```

- List:

*Lists are a very useful variable type in python. A list can contain a series of values. list variables are declared by using brackets following the variable name.

*All lists in python are zero-based indexed. When referencing a member or the length of a list the number of list elements is always the number shown plus one.

* Lists aren't limited to a single dimension. Although most people can't comprehend more than three or four dimensions. You can declare multiple dimensions by seperating with commas.

* In a two-dimensional array, the first number is always the number of rows;
the second number is the number of columns.

- Tuple:

* Tuples are a group of values like a list and are manipulated in similar ways. But tuples are fixed in size once they are assigned.

* In python the fixed size is considered immutable as compared to a list that is dynamic and mutable.

* Tuples are defined by parenthesis ().

* Advantages of tuples over lists:

- Elements to a tuple. Tuples have no append or

extend method.
- Elements cannot be removed from a tuple.
- you can find elements in tuple, since this doesn't change the tuple.

- Dictionary:
* Dictionaries in python are lists of Key:Value pairs. This is a very powerful datatype to hold a lot of related information that can be associated through keys.
* The main operation of a dictionary is to extract a value based on the Key name.
* Dictionaries can also be used to sort, iterate and to compare data.
* Dictionaries can be more complex to understand, but they are great to store data that is easy to acces.

② Briefly Explain history of python:
* python was concieved in the late 1980's by Guido van Rossum at centrum wiskunde & informatica in the Netherland. s as a successor to the ABC language, capable of Exception handling and interfacing with the Amoeba operating System.
* Python is a multi-pradigm programing language. Object Oriented programing and structured programing are fully Supported, and many of its features support functional Programming. Many other paradigms are Supported via extensions, including design by contract and also the logic programing.
* python uses dynamic typing and a combination of reference counting and a cycle-detecting gabage collector for memory

management.

* Python is meant to be an easily readable language. Its formatting is visually uncluttered, and it often uses English keywords where other languages use punctuation. Unlike many other languages that use punctuation, it does not use curly brackets to delimit blocks, and semicolons after statements are optional.

* Python uses whitespace indentation, rather than curly brackets or keywords, to delimit blocks. An increase in indentation comes after certain statements; a decrease in indentation signifies the end of the current block.

* Python interpreters are available for many operating systems. A global community of programers develop and maintains CPython, and open source reference implementation.

* Python's name is derived from the British comedy group Monty Python, whom Python creator Guido Van Rossum enjoyed while developing the language. Monty Python references appear frequently in Python code and culture. For example, the metasyntactic variables often used in Python literature are spam and eggs instead of the traditional foo and bar. The official Python documentation also contains various references to Monty Python routines.

* The prefix py- is used to show that something is related to Python. Examples of the use of this prefix in names of Python applications or libraries include Pygame, a binding of SDL to Python (commonly used to create games).

③ Explain all the operators in Python.

→ There are different types of python operators:

1) Arithmetic operators:

- These Arithmetic operators are used to perform mathematical operations like addition, subtraction, multiplication & Division.

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

2) Relational operators:

- These operators compares the values. it either returns

True or false according to the condition.

Operator	Description	Syntax.
>	Greater than: True if left operand is greater than the right. less than: True if left operand is less than the right.	x > y
==	True if both operands are equal	x == y
!=	True if operands are not equal.	x != y.
>=	Greater than / equal to: true if left operand is greater than or equal to the right. less than / equal to: True if left operand is less than / = to the right.	x >= y.

3) Logical operators:

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

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

4) Bitwise operators:

- These operators acts on bits and performs bit by bit operation.

operator	Description	Syntax
&	Bitwise AND	x & y
|	Bitwise OR	x | y
~	Bitwise NOT	~x
^	Bitwise XOR	x ^ y
>>	Bitwise Right shift	x >>
	Bitwise left shift	x

5) 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.

is	True if the operands are identical
is not	True if the operands are not identical

6) Membership Operators:

in and not in are the membership operators; used to test whether a value or variables is in a sequence.

in	True if value is found in the sequence
not in	True if value is not found in the sequence.

④ Explain the features of python:

→ Features of python are:

① Easy to Learn and use:

Python is easy to learn and use. it is developer friendly and high level programing language.

② Expressive Language:

Python Language is more expressive means that it is more understandable and readable.

③ Interpreted language:

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

④ Cross-platform Language:

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

⑤ Free and open source:

Python language is freely available at official web address. The source code is also available. Therefor it is an open source.

⑥ Object-oriented language:

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

⑦ Extensible:

it implies that other language such as c/c++ can be used

to compile the code and thus it can be used further in our python code.

⑧ GUI programing support.
Graphical user interfaces can be developed using python.

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 programing 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.