1. In the below elements which of them are values or an expression? eg:- values can be integer or string and expressions will be mathematical operators.

\*

'hello'

-87.8

-

/

6

**Answer:**

Values are ‘hello’, -87.8, and 6.

Expressions are \*, -, /, and +.

2. What is the difference between string and variable?

**Answer:**

|  |  |
| --- | --- |
| String | Variable |
| It is a type of information declared with single or double quotes (‘’ or “”) in Python. | It is a stores of information or holds a value. |
| It is one of the data type in Python. | Variable types can be of integers, floats, boolean, string, list, dictionaries, tuple, etc. |
| Example: “My name is Debabrata” | Example: A = “My name is Debabrata”  Here A is a variable that holds or stores string information: My name is Debabrata. |

3. Describe three different data types.

**Answer:**

Pyhton has numerous built-in data types, out of which following are the three useful data types presented: numeric type, sequence type, and mapping type.

*Numeric types:*

In Python following three numeric type presents, such as int, float, and complex data types. Int or integer represented as a whole number either positive or negative without any decimal places with it. Float data types consist of a number either positive or negative with one or more decimal numbers. Complex number represented with real and imaginary part and the imaginary part represented through symbol i or j.

Int example: X = 10

Float example: X = 1.15

Complex data type example: X = 10 + 5\*i

*Sequence types:*

Following three sequence types present in Python: string, list, and tuple. Sequence types are a collection of items that can access by a particular index number. String is a group of characters that can be alphanumeric and special symbols with or without spaces in-between. It is denoted by single quotes (‘’) or double quotes (“”) or triple quotes (“”””””). List in Python used to store collections of data with different data types. List is denoted by square brackets (‘[]’) and objects in list can be mutable.

Example of string:

S1 = ‘Hi’

S2 = "Ram's car"

S3 = “””Hello,

World!”””

Example of list:

L = [“I”, “am”, “Debabrata”]

Similar to list, tuple also store collections of data with different data types and objects in tuples are immutable. It is denoted by parentheses (‘()’).

Example of tuple:

T = (“a”, “b”, “c”)

Or, T = “a”, “b”, “c”

*Mapping data type:*

This is an unordered and mutable data type. The dictionary data type in Python is a type of mapping data type. The dictionary is denoted by curly braces ({}). It is a collection of data items in the form of key-value pairs separated by using a colon (:).

Example of dictionary:

D1 = {“name”:”Debabrata”, “age”:38, “degree”:”Ph.D.”}

D2 = {'list1':[1,2,3,4,5], 'list2':[1,2,3]}

4. What is an expression made up of? What do all expressions do?

**Answer:**

An expression made up of operators and operands that are constructed according to the syntax of the language, which evaluates to a single value.

It is anything that has "a value" including function name as well. As for example: 3, 'Hello, World!', 2+2, math.sqrt(2), etc. all are expression.

Through expression we can combine values, variables, operators, and calls to functions. In Python, any sequence of literals, objects, function calls, identifiers combined through an expression with a variety of operators which results in a value regardless of whether of the resulting value is an object, or a number, or even a none.

5. This assignment statements, like spam = 10. What is the difference between an expression and a statement?

**Answer:**

An expression refers to a piece of code that evaluates to a value and used as operands. In the other hand, statement refers to a piece of code that executes a specific instruction or a complete line of code that performs some action. In the example above, the statement performs the action of assigning the variable spam with a value of 10.

6. After running the following code, what does the variable bacon contain?

bacon = 22

bacon + 1

**Answer:**

After running the above code one after one, the variable bacon will contain value of 22 only as the second line of code not replacing the first value of bacon variable since it is not executed as an expression; it is only executed as a statement to display result.

7. What should the values of the following two terms be?

'spam' + 'spamspam'

'spam' \* 3

**Answer:**

The value of the first term would be following: ‘spamspamspam’ as ‘+’ sign works as concatenation for string operation.

The value of the second term would be following: ‘spamspamspam’ as ‘\*’ sign works as repetition of the words or string in string operation.

8. Why is eggs a valid variable name while 100 is invalid?

**Answer:**

Generally, any programming language has set of rules to write code and perhaps, Python has too. In Python, following rules are mandatory to follow while declaring a variable name to avoid syntax error:

-> a variable name cannot be start with number

-> there cannot be a space in-between variable name

-> a variable name must be start with a letter followed by alphanumeric (A-Z, a-z, 0-9) or the underscore (\_) character

-> variable names are case-sensitive (capital letter and small letter are recognized as different variables)

-> special character not allowed apart from underscore (\_) while declaring variable name, etc.

Due to predefine coding rules and avoid syntax error in Python we cannot use 100 which is representing number as variable name but we can use eggs as variable name as it is start with letter.

9. What three functions can be used to get the integer, floating-point number, or string version of a value?

**Answer:**

Following three functions can be used to get the integer, floating-point number, or string version of a value:

int() function for integer;

float() function for floating-point;

str() function for string.

10. Why does this expression cause an error? How can you fix it?

'I have eaten ' + 99 + ' burritos.'

**Answer:**

This expression tries to concatenate string and integer value which is not possible in Python. In Python, string can concatenate with another string or multiple string.

To fix this expression, we need to convert the integer data type to string data type and then we have to concatenate complete string. Here is the fix:

‘I have eaten ‘ + str(99) + ‘ burritos.’