**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

**Ans: values: 'hello', -87.8, 6**

**expression: \*, -, /, +**

**2. What is the difference between string and variable?**

Variable is a container (reserved memory locations) to store different types of data values.

Whereas a string is a data type which can be assigned a variable to it and its value is stored in a memory location corresponding to an assigned variable.

for example, a = "akhil2001"

Here **a** is **variable** which is assigned a **string value** **"akhil2001"** to it.

**3. Describe three different data types.**

**1) int data type:**

a. int is a numeric data type (class 'int'). int data type contains whole numbers (i.e Positive and negative integers).

example: a= 23456, b= -9087, etc

b. There is no upper limit to the value of int data type that a variable can store.

c. int data type is not iterable.

d. other examples of numeric data type are: float and complex

**2)list data type:**

a. It is a sequence type data type (class 'list'). List is used to store multiple items of different data types in single variable.

b. list items are ordered, changeable(mutable), indexed and allow duplicates. list can be created by placing sequence (collection of data) in [] brackets.

c. since list is indexed and hence it is iterable.

d. example: l1 = [ 1 ,"shutdown", 3 ,(1 ,2 ,3 ),["Akhil", 1], {1 ,"a ","b "}, {"k1" : 123, 1 : 2}]

e. other example of sequence data type is set, tuple.

l1=[1,"shutdown",3,(1,2,3),["Akhil", 1], {1,"a","b"}, {"k1":123, 1:2}]

l1 is a list which contains following data types: int, str, tuple, list, set and dict.

**3)dictionary(dict):**

a. It is a mapping data type (class 'dict'). dict is collection of keys (keys must be unique in a dict) and value pair, which is ordered (as of python 3.7), changeable (mutable) and do not allow duplicates in keys but values can be repeated.

b. dictionary is created using {} and having key : value pair, key and value pairs are separated by ",".

c. example: d={"k1": "Akhil", "k2":1234, 1:[1,2,3,4], "name": {"k3":"sarma"}}

d. keys in dict d are 'k1', 'k2', 1, 'name' and values are 'Akhil', 1234, [1, 2, 3, 4], {'k3': 'sarma'}

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

a. The expression is made of values, variables, operators (arithmetic, bitwise, logical, comparison, etc), function calls ( ex. insert(), remove(), print(),append(),etc) and an expression always returns or produces a result value.

b. for example

a = 5, b = 7

c = a + b

In above example a, b, c are variables, 5 and 7 are values and + and = are operators

here a=5, b = 7 and c = a + b are three different expressions.

c. An expression always calculates/ evaluates to itself i.e expression always returns a value as a result of its evaluation

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

a. Any instruction that an interpretor can execute is called statement. a statement is smallest unit of code that can be executed like creating a variable, displaying a value, etc

b. Every line of code that we write is a statement. For example, print statement, if statement, for and while statement, etc

c. x=7 : it is a statement where value 7 is assigned to variable x.

print(x) : it is a print statement that displays the value of variable x.

d. difference between expression and assignment

1) an expression evaluates to a value whereas a statement executes something.

2) An expression can be made of several expressions but a statement can’t be made of other statements.

3) Expressions are mostly defined by users but statements are mostly predefined in programming language.

4) Most important, an expression is a section of code that evaluates to a value, but a statement is complete line of code that performs some action.

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

bacon = 22

bacon + 1

**Ans: After running the above code the bacon variable still contains value equal to 22.**

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

'spam' + 'spamspam' **equals to ‘spamspamspam’**

'spam' \* 3 **also equals to ‘spamspamspam’**

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

**Ans: Since 100 is a value and a value cannot be assigned to another value hence 100 is invalid variable.**

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

Ans: type casting functions.

1. To get **integer** version of value: **int() function**
2. To get **floating-point number** version of value: **float() function**
3. To get **string** version of value: **str() function**

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

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

**Ans:** Here,

‘I have eaten’ , is a string data type.

99 is integer data type

And ' burritos.' is again a string datatype.

Only same datatypes can be concatenated.

To fix this error we have to convert 99 into string by doing this ‘99’.

The correct code is: **' I have eaten ' + ‘ 99 ’ + ' burritos.'**