

1. What are the differences between operators and values in the following?

'hello'

-87.8

-

/

+

6

Ans:

***** → This is an operator which performs ***multiplication*** operation between operands.

- → This is an operator which performs ***subtraction*** operation.

/ → This is an operator which performs ***division*** operation.

+ → This is an operator which performs ***addition*** operation.

'hello', -87.8, 6 → These are the values that can be stored in a variable.

2. What is the difference between string and variable?

spam

'spam'

Ans:

- spam → variable
- 'spam' → string

String:

- String is a data type for a sequence of characters.
- These are arrays of bytes representing Unicode characters.
- Strings are represented by either single quotation marks, or double quotation marks.

Variable:

- variables are a storage placeholder for texts and numbers.
- Variables are references that are created to refer to other values.
- It is an identifier to store a value in a memory location.

3. Describe three different data forms.

Ans:

1. Quantitative data and Qualitative data:

- Quantitative data answers key questions such as “how many, “how much” and “how often”.
- Quantitative data can be expressed as a number or can be quantified. It can be measured by numerical variables.
- Quantitative data are easily manageable to statistical manipulation and can be represented by a wide variety

of statistical types of graphs and charts such as line, bar graph, scatter plot, and etc.

- Qualitative data cannot be expressed as a number and cannot be measured.
- Qualitative data consist of words, pictures, and symbols but not numbers.
- Qualitative data is also called categorical data because the information can be sorted by category, not by number.
- Qualitative data can answer questions such as “how this has happened” or and “why this has happened”.

Examples of quantitative data:

- The weight of a person or a subject.
- The temperature in a room.

Examples of qualitative data:

- Colors e.g., the color of the sea
- Favorite holiday destination such as Hawaii, New Zealand etc.

2. Nominal data and Ordinal data:

- Nominal data is used just for labeling variables, without any type of quantitative value.
- The name ‘nominal’ comes from the Latin word “***nomen***” which means ‘***name***’.
- The nominal data just names a thing without applying it to order. The nominal data could just be called “*labels*.”
- Ordinal data shows where a number is in order. This is the crucial difference from nominal types of data.

- Ordinal data is data which is placed into some kind of order by their position on a scale. Ordinal data may indicate superiority.
- We cannot do arithmetic with ordinal numbers because they only show sequence.
- Ordinal variables are considered as “in between” qualitative and quantitative variables.
- In other words, the ordinal data is qualitative data for which the values are ordered.
- In comparison with nominal data, the second one is qualitative data for which the values cannot be placed in an ordered.
- We can also assign numbers to ordinal data to show their relative position. But we cannot do math with those numbers. For example: “first, second, third...etc.”

Examples of Ordinal Data:

- The first, second and third person in a competition.
- When a company asks a customer to rate the sales experience on a scale of 1-10.
- Economic status: low, medium and high.

Examples of Nominal Data:

- Gender (Women, Men)
- Marital status (Married, Single, Widowed)

3. Discrete data:

- Discrete data is a count that involves only integers. The discrete values cannot be subdivided into parts.

- For example, the number of children in a class is discrete data. You can count whole individuals. You can't count 1.5 kids.
- In other words, discrete data can take only certain values. The data variables cannot be divided into smaller parts.
- It has a limited number of possible values e.g., days of the month.

Examples of discrete data:

- The number of students in a class.
- The number of workers in a company.
- The number of home runs in a baseball game.
- The number of test questions you answered correctly

4. Continuous data:

- Continuous data is information that could be meaningfully divided into finer levels. It can be measured on a scale or continuum and can have almost any numeric value.
- For example, you can measure your height at very precise scales — meters, centimeters, millimeters and etc.
- You can record continuous data at so many different measurements — width, temperature, time, and etc. This is where the key difference from discrete types of data lies.
- The continuous variables can take any value between two numbers. For example, between 50 and 72 inches,

there are literally millions of possible heights: 52.04762 inches, 69.948376 inches and etc.

- If the point of measurement can be reduced in half and still make sense, the data is continuous.

Examples of continuous data:

- The amount of time required to complete a project.
- The height of children.
- The square footage of a two-bedroom house.
- The speed of cars.

5.Primary and Secondary Data:

- Primary data means the raw data (data without fabrication or not tailored data) which has just been collected from the source and has not gone any kind of statistical treatment like sorting and tabulation. The term primary data may sometimes be used to refer to first-hand information.
- The sources of primary data are primary units such as basic experimental units, individuals, households.
- Secondary Data which has already been collected by someone, may be sorted, tabulated and has undergone a statistical treatment. It is fabricated or tailored data.

4. What makes up an expression? What are the functions of all expressions?

Ans:

- An expression is a combination of symbols like a variable, constants, and operators representing a value.
- An expression must have at least one operand (variable or constant) and have one or more operators.
- Expressions are representations of value. For example, any string is also an expression since it represents the value of the string as well.
- Python has some advanced constructs through which you can represent values and hence these constructs are also called expressions.
- Function of all expressions is to evaluate and return a value.

Example : $a+b*c-3$

5. In this chapter, assignment statements such as `spam = 10` were added. What's the difference between a declaration and an expression?

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

```
bacon = 22
```

```
bacon + 1
```

Ans:

bacon contains a value of **22**.

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

'spam' + 'spamspam'

'spam' * 3

Ans:

- **'spam' + 'spamspam' = 'spamspamspam'**
- **'spam' * 3 = 'spamspamspam'**

8. Why is it that eggs is a true variable name but 100 is not?

Ans: A variable name must start with a letter or underscore. Hence eggs is a valid variable. 100 is not a true variable name because a variable name cannot start with a number.

9. Which of the following three functions may be used to convert a value to an integer, a floating-point number, or a string?

Ans:

Function used to convert a value to an integer:

Ex: `a = int(4.3)`

`Print(a)`

Output: 4

Function used to convert a value to a floating-point number:

Ex: `b = float(3)`

Print(b)

Output: 3.0

Function used to convert a value to string:

Ex: c = str(8)

Print(c)

Output: '8'

10. What is the error caused by this expression? What would you do about it?

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

Ans:

Error: can only concatenate str (not "int") to str.

We must do type casting to convert the integer value to string.

'I have eaten ' + str (99) + ' burritos.'

(Or)

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