UNIVERSITY OF EXETER

Level 7 Research Scientist (MSc Data Science Professional): Python Driving Test

There is usually more than one way to solve any of these problems, so if you have a different solution it may still be correct if it answers the question.

Q1
Write a program that will:

- prompt the user to enter a vowel (i.e. one of a, e, i, o, u)
- validate user input by checking that the character entered is a vowel and, if not, prompt for another letter until a vowel is supplied
- display the letter they entered.

Example usage: If the user enters a, the program should display a. If the user enters x, they should be prompted for another letter (and so on, until a vowel is entered).

Q2
Write Python commands to declare an empty list called scores and then append to it the values 3, 2 and -5.

Q3
Write a Python program that uses a loop to display a sequence of 10 random integers between 0 and 100 (inclusive).

Q4
Write a function that takes two strings as input variables and then displays the similarity between them. If the strings are of different lengths, then similarity is 0. If the strings are the same length, then similarity is the proportion of characters within the strings that are the same at each position. Upper and lower case characters should be treated as equal, e.g. A and a are the same.

Example output is given in the table below:

First string	**Second string**	**Program output**
dog	carrot	Similarity is 0
Dog	doG	Similarity is 1
dog	dig	Similarity is 0.666666666667
meat	team	Similarity is 0.5

Q5
Write a conditional statement that compares the values of two numerical variables x and y.

The statement should display the appropriate message from the selection below, depending on the result of the comparison.

Possible messages:
"x is greater"
"y is greater"
"x and y are equal"

Q6
Write a command to perform this mathematical operation: $\frac{1-\sqrt{2}}{3+\sqrt{5}}$

Q7
Write a command that uses list slice notation to form a list called y containing the 3rd, 4th and 5th elements of the list x defined below.

```
x = ['a','b','c','d','e','f','g']
```

Q8
Write code to open a new text file called "output.txt" and write to it the text string "the eagle has landed".

Q9
Write a Python statement to convert the lower-case string "pirate" to upper-case characters.

Q10
Write a Python function called `list_average()`. This function should:

- take any list of numerical values as an argument
- find the mean (average) of all the values in the list
- return the mean value.

You may assume that a valid numerical list will always be supplied (i.e. you do not need to validate the argument). Your function may not use any built-in sum() or mean() functions. Below your function definition, include a statement that demonstrates your function with an appropriate function call.

Example usage: the function should return 5 when called with argument [5,4,6].