100+ Python challenging programming exercises

Level description

Level 1: Beginner means someone who has just gone through an introductory Python course. He can solve some problems with 1 or 2 Python classes or functions. Normally, the answers could directly be found in the textbooks.

Level 2: Intermediate means someone who has just learned Python, but already has a relatively strong programming background from before. He should be able to solve problems which may involve 3 or 3 Python classes or functions. The answers cannot be directly be found in the textbooks.

Level 3: Advanced. He should use Python to solve more complex problem using more rich libraries functions and data structures and algorithms. He is supposed to solve the problem using several Python standard packages and advanced techniques.

Level 1

01. Write a program which will find all such numbers which are divisible by 7 but are not a multiple of 5,

between 2000 and 3200 (both included).

The numbers obtained should be printed in a comma-separated sequence on a single line.

Hints: Consider use range method.

02. Write a program which can compute the factorial of a given number.

Suppose the following input is supplied to the program:

8

Then, the output should be:

40320

Hints: In case of input data being supplied to the question, it should be assumed to be a console input.

03. With a given integer number n, write a program to generate a dictionary that contains (i : i\*i) such that is an integer number between 1 and n (both included) and then the program should print the dictionary.

Suppose the following input is supplied to the program:

8

Then, the output should be:

{1: 1, 2: 4, 3: 9, 4: 16, 5: 25, 6: 36, 7: 49, 8: 64}

Hints: In case of input data being supplied to the question, it should be assumed to be a console input. Consider use dict().

04. Write a program which accepts a sequence of comma-separated numbers from console and generate a list and a tuple which contains every number.

Suppose the following input is supplied to the program:

34,67,55,33,12,98

Then, the output should be:

['34', '67', '55', '33', '12', '98']

('34', '67', '55', '33', '12', '98')

Hints: In case of input data being supplied to the question, it should be assumed to be a console input.

tuple() method can convert list to tuple.

05. Write a method which can calculate square value of number.

Hints: Using the \*\* operator

06. Define a class which has at least two methods:

getString: to get a string from console input

printString: to print the string in upper case.

Also please include simple test function to test the class methods.

Hints: Use \_\_init\_\_ method to construct some parameters.

07. Python has many built-in functions, and if you do not know how to use it, you can read document online or find some books. But Python has a built-in document function for every built-in functions.

Please write a program to print some Python built-in functions documents, such as abs(), int(), input() and add document for your own function.

Hints: The built-in document method is \_\_doc\_\_

08. Define a class, which have a class parameter and have a same instance parameter.

Hints: Define a instance parameter, need add it in \_\_init\_\_ method. You can init a object with construct parameter or set the value later.

Level 2

09. Write a program that calculates and prints the value according to the given formula:

Q = Square root of [(2 \* C \* D)/H]

Following are the fixed values of C and H:

C is 50. H is 30. D is the variable whose values should be input to your program in a comma-separated sequence.

Hints:

If the output received is in decimal form, it should be rounded off to its nearest value (for example, if the output received is 26.0, it should be printed as 26). In case of input data being supplied to the question, it should be assumed to be a console input.

10. Write a program which takes 2 digits, X,Y as input and generates a 2-dimensional array. The element value in the i-th row and j-th column of the array should be i\*j.

Suppose the following inputs are given to the program:

3,5

Then, the output of the program should be:

[[0, 0, 0, 0, 0], [0, 1, 2, 3, 4], [0, 2, 4, 6, 8]]

Hints:

Note: In case of input data being supplied to the question, it should be assumed to be a console input in a comma-separated form.