python-workbook-1

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This is a list of exercises on Python coding.
The goal is to provide an opportunity for everyone to evolve in the concept of coding.
Each exercise must be prepared in the least amount of lines possible, above to each exercise title there is a *target* for the number of lines.
You must be upload the solution in a specific repository in https://github.com/the-last-question .
Comments are necessary for you to explain each step of the code.
Each repository should have a readme with clear explanations of how to use the script.
The due date to upload your script in the repository is 04-september-2020.

Function Exercises

Functions allow a programmer to break a problem into pieces that can be reused. They can also help a programmer focus on one part a larger problem at a time. As a result, writing functions is often an important part of developing larger pieces of software. The exercises in this list will help you practice these skills:

- Define a function for later use
- Pass one or more values into a function
- Perform a complex calculation within a function
- Return one or more results from a function
- Call a function that you have defined previously

1-Median of Three Values

(42 Lines)
Write a function that takes three numbers as parameters, and returns the median value of those parameters as its result. Include a main program that reads three values from the user and displays their median.
Hint: The median value is the middle of the three values when they are sorted into ascending order. It can be found using if statements, or with a little bit of mathematical creativity.

2-The Twelve Days of Christmas

(48 Lines)
The Twelve Days of Christmas is a repetitive song that describes an increasingly long list of gifts sent to one's true love on each of 12 days. A single gift is sent on the first day. A new gift is added to the collection on each additional day, and then the complete collection is sent. The first three verses of the song are shown below. The complete lyrics are available on the internet.

On the first day of Christmas
my true love sent to me:
A partridge in a pear tree.
On the second day of Christmas
my true love sent to me:
Two turtle doves,
And a partridge in a pear tree.
On the third day of Christmas
my true love sent to me:
Three French hens,
Two turtle doves,
And a partridge in a pear tree.

Your task is to write a program that displays the complete lyrics for *The Twelve Days of Christmas*. Write a function that takes the verse number as its only parameter and displays the specified verse of the song. Then call that function 12 times with integers that increase from 1 to 12.
Each item that is sent to the recipient in the song should only appear once in your program, with the possible

exception of the partridge. It may appear twice if that helps you handle the difference between “A partridge in a pear tree” in the first verse and “And a partridge in a pear tree” in the subsequent verses.

3-Center a String in the Terminal

(31 Lines)

Write a function that takes a string of characters as its first parameter, and the width of the terminal in characters as its second parameter. Your function should return a new string that consists of the original string and the correct number of leading spaces so that the original string will appear centered within the provided width when it is printed. Do not add any characters to the end of the string. Include a main program that demonstrates your function.

4-Capitalize It

(48 Lines)

Many people do not use capital letters correctly, especially when typing on small devices like smart phones. In this exercise, you will write a function that capitalizes the appropriate characters in a string. A lowercase “i” should be replaced with an uppercase “I” if it is both preceded and followed by a space. The first character in the string should also be capitalized, as well as the first non-space character after a “.”, “!” or “?”. For example, if the function is provided with the string “what time do i have to be there? what’s the address?” then it should return the string “What time do I have to be there? What’s the address?”. Include a main program that reads a string from the user, capitalizes it using your function, and displays the result.

5-Does a String Represent an Integer?

(30 Lines)

In this exercise you will write a function named isInteger that determines whether or not the characters in a string represent a valid integer. When determining if a string represents an integer you should ignore any leading or trailing white space. Once this white space is ignored, a string represents an integer if its length is at least 1 and it only contains digits, or if its first character is either + or - and the first character is followed by one or more characters, all of which are digits.

Write a main program that reads a string from the user and reports whether or not it represents an integer. Ensure that the main program will not run if the file containing your solution is imported into another program.

Hint: You may find the lstrip, rstrip and/or strip methods for strings helpful when completing this exercise. Documentation for these methods is available online.

6-Is a Number Prime?

(28 Lines)

A prime number is an integer greater than 1 that is only divisible by one and itself. Write a function that determines whether or not its parameter is prime, returning True if it is, and False otherwise. Write a main program that reads an integer from the user and displays a message indicating whether or not it is prime. Ensure that the main program will not run if the file containing your solution is imported into another program.

7-Random Password

(33 Lines)

Write a function that generates a random password. The password should have a random length of between 7 and 10 characters. Each character should be randomly selected from positions 33 to 126 in the ASCII table. Your function will not take any parameters. It will return the randomly generated password as its only result. Display the randomly generated password in your file’s main program. Your main program should only run when your solution has not been imported into another file.

Hint: You will probably find the chr function helpful when completing this exercise. Detailed information about this function is available online.

8-Check a Password

(40 Lines)

In this exercise you will write a function that determines whether or not a password is good. We will define a good password to be a one that is at least 8 characters long and contains at least one uppercase letter, at least one lowercase letter, and at least one number. Your function should return true if the password passed to it as

its only parameter is good. Otherwise it should return false. Include a main program that reads a password from the user and reports whether or not it is good. Ensure that your main program only runs when your solution has not been imported into another file.

9-Arbitrary Base Conversions

(61 Lines)

Write a program that allows the user to convert a number from one base to another. Your program should support bases between 2 and 16 for both the input number and the result number. If the user chooses a base outside of this range then an appropriate error message should be displayed and the program should exit. Divide your program into several functions, including a function that converts from an arbitrary base to base 10, a function that converts from base 10 to an arbitrary base, and a main program that reads the bases and input number from the user.

10-Reduce a Fraction to Lowest Terms

(47 Lines)

Write a function that takes two positive integers that represent the numerator and denominator of a fraction as its only two parameters. The body of the function should reduce the fraction to lowest terms and then return both the numerator and denominator of the reduced fraction as its result. For example, if the parameters passed to the function are 6 and 63 then the function should return 2 and 21. Include a main program that allows the user to enter a numerator and denominator. Then your program should display the reduced fraction.

11-Reduce Measures

(83 Lines)

Many recipe books still use cups, tablespoons and teaspoons to describe the volumes of ingredients used when cooking or baking. While such recipes are easy enough to follow if you have the appropriate measuring cups and spoons, they can be difficult to double, triple or quadruple when cooking Christmas dinner for the entire extended family. For example, a recipe that calls for 4 tablespoons of an ingredient requires 16 tablespoons when quadrupled. However, 16 tablespoons would be better expressed (and easier to measure) as 1 cup.

Write a function that expresses an imperial volume using the largest units possible. The function will take the number of units as its first parameter, and the unit of measure (cup, tablespoon or teaspoon) as its second parameter. Return a string representing the measure using the largest possible units as the function's only result. For example, if the function is provided with parameters representing 59 teaspoons then it should return the string "1 cup, 3 tablespoons, 2 teaspoons".

Hint: One cup is equivalent to 16 tablespoons. One tablespoon is equivalent to 3 teaspoons.

12-Magic Dates

(26 Lines)

A magic date is a date where the day multiplied by the month is equal to the two digit year. For example, June 10, 1960 is a magic date because June is the sixth month, and 6 times 10 is 60, which is equal to the two digit year. Write a function that determines whether or not a date is a magic date. Use your function to create a main program that finds and displays all of the magic dates in the 20th century.

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