TFL115 - Exercise 2

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1 Introduction

In this exercise there are assignments which should help you understand what we covered in the lecture. This exercise is not mandatory and should not be delivered, however it will help you manage the mandatory exercise which is introduced later on. Please let us know if there are any problems with the exercise or you feel unable to solve the tasks.

Feel free to use Github or Bitbucket when solving the tasks, but please do use a private repository for the solutions.

2 General

- Create a function called `foo` which takes *one* numerical positional argument and returns the square of that number
- Create a function called `divide` which takes *two* numerical positional arguments (`input1` and `input2`) and returns `input1` divided by `input2`.

3 Weather

Given the following information:

- The probability of rain is 15%, snow 58% and the temperature is 14 degrees.

create a solution which solves the following:

- If it is warmer than 14 degrees, the program should advise me to use a t-shirt.
- If it is cooler than 14 degrees, the program should advise me to use a coat.
- If the probability of rain is larger than 12%, the program should advise me to use an umbrella
- If the probability of snow is larger than 54%, the program should advise me to stay inside.

4 Exam results

Create a solution which solves the following:

- Create a variable `passed`, which is either `True` or `False` and a variable `exam_result` which is my exam score.
- If the variable is `True`, and the `exam_result` is larger than 50%, the program should return "D was your grade"
- If the variable is `True`, and the `exam_result` is larger than 60%, the program should return "C was your grade"
- If the variable is `True`, and the `exam_result` is larger than 80%, the program should return "B was your grade"
- If the variable is `True`, and the `exam_result` is larger than 90%, the program should return "A was your grade"
- If the variable is `False`, and the `exam_result` is smaller than 50%, the program should return "F was your grade"

5 Palindrome

A palindromic number reads the same both ways. The largest palindrome made from the product of two 2-digit numbers is $9009 = 91 \times 99$.

Find the largest palindrome made from the product of two 3-digit numbers.

6 Smallest positive number

2520 is the smallest number that can be divided by each of the numbers from 1 to 10 without any remainder.

What is the smallest positive number that is evenly divisible by all of the numbers from 1 to 15 (inclusive)?

7 Sum square difference

The sum of the squares of the first five natural numbers is,

$$1^2 + 2^2 + ... + 5^2 = 55$$

The square of the sum of the first five natural numbers is,

$$(1 + 2 + ... + 5)^2 = 225$$

Hence the difference between the sum of the squares of the first five natural numbers and the square of the sum is

$$225 - 55 = 170$$

Find the difference between the sum of the squares of the first fifty natural numbers and the square of the sum.

8 Sum square difference - Extended

Create a program which is able to calculate the difference between the sum of the square of X natural numbers and the square of the sum (this will be like your solution over, except it will not be hard coded for the first 50 numbers, it will be a general solution).

9 Solutions

9.1 Palindrome: 906609

9.2 Smallest positive number: 360360

9.3 Sum square difference: 1582700