

Problem Set 4 - Getting started

Hello student,
the goal of this problem-set is to familiarize with the different control flow statements.

During last lectures you learned about the use of the string formatter, in this problem set you are expected to use it.

An example could be:

```
answer = 42
print(f"The meaning of life is {answer}!")
```

Which prints:
The meaning of life is 42!

Assignment 4.1 - Properties of the numbers (3 points)

Write a program that asks the user for two positive integer numbers and that determines:

- If the first number is a multiple of the second, print the result of the division.
- Print which number is bigger.
- If the difference between the first number and the second is bigger than the difference between the second and the first or viceversa.

```
Insert the first number: 4
Insert the second number: 2
The result of the division is: 2
4 is bigger than 2
The difference (4 - 2) is bigger than (2 - 4)
```

```
Insert the first number: 2
Insert the second number: 7
2 is smaller than 7
The difference (2 - 7) is smaller than (7 - 2)
```

```
Insert the first number: 15
Insert the second number: 15
The result of the division is: 1
The two numbers are equal
```

Assignment 4.2 - Range numbers (3 points)

Write a program that asks the user for one positive integer number between 0 and 100. If the number is not between the specified range, the program must print an error message, otherwise it should print in which range it is: between 0 and 10, 11 and 20, 21 and 30, ... , 91 and 100.

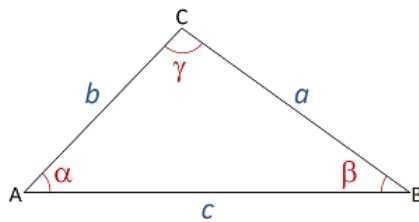
The output should be like this:

```
Insert a number between 0 and 100: 54
The number (54) is in the range between 51 and 60.
```

```
Insert a number between 0 and 100: -5
The number (-5) is not in the range between 0 and 100.
```

Assignment 4.3 - Law of cosines (3 points)

Write a program that, using the law of cosines, calculate the length of a side of a triangle, having only the two other sides and the angle between them.



$$a^2 = b^2 + c^2 - 2bc \cos \alpha$$

$$b^2 = a^2 + c^2 - 2ac \cos \beta$$

$$c^2 = a^2 + b^2 - 2ab \cos \gamma$$

Hint: Use the math library to do the calculation.

```
from math import radians, sqrt, cos
```

Hint 2: The angles' measure must be in radians.

Assignment 4.4 - Engines management (optional)

You are an engineer at NASA (Not Another Supsi Aircraft) and you need to write a piece of firmware (code) to manage the calibration of the engines of the new Falcon S (where "S" stays for Supsi).

These aircrafts have different engine-configurations depending on the field of application.

Your job is to write a software that is able to tell the maximum pressure the engines can hold (it is a steam-engine for some reason).

This calculation is based on the engine-type and the length of the aircraft.

The informations you got from the engineering team are:

- If the engine is of type 1 and the length of the aircraft is greater than 20m, the maximum pressure is 200 bar.
- If the engine is of type 2 and the length is between 10m (excluded) and 20m (included), or the engine is of type 1 and the length is less than 20m, the maximum pressure is 150 bar.
- If the engine is of type 3 or the length is less than 10m, the maximum pressure is 100 bar.
- Otherwise 50 is safe.

The program should work like this:

```
Insert the engine's type: 1
Insert the aircraft's length: 15
>>> The maximum pressure is 150 bar.
```

```
Insert the engine's type: 5
Insert the aircraft's length: 30
The maximum pressure is 50 bar.
```