The goal of this practice session is to get the student familiar with if sentence and loops.

Program 1: Calculate sine of an angle using the series

Write a program to request an angle in degrees and calculate the sine of an angle. To calculate the sine, use the following expression (being x the angle in radians):

$$x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$$

The program will first read the angle (in degrees) and the precision of the calculations (number of terms n of the series to be added, **validate this data using a loop**). Then, the angle is transformed into radians. Then, the program uses the series to calculate the sine of the angle.

After calculating the sine from the above series, we can apply the trigonometric functions of python (sin()) to calculate the sine and compare its value with the sine calculated from the series. Display the results of the program.

Note1: To calculate the <u>factorial</u> or <u>pow</u>() of a number use the corresponding functions of the module **math**.

Note2: To convert degrees to radians we can declare the constant **PI** or use the value from the module **math**.

Program 2: Menu program

Write a program to display the following menu on the screen:

> 1 – Area of a circle.
>
> 2 – Perimeter of a square.
>
> 3 – Perimeter of a triangle.
>
> 4-Exit.

According to the option selected by the user, the program will request the required input values, make the computation and display the result. Display an error message if the option selected by the user is not valid.

Note: The program has to continue as long as the user selects options 1 to 3. The program ends when the user selects option-4.

Program 3: Prime number

Write a program to determine if an integer number is prime or not. Display a message to indicate the results. The program repeats the operation many times by asking if the user wants to continue or not (use letters y/n).

Program 4: Calculate length

Write a program that asks for a length in feet and inches and converts it to centimeters. The program must **validate the value of length** to be positive before doing the calculations. **The program has to repeat as many times as indicated by the user** before starting the program (user has to indicate the number of times to repeat the program at the beginning of the program).

Note: 1 foot= 30.48 cm, 1 inch= 2.54 cm