Hacettepe University
Department of Electrical and Electronics Engineering
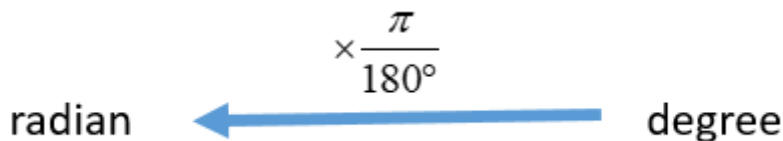ELE122 - Computers And Programming Laboratory

29.03.2021

Experiment 1

Q1) Consider that you are working on a project that uses math.h library for sine and cosine calculation, but one of your project members accidentaly deleted math.h file from your computer while removing old projects. Luckily you remember the Taylor Series approximation of sine and cosine functions from Calculus course and taking the first 5 terms is good enough for your calculation.

$$\cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \frac{x^8}{8!} - \dots$$

$$\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \frac{x^9}{9!} - \dots$$

Write a C program that calculates Taylor series approximations with first 5 terms for sine and cosine for an angle value user enters without using any part of math.h library.

*Hint 1: Remember the Taylor series uses angle x in **radians**. Do not forget to convert **degrees to radian** before calculation.*

Hint 2: You can define and use number PI in your code with "#define PI 3.14159".

Here is an example usage of the program you are supposed to write:

```
Please enter the angle in degrees: 60
cos(x): 0.50
sin(x): 0.87

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Process exited after 5.425 seconds with return value 0
Press any key to continue . . .
```

Q2) Consider that you are an engineer working on the statistics department of the big streaming company **BestFlix**. They want you to write a program that calculates the popularity of this season's movies. Your program is going to get watching counts from user and print the percentage of popularity for each movie, best movie of the season with highest percentage and worst movie of this season with lowest percentage. We are considering **total of 5 movies** and all of the **watching counts are different** for all the movies.

Here is an example usage of the program you are supposed to write:

```
How many peeople watched 'Nice Time'?
15000
How many peeople watched 'Emine Holmes'?
22000
How many peeople watched 'The Return of the Zoom'?
12000
How many peeople watched '21st Century Cats'?
1000
How many peeople watched 'The Turkishman'?
20000
'Nice Time' : 21%
'Emine Holmes' : 31%
'The Return of the Zoom' : 17%
'21st Century Cats' : 1%
'The Turkishman' : 29%
The best movie of this season is Emine Holmes with percentage 31%
The worst movie of this season is 21st Century Cats with percentage 1%
```