

1. Write a program to approximate the for sin function using Maclaurin series.

$$\sin(x) = \sum_{i=0}^n \frac{(-1)^i}{(2i+1)!} x^{2i+1}$$

(User input: number of iteration i and value x)

Display the difference between math.h sinus and Maclaurin sinus between  $[-\pi, \pi]$  with a step of 0.2

Try to improve previous version using (if needed):

$$(-1)^{i+1} = (-1)^i * (-1)$$

$$(2(i+1)+1)! = (2i+3)! = (2i+1)! * (2i+2) * (2i+3)$$

$$x^{2(i+1)+1} = x^{2i+3} = x^{2i+1} * x * x$$

2. Gauss Gaussian Elimination:

This method allows to solve a system of linear equations (For more information see, Wiki: [https://en.wikipedia.org/wiki/Gaussian\\_elimination](https://en.wikipedia.org/wiki/Gaussian_elimination))

According to this, coefficient matrix A(nXm) multiply by variable vector X(m) which gives the constant vector B(m):  $A \cdot X = B$ .

Note: n and m are the size of vector and matrix.

Use the equations given on wiki under Examples of the algorithm and solve them for x, y and z.

- a. Write a function to process equations to put this system in to triangular form.

(Hint: void Process\_func(float V[], float k, float W[], int n)

Where n is the length of V and W;

V, W and k are  $V \leftarrow V + kW$  2.

- b. Write program for Gaussian elimination.

```
(int n, m;
int max = 12;
float A[max][max];
float X[max];
float B[max];)
```