5)A sensor in a robotic arm needs to calculate the angle of rotation in real-time, but the hardware doesn't support built-in trigonometric functions. Develop a C program to approximate the value of sin(x) using a series expansion method for improved performance.

```
#include<stdio.h>
#include<math.h>
#define PI 3.142

int main()
{
        float x, sum=0,term, nume, deno;
        int degree,i;

        printf("Enter the degree: \n");
        scanf("%d", &degree );

        x = degree * (PI/180);      //covert degree to radian

        nume = x;
        deno = 1;
        i = 2;

        do
        {
              term = nume/deno;
              nume = -nume * x * x;
              deno = deno * i * (i+1);
              sum = sum + term;
              i = i + 2;
        } while(fabs(term) > 0.00001);

        printf("The sine value of %d is =%f\n", degree, sum );
        printf("According to built in function = %f\n",sin(x));
        return 0;
 }
```

OUTPUT:

```
Enter the degree : 30

The sine value of 30 is = 0.500059

According to built in function = 0.500059
```