ASSIGNMENT NO:6 **DATE:30/10/2014**

PROGRAM TITLE: Find the value of sin(π/4) using the sine series given by
sin(x) = x – x3/3! + x5/5! – x7/7! + x9/9! – … (use at least first 20 terms of the series to compute the value)

PROGRAM ALGORITHM:

```
algo sine()
{
      initialise sine to zero
      input deg
      convert deg to radian
      for(i=1 to 20)
      {
            if(i is even)
                  add deg raised to 2i+1 divided by fact of 2i+1 to sine
            else
                  subtract deg raised to 2i+1 divided by fact of 2i+1 from
sine
      }
      print sine
}
```

PROGRAM CODE:

```
/*C Program to find Sine of an Angle*/
#include <stdio.h>
#include <math.h>

/*Use user-defined function to find Factorial*/
double fact(int);
int main()
{
      int i;
      double deg,sine=0;

      /*Read the input*/
      printf("Enter the degree:");
      scanf("%lf",&deg);
      printf("The value of sin(%3.1lf) is: ",deg);

      /*Convert Degree to radian*/
      deg=3.142/180*deg;

      /*Run loop to find sum of 1st 20 terms*/
      for(i=0;i<20;i++)
      {
            if(i%2==0)
                  sine=sine+(pow(deg,2*i+1)/fact(2*i+1));
            else
                  sine=sine-(pow(deg,2*i+1)/fact(2*i+1));
      }
```

```
      printf("%6.4lf\n",sine);
      return 0;
}
double fact(int x)
{
      if(x==0)
            return 1;
      else
            return(x*fact(x-1));
}
```

OUTPUT:

Set 1:
```
Enter the degree:0
The value of sin(0.0) is: 0.0000
```

Set 2:
```
Enter the degree:30
The value of sin(30.0) is: 0.5001
```

Set 3:
```
Enter the degree:45
The value of sin(45.0) is: 0.7072
```

Set 4:
```
Enter the degree:60
The value of sin(60.0) is: 0.8661
```

Set 5:
```
Enter the degree:90
The value of sin(90.0) is: 1.0000
```

DISCUSSION:

This Program shows discrepancy when a large number(>700) is taken as input. That is the value shown by this function and the value generated by the inbuilt sin function in the math.h library do not come out as equal.