Name: …………….. KEY SOLUTION …….…………….…….………... **ID**: …………..…..…..................

The following Taylor series expansion gives an approximation of the function cos(x):

$$\cos x \quad = \quad 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \frac{x^8}{8!} - \dots \quad = \quad \sum_{n=0}^{\infty}(-1)^n \frac{x^{2n}}{(2n)!}$$

Write a complete C code that asks the user to enter x and the number n of terms used in the expansion. The code should run only once. **Note** that the angle x is given in radians; you need to convert it in degrees. Also your code should not use any function from the math.h library.

Sample Program Run:

```
Enter number of terms N: 3
Result may not be accurate !
```

```
Enter number of terms N: 20
Enter x in degrees: 45
cos(0.79 rd) = 0.7070
```

```c
// C program to find cos(x) series
#include <stdio.h>
const double PI = 3.142;
int main(void){
    double x, res, sign, term;
    int i, N;

    printf("Enter number of terms N: ");
    scanf("%d", &N);

    if(N<=4){
        printf("Result may not be accurate !\n");
        return 0;
    }
    printf("Enter x in degrees: ");
    scanf("%lf", &x);

    x = x*PI/180.0;

    res   = 1.0;
    sign  = 1.0;
    term  = 1.0;
    for(i = 1; i <= N; i+=2){
        sign = -sign;
        term = term*x*x/(i*(i+1));
        res  = res + sign*term;
    }
    printf("cos(%.2f rd) = %.4f",x,res);
    return 0;
}
```