```
/*  USER DEFINED HEADER FILE */

#include<stdio.h>
#include<math.h>
#include<stdlib.h>
#include<string.h>

int     sum( int  p  , int  q )
{
        return( p + q );
}
int     square ( int  p )
{
        return( p * p );
}
float   circle_area ( float  r)     // area of circle
{
        return ( 3.14 * r * r ) ;
}
 float   triangle_area ( float  b , float h )     // area of triangle
{
        return ( 0.5 * b * h ) ;
}
// save  -- >  my.h
```

```
        //  USE  HEADER FILE

#include “my.h”

   int    main()
   {
          float  r , t;

          printf(" enter radius\n ");

          scanf("%f", &r);  // input

          t = circle_area(r);    // fun. call

          printf(" area of circle = %f\n " , t); // print

   }
```

HEADER FILE (my1.h)

```
#include<stdio.h>

 int     fact ( int  n )
 {
        int  i , f = 1 ;

        for( i = 1 ; i <= n ; i++)
        {
f = f * i;
        }
return ( f );
 }
  int     power ( int  x , int  n )
 {
       int   i ,  p = 1 ;

       for ( i = 1 ;i <= n; i++)
       {    p = p * x ;
  }
       return(p);
  }
```

```
float   expn ( float  x , int n )
```

$1 + \frac{x}{\lfloor 1} + \frac{x^2}{\lfloor 2} + \frac{x^3}{\lfloor 3} + \ldots$

```
{
        int  i , f ;
        float  s = 1 ;

       for ( i = 1 ; i <= n ; i ++ )
       {
             f = fact(i) ;   // nested of function
       s = s + power(x,i) / f;
       }
return( s);
}
```

sinhx = $x^1/1! + x^3/3! + x^5/5! + ...$

```
float   sinhx ( float  x , int n )
{
        int i , f ;
        float  s = 0 ;

        for ( i = 1 ; i <= n ; i +=2 )
        {
                f = fact(i) ;   // nested of function
                s = s + power(x,i) / f;
        }
        return( s);
}
```

coshx = $1 + x^2/2! + x^4/4! + x^6/6! + ...$

```
float   coshx ( float  x , int n )
{
        int i , f ;
        float  s = 1 ;

        for ( i = 2 ; i <= n ; i +=2 )
        {
                f = fact(i) ;   // nested of function
```

```
                s = s + power(x,i) / f;
        }
        return( s);
}
```

sinx = $x^1/1! - x^3/3! + x^5/5! - .....$

```
float   sinx ( float  x , int n )
{
        int  i , f , t = 2 ;

        float  s = 0 ;

        for ( i = 1 ; i <= n ; i +=2 )
        {
                f = fact(i) ;
                s = s + power ( -1 , t ) * power(x,i) / f;

                t++;
        }
        return( s);
}
```

$\cos x = 1 - x^2/2! + x^4/4! - x^6/6! + ...$

```
float   cosx ( float  x , int n )
{
        int  i , f , t = 1;

        float  s = 1 ;

        for ( i = 2 ; i <= n ; i +=2 )
        {
                f = fact(i) ;

                s = s + pow ( -1 , t ) * pow(x,i) / f;

                t++;

        }
        return( s);
}
```

// CALLING SINX() FUNCTION USING HEADER FILE

```
#include  "my1.h"

  int    main()
  {
       int   n  ;

             float  x , t;

             printf(" enter x amd n \n");

             scanf("%f%d", &x , &n);  // INPUT

             t = sinx(x,n);    // CALLING

             printf(" ans = %f \n" , t); // PRINT

   }
```

// FUNCTION AND ARRAY

```
#include<stdio.h>

        void        inputarray ( int  a[10]  , int  n )
        {
                    int i;

                   for (  i = 0 ; i < n ; i++ )
                   {
                            scanf("%d", &a[i]);
                   }
        }

        void       printarray ( int  a[10]  , int  n )
        {          int  i ;

                   for (  i = 0 ; i < n ; i++ )
                   {
                            printf(" %d\n", a[i] );
                   }
        }
```

// FUNCTION AND MATRIX

```
void     inputmatrix ( int  a[10][10] , int  m , int  n )
{
          int  i , j ;

          for ( i =  0 ; i < m ; i++ )   // ROWS
          {
                for ( j = 0 ; j < n ; j++ )  // COLS
                {
                      scanf("%d", &a[i][j]);
                }
          }
}

void    printmatrix ( int  a[10][10] , int  m , int  n )
{
          int  i , j ;
          for ( i =  0 ; i < m ; i++ )
          {
                for ( j = 0 ; j < n ; j++ )
                {
                      printf("%4d", a[i][j]);
                }
```

```
                printf("\n");
            }
        }
void   addmatrix ( int a[10][10] , int b[10][10] , int m , int n )
{
        int  i , j , c[10][10] ;

        for ( i =  0 ; i < m ; i++ )
        {
                for ( j = 0 ; j < n ; j++ )
                {
                        c[i][j] = a[i][j] + b[i][j] ;
                }
        }
        printmatrix ( c , m , n );
}
 void  mulmatrix ( int a[10][10] ,int b[10][10] ,int m , int n, int p , int q )
{
        int  i , j , k , c[10][10] ;

        if( n != p )
        {
                printf(" MULTIPLICATION IS NOT POSSIBLE ");
```

```
        }
else
        {
            for ( i =  0 ; i < m ; i++ )
            {
                for ( j = 0 ; j < q ; j++ )
                {
                        c[i][j] = 0 ;

                    for ( k = 0 ; k < n ; k++)
                    {
                        c[i][j] = c[i][j] + a[i][k] * b[k][j] ;
                    }
                }
            }
            printmatrix ( c , m , q );
        }   // else
}
```