1. Function to calculate and return factorial of an integer

```
#include<stdio.h>
#include<conio.h>
long  factorial( int  no )  // function defined before main().. Fn Declaration Not required
{
    long f = 1;
    while( no >= 1)
    {
        f = f * no;
        no--;
    }
    return  f ;   // OR   return  ( f ) ;
}
void main()
{
    int n;
    long y;
    clrscr();
    printf("Enter a number:");
    scanf("%d", &n );
    y = factorial( n );
    printf("Factorial = %ld", y );
    getch();
}
```

Example Output :

Enter a number: 6
Factorial = 720

2. Write a function to check whether given number is a Armstrong number or not. The function should display message accordingly.


```
#include<stdio.h>
#include<conio.h>

void  Armstrong( int  no )
{
    int y=no, d, sum=0;
    while( y != 0 )
    {
        d = y % 10;
        sum = sum + d*d*d;
        y = y /10;
    }
    if( sum == no )
        printf("It's as Armstrong number");
    else
        printf("It is Not an Armstrong number");
}
void main()
{
    int n;
    long y;
    clrscr();
    printf("Enter a number:");
    scanf("%d", &n );
    Armstrong( n );

    getch();
}
```

Example Outputs :

1.
Enter a number: 153
It's an Armstrong number

2.
Enter a number: 233
It is Not an Armstrong number

3. Write a function to find largest of three integers and return the largest number.

```
#include<stdio.h>
#include<conio.h>

int  Max( int  x, int  y, int  z )
{
    int n, m;
    n = x > y ? x : y;
    m = z > n ? z : n;
    return   m;
}

void main()
{
    int a, b, c, d;
    long y;
    clrscr();
    printf("Enter three numbers:");
    scanf("%d%d%d", &a, &b, &c );
    d = Max( a, b, c );
    printf("Largest no = %d", d );
    getch();
}
```

Example Output :

Enter three numbers : 4 6 3
Largest no = 6

4. Write a function to display pattern of n lines as follows.

```
*
**
***
****
```

n is parameter to the function.


```
#include<stdio.h>
#include<conio.h>
void  Pattern( int n )
{
    int i, j;

    for( i=1; i<=n; i++ )
    {
        for( j=1; j<=i; j++ )
            printf("*");

        printf("\n");
    }
}

void main()
{
    int  n ;
    clrscr();

    printf("Enter n :");
    scanf("%d", &n );
    Pattern( n );
    getch();
}
```

Example Output :

Enter n : 6
*
**
***
****
*****
******

5. Write a function to calculate N!/R!(N-R)!.

```
#include<stdio.h>
#include<conio.h>

int  Facto( int no ) // fn for factorial
{
    int f=1, i;
    for( i=1; i<=no; i++ )
        f *= i;

    return f;
}
int  NCR( int n, int r )  // fn for given formula
{
    int y;
    y = Facto(n) / ( Facto(r) * Facto(n-r) );
    return y;
}

void main()
{
    int n, r , a;
    clrscr();

    printf("Enter n and r :");
    scanf("%d%d" , &n, &r);
    a = NCR( n , r );
    printf("Answer =%d", a );
    getch();
}
```

Example Output :

Enter n and r : 6 2
Answer = 15

6. Print Pascal triangle of n lines. **[M-2016]**

```
#include<stdio.h>
#include<conio.h>

int facto( int n )
{
    int i, f=1;
    for( i=1; i<=n; i++ )
        f = f*i;

    return f;
}

void main()
{
    int n , i, j ,y;
    clrscr();
    printf("Enter  n :");
    scanf("%d", &n );

    for( i=0; i<n; i++ )
    {
        for( j=1; j<=n-i+1; j++ )   // spaces before numbers
            printf(" ");
```

```
        for( j=0; j<=i; j++ )
        {
            // each no of pattern is nCr i.e.  iCj
            y = facto(i) / ( facto(j) * facto(i-j) );
            printf("%d ", y );
        }
        printf("\n");
    }
    getch();
}
```

Example Output :

Enter n: 5

```
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
```

7. Define a function to check whether given number is Armstrong number or not. Using this function print all Armstrong numbers from 101 to 1000. **[D-2015]**

```
#include<stdio.h>
#include<conio.h>

// fn returns 1 if no is Armstrong else returns 0
int Arm( int no )
{
    int d, sum=0, x;
    x = no;
    while( x != 0 )
    {
        d = x % 10;
        sum = sum + d*d*d;
        x =  x / 10;
    }
    if( sum == no )
        return  1;  // for YES
    else
        return  0;  // for No
}

void main()
{
    int n;
    clrscr();

    printf("Armstrong numbers \n");
    for( n=101; n<=1000; n++ )
    {
        if( Arm( n ) == 1 )   // print n, if function returns 1
            printf("%d\t", n );
    }
    getch();
}
```


Example Output :

Armstrong numbers
153 370 371 407

8. Find Compound interests and Amount for n years,
Comp. interest : I = P(1 + R/100)^n .. where P=principle amount, R=Rate of interest.
Define function to find Power. [M-2016]

```
#include<stdio.h>
#include<conio.h>

float Power( float , int ) ;   // fn declaration
```

```
void main()
{
    int n , i;
    float P, I, A, R;
    clrscr();

    printf("Enter number of years :");
    scanf("%d", &n );
    printf("Enter Principal amt :");
    scanf("%f", &P );
    printf("Enter Rate of interest :");
    scanf("%f", &R );

    printf("\nPr. Amount\tInterest\n");
    for( i=1; i<=n; i++ )   // for n years
    {
        A = P * Power( (1 + R/100 ) ,  i );
        I = A - P;
        printf("%8.2f\t%8.2f\n", A, I );
    }
    getch();
}

// Fn to get Power x^y
float  Power( float x, int y )
{
    int i;
    float res=1;
    for( i=1; i<=y; i++ )
    {
        res = res  *  x;
    }
    return   res;
}
```

Example Output :

```
Enter number of years :4
Enter Principal amt :1000
Enter Rate of interest :10

Pr. Amount      Interest
 1100.00        100.00
 1210.00        210.00
 1331.00        331.00
 1464.10        464.10
```


Functions with Array/Strings as Parameters :

9. Write a function to find largest of n numbers in integer array. n values to be input in array in main().

```
#include<stdio.h>
#include<conio.h>

int  Largest( int  m[ ] , int n )
{
    int i, no;
    no = m[0];
    for( i=0; i<n; i++ )
    {
        if( m[i] > no )
        {
            no = m[i];
        }
    }
    return   no;
}
```

```
void main()
{
    int a[50] , i, n , y;
    clrscr();

    printf("Enter n :");
    scanf("%d", &n );
    printf("Enter %d numbers\n", n );
    for( i=0; i<n; i++ )
    {
        scanf("%d", &a[i] );
    }
    y = Largest( a, n );
    printf("Largest no = %d", y );
    getch();
}
```

Example Output :

```
Enter n : 5
Enter 5 numbers
4  10  8  12  7
Largest no = 12
```

10. Write a function to return count of spaces in a string. Use String as function parameter.

```
#include<stdio.h>
#include<conio.h>

int  Spaces( char s[ ] )
{
    int i, c=0;

    i = 0;  // string index
    while( s[i] != '\0' )
    {
        if( s[i]==' ') // if space found at ith index
        {
            c++;    // increment counter
        }
        i++;
    }
    return c;
}

void main()
{
    char  a[50];
    int n;
    clrscr();

    printf("Enter String :");
    gets( a );
    n = Spaces( a );
    printf("no. of spaces=%d", n );
    getch();
}
```


Example Output :

```
Enter String : this is some text
no. of spaces= 3
```

11. Write a function to Copy one string into another. Pass Strings as parameters.

```
#include<stdio.h>
#include<conio.h>

void CopyStr( char [ ], char [ ] ) ;
```

```
void main()
{
    char  s1[50], s2[50];
    clrscr();

    printf("Enter 1st String :");
    gets( s1 );
    printf("Enter 2nd String :");
    gets( s2 );
    CopyStr( s1, s2 );
    printf("String s1 = %s", s1 );
    getch();
}

// copys 2nd string into 1st
void  CopyStr( char  a[ ], char  b[ ] )
{
    int i=0;

    while( b[i] != '\0' )
    {
        a[i] = b[i]; // put each char of b into a
        i++;
    }
    a[i] = '\0';  // ... End the string
}
```

Example Output :

```
Enter 1st  String : Some text here
Enter 2nd String : Another string
String s1 = Another string
```


Recursive Functions :

12. Recursive function to find N!.

```
#include<stdio.h>
#include<conio.h>
float  Factorial( int n )
{
    if( n==0 || n==1 )
        return 1;
    else
        return  n * Factorial( n-1 );
}
void main()
{
    int no;
    float r;
    printf("Enter a number :");
    scanf("%d" , &no );
    r = Factorial( no );
    printf("Factorial = %f", r );
    getch();
}
```

Function calling itself

Example Output :

```
Enter a number :5
Factorial = 120
```

13 . Recursive function to find sum of n natural numbers.

```
#include<stdio.h>
#include<conio.h>
```

```
int Sum( int n );  // fn declaration. Function after main()

void main()
{
    int n, s;
    clrscr();
    printf("Enter a number :");
    scanf("%d" , &n );
    s = Sum( n );
    printf("Sum = %d", s );
    getch();
}

int  Sum( int n )
{
    if( n == 1 )
        return 1;
    else
        return n + Sum( n-1 ) ;
}
```

Example Output :

Enter a number :5
Sum = 15

14. Recursive function to find X^n, where X is real and n is integer.

```
#include<stdio.h>
#include<conio.h>

float Power( float, int );  // fn declaration. Function after main()

void main()
{
    float b, a;
    int p;
    clrscr();
    printf("Enter Base and Power :");
    scanf("%f%d" , &b, &p );
    a = Power( b , p );
    printf("Answer = %f", a );
    getch();
}

float Power( float x, int n )
{
    if( n==0 )
        return 1;
    else if ( n>0 )
        return  x  * Power( x, n-1 );
    else
        return 1/x  * Power( x, n+1 );
}
```


Example Outputs :

1.
Enter Base and Power : 4 3
Answer = 64.0

2.
Enter Base and Power: 2 -3
Answer = 0.125

15. Recursive function to find nth term of Fibonacci series.

```
#include<stdio.h>
#include<conio.h>

int Fib( int n );

void main()
{
    int n, f;
    clrscr();
    printf("Enter a number :");
    scanf("%d" , &n );
    f = Fib( n );
    printf("Fibo. term = %d", f );
    getch();
}

int Fib( int n )
{
    if( n == 1 || n == 2 )  // first two terms are 1
        return 1;
    else
        return Fib(n-1) + Fib(n-2);
}
```

Example Output :

```
Enter a number:6
Fibo. term = 8
```

16. Recursive function to find nth term of Fibonacci series. Using this function display first n terms of the series.


```
#include<stdio.h>
#include<conio.h>

int Fib( int n );

void main()
{
    int n, f, i;
    clrscr();
    printf("Enter a number :");
    scanf("%d" , &n );
    for( i=1; i<=n; i++ ) // find and display 1 to n terms
    {
        f = Fib( i );
        printf("%d\t", f );
    }
    getch();
}

int Fib( int n )
{
    if( n == 1 || n == 2 )
        return 1;
    else
        return Fib(n-1) + Fib(n-2);
}
```

Example Output :

```
Enter a number:7
1  1  2  3  5  8  13
```

17. Recursive function to find GCD of two numbers using Euclid's algo.

```
#include<stdio.h>
#include<conio.h>

int GCD( int m, int n );  // fn declaration. Function after main()

void main()
{
    int a, b, g;
    clrscr();
    printf("Enter two numbers :");
    scanf("%d%d" , &a, &b );
    g = GCD( a, b );
    printf("GCD = %d", g );
    getch();
}

int GCD( int m, int n )
{
    if( n == 0 )
        return m;
    else if( n > m )
        return GCD( n , m );
    else
        return  GCD( n, m%n );
}
```

Example Output :

Enter two numbers :12 8
GCD = 4

18. Recursive function to get Reverse of a given number. [M-2016]

```
#include<stdio.h>
#include<conio.h>

int Reverse( int no )
{
    int d;
    static int rev = 0;
    if( no != 0 )
    {
        d = no%10;
        rev = rev * 10 + d;
        Reverse( no / 10 );
    }
    return rev;
}

void main()
{
    int n , r;
    clrscr();
    printf("Enter a no:");
    scanf("%d", &n );

    r = Reverse( n );
    printf("Reverse=%d", r );
    getch();
}
```

Example Output :

Enter a no : 2314
Reverse = 4132

19. Recursive function to find sum of n numbers in array

```
#include<stdio.h>
#include<conio.h>

int Sum( int  [ ] , int );  // fn declaration. Function after main()

void main()
{
    int p[20], n ,i;
    int s;
    clrscr();
    printf("Enter n :");
    scanf("%d" , &n );
    printf("Enter  %d numbers\n" , n );
    for( i=0; i<n; i++ )
        scanf("%d" , &p[i] );

    s = Sum( p, n );

    printf("Answer = %d", s );
    getch();
}

int Sum( int a[ ], int n )
{
    if( n==1 )
        return a[0];
    else
        return  a[n-1] + Sum( a, n-1 );
}
```

Example Output :

```
Enter n : 5
Enter  5 numbers
4  6  3  6  7
Answer = 26
```


20. Recursive function to Reverse a an array

```
#include<stdio.h>
#include<conio.h>

void  Reverse( int [ ] , int, int );  // fn declaration. Function after main()

void main()
{
    int a[100] ,i , n;
    clrscr();
    printf("Enter n:");
    scanf("%d" , &n );
    printf("Enter  %d numbers\n" , n );
    for( i=0; i<n; i++ )
        scanf("%d" , &a[i] );

    Reverse( a, 0 , n-1 ); // pass array, 1st index i.e. 0, last index to fn

    printf("Reversed array ..\n" );
    for( i=0; i<n; i++ )
        printf("%d\t", a[i] );

    getch();
}
```

```
void Reverse( int a[ ], int f, int l )
{
    int t;
    if( l > f )
    {
        t = a[f];
        a[f] = a[l];
        a[l] = t;
        Reverse( a, f+1, l-1 );
    }
}
```

Example Output :

```
Enter n : 5
Enter  5 numbers
4   5   3   6   7
Reversed Array…
7   6   3   5   4
```

==========