# Day 4 – (Loop control structure)

## Assignment no:-20A

Print the following pattern:

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

***Program code:***

```
#include<stdio.h>
#include<math.h>
void main()
{
      int num,org_num,rem,result=0,nod=0;

      printf("Enter a number: ");
      scanf("%d",&num);

      org_num=num;
      while(org_num!=0)
      {
            org_num/=10;
            ++nod;
      }

      org_num=num;
      while(org_num!=0)
      {
            rem=org_num%10;
            result+=pow(rem,nod);
            org_num/=10;
      }

      if(result==num)
            printf("Armstrong number");
      else
            printf("Not an Armstrong number");
}
```

***Output:***

```
Enter the number of rows: 7
*
**
***
****
*****
******
*******
```

# Assignment no:-20B

Print the following pattern:

```
    1
   12
  123
 1234
12345
```

***Program code:***

```
#include<stdio.h>
void main()
{
      int row;
      printf("Enter the number of rows: ");
      scanf("%d",&row);
      for(int i=1;i<=row;i++)
      {
            for(int j=1;j<=(row-i);j++)
            {
                  printf(" ");
            }
            for(int k=1;k<=i;k++)
            {
                  printf("%d",k);
            }
            printf("\n");
      }
}
```

***Output:***

```
Enter the number of rows: 7
     1
    12
   123
  1234
 12345
123456
1234567
```

# Assignment no:-20C

## Print the following pattern:

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

***Program code:***

```
#include<stdio.h>
void main()
{
      int row,i,j,k,l;
      printf("Enter the number of rows: ");
      scanf("%d",&row);
      for(i=1;i<=row;i++)
      {
            for(j=1;j<=(row-i);j++)
                  printf(" ");
            for(k=1;k<=((2*i)-1);k++)
                  printf("*");
            printf("\n");
      }
}
```

***Output:***

```
Enter the number of rows: 5
    *
   ***
  *****
 *******
*********
```

# Assignment no:-20D

Print the following pattern:

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

***Program code:***

```
#include<stdio.h>
void main()
{
      int row,n,i,j,k;
      printf("Enter the number of rows: ");
      scanf("%d",&row);
      if((row%2)==0)
            printf("Invalid! enter odd number of rows");
      else
      {
            n=(row+1)/2;
            for(i=1;i<=n;i++)
            {
                  for(j=1;j<=(n-i);j++)
                        printf(" ");
                  for(k=1;k<=((2*i)-1);k++)
                        printf("*");
                  printf("\n");
            }
            for(i=1;i<=(n-1);i++)
            {
                  for(j=1;j<=i;j++)
                        printf(" ");
                  for(k=1;k<=((2*(n-i))-1);k++)
                        printf("*");
                  printf("\n");
            }
      }
}
```

***Output***:

```
Enter the number of rows: 5
  *
 ***
*****
 ***
  *
```

# Assignment no:-20E

Print the following pattern:

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

***Program code:***

```
#include<stdio.h>
void main()
{     int row,n,i,j,k;
      printf("Enter the number of rows(odd): ");
      scanf("%d",&row);
      if((row%2)==0)
            printf("It is not an odd number");
      else
      {
            n=(row+1)/2;
            for(i=1;i<=n;i++)
            {
                  for(j=1;j<=(i-1);j++)
                        printf(" ");
                  for(k=1;k<=((2*(n-i))+1);k++)
                        printf("*");
                  printf("\n");
            }
            for(i=1;i<=(n-1);i++)
            {
                  for(j=1;j<=(n-i-1);j++)
                        printf(" ");
                  for(k=1;k<=((2*i)+1);k++)
                        printf("*");
                  printf("\n");
            }
      }
}
```

***Output:***

```
Enter the number of rows(odd): 7
*******
 *****
  ***
   *
  ***
 *****
*******
```

# Assignment no:-21

## Input two numbers and find their HCF and LCM.

***Program code:***

```
#include<stdio.h>
void main()
{
      int num1,num2;
      printf("Enter two numbers: ");
      scanf("%d %d",&num1,&num2);
      if((num1==0)||(num2==0))
            printf("Wrong input(one of the input is 0)");
      else
      {
            int divisor,divident,rem,gcd,lcm;
            divisor=num1;
            divident=num2;
            rem = divident % divisor;
            while(rem != 0)
            {
                  divident = divisor;
                  divisor = rem;
                  rem = (divident % divisor);
            }
            gcd = divisor;
            lcm = (num1 * num2) / gcd;
            printf("GCD & LCM are respectively: %d, %d",gcd,lcm);
      }
}
```

***Output:***

Enter two numbers: 45 32

GCD & LCM are respectively: 1, 1440

# Assignment no:-22

Input a number and find:

a. Fibonacci series up to n

***Program code:***

```
#include<stdio.h>
void main()                /* Fibonacci series upto n */
{
      int ul,a=0,b=1,sum=0;
      printf("Enter the upper limit: ");
      scanf("%d",&ul);
      while(sum<=ul)
      {     printf("%d ",sum);
            a=b;
            b=sum;
            sum=a+b;
      }
      printf("\n");
}
```

***Output:***

Enter the upper limit: 50

0 1 1 2 3 5 8 13 21 34

b. n th Fibonacci number

***Program code:***

```
#include<stdio.h>
void main()           /* The nth fibonacci number */
{
      int terms,a=0,b=1,sum=0;
      printf("Enter the position: ");
      scanf("%d",&terms);
      for(int i=1;i<terms;i++)
      {
            a=b;
            b=sum;
            sum=a+b;
      }
      printf("%d\n",sum);
}
```

***Output:***

Enter the position: 8

13

c. Fibonacci series of n terms

***Program code:***

```
#include<stdio.h>
void main()                /* Fibonacci series of n terms */
{
      int terms,a=0,b=1,sum=0;
      printf("Enter the number of terms: ");
      scanf("%d",&terms);
      for(int i=1;i<=terms;i++)
      {
            printf("%d ",sum);
            a=b;
            b=sum;
            sum=a+b;
      }
      printf("\n");
}
```

***Output:***

Enter the number of terms: 10

0 1 1 2 3 5 8 13 21 34

# Assignment no:-23

Input a number and find the sum of its digits using while/do-while loop.

***Program code:***

```
#include<stdio.h>
void main()
{
      int num,sum=0,digit;
      printf("Enter a number: ");
      scanf("%d",&num);
      while(num>0)
      {
            digit=num%10;
            sum=sum+digit;
            num=num/10;
      }
      printf("Sum is %d",sum);
}
```

***Output:***

Enter a number: 56

Sum is 11

# Assignment no:-24

## Input a number and reverse its using while/do-while loop.

***Program code:***

```
#include<stdio.h>
void main()
{
      int num,rev=0,rem;
      printf("Enter a number: ");
      scanf("%d",&num);
      while(num != 0)
      {
            rem = num % 10;
            rev = (rev * 10) + rem;
            num = num/10;
      }
      printf("Reverse of the number is %d",rev);
}
```

***Output:***

Enter a number: 2345

Reverse of the number is 5432

# Assignment no:-25

## Input a number and check if it is a prime number or not.

***Program code:***

```
#include<stdio.h>
void main()
{
      int num,count=0;
      printf("Enter a number: ");
      scanf("%d",&num);
      for(int i=1;i<=num;i++)
            if((num % i) == 0)
                  count++;
      if(count==2)
            printf("It is a prime number");
      else
            printf("It is not a prime number");
}
```

***Output:***

Enter a number: 234

It is not a prime number

Enter a number: 23

It is a prime number

# Assignment no:-26

According to the Goldbach conjecture, every even number greater than two is the sum of two prime numbers. Input an even numbers and decompose it into two primes.

***Program code:***

```
#include<stdio.h>
int is_prime(int);
void goldbach(int);
void main()
{
      int n;
      printf("Enter a number: ");
      scanf("%d",&n);
      if(((n%2)==0) && (n>2))
            goldbach(n);
      else
            printf("Invalid input");
}
int is_prime(int num)
{
      int flag=1;
      for(int i=2;i<=(num/2);i++)
            if((num % i) == 0)
                  return(flag-1);
      return(flag);
}
void goldbach(int g)
{
      for(int i=2;i<=(g/2);i++)
            if(is_prime(i) && is_prime(g-i))
                  printf("%d + %d = %d\n",i,(g-i),g);
}
```

***Output:***

Enter a number: 67

Invalid input

Enter a number: 234

5 + 229 = 234

7 + 227 = 234

11 + 223 = 234

23 + 211 = 234

37 + 197 = 234

41 + 193 = 234

43 + 191 = 234

53 + 181 = 234

61 + 173 = 234

67 + 167 = 234

71 + 163 = 234

83 + 151 = 234

97 + 137 = 234

103 + 131 = 234

107 + 127 = 234

## Assignment no:-27

Input a number and check whether it is an Automorphic number or not using while/do-while loop.

***Program code:***

```
#include<stdio.h>
#include<math.h>
void main()
{
      int num,temp,last,nod=0;
      long int sqr;
      printf("Enter a number: ");
      scanf("%d",&num);
      sqr=num*num;
      temp=num;
      while(temp!=0)
      {
            nod++;
            temp = temp/10;
      }
      last = sqr % (int)(pow(10,nod));
      if(last==num)
            printf("Automorphic number");
      else
            printf("Not Automorphic");
}
```

***Output:***

Enter a number: 34

Not Automorphic

Enter a number: 25

Automorphic number

# Assignment no:-28

Input a number and check whether it is an Armstrong number or not using while/do-while loop.

***Program code:***

```
#include<stdio.h>
#include<math.h>
void main()
{
      int num,org_num,rem,result=0,nod=0;

      printf("Enter a number: ");
      scanf("%d",&num);

      org_num=num;
      while(org_num!=0)
      {
            org_num/=10;
            ++nod;
      }

      org_num=num;
      while(org_num!=0)
      {
            rem=org_num%10;
            result+=pow(rem,nod);
            org_num/=10;
      }

      if(result==num)
            printf("Armstrong number");
      else
            printf("Not an Armstrong number");
}
```

***Output:***

Enter a number: 345

Not an Armstrong number

Enter a number: 153

Armstrong number