Print Natural Numbers:

1.Write a program to print the first 10 natural numbers using a while loop.

```
#include <stdio.h>


int main()
{
   int i = 1 ;
   while(i <= 10)
   {
   printf("%d\n",i);
   i++;


   }


   return 0;
}
```

Sum of Digits:

2. Write a program to calculate the sum of the digits of a given integer using a while loop.

```
#include <stdio.h>


int main() {
   int num, sum = 0;
   printf("enter the number");
   scanf("%d",&num);
   while(num!=0)
   {
      sum=sum+num%10;
      num=num/10;


   }
```

```
    printf("sum of digits =%d",sum);
    return 0;
}
```

Factorial of a Number:
Write a program to compute the factorial of a number using a while loop.

```
#include <stdio.h>

int main()
{
    int i=1,n,fact=1;
    printf("enter the number:");
    scanf("%d",&n);

        if(n==0)
        {
            printf("factorial=0");
        }else{
            while(i<=n)
    {
        fact=fact*i;
        i++;

        }
        printf("factorial of %d = %d",n,fact);
    }

    return 0;
}
```

Reverse a Number:
Write a program to reverse a given number using a while loop.

```
#include <stdio.h>
int main()
{
   int num, rev = 0, rem;
   printf("Enter an integer: ");
   scanf("%d", &num);
   while (num != 0)
   {
   rem = num % 10;
   rev = rev * 10 + rem;
   num /= 10;
   }
   printf("Reversed Number: %d\n", rev);
   return 0;
}
```

Write a program to count the number of digits in an integer using a while loop.

```
#include <stdio.h>

int main() {
   int num, count = 0;
   printf("enter the number");
   scanf("%d",&num);
   if(num==0)
   {
```

```
        printf("count =1");


    }
else{
    while(num!=0)
    {
        num=num/10;
        count++;


    }
}
    printf("number of digits =%d",count);
    return 0;
}
```

Print Multiplication Table:
Write a program to print the multiplication table of a given number using a while loop.

```
#include <stdio.h>


int main()
{
    int n , i=1;
    printf("enter the number");
    scanf("%d",&n);
    if(n==0){
    printf("any number * 0 =0");
    }
    else
    {
        while(i<=10)
```

```
    {
        printf("%d * %d = %d\n",i,n,i*n);

        i++;
    }
  }
  return 0;
}
```

Write a program to check if a number is a palindrome using a while loop.

```
#include <stdio.h>

int main()
{
  int rev=0,num,rem,orginal;
  printf("enter a number");
  scanf("%d",&num);
  orginal=num;
  while(num!=0)
  {
    rem=num%10;
    rev=rev*10+rem;
    num=num/10;


  }
   if(orginal==rev)
   {
     printf("palinedrome");
```

```
    }
    else{
        printf("Not palinedrome");
    }
   return 0;
}
```

Print Odd Numbers:
Write a program to print all odd numbers between 1 and 50 using a while loop.

```
#include <stdio.h>

int main()
{
   int num=1;
   while(num<50)
   {

      printf("%d\n",num);
      num+=2;
   }

   return 0;
}
```

1. **Sum of Series:**
   Write a program to calculate the sum of the series:

S=1+2+3+…+n

using a while loop.

```
#include <stdio.h>

int main()
```

```
{
   int num,sum=0,i=1;
   printf("enter the number:");
   scanf("%d",&num);

   while(i<=num)
   {
      sum=sum+i;
      i++;

   }
   printf("the sum of first %d series =%d",num,sum);

   return 0;
}
```

Find GCD of Two Numbers:
Write a program to compute the GCD of two numbers using a while loop.

```
#include <stdio.h>

int main()
{
   int n1=40,n2=50;
   while(n1!=n2)
   {
      if(n1>n2)
      {
         n1=n1-n2;
      }
```

```
        else
        {
            n2=n2-n1;
        }
    }
    printf("GCD of 40 and 50 is %d",n2);
    return 0;
}
```

Print Even Numbers:

1. Write a program to print all even numbers between 1 and 100 using a for loop

```
#include <stdio.h>
int main()
{
    int i;
    for(i=2;i<=100;i++)
    {
        if(i%2==0)
        {
            printf("%d\n",i);
        }

    }
    return 0;
}
```

Sum of First N Natural Numbers:

2. Write a program to calculate the sum of the first N natural numbers using a for loop.

```
#include <stdio.h>
int main()
{
   int n, i,sum=0;
   printf("enter the limit:");
   scanf("%d",&n);
   for(i=1;i<=n;i++)
   {
      sum+=i;
   }
      printf("Sum of first %d numbers = %d",n,sum);
   return 0;
}
```

Factorial of a Number:

3.Write a program to calculate the factorial of a given number using a for loop.

```
#include <stdio.h>
int main()
{
   int n, i,fact=1;
   printf("enter the limit:");
   scanf("%d",&n);
   for(i=1;i<=n;i++)
   {
      fact=fact*i;
   }
      printf("factorial of %d = %d",n,fact);
   return 0;
```

```
}
```

Fibonacci Series:

4.Write a program to generate the first nnn terms of the Fibonacci series using a for loop.

```
#include <stdio.h>
int main()
{
   int n,t1=0,t2=1,t3,i;
   printf("enter the limit:");
   scanf("%d",&n);
   printf("fibonscci series: %d %d ",t1,t2);
   for(i=2;i<=n;i++)
   {
      t3=t1+t2;
      printf("%d ",t3);
      t1=t2;
      t2=t3;
   }

   return 0;
}
```

Prime Number Check:

5.Write a program to check if a given number is prime using a for loop.

```
#include <stdio.h>
int main()
{
   int n,i,count=0;
   printf("enter number:");
```

```
    scanf("%d",&n);

    for(i=2;i<=n;i++)
    {
        if(n%i==0)
        {
            count++;
        }
    }
      if(n==0||n==1)
      {
         printf("%d is not a prime number",n);
      }
      else if(count>2)
      {
         printf("%d is not a prime number",n);
      }
      else
      {
         printf("%d is a prime number",n);
      }

    return 0;
}
```

6.Print the following pattern using a for loop:

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

****

```
#include <stdio.h>

int main()
{
   int i,j;
   for(i=1;i<=4;i++)
   {
      for(j=1;j<=i;j++)
      {
      printf("*");
      }
      printf("\n");
   }

   return 0;
}
```

Sum of Squares of Numbers:

Write a program to calculate the sum of squares of the first nnn natural numbers using a for loop.

```
#include <stdio.h>

int main()
{
   int n,sum=0;
   printf("enter the limit");
   scanf("%d",&n);
   for(int i=1;i<=n;i++)
   {
```

```
    sum=sum+i*i;
    }

printf("square of first %d numbers=%d",n,sum);
    return 0;
}
```

Power of a Number:

Write a program to compute (x raised to the power y) using a for loop.

Reverse Counting:

Write a program to print numbers from 100 to 1 in reverse order using a for loop.

```
#include <stdio.h>

int main()
{
    int i;
    for(i=100;i>=1;i--)
    {
        printf("%d \n",i);
    }
    return 0;
}
```

Count Divisors of a Number:

Write a program to count the divisors of a given number using a for loop

```
#include <stdio.h>


int main()
{
   int n,i,count=0;
   printf("enteer the number");
   scanf("%d",&n);
   for(i=1;i<=n;i++)
   {
      if(n%i==0){
         count++;
      }


   }
   printf("Number of divisors of %d is %d",n,count);
   return 0;
}
```

Menu-Driven Calculator:

1. Write a menu-driven calculator using a do-while loop. Continue asking for user input until they choose to exit.

```
#include <stdio.h>
int main() {
    int choice;
   double num1, num2, result;
   do {
       printf("1. Add\n");
       printf("2. Subtract\n");
      printf("3. Multiply\n");
       printf("4. Divide\n");
       printf("5. Exit\n");
```

```
printf("Enter your choice : ");
scanf("%d", &choice);
if (choice >= 1 && choice <= 4) {
    printf("Enter the first number: ");
    scanf("%lf", &num1);
    printf("Enter the second number: ");
    scanf("%lf", &num2);
}
switch (choice) {
    case 1:
        result = num1 + num2;
        printf("Result: %.2lf\n", result);
       break;
    case 2:
        result = num1 - num2;
        printf("Result: %.2lf\n", result);
        break;
    case 3:
        result = num1 * num2;
        printf("Result: %.2lf\n", result);
        break;
    case 4:
        if (num2 != 0) {
            result = num1 / num2;
            printf("Result: %.2lf\n", result);
        } else {
            printf(" Division by zero is not allowed.\n");
        }
        break;
    case 5:
        printf("Exiting\n");
```

```
            break;
        default:
            printf("Invalid choice! Please select a valid option.\n");
    }

} while (choice != 5);
return 0;
}
```

2.Write a program to keep accepting numbers from the user and print them until the user enters zero.

```
#include <stdio.h>

int main()
{
   int n;

   do{
   printf("enter a number:");
   scanf("%d",&n);
      if(n!=0)
      {
      printf("you entered %d\n",n);
   }
   }while(n!=0);

   return 0;
}
```

3.Write a program that asks for a password until the user provides the correct one using a do-while loop.

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

```
#include <string.h>

int main()
{
   int n;

   char correctpassword []= "m123";
   char password[25];
   do{
      printf("enter the password \t");
      scanf("%s",&password);
      if(strcmp(password,correctpassword)==0)
      {
         printf("correct password");
      }
      else
      {
         printf("incorrect pasword,try again\n");
      }
   }while(1);

   return 0;
}
```

Sum of Positive Numbers:
4.Write a program to read integers from the user and compute their sum. Stop when the user enters a negative number.

```
#include <stdio.h>

int main() {
```

```
    int a,b, sum = 0;
    do {
        printf("Enter two numbers");
        scanf("%d %d",&a,&b);
        if (a >= 0 && b>=0) {
            sum = a+b;
        }
    } while (a < 0|| b < 0);
    printf("Sum of entered numbers: %d\n", sum);

    return 0;
}
```

Repeat Multiplication Table:

5.Write a program to repeatedly display the multiplication table of a number until the user decides to stop.

```
#include <stdio.h>

int main() {
    int n,choice;
    do {
        printf("enter a number: ");
        scanf("%d",&n);
        for(int i=1;i<=10;i++)
        {
            printf("%d * %d = %d \n", i,n,i*n);
        }
        printf("enter a choice 0 for end and 1 for continue:  ");
        scanf("%d",&choice);
    }while(choice == 1);

    return 0;
```

```
}
```

6.Write a program where the user guesses a pre #include <stdio.h>

```
int main() {
   int n=6,guess;
   do {
      printf("guess the  number: ");
      scanf("%d",&guess);
      if(guess==n)
      {
         printf("you have guessed right");
      }
      else
      {
         printf("try again\n");
      }
   }while(guess!=n);




   return 0;
}
```

Input Validation:

7.Write a program to ensure that the user enters a number between 1 and 10. Prompt until a valid number is provided.

```
#include <stdio.h>


int main() {
   int n;
```

```
    do {
        printf("enter a number ");
        scanf("%d",&n);
        if(n <1 || n>10)
        {
            printf("invalid try again\n");
        }
        }while(n < 1 || n>10);
        printf("valid number");



    return 0;
}
```

Print Alphabets:

9.Write a program to print lowercase alphabets from 'a' to 'z' using a do-while loop.

```
#include <stdio.h>

int main() {
    int ch=97;
    printf("lower case English alphabets:\n");
    do{
        printf("%c\t",ch);
        ch++;
    }while(ch<= 'z');




    return 0;
}
```

Count Digits of a Number:
10. Write a program to count the number of digits in a number entered by the user using a do-while loop.

```
#include <stdio.h>

int main() {
   int number, count = 0;
     printf("Enter a number: ");
     scanf("%d", &number);
     if (number == 0) {
       count = 1;
   } else {
       do{
          number=number/10;
          count++;

       }while(number!=0);
   }
   printf("The number of digits is: %d\n", count);

   return 0;
}
```

Problem statements with respect to Pattern printing using For as well as while Loop

1. Pascal's Triangle

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

```
#include <stdio.h>

int main() {
    int n=5;
    for(int i=0; i<n;i++)
    {
        for(int j=0;j < n-i-1;j++)
        printf(" ");
        int val=1;
        for(int k=0; k <= i; k++)
        {
            printf("%d ",val);
            val=val*(i-k)/(k+1);
        }
        printf("\n");
    }
    return 0;
}
```

----------using while loop----------

```
#include <stdio.h>
int main() {
    int i = 0, j, n, value, spaces;
    printf("Enter the number of rows: ");
```

```
    scanf("%d", &n);
    while (i < n) {
        spaces = 0;
        while (spaces < n - i - 1) {
            printf(" ");
            spaces++;
        }
        value = 1;
        j = 0;
        while (j <= i) {
            printf("%d ", value);
            value = value * (i - j) / (j + 1);
            j++;
        }
        printf("\n");
        i++;
    }
    return 0;
}
```

2. Binary Pattern

```
1
01
101
0101
10101
```

```
#include <stdio.h>

int main()
{
```

```
  int i,j,n,a;
  printf("enter the no of lines of pattern :");
  scanf("%d",&n);
  a=0;
  for(i=1;i<=n;i++)
  {
     for(j=1;j<=i;j++)
     {
        printf("%d",a%2);
        a++;
     }
     printf("\n");
  }
   return 0;
}
```

----------using while loop----------

```
#include <stdio.h>

int main()
{
   int rows, i = 1, j;
   int count;

   printf("Enter the number of rows: ");
   scanf("%d", &rows);

   while (i <= rows)
   {
      j = 1;
```

```
        count = i % 2;
        while (j <= i)
        {
            printf("%d ", count);
            count = !count;
            j++;
        }
        printf("\n");
        i++;
    }

    return 0;
}
```

3. Floyd’s Triangle (Numbers)

```
1
2 3
4 5 6
7 8 9 10
11 12 13 14 15
```

```
#include <stdio.h>

int main()
{
   int row,i,j,number=1;
   printf("emter the no of rows: ");
   scanf("%d",&row);
   for(i=1;i<=row;i++)
```

```
  {
     for(j=1;j<=i;j++)
     {
        printf("%d\t",number);
        number++;

     }
     printf("\n");

  }
   return 0;
}
```

----------using while loop----------

```
#include <stdio.h>

int main() {
   int i = 1, j, n, num = 1;


   printf("Enter the number of rows: ");
   scanf("%d", &n);


   while (i <= n) {

      j = 1;
      while (j <= i) {
         printf("%d ", num);
```

```
            num++;
            j++;
        }


        printf("\n");
        i++;
    }

    return 0;
}
```

4. Inverted Right-Angled Triangle (Numbers)

```
12345
1234
123
12
1
```

```
#include <stdio.h>

int main()
{
    int rows, i, j;
    printf("Please Enter the Number of Rows: ");
    scanf("%d", &rows);
```

```
    for (i = rows; i >= 1; i--)
    {
        for (j = 1; j <= i; j++)
        {
            printf("%d", j);
        }
        printf("\n");
    }

    return 0;
}
```

----------using while loop----------

```
#include <stdio.h>

int main() {
    int rows, i, j;
    printf("Please enter the number of rows: ");
    scanf("%d", &rows);

    i = rows;
    while (i >= 1) {
        j = 1;
        while (j <= i) {
            printf("%d", j);
            j++;
        }
        printf("\n");
        i--;
    }
```

```
    return 0;
}
```

5. Diamond (Stars)

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

```
#include <stdio.h>

void main()
{
   int i, j, r;
```

```
  printf("Input number of rows (half of the diamond) :");
  scanf("%d", &r);

  for(i = 0; i <= r; i++)
  {
    for(j = 1; j <= r - i; j++)
      printf(" ");
    for(j = 1; j <= 2 * i - 1; j++)
      printf("*");
    printf("\n");
  }

  for(i = r - 1; i >= 1; i--)
   {
    for(j = 1; j <= r - i; j++)
      printf(" ");
    for(j = 1; j <= 2 * i - 1; j++)
      printf("*");
    printf("\n");
  }
}
```

----------using while loop----------

```
#include <stdio.h>

int main()
{
   int i = 1, j, n;

   printf("Enter the number of rows: ");
   scanf("%d", &n);
```

```
while (i <= n)
{

   j = i;
   while (j < n)
   {
      printf(" ");
      j++;
   }

   j = 1;
   while (j <= (2 * i - 1))
   {
      printf("*");
      j++;
   }

   printf("\n");
   i++;
}


i = n - 1;
while (i >= 1)
{

   j = n;
   while (j > i)
   {
      printf(" ");
```

```
            j--;
        }
        j = 1;
        while (j <= (2 * i - 1))
        {
            printf("*");
            j++;
        }
        printf("\n");
        i--;
    }

    return 0;
}
```

6. Inverted Pyramid (Stars)

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

```
#include <stdio.h>

int main() {
    int n = 5;

    for (int i = 0; i < n; i++)
    {
```

```
        for (int j = 0; j < 2 * i; j++)
        {
            printf(" ");
        }
        for (int k = 0; k < 2 * (n - i) - 1; k++) {
            printf("* ");
        }
        printf("\n");
    }
}
```

----------using while loop----------

```
#include <stdio.h>
int main() {
    int i = 0, j, n;

    printf("Enter the number of rows: ");
    scanf("%d", &n);
    while (i < n) {
        j = 0;
        while (j < i) {
            printf(" ");
            j++;
        }
        j = 0;
        while (j < (2 * (n - i) - 1)) {
            printf("*");
            j++;
        }
        printf("\n");
```

```
        i++;
    }
    return 0;
}
```