Programs Day 4

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while loop

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,",i);
        i++;
    }

    return 0;
}
```

Output

1,2,3,4,5,6,7,8,9,10

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=%d\n",sum);
    return 0;
}
```

Output

Enter the number:100

Sum=1

3.Write a program to compute the factorial of a number using a while loop.

```
#include <stdio.h>

int main()
{
    int num,factorial=1;
    printf("Enter a +ve number:");
    scanf("%d",&num);
    int i=1;
    while(i<=num){
        factorial=factorial*i;
        i++;
```

```
        }
        printf("Factorial of %d is %d\n", num, factorial);
    return 0;
}
```

Output

```
Enter a +ve number:5
Factorial of 5 is 120
```

4.Write a program to reverse a given number using a while loop.

```
#include <stdio.h>

int main()
{
    int num,reversed=0;
    printf("Enter a +ve number:");
    scanf("%d",&num);
    while(num!=0){
        reversed=reversed*10+num%10;
        num=num/10;

        }
        printf("The reversed number is %d\n",reversed);
        return 0;
}
```

Output

Enter the number:465

The reversed number is 564

5.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 a +ve number:");
    scanf("%d",&num);
    while(num!=0){
        num=num/10;
        count++;

        }
        printf("Count=%d\n",count);
        return 0;
}
```

Output

Enter a +ve number:2345

Count=4

6.Write a program to print the multiplication table of a given number using a while loop.

```
#include <stdio.h>

int main() {
    int number, i = 1;

    printf("Enter a number to print its multiplication table: ");
    scanf("%d", &number);

    printf("Multiplication Table of %d:\n", number);

    while (i <= 10) {
        printf("%d x %d = %d\n", number, i, number * i);
        i++;
    }

    return 0;
}
```

Output

```
--------
5*1=5
5*2=10
------
------
5*10=50
```

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

```
#include <stdio.h>

int main()
{
    int num,reversed=0,original;
    printf("Enter a +ve number:");
    scanf("%d",&num);
    original=num;
    while(num>0){
        reversed=reversed*10+num%10;
        num=num/10;

        }
        if(original==reversed){
            printf("Palindrome");
        }
        else{
            printf("Not Palindrome");
        }
        return 0;
}
```

Output

Enter a +ve number:464

Palindrome

8.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){
        if(num%2!=0){
            printf("%d\n",num);

        }
        num++;
    }
    return 0;
}
```

Output

1,3,5 .....,49

9.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 n, i = 1, sum = 0;
    printf("Enter the value of n: ");
```

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

    while (i <= n) {
        sum += i;
        i++;
    }
    printf("The sum of the series 1 + 2 + 3 + ... + %d is: %d\n", n, sum);

    return 0;
}
```

Output

Enter the value of n:5

The sum of the series 1+2+3+...+5 is:15

10. Write a program to compute the GCD of two numbers using a while loop.

```
#include <stdio.h>

int main() {
    int num1, num2, remainder;

    printf("Enter two numbers to find their GCD: ");
    scanf("%d %d", &num1, &num2);

    while (num2 != 0) {
        remainder = num1 % num2;
        num1 = num2;
```

```
        num2 = remainder;
    }

    printf("GCD = %d\n", num1);

    return 0;
}
```

Output

Enter two numbers to find their GCD:40 60

GCD=20

for loop

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

```
#include <stdio.h>

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

```
    return 0;
}
```

Output

2,4,6 ……..,100

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

```
#include <stdio.h>

int main()
{
    int sum=0,n,i;
    printf("Enter the value for n:");
    scanf("%d",&n);
    for(i=1;i<=n;i++){
        sum=sum+i;
    }
    printf("Sum=%d\n",sum);
    return 0;
}
```

Output

Enter the value for n:6

Sum=21

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

```
#include <stdio.h>

int main()
{
    int num,factorial=1;
    printf("Enter the number:");
    scanf("%d",&num);
    for(int i=1;i<=num;i++){
        factorial=factorial*i;
    }
    printf("Factorial of %d is %d\n",num,factorial);

    return 0;
}
```

Output

Enter the number:5

Factorial of 5 is 120

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,i;
    int n1=0,n2=1,n3;
```

```
    printf("Enter the number of terms:");
    scanf("%d",&n);
    for(i=1;i<=n;i++){
        printf("%d",n1);
        n3=n1+n2;
        n1=n2;
        n2=n3;

    }
    return 0;
}
```

Output

Enter the number of terms:5

01123

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

```
#include <stdio.h>

int main() {
    int num, i;

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

    if (num < 2) {
        printf("%d is not a prime number.\n", num);
        return 0;
```

```
    }

    for (i = 2; i * i <= num; i++) {
        if (num % i == 0) {
            printf("%d is not a prime number.\n", num);
            return 0;
        }
    }

    printf("%d is a prime number.\n", num);
    return 0;
}
```

Output

Enter a positive integer:5

5 is a prime number

6. Print the following pattern using a for loop:

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

```
#include <stdio.h>

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

```
    for (i = 1; i <= 4; i++) {
        if (i % 2 == 1) {
            printf("*\n");
        } else {
            printf("**\n");
        }
    }

    return 0;
}
```

Output

```
-------
*
**
*
**
```

7.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,i,sum=0;
    printf("Enter the number of terms:");
    scanf("%d",&n);
    for(i=1;i<=n;i++){
        sum=sum+(i*i);
```

```
    }
    printf("Sum=%d\n",sum);
    return 0;
}
```

Output

```
-------
Enter the number of terms:3
Sum=14
```

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

```
#include <stdio.h>

int main() {
    int x, y, result = 1;

    printf("Enter the base (x): ");
    scanf("%d", &x);
    printf("Enter the exponent (y): ");
    scanf("%d", &y);

    for (int i = 0; i < y; i++) {
        result *= x;
    }

    printf("%d raised to the power %d is %d\n", x, y, result);

    return 0;
```

```
}
```

Output

Enter the base (x):2

Enter the exponent (y):2

2 raised to the power 2 is 4

9. 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>0;i--){
        printf("%d\n",i);
    }

    return 0;
}
```

Output

100,99,98,..... ,1

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

```
#include <stdio.h>

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

    }
    printf("Count=%d\n",count);
    return 0;
}
```

Output

```
Enter the number:6
Count=4
```

do-while

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;
```

```
float num1, num2, result;

do {
    printf("\nMenu:\n");
    printf("1. Add\n");
    printf("2. Subtract\n");
    printf("3. Multiply\n");
    printf("4. Divide\n");
    printf("5. Exit\n");


    printf("Enter your choice (1-5): ");
    scanf("%d", &choice);

    if (choice >= 1 && choice <= 4) {
        printf("Enter first number: ");
        scanf("%f", &num1);
        printf("Enter second number: ");
        scanf("%f", &num2);
    }

    if (choice == 1) {
        result = num1 + num2;
        printf("Result: %.2f\n", result);
    } else if (choice == 2) {
        result = num1 - num2;
        printf("Result: %.2f\n", result);
    } else if (choice == 3) {
        result = num1 * num2;
```

```
            printf("Result: %.2f\n", result);
        } else if (choice == 4) {
            if (num2 != 0) {
                result = num1 / num2;
                printf("Result: %.2f\n", result);
            } else {
                printf("Error: Division by zero is not allowed.\n");
            }
        } else if (choice == 5) {
            printf("Exiting the program...\n");
        } else {
            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 num;

    do {
        printf("Enter a number: ");
```

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

        if (num != 0) {
            printf("You entered: %d\n", num);
        }
    } while (num != 0);

    return 0;
}
```

Output

Enter a number:5

You Entered:5

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() {
    char password[20];

    do {
        printf("Enter password: ");
        scanf("%s", password);
    } while (strcmp(password, "mypassword") != 0);

    printf("Password correct!\n");
    return 0;
```

```
}
```

Output

Enter password:mypassword

Password correct!

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 num1,num2,sum=0;
    printf("Enter num1:");
    scanf("%d",&num1);
    printf("Enter num2:");
    scanf("%d",&num2);

    do{
        sum=num1+num2;
    }while(num1<0 || num2<0);
    printf("Sum=%d\n",sum);
    return 0;
}
```

Output

Enter num1:8

Enter num2:4

Sum=12

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 number, i = 1;
    do{
        printf("Enter a number to print its multiplication table: ");
    scanf("%d", &number);

    printf("Multiplication Table of %d:\n", number);
    while (i <= 10) {
        printf("%d x %d = %d\n", number, i, number * i);
        i++;
    }
    }while(number!=0);

    return 0;
}
```

Output

Enter a number to print its multiplication table:0

6.Write a program where the user guesses a predefined number. Continue the game until the correct number is guessed.

```
#include <stdio.h>

int main() {
    int num,n=90;
    do{
        printf("Enter a number:");
        scanf("%d",&num);

    }while(num!=n);
    return 0;
}
```

Output

Enter a number:7

Enter a number:67

Enter a number:90

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

    }while(num!=0 && num<=10);
    return 0;
```

```
}
```

Output

Enter a number:11

8.Write a program to calculate the average of a series of numbers entered by the user. Stop when the user enters zero.

```
#include <stdio.h>

int main() {
    int num, sum = 0, count = 0;
    float avg;

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

        if (num != 0) {
            sum += num;
            count++;
        }

    } while (num != 0);  //

    if (count > 0) {
        avg = (float)sum / count;
        printf("Sum = %d\n", sum);
        printf("Average = %.2f\n", avg);
```

```
    } else {
        printf("No numbers were entered.\n");
    }

    return 0;
}
```

Output

```
-------
Enter a number:5
Enter a number:0
Sum=10
Average=5.00
```

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

```
#include <stdio.h>

int main() {
    char letter='a';
    do{
        printf("%c\n",letter);
        letter++;
    }while(letter<='z');
    return 0;
}
```

Output

```
-------
```

a,b,c. .... ,z

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 num,count=0;
    printf("Enter num:");
    scanf("%d",&num);

    do{
        num=num/10;
        count++;
    }while(num>0);
    printf("Count=%d\n",count);
    return 0;
}
```

Output

Enter the num:567

Count=3

Patterns

---

1. Pascal’s Triangle

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

Uisng for loop

```
#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) {
        // Print leading spaces for alignment
        spaces = 0;
        while (spaces < n - i - 1) {
            printf(" ");
            spaces++;
        }

        // Print the values in each row
        value = 1;
        j = 0;
        while (j <= i) {
            printf("%d ", value);
            value = value * (i - j) / (j + 1);
            j++;
        }

        // Move to the next line after printing each row
        printf("\n");
```

```
        i++;
    }

    return 0;
}
```

2. Binary Pattern

```
1
01
101
0101
10101
```

Using for loop

```
#include <stdio.h>

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

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


    for (i = 1; i <= n; i++) {

        for (j = 1; j <= i; j++) {
```

```
            if ((i + j) % 2 == 0) {
                printf("1");
            } else {
                printf("0");
            }
        }

        printf("\n");
    }

    return 0;
}
```

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

```
            if ((i + j) % 2 == 0) {
                printf("1");
            } else {
                printf("0");
            }
            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
```

Using for loop

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

```
int main()
{
    int row, i, j, number=1;

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

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

        printf("\n");
    }
}
```

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
```

5. Diamond (Stars)

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

using for loop

```
#include <stdio.h>

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

    // Ask the user for the number of rows (for the top part of the diamond)
    printf("Enter the number of rows: ");
    scanf("%d", &n);

    // Print the top part of the diamond
    for (i = 1; i <= n; i++) {
        // Print spaces
        for (j = i; j < n; j++) {
            printf(" ");
        }
        // Print stars
        for (j = 1; j <= (2 * i - 1); j++) {
```

```
            printf("*");
        }
        // Move to the next line after printing stars
        printf("\n");
    }

    // Print the bottom part of the diamond
    for (i = n - 1; i >= 1; i--) {
        // Print spaces
        for (j = n; j > i; j--) {
            printf(" ");
        }
        // Print stars
        for (j = 1; j <= (2 * i - 1); j++) {
            printf("*");
        }
        // Move to the next line after printing stars
        printf("\n");
    }

    return 0;
}
```

using while loop

```
#include <stdio.h>

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

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

// Print the top part of the diamond
while (i <= n) {
    // Print spaces
    j = i;
    while (j < n) {
        printf(" ");
        j++;
    }
    // Print stars
    j = 1;
    while (j <= (2 * i - 1)) {
        printf("*");
        j++;
    }
    // Move to the next line
    printf("\n");
    i++;
}

// Print the bottom part of the diamond
i = n - 1;
while (i >= 1) {
    // Print spaces
    j = n;
    while (j > i) {
```

```
            printf(" ");
            j--;
        }
        // Print stars
        j = 1;
        while (j <= (2 * i - 1)) {
            printf("*");
            j++;
        }
        // Move to the next line
        printf("\n");
        i--;
    }

    return 0;
}
```

6. Inverted Pyramid (Stars)

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

using for loop

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

```
int main() {
    int i, j, n;

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

    // Outer loop to handle the rows (inverted pyramid)
    for (i = 0; i < n; i++) {
        // Print leading spaces
        for (j = 0; j < i; j++) {
            printf(" ");
        }

        // Print stars
        for (j = 0; j < (2 * (n - i) - 1); j++) {
            printf("*");
        }

        // Move to the next line after printing stars
        printf("\n");
    }

    return 0;
}
```

using while loop

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

```
int main() {
    int i = 0, j, n;

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

    // Outer loop to handle the rows (inverted pyramid)
    while (i < n) {
        // Print leading spaces
        j = 0;
        while (j < i) {
            printf("  ");
            j++;
        }

        // Print stars
        j = 0;
        while (j < (2 * (n - i) - 1)) {
            printf("*");
            j++;
        }

        // Move to the next line after printing stars
        printf("\n");
        i++;
    }

    return 0;
```

```
}
```