

While Loop

1. **Print Natural Numbers:**
Write a program to print the first 10 natural numbers using a while loop.
2. **Sum of Digits:**
Write a program to calculate the sum of the digits of a given integer using a while loop.
3. **Factorial of a Number:**
Write a program to compute the factorial of a number using a while loop.
4. **Reverse a Number:**
Write a program to reverse a given number using a while loop.
5. **Count Digits in a Number:**
Write a program to count the number of digits in an integer using a while loop.
6. **Print Multiplication Table:**
Write a program to print the multiplication table of a given number using a while loop.
7. **Check Palindrome Number:**
Write a program to check if a number is a palindrome using a while loop.
8. **Print Odd Numbers:**
Write a program to print all odd numbers between 1 and 50 using a while loop.
9. **Sum of Series:**
Write a program to calculate the sum of the series:

$$S=1+2+3+\dots+n$$

using a while loop.

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

// Online C compiler to run C program online

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

```
int main() {  
    int i=1;  
    while(i<=10){  
        printf("%d\n", i++);  
    }  
    return 0;  
}
```

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

```
int main() {  
    int sum=0;  
    int number,unitdigit;  
    scanf("%d",&number);  
    while(number>0){  
        unitdigit=number%10;  
        sum+=unitdigit;  
        number/=10;  
    }  
    printf("%d",sum);  
}
```

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

```
int main() {  
    int fact=1;  
    int i=1,number;  
    scanf("%d",&number);  
    while(i<=number){  
        fact*=i;  
        i++;  
    }  
    printf("%d",fact);  
}
```

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

```
int main() {  
    int number,c=0;  
    scanf("%d",&number);  
    while(number>0){  
        c++;  
    }  
}
```

```

        number/=10;
    }
    printf("%d",c);
}
5]
#include <stdio.h>

int main() {
    int i=1;
    int number;
    scanf("%d",&number);
    while(i<=10){
        int result=number*i;
        printf(" %d * i = %d\n",i,result);
        i++;
    }
}

```

```

6]#include <stdio.h>

int main() {
    int reversednumber=0;
    int number;
    scanf("%d",&number);
    int temp=number;
    while(number>0){
        reversednumber=reversednumber*10 + (number%10);
        number/=10;
    }
    if(reversednumber==temp){
        printf("palindrome number");
    }else{
        printf("not a palindrome number");
    }
}

```

```

    }
}
7]
#include <stdio.h>
int main() {
    int i=2;
    while(i<50){
        if(i%2!=0){
            printf("%d ",i);
        }
        i++;
    }
}

```

```

8]
#include <stdio.h>
int main() {
    int sum=0,i=1;
    int num;
    scanf("%d",&num);
    while(i<=num){
        sum=sum+i;
        i++;
    }
    printf("%d",sum);
}

```

```

9]
#include <stdio.h>
int main() {
    int a,b;
    scanf("%d %d",&a,&b);
    int remainder=a%b;
}

```

```

a=b;
b=remainder;
while(remainder>0){
    remainder=a%b;
    a=b;
    b=remainder;
}
printf("%d",a);
}

```

For loop:

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

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

```

int main() {
    for(int i=1;i<100;i++){
        if(i%2==0){
            printf("%d ",i);
        }
    }
}

```

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

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

```

int main() {
    int number,sum=0;
    scanf("%d",&number);

```

```

for(int i=1;i<=number;i++)
{
    sum=sum+i;
}
printf("%d",sum);
}

```

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

```

#include <stdio.h>

int main() {
    int fact=1;
    int number;
    scanf("%d",&number);
    for(int i=1;i<=number;i++){
        fact*=i;
    }
    printf("%d",fact);
}

```

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

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```

#include <stdio.h>

int main() {
    int a=0,b=1,c,number;
    scanf("%d",&number);
    printf("%d %d ",a,b);
    if(number>2){
        for(int i=1;i<=number-2;i++)
        {
            c=a+b;
            printf("%d ",c);

```

```
        a=b;

        b=c;
    }
}
}
```

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

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

```
int main() {
    int number,flag=0;
    scanf("%d",&number);
    for(int i=2;i<number;i++)
    {
        if(number%i==0){
            printf("not a prime number");

            flag=1;

            break;
        }
    }
    if(flag==0){
        printf("prime number");
    }
}
```

Print the following pattern using a for loop:

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

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

```

int main() {
    int number;
    scanf("%d",&number);
    for(int i=1;i<=number;i++){
        for(int j=1;j<=i;j++){
            printf("*");
        }
        printf("\n");
    }
}

```

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

```

#include <stdio.h>

int main() {
    int number,sum=0;
    scanf("%d",&number);
    for(int i=1;i<=number;i++)
    {
        sum=sum+i*i;
    }
    printf("%d",sum);
}

```

Write a program to compute $(x \text{ raised to the power } y)$ using a for loop.

```

#include <stdio.h>

int main() {
    int res=1;
    int x,y;
    scanf("%d %d",&x,&y);
    for(int i=1;i<=y;i++){

```



```

        res=res*x;
    }
    printf("%d",res);

    return 0;
}

```

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

```

#include <stdio.h>

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

```

Write a program to count the divisors of a given number using a for loop.
has context menu

```

#include <stdio.h>

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

```

```
printf("\n");  
printf("%d",c);  
return 0;  
}
```

DO WHILE LOOP:

Do-While Loop

Menu-Driven Calculator:

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

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

```
int main() {  
    int choice;  
    int num1,num2,result;  
    do{  
        printf("\nMenu:\n");  
        printf("1. Add\n2. Subtract\n3. Multiply\n4. Divide\n5. Exit\n");  
        printf("Enter Choice");  
        scanf("%d",&choice);  
        if(choice>=1 && choice<=5){  
            printf("enter a numbers:");  
            scanf("%d %d",&num1,&num2);  
        }  
        switch(choice){  
            case 1:  
                result=num1+num2;  
                printf("%d",result);  
                break;  
            case 2:
```

```

        result=num1-num2;

        printf("%d",result);

        break;
case 3:
        result=num1*num2;

        printf("%d",result);

        break;
case 4:
        result=num1/num2;

        printf("%d",result);

        break;
case 5:
        printf("existing!");

        break;
default:
        printf("Invalid input");

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

```

Print Numbers Until Zero:

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

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

```

int main() {
    int number;

    do{
        printf("Enter number:");

```

```

scanf("%d",&number);

if(number!=0){
    printf("The number is %d\n",number);
}

}while(number!=0);

return 0;
}

```

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

// Online C compiler to run C program online

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

```
#include<string.h>
```

```

int main() {
    char password[20];
    char correct_pass[]="Swee186";
    do{
        printf("Enter password:");
        scanf("%s",password);
        if(strcmp(password,correct_pass)==0){
            printf("Access!");
            break;
        }
        else{
            printf("Enter a valid password!");
            printf("\n");

```

```

    }

}while(password!=correct_pass);


return 0;
}

```

Write a program to read integers from the user and compute their sum. Stop when the user enters a negative number.

// Online C compiler to run C program online

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

```
#include<string.h>
```

```

int main() {
    int number,sum=0;
    do{
        printf("Enter number:");
        scanf("%d",&number);
        if(number>0){
            sum=sum+number;
        }
    }while(number!=0);
    printf("%d",sum);

    return 0;
}

```

Repeat Multiplication Table:

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

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

```
int main() {
```

```
    int num, i, choice;
```

```
    do {
```

```
        printf("Enter a number to display its multiplication table: ");
```

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

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

```
        for (i = 1; i <= 10; i++) {
```

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

```
        }
```

```
        printf("Do you want to display another table? (1 for Yes, 0 for No): ");
```

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

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

```
    printf("Program exited. Thank you!\n");
```

```
    return 0;
```

```
}
```

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 predefinedNumber = 42;
```

```
    int guess;
```

```
    printf("Guess the predefined number (between 1 and 100):\n");
```

```

do {
    printf("Enter your guess: ");
    scanf("%d", &guess);
    if (guess < predefinedNumber) {
        printf("Too low! Try again.\n");
    } else if (guess > predefinedNumber) {
        printf("Too high! Try again.\n");
    }

} while (guess != predefinedNumber);

printf("Congratulations! You guessed the correct number: %d\n", predefinedNumber);
return 0;
}

```

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 number;

    do {
        printf("Enter a number between 1 and 10: ");
        scanf("%d", &number);
        if (number < 1 || number > 10) {
            printf("Invalid input. Please try again.\n");
        }

    } while (number < 1 || number > 10);
}

```

```
    printf("Thank you! You entered a valid number: %d\n", number);  
    return 0;  
}
```

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 number, count = 0;  
    float sum = 0.0, average;  
  
    printf("Enter numbers to calculate the average (enter 0 to stop):\n");  
  
    do {  
        printf("Enter a number: ");  
        scanf("%d", &number);  
        if (number != 0) {  
            sum += number;  
            count++;  
        }  
    } while (number != 0);  
    if (count > 0) {  
        average = sum / count;  
        printf("The average of the entered numbers is: %.2f\n", average);  
    } else {  
        printf("No numbers were entered to calculate the average.\n");  
    }  
  
    return 0;}
```


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

```
#include <stdio.h>

int main() {
    char letter = 'a';

    printf("Lowercase alphabets from 'a' to 'z':\n");

    // Start the do-while loop
    do {
        printf("%c ", letter);
        letter++;
    } while (letter <= 'z');

    printf("\n"); // End with a newline
    return 0;
}
```

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 /= 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

```

2. Binary Pattern

```

1
01
101
0101
10101

```

3. Floyd's Triangle (Numbers)

```

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

```

4. Inverted Right-Angled Triangle (Numbers)

```

12345
1234
123
12
1

```

5. Diamond (Stars)

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

6. Inverted Pyramid (Stars)

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

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

```
int main() {
```

```
    int rows, coef = 1, space, i, j;
```

```
    printf("Enter the number of rows: ");
```

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

```
    for (i = 0; i < rows; i++) {
```

```
        for (space = 1; space <= rows - i; space++)
```

```
            printf(" ");
```

```
        for (j = 0; j <= i; j++) {
```

```
            if (j == 0 || i == 0)
```

```
                coef = 1;
```

```
            else
```

```
                coef = coef * (i - j + 1) / j;
```

```
            printf("%d ", coef);
```

```
    }  
    printf("\n");  
}  
  
return 0;  
}
```

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

```
int main() {  
    int rows, i, j;  
  
    printf("Enter the number of rows: ");  
    scanf("%d", &rows);  
  
    for (i = 1; i <= rows; i++) {  
        for (j = 1; j <= i; j++) {  
            if ((i + j) % 2 == 0)  
                printf("1");  
            else  
                printf("0");  
        }  
        printf("\n");  
    }  
  
    return 0;  
}
```

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

```
int main() {  
    int rows, i, j, num = 1;  
  
    printf("Enter the number of rows: ");  
    scanf("%d", &rows);  
  
    for (i = 1; i <= rows; i++) {  
        for (j = 1; j <= i; j++) {  
            printf("%d ", num++);  
        }  
        printf("\n");  
    }  
  
    return 0;  
}
```

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

```
int main() {  
    int rows, i, j;  
  
    printf("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;
}
```

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

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

    printf("Enter the number of rows for the diamond's half (odd number): ");
    scanf("%d", &rows);
    for (i = 1; i <= rows; i++) {
        for (space = 1; space <= rows - i; space++)
            printf(" ");
        for (j = 1; j <= 2 * i - 1; j++)
            printf("*");
        printf("\n");
    }
    for (i = rows - 1; i >= 1; i--) {
        for (space = 1; space <= rows - i; space++)
            printf(" ");
        for (j = 1; j <= 2 * i - 1; j++)
            printf("*");
        printf("\n");
    }

    return 0;
}
```

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

```
int main() {
```

```
    int rows, i, j, space;
```

```
    printf("Enter the number of rows: ");
```

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

```
    for (i = rows; i >= 1; i--) {
```

```
        for (space = 1; space <= rows - i; space++)
```

```
            printf(" ");
```

```
        for (j = 1; j <= 2 * i - 1; j++)
```

```
            printf("*");
```

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

```
    }
```

```
    return 0;
```

```
}
```