While loop Assignments (Basic Level)

1) Write a program to read n numbers from the keyboard and find their sum.

```c
#include <stdio.h>
int main() {
    int n, num, sum = 0, i;
    printf("Enter n number: ");
    scanf("%d", &n);
    printf("Enter %d numbers:\n", n);
    for (i = 0; i < n; i++) {
        scanf("%d", &num);
        sum += num;
    }
    printf("Sum: %d\n", sum);
    return 0;
}
```

```
Enter n number: 5
Enter 5 numbers:
1
1
2
2
3
Sum: 9
```

//--
----

2) Write a program to read a number n, and print sum of all the numbers from 1 to n.

```c
#include <stdio.h>
int main() {
    int n, sum = 0, i;
    printf("Enter n number: ");
    scanf("%d", &n);
    for (i = 1; i <= n; i++) {
```

```
        sum += i;
    }
    printf("Sum of all numbers from 1 to %d is %d\n", n, sum);
    return 0;
}
```

```
    Enter n number: 4
    Sum of all numbers from 1 to 4 is 10
```

```
    Enter n number: 9
    Sum of all numbers from 1 to 9 is 45
```

//--

3) Write a program to read a number n and print the factorial of n.

```
#include <stdio.h>
int main() {
    int n, factorial = 1, i;
    printf("Enter n number: ");
    scanf("%d", &n);
    for (i = 1; i <= n; i++) {
        factorial *= i;
    }
    printf("Factorial of %d is %d\n", n, factorial);
    return 0;
}
```

```
    Enter n number: 8
    Factorial of 8 is 40320
```

//--

4) Write a program to print the value of below series:

Example:

Enter n number: 3

1 - 1/2 + 1/3

Generic formula: 1 - 1/2 + 1/3 - 1/4 .... + 1/n etc

```c
#include <stdio.h>
int main() {
    int n, i;
    double sum = 0.0;
    printf("Enter n number: ");
    scanf("%d", &n);
    for (i = 1; i <= n; i++) {
        if (i % 2 == 1) {
            sum += 1.0 / i;
        } else {
            sum -= 1.0 / i;
        }
    }
    printf("Series sum: %lf\n", sum);
    return 0;
}
```

```
 Enter n number: 4
 Series sum: 0.583333
```
//--

5) Write a program to multiply two numbers without using * operator,

```c
#include <stdio.h>
int main() {
    int num1, num2, result = 0, i;
    printf("Enter two numbers:\n");
    scanf("%d%d", &num1, &num2);
    for (i = 0; i < num2; i++) {
        result += num1;
    }
    printf("Result is %d\n", result);
    return 0;
}
```

```
   Enter two numbers:
   3
   2
   Result is 6
```
//--
----

6) Write a program to find the power of a number to the given number.

eg.,input : 3 5

output: 3 to the power of 5 -> 243 Write the following programs, using while loop, with counting based logic :

```c
#include <stdio.h>
int main() {
    int base, exponent, result = 1, i;
    printf("Enter base and exponent: ");
    scanf("%d%d", &base, &exponent);

    for (i = 0; i < exponent; i++) {
        result *= base;
    }

    printf("%d to the power of %d -> %d\n", base, exponent, result);
    return 0;
}
```

```
   Enter base and exponent: 3 7
   3 to the power of 7 -> 2187
```
//--
----

1) Read n number of numbers from user (n value taken as input) and print if each number is even or odd.

```c
#include <stdio.h>
int main() {
    int n, x, i;
    printf("Enter n number: ");
    scanf("%d", &n);
```

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

        printf("Enter x value: ");

        scanf("%d", &x);

        if (x % 2 == 0) {

            printf("The given number %d is EVEN.\n", x);

        } else {

            printf("The given number %d is ODD.\n", x);

        }

    }

    return 0;

}
```

```
    Enter n number: 3

    Enter x value: 1

    The given number 1 is ODD.

    Enter x value: 2

    The given number 2 is EVEN.

    Enter x value: 3

    The given number 3 is ODD.
```

//--
----

2) Read n characters from user, and print if each character is vowel or not.

```c
#include <stdio.h>

int main() {

    int n, i;

    char ch;

    printf("Enter n characters: ");

    scanf("%d", &n);


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

        printf("Enter a character: ");

        scanf(" %c", &ch);


        if (ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u' ||

            ch == 'A' || ch == 'E' || ch == 'I' || ch == 'O' || ch == 'U') {
```

```c
            printf("The given character '%c' is a vowel.\n", ch);
        } else {
            printf("The given character '%c' is not a vowel.\n", ch);
        }
    }
    return 0;
}
```

```
    Enter a character: y
    The given character 'y' is not a vowel.
    Enter a character: a
    The given character 'a' is a vowel.
    Enter a character:
```

//--

3) Read n characters from user and print if each character is a capital

```c
#include <stdio.h>
int main() {
    int n, i;
    char ch;

    printf("Enter n characters: ");
    scanf("%d", &n);

    for (i = 0; i < n; i++) {
        printf("Enter a character: ");
        scanf(" %c", &ch);

        if (ch >= 'a' && ch <= 'z') {
            printf("The given character '%c' is a small alphabet.\n", ch);
        } else if (ch >= 'A' && ch <= 'Z') {
            printf("The given character '%c' is a capital alphabet.\n", ch);
        } else if (ch >= '0' && ch <= '9') {
            printf("The given character '%c' is a numeric character.\n", ch);
        } else {
            printf("The given character '%c' is a special character.\n", ch);
```

```c
        }
    }
    return 0;
}
```

```
    Enter n characters: q
    Enter a character: The given character 'q' is a small alphabet.
    Enter a character: A
    The given character 'A' is a capital alphabet.
    Enter a character:
```

//---

4) Read n numbers from the user, and while reading every number, print if the number is bigger or smaller than the previous number. For the first number, there won't be any output as it is the first one.

```c
#include <stdio.h>
int main() {
    int n, num, prev, i;

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

    if (n > 0) {
        printf("Enter number: ");
        scanf("%d", &prev);

        for (i = 1; i < n; i++) {
            printf("Enter number: ");
            scanf("%d", &num);

            if (num > prev) {
                printf("The given number is bigger than the previous number.\n");
            } else if (num < prev) {
                printf("The given number is smaller than the previous number.\n");
            }
            prev = num;
        }
```

```
    }
    return 0;
}
```

```
    Enter n number: 6
    Enter number: 88
    Enter number: 4
    The given number is smaller than the previous number.
    Enter number:
```

//--

5) *Read n numbers in ascending order. If a number entered is bigger than the previous number, then count it. If it is smaller, then don't count it, instead let the loop repeat itself and read another number.*

```c
#include <stdio.h>

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

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

    if (n > 0) {
        printf("Enter number: ");
        scanf("%d", &prev);

        for (i = 1; i < n; i++) {
            printf("Enter number: ");
            scanf("%d", &num);

            if (num > prev) {
                count++;
                prev = num;
            } else {
                i--;
            }
        }
```

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

```
    Enter n number: 7
    Enter number: 1
    Enter number: 5
    Enter number: 6
    Enter number:
    9
    Enter number: 8
    Enter number: 44
    Enter number: -55
    Enter number: 74
    Enter number: 100
    The count is 7
```
//--
----

6) Read n numbers from the user ,and print the smallest number of all.

```c
#include <stdio.h>
int main() {
    int n, num, smallest, i;

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

    if (n > 0) {
        printf("Enter number: ");
        scanf("%d", &smallest);

        for (i = 1; i < n; i++) {
            printf("Enter number: ");
            scanf("%d", &num);
```

```
            if (num < smallest) {

                smallest = num;

            }

        }

    }
    printf("The smallest number is %d\n", smallest);


    return 0;
}
```

```
    Enter n number: 3

    Enter number: 7

    Enter number: 56

    Enter number: 5

    The smallest number is 5
```

//---

6) **Read a number from the user, and print its multiplication table upto 10 multiples.**

```
#include <stdio.h>

int main() {

    int n, i;


    printf("Enter n number: ");

    scanf("%d", &n);


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

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

    }

    return 0;

}
```

```
    Enter n number: 27

    27 * 1 = 27

    27 * 2 = 54
```

```
    27 * 3 = 81

    27 * 4 = 108

    27 * 5 = 135

    27 * 6 = 162

    27 * 7 = 189

    27 * 8 = 216

    27 * 9 = 243

    27 * 10 = 270
```

//---
----

8) For n students from a class, read 6 subject marks for every student, and calculate their percentage of marks, and print who is the topper of all (print the student number).

```c
#include <stdio.h>

int main() {
    int n, i, j, marks[6], topperStudent = 1;
    float percentage, maxPercentage = 0.0;


    printf("Enter n students: ");
    scanf("%d", &n);


    for (i = 1; i <= n; i++) {
        printf("Enter %d student 6 subjects marks:\n", i);
        percentage = 0.0;
        for (j = 0; j < 6; j++) {
            scanf("%d", &marks[j]);
            percentage += marks[j];
        }
        percentage /= 6.0;
        printf("Student %d percentage is: %.2f%%\n", i, percentage);


        if (percentage > maxPercentage) {
            maxPercentage = percentage;
            topperStudent = i;
        }
    }
```

```
    printf("Topper student ID is %d\n", topperStudent);


    return 0;
}
```

    Enter n students: 2

    Enter 1st student 6 subjects marks:

    40

    50

    45

    75

    60

    55

    Student 1 percentage is: 54.16%

    Enter 2nd student 6 subjects marks:

    45

    65

    55

    80

    40

    55

    Student 2 percentage is: 56.66%

    Topper student ID is 2

//--

9) Read two numbers from the user, and print all serial numbers between those numbers.

eg., inputs: 10   20

output: 10 11 12 13 14 15 16 17 18 19 20

```
#include <stdio.h>
int main() {
    int start, end, i;

    printf("Enter two numbers: ");
    scanf("%d %d", &start, &end);
```

```c
    for (i = start; i <= end; i++) {

        printf("%d ", i);

    }

    printf("\n");

    return 0;

}
```

//---

10) write the calculator program to read two numbers and one character (+, -, *, / , %) from the user, and based on character, do appropriate operations on numbers and print the output. Modify the program to repeat this task n number of times.

Example:

Enter n number: 2

Enter two numbers:

5

4

Enter a character (+,-,*,/,%):

+

Result of 5 + 4 is 9

Enter two numbers:

4

3

Enter a character (+,-,*,/,%):

-

Result of 4 - 3 is 1


```c
#include <stdio.h>

int main() {

    int n, i, num1, num2;

    char op;


    printf("Enter n number: ");

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

```c
for (i = 0; i < n; i++) {
    printf("Enter two numbers:\n");
    scanf("%d %d", &num1, &num2);
    printf("Enter a character (+,-,*,/,%%): ");
    scanf(" %c", &op);

    switch (op) {
        case '+':
            printf("Result of %d + %d is %d\n", num1, num2, num1 + num2);
            break;
        case '-':
            printf("Result of %d - %d is %d\n", num1, num2, num1 - num2);
            break;
        case '*':
            printf("Result of %d * %d is %d\n", num1, num2, num1 * num2);
            break;
        case '/':
            if (num2 != 0) {
                printf("Result of %d / %d is %d\n", num1, num2, num1 / num2);
            } else {
                printf("Division by zero error.\n");
            }
            break;
        case '%':
            if (num2 != 0) {
                printf("Result of %d %% %d is %d\n", num1, num2, num1 % num2);
            } else {
                printf("Modulo by zero error.\n");
            }
            break;
        default:
            printf("Invalid operator.\n");
            break;
    }
```

```
    }

    return 0;
}
```

//--

11) Read two numbers from the user, and print all odd numbers between those numbers and then all even numbers.

eg., inputs: 10   20

output:

even numbers: 10 12 14 16 18 20

odd numbers: 11 13 15 17 19

```c
#include <stdio.h>
int main() {
    int start, end, i;

    printf("Enter two numbers: ");
    scanf("%d %d", &start, &end);

    printf("even numbers: ");
    for (i = start; i <= end; i++) {
        if (i % 2 == 0) {
            printf("%d ", i);
        }
    }
    printf("\nodd numbers: ");
    for (i = start; i <= end; i++) {
        if (i % 2 != 0) {
            printf("%d ", i);
        }
    }
    printf("\n");
    return 0;
```

```
    }
    //----------------------------------------------------------------------------
    ---------------------------------------------------

    12) Read two numbers from the user, and print all numbers in reverse order.


    eg., inputs: 10    20

    output:

    20 19 18 17 16 15 14 13 12 11 10


#include <stdio.h>

int main() {
    int start, end, i;

    printf("Enter two numbers: ");
    scanf("%d %d", &start, &end);

    for (i = end; i >= start; i--) {
        printf("%d ", i);
    }
    printf("\n");

    return 0;
}
```