Batch: C1-1	**Roll No.: 16010123012**
Experiment / assignment / tutorial No. 3	
Grade: AA / AB / BB / BC / CC / CD /DD	
Signature of the Staff In-charge with date	

TITLE: Write a program in C to demonstrate use of looping control structures

AIM: Write a menu driven program for following option

a. To find whether a number is palindrome or not. (e.g. 1221 is palindrome) using while loop

b. To calculate the sum of the Fibonacci series up to 'n' terms(use do-while loop only)

c. Write a program in C to make such a pattern like a right angle triangle with a number which will repeat a number in a row. (Pattern is given below)

Expected OUTCOME of Experiment:

Apply basic concepts of C programming for problem solving.(CO1 and CO2).

Books/ Journals/ Websites referred:

1. Programming in C, second edition, Pradeep Dey and Manas Ghosh, Oxford University Press.
2. Programming in ANSI C, fifth edition, E Balagurusamy, Tata McGraw Hill.
3. Introduction to programming and problem solving , G. Michael Schneider ,Wiley India edition.

Problem Definition:

The program accepts a choice from the user using a switch case statement and generates output accordingly.

Choice a: The program checks whether a given numbered by user is palindrome or not. If a number remains same, even if we reverse its digits then the number is known as palindrome number. For example, 12321 is a palindrome number because it remains same if we reverse its digits.

Choice b: Sum of Fibonacci series up to n terms will be generated. Fibonacci series is a series in which each number is the sum of the last two preceding numbers. The first two terms of a Fibonacci series are 0 and 1.(use while loop only)

Example:

Input: n = 5

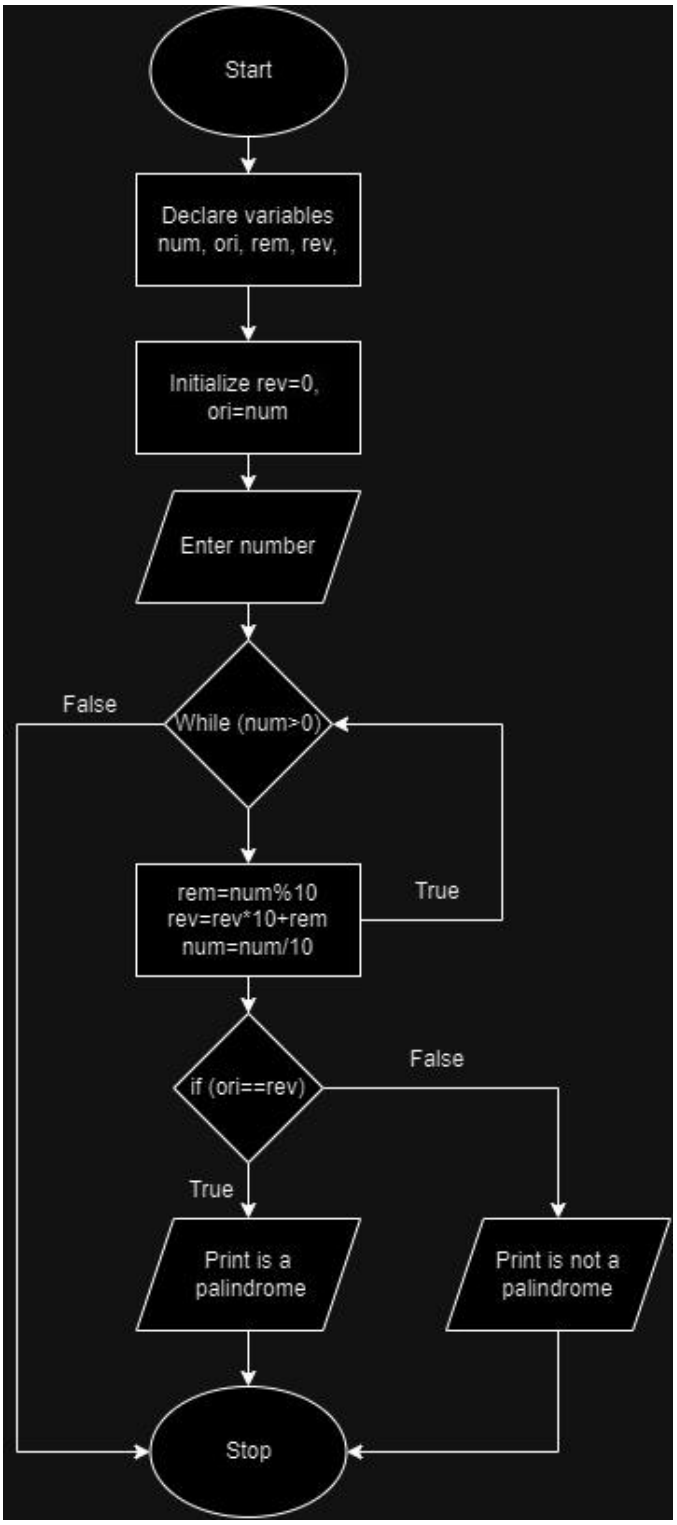
Output: 7

Explanation: 0 + 1 + 1 + 2 + 3 = 7

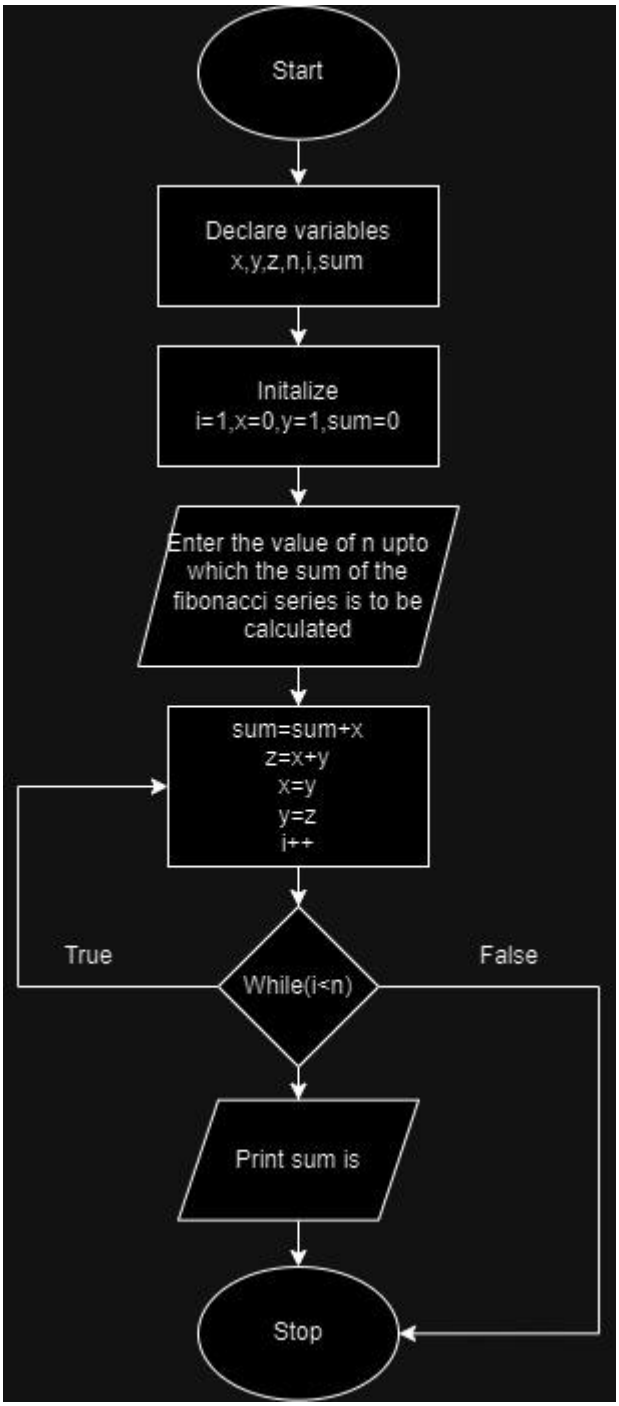
Choice c: Write a program in C to make such a pattern like right angle triangle with a number which will repeat a number in a row.
The pattern like :
1
22
333
4444

Algorithm:

Q1


Start
Declare variables num, ori, rem, rev,
Initialize rev=0, ori=num
Enter number
While (num>0)
False
True
rem=num%10
rev=rev*10+rem
num=num/10
if (ori==rev)
False
True
Print is a palindrome
Print is not a palindrome
Stop

Q2



Implementation details:

Q1

```
#include<stdio.h>
int main(){
printf("Aaryan Sharma\n");
printf("16010123012\n");

int num,ori,rem,rev=0;
printf("Enter number: ");
scanf("%d",&num);
ori=num;

while(num>0)
{
   rem=num%10;
   rev=rev*10+rem;
   num=num/10;
}
if(ori==rev)
{
   printf("%d is a palindome",ori);
}
else
{
   printf("%d is not a palindrome",ori);
}
return 0;
}
```

Q2

```
#include<stdio.h>
int main(){
printf("Aaryan Sharma\n");
printf("16010123012\n");

int x=0,y=1,sum=0;
int n,z;
printf("Enter the value of n upto which the sum of the fibonacci series is to be
calculated: ");
scanf("%d",&n);
int i=0;
do
{
   printf("%d,",x);
```

```
    sum=sum+x;
    z=x+y;
    x=y;
    y=z;
    i++;
}
while(i<n);
{
    printf("\nSum is : %d",sum);
}
return 0;
}
```

Q3
5)

```
#include <stdio.h>
int main()
{
  printf("Aaryan Sharma\n");
  printf("16010123012\n");
  int r;
  printf("Enter the number of rows: ");
  scanf("%d", &r);

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

6)

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

```
int main()
{
   printf("Aaryan Sharma\n");
   printf("16010123012\n");
   int r;
   printf("Enter the number of rows: ");
   scanf("%d", &r);

   for (int i = r; i >= 0; i--)
   {
      for (int j = 0; j <= i ; j++)
      {
        printf("*");
      }
     printf("\n");
   }
   return 0;
}
```

12)

```
#include <stdio.h>

int main()
{
  printf("Aaryan Sharma\n");
  printf("16010123012\n");
  int r;
  printf("Enter the number of rows: ");
  scanf("%d", &r);

  for(int i=1; i<=r*3; i++)
    {
      if(i%3==0)
      {
        printf("%d\n", i);
      }
      else
      {
        printf("%d\t",i);
      }
    }
  return 0;
}
```

13)

```
#include <stdio.h>
int main()
{
  printf("Aaryan Sharma\n");
  printf("16010123012\n");
  int r;
  printf("Enter the number of rows: ");
  scanf("%d", &r);

    for (int i = 1; i <= r; i++)
    {
        for (int space = 1; space <= r - i; space++)
        {
            printf(" ");
        }
            for (int j = 1; j <= i; j++)
        {
            printf("%d", i);
        }
        printf("\n");
    }
    return 0;
}
```

14)

```
#include <stdio.h>
int main()
{
  printf("Aaryan Sharma\n");
  printf("16010123012\n");
  int r;
  printf("Enter the number of rows: ");
  scanf("%d", &r);
  for (int i=0;i<r;i++){
    for (int j=1;j<=r*2-1;j++){
      if ((j==r-i) || (j==r+i) ){
        printf("*");
      }else{
        if (i==r-1){
```

```
        if(j%2!=0){
          printf("*");
        }else{
          printf(" ");
        }
      }else{
        printf(" ");
      }
    }
    }
    printf("\n");
  }
    return 0;
}
```

Output(s):

Q1

```
Aaryan Sharma
16010123012
Enter number: 1221
1221 is a palindome
Process returned 0 (0x0)   execution time : 5.101 s
Aaryan Sharma
16010123012
Enter number: 123
123 is not a palindrome
Process returned 0 (0x0)   execution time : 6.164 s
Aaryan Sharma
16010123012
Enter number: 12321
12321 is a palindome
Process returned 0 (0x0)   execution time : 1.740 s
```

Q2

```
Aaryan Sharma
16010123012
Enter the value of n upto which the sum of the fibonacci series is to be calculated: 1
0,
Sum is : 0
Process returned 0 (0x0)   execution time : 1.306 s
Aaryan Sharma
16010123012
Enter the value of n upto which the sum of the fibonacci series is to be calculated: 5
0,1,1,2,3,
Sum is : 7
Process returned 0 (0x0)   execution time : 1.356 s
Aaryan Sharma
16010123012
Enter the value of n upto which the sum of the fibonacci series is to be calculated: 7
0,1,1,2,3,5,8,
Sum is : 20
```

Q3.5)

```
Aaryan Sharma
16010123012
Enter the number of rows: 25
                         *
                        **
                       ***
                      ****
                     *****
                    ******
                   *******
                  ********
                 *********
                **********
               ***********
              ************
             *************
            **************
           ***************
          ****************
         *****************
        ******************
       *******************
      ********************
     *********************
    **********************
   ***********************
  ************************
 *************************

Process returned 0 (0x0)   execution time : 1.714 s
```

```
Aaryan Sharma
16010123012
Enter the number of rows: 5
    *
   **
  ***
 ****
*****

Process returned 0 (0x0)   execution time : 1.726 s
```

6)

```
Aaryan Sharma
16010123012
Enter the number of rows: 5
******
*****
****
***
**
*

Process returned 0 (0x0)   execution time : 1.021 s
```

```
Aaryan Sharma
16010123012
Enter the number of rows: 10
**********
*********
********
*******
******
*****
****
***
**
*

Process returned 0 (0x0)   execution time : 2.189 s
```

12)

```
Aaryan Sharma
16010123012
Enter the number of rows: 3
1       2       3
4       5       6
7       8       9

Process returned 0 (0x0)   execution time : 1.086 s
Aaryan Sharma
16010123012
Enter the number of rows: 6
1       2       3
4       5       6
7       8       9
10      11      12
13      14      15
16      17      18

Process returned 0 (0x0)   execution time : 0.947 s
```

13)

```
Aaryan Sharma
16010123012
Enter the number of rows: 5
    1
   22
  333
 4444
55555

Process returned 0 (0x0)   execution time : 1.351 s
```

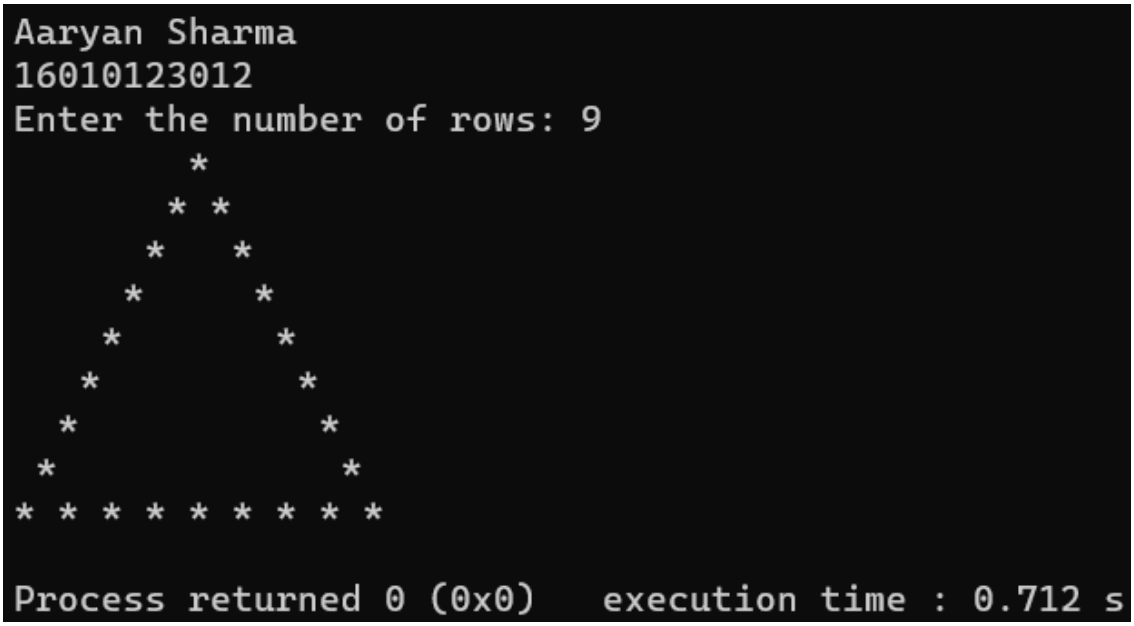
```
Aaryan Sharma
16010123012
Enter the number of rows: 9
        1
       22
      333
     4444
    55555
   666666
  7777777
 88888888
999999999

Process returned 0 (0x0)   execution time : 1.079 s
```

14)

```
Aaryan Sharma
16010123012
Enter the number of rows: 5
    *
   * *
  *   *
 *     *
* * * * *

Process returned 0 (0x0)   execution time : 1.640 s
```



Conclusion:
We learned to use the looping control structures in C

Post Lab Descriptive Questions

- Write a program to enter numbers till the user wants. At the end it should display the count of positive, negative and zeros entered.

```
#include <stdio.h>
int main()
{
   printf("Aaryan Sharma\n");
   printf("16010123012\n");

   int num, positive = 0, negative = 0, zero = 0;
   char more;

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

      if (num > 0) {
```

```
            positive++;
        } else if (num < 0) {
            negative++;
        } else {
            zero++;
        }

        printf("Do you want to enter more numbers? (y/n): ");
        scanf(" %c", &more);

    } while (more == 'y' || more == 'Y');

    printf("\nCount of Positive Numbers: %d\n", positive);
    printf("Count of Negative Numbers: %d\n", negative);
    printf("Count of Zeroes: %d\n", zero);

    return 0;
}
```

```
Aaryan Sharma
16010123012
Enter a number: 4
Do you want to enter more numbers? (y/n): y
Enter a number: -4
Do you want to enter more numbers? (y/n): y
Enter a number: 0
Do you want to enter more numbers? (y/n): y
Enter a number: 2
Do you want to enter more numbers? (y/n): y
Enter a number: -24
Do you want to enter more numbers? (y/n): y
Enter a number: 0
Do you want to enter more numbers? (y/n): n

Count of Positive Numbers: 2
Count of Negative Numbers: 2
Count of Zeroes: 2

Process returned 0 (0x0)   execution time : 18.963 s
```

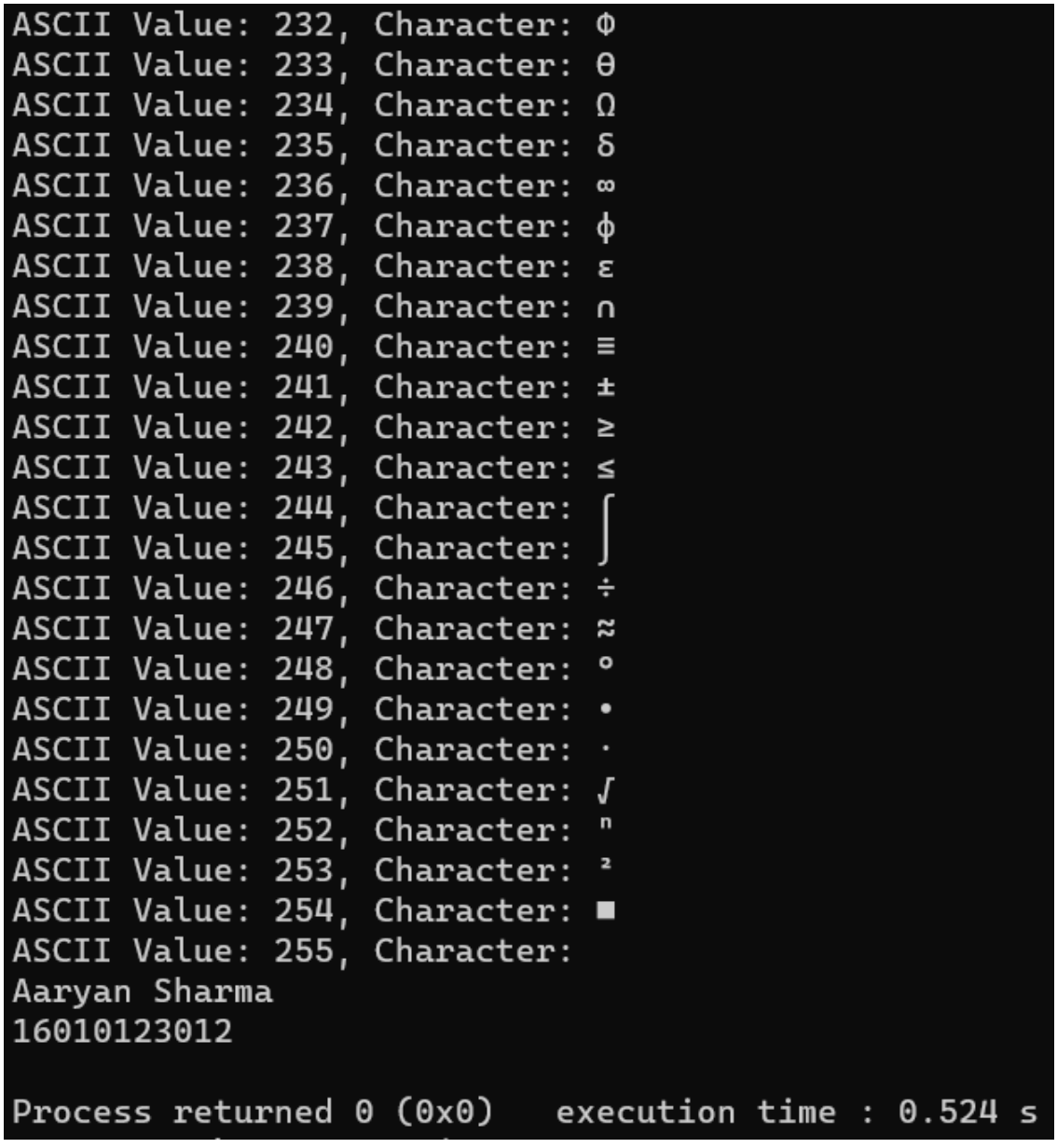
- Write a program to print all the ASCII values and their equivalent characters using a while loop. The ASCII values vary from 0 to 255.

```
#include <stdio.h>

int main() {
   int aV = 0;

   printf("ASCII Values and Equivalent Characters:\n");

   while (aV <= 255) {
      printf("ASCII Value: %d, Character: %c\n", aV, aV);
      aV++;
   }
   printf("Aaryan Sharma\n");
   printf("16010123012\n");
   return 0;
}
```



Date: 26/01/24 **Signature of faculty in-charge**