Batch:C1_2 Roll No.:1601023032

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:

Step 1: Print name and roll no on first line.

Step 2: Take input of the choice in char datatype by initializing a variable.

Step 3: Initialize all required variables in the int data type.

Step 4: Put the variable in the switch case.

Step 5: Case 'a' consists of a palindrome program.

(i)Take input of the number.

(ii)Declare a temp variable and assign it the number's value.

(iii)Construct the while loop and give the condition that it should continue till the number's value is greater than 0.

(iv)Use a variable to store the digits and also divide the number by 10.

(v)Use a variable to store the reverse number by using the formula (rev*10)+digit.(the number increments by place values after each iteration eg units becomes 10s next and so on)

(vi)exit while loop when the number is destroyed or becomes zero then check if the number is a palindrome by comparing the rev number to the temp variable.

Step 6: Case 'b' consists of sum of fibonacci.

(i)initiate a for loop which runs till two less than the requested range inputted by the user (n-2 since we already added 0 and 1 to the sum variable in the start)

(ii)Add all the fibonacci numbers

(iii)c variable is sum of a and b , after adding c to sum variable assign c's value to b and b's value to a.

Step 7: Case 'c' consists of a pattern.

(i)Initialize i,j for loop variables and n as number of rows.

(ii)Take the number of rows as input in n.

(iii)Write outer j loop to iterate till j achieves the value of n.

(iv)Write the inner i loop to iterate till i achieves the value of j.

(v)Print j in the inner loop.

Implementation details:

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

int main()
{
    char c;
    printf("Aksh Maheshwari 16010123032 \n");
    printf("Enter choice a.palindrome b.sum of fibonacci c.pattern \n");
    scanf("%c",&c);
    int n,i,j,t,r,z=0,a=0,b=1,s=0;
    switch(c)
    {
    case 'a':
        printf("enter a number : \n");
        scanf("%d",&n);
        t=n;
        while(n>0)
        {
            r=n%10;
            n/=10;
            z=(z*10)+r;

        }
        if(z==t)
        {
            printf("%d is a palindrome \n",t);
        }
        else
        {
            printf("%d is not a palindrome \n",t);
        }
        break;
    case 'b':
        printf("Enter range: \n");
        scanf("%d",&n);
        s=a+b;
        for(i=1;i<=n-2;i++)
        {
            c=a+b;
```

```
39              c=a+b;
40              s+=c;
41              a=b;
42              b=c;
43          }
44          printf("%d \n",s);
45
46          break;
47      case 'c':
48          for(j=1;j<=4;j++)
49          {
50              for(i=1;i<=j;i++)
51              {
52                  printf("%d",j);
53              }
54              printf("\n");
55          }
56          break;
57
58      }
59      return 0;
60  }
61
```

Output(s):

```
Aksh Maheshwari 16010123032
Enter choice a.palindrome b.sum of fibonacci c.pattern
a
enter a number :
12121
12121 is a palindrome

Process returned 0 (0x0)   execution time : 7.062 s
Press any key to continue.
```

```
Aksh Maheshwari 16010123032
Enter choice a.palindrome b.sum of fibonacci c.pattern
b
Enter range:
5
7

Process returned 0 (0x0)   execution time : 3.504 s
Press any key to continue.
```

```
Aksh Maheshwari 16010123032
Enter choice a.palindrome b.sum of fibonacci c.pattern
c
1
22
333
4444
```

Conclusion:
We learnt about the flexibility of decision control statements and looping structures.

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.

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

int main()
{
    int p=0,nve=0,z=0,n,temp;
    do{
        printf("Enter a number:\n");
        scanf("%d",&n);
        if(n>0){

            p++;
        }
        else if(n==0){

            z++;
        }
        else{
            nve++;
        }
        printf("Do u want to continue type 1)yes,0)no:\n");
        scanf("%d",&temp);
    }while(temp==1);
    printf("No of positive numbers are:%d\n",p);
    printf("No of negative numbers are:%d\n",nve);
    printf("No of zeroes are:%d\n",z);
    return 0;
}

```

```
Enter a number:
5
Do u want to continue type 1)yes,0)no:
1
Enter a number:
7
Do u want to continue type 1)yes,0)no:
1
Enter a number:
-1
Do u want to continue type 1)yes,0)no:
1
Enter a number:
0
Do u want to continue type 1)yes,0)no:
0
No of positive numbers are:2
No of negative numbers are:1
No of zeroes are:1

Process returned 0 (0x0)   execution time : 14.808
s
Press any key to continue.
```

- 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.

```c
#include <stdio.h>

int main()
{
    int i=0;
    while(i<=255){
        printf("Ascii value of %d is %c\n\t",i,i);
        i++;
    }
}
```

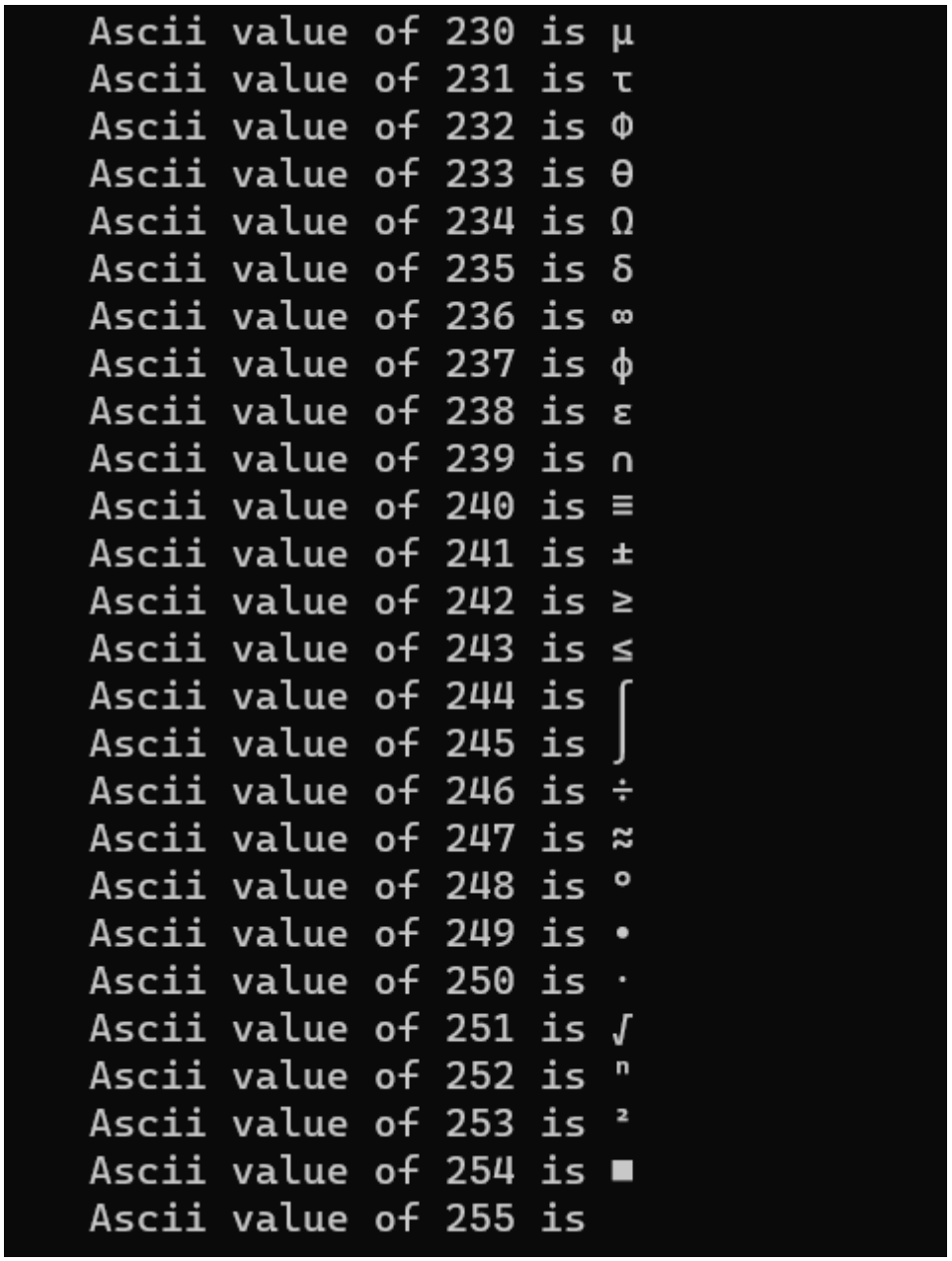
```
Ascii value of 0 is
        Ascii value of 1 is
        Ascii value of 2 is
        Ascii value of 3 is
        Ascii value of 4 is
        Ascii value of 5 is
        Ascii value of 6 is
        Ascii value of 7 is
        Ascii value of 8 is
        Ascii value of 9 is
        Ascii value of 10 is

        Ascii value of 11 is

        Ascii value of 12 is

        Ascii value of 13 is
        Ascii value of 14 is
        Ascii value of 15 is
        Ascii value of 16 is
        Ascii value of 17 is
        Ascii value of 18 is
        Ascii value of 19 is
        Ascii value of 20 is
        Ascii value of 21 is
        Ascii value of 22 is
        Ascii value of 23 is
        Ascii value of 24 is
        Ascii value of 25 is
        Ascii value of 26 is ?
        Ascii value of 27 is

                scii value of 28 is
        Ascii value of 29 is
        Ascii value of 30 is
        Ascii value of 31 is
        Ascii value of 32 is
        Ascii value of 33 is !
        Ascii value of 34 is "
```


Ascii value of 230 is µ
Ascii value of 231 is τ
Ascii value of 232 is Φ
Ascii value of 233 is Θ
Ascii value of 234 is Ω
Ascii value of 235 is δ
Ascii value of 236 is ∞
Ascii value of 237 is ϕ
Ascii value of 238 is ε
Ascii value of 239 is ∩
Ascii value of 240 is ≡
Ascii value of 241 is ±
Ascii value of 242 is ≥
Ascii value of 243 is ≤
Ascii value of 244 is ⌠
Ascii value of 245 is ⌡
Ascii value of 246 is ÷
Ascii value of 247 is ≈
Ascii value of 248 is °
Ascii value of 249 is •
Ascii value of 250 is ·
Ascii value of 251 is √
Ascii value of 252 is ⁿ
Ascii value of 253 is ²
Ascii value of 254 is ■
Ascii value of 255 is

Date: _____ **Signature of faculty in-charge**