

(SE - FUNDAMENTALS OF PROGRAMMING)

{C LANGUAGE} -

‘Fundamentals Of Programming’

MODULES:- [3.1,3.2,3.3]

Submitted to :-

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MODULE: 3.1 (C Language Fundamental)

1. Display This Information using printf :

- i) Your Name
- ii) Your Birth date
- iii) Your Age
- iv) Your Address

Ans :-

Practical:-

The screenshot shows a code editor window titled "Practical-1.c". The code is as follows:

```
1 #include <stdio.h>
2 #include <conio.h>
3 int main()
4 {
5     printf("-----Bio Data-----\n\n");
6     printf("Enter Your Name : Janvi Panchal \n");
7     printf("Enter Your DOB : Sep 9, 2003\n");
8     printf("Enter Your Age : 19\n");
9     printf("Enter Your Address : ABCD....\n");
10    return(0);
11 }
```

Output:-

The screenshot shows a terminal window with the following output:

```
C:\Users\Lenovo\Desktop\C\Module 3.1\Practical-1.exe
-----Bio Data-----

Enter Your Name : Janvi Panchal
Enter Your DOB : Sep 9, 2003
Enter Your Age : 19
Enter Your Address : ABCD...

-----
Process exited after 0.0735 seconds with return value 0
Press any key to continue . . .
```

2. Write a program to make Simple calculator
(to make addition, subtraction, multiplication,
division and modulo)?

Ans:-

Practical:-

```
Practice_Example.c Task_3(Arith.Operator).c
1 #include<stdio.h>
2
3 int main()
4 {
5     int a , b ;
6
7     printf("Enter the number a=");
8     public int __cdecl printf (const char * __restrict__ _Format, ...)
9     printf("Enter the number b=");
10    scanf("%d", &b);
11
12    printf(" \n \n a=%d b=%d", a,b);
13    printf(" \n \n Addition a + b = %d", a+b);
14    printf(" \n \n Substraction a - b = %d", a-b);
15    printf(" \n \n Multiplication a * b = %d", a*b);
16    printf(" \n \n Division a / b = %d", a/b);
17    printf(" \n \n Modulo a % b = %d", a%b);
18 }
```

Output:-

```
C:\Users\hp\OneDrive\Documents\DEV C++\Task_3(Arith.Operator).exe
Enter the number a=12
Enter the number b=6

a=12 b=6

Addition a + b = 18

Substraction a - b = 6

Multiplication a * b = 72

Division a / b = 2

Modulo a % b = 0
-----
Process exited after 11.42 seconds with return value 19
Press any key to continue . . .
```

3. WAP to find area of circle, rectangle and triangle.

Ans:-

i) Area Of Rectangle:

Practical:-

```
Practice_Example.c
1 //WAP to print area of Rectangle.
2 #include<stdio.h>
3
4 int main()
5 {
6     int l,b,a;
7     printf("Enter the Length :");
8     scanf("%d",&l);
9     printf("\n Enter the Breadth :");
10    scanf("%d",&b);
11
12    a=l*b;
13    printf("\n Area of Rect.= %d",a);
14    return 0;
15 }
```

Output:-

```
C:\Users\hp\OneDrive\Documents\DEV C++\Practice_Example.exe
Enter the Length :10

Enter the Breadth :5

Area of Rect.= 50
-----
Process exited after 4.947 seconds with return value 0
Press any key to continue . . .
```

ii) Area Of Triangle:

Practical:-

```
Practice_Example.c
1 //WAP to print area of Triangle.
2 #include<stdio.h>
3
4 int main()
5 {
6     int l,b,a;
7     printf("Enter the Length :");
8     scanf("%d",&l);
9     printf("\n Enter the Breadth :");
10    scanf("%d",&b);
11
12    a=(l*b)/2;
13    printf("\n Area of Triangle= %d",a);
14    return 0;
15 }
```

Output:-

```
C:\Users\hp\OneDrive\Documents\DEV C++\Practice_Example.exe
Enter the Length :10

Enter the Breadth :5

Area of Triangle= 25
-----
Process exited after 5.751 seconds with return value 0
Press any key to continue . . .
```

iii) Area Of Circle:

Practical:-

```
Practice_Example.c
1 //WAP to print area of Circle.
2 #include<stdio.h>
3
4 int main()
5 {
6     float pi=3.14,r,a;
7     printf("Enter the Radius :");
8     scanf("%f",&r);
9
10    a=pi*r*r;
11    printf("\n Area of Circle= %f",a);
12    return 0;
13 }
```

Output:-

```
C:\Users\hp\OneDrive\Documents\DEV C++\Practice_Example.exe
Enter the Radius :14

Area of Circle= 615.440063
-----
Process exited after 3.808 seconds with return value 0
Press any key to continue . . .
```

4. WAP to find simple interest.

Ans:-

Simple Interest:

Practical:-

```
Practice_Example.c
1 //WAP to print simple Interest.
2 #include<stdio.h>
3
4 int main()
5 {
6     int p,r,n;
7     float I;
8     printf("Enter the Principal bal. :");
9     scanf("%d",&p);
10    printf("Enter the Rate :");
11    scanf("%d",&r);
12    printf("Enter the Time :");
13    scanf("%d",&n);
14
15    I=(p*r*n)/100;
16    printf("\n Interest= %f",I);
17    public int __cdecl printf (const char * __restrict__ _Format, ...)
18 }
```

Output:-

```
C:\Users\hp\OneDrive\Documents\DEV C++\Practice_Example.exe
Enter the Principal bal. :50
Enter the Rate :150
Enter the Time :3

Interest= 225.000000
-----
Process exited after 31.46 seconds with return value 0
Press any key to continue . . .
```

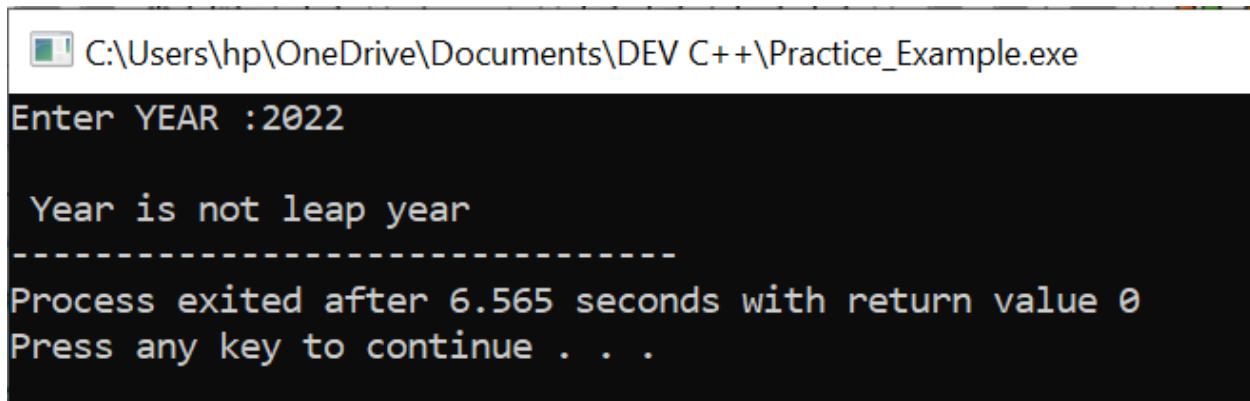
5. WAP to check if the given year is a leap year or not.

Ans:-

Practical:-

```
[*] Practice_Example.c
1 //WAP to check if the given year is a leap year or not.
2 #include<stdio.h>
3
4 int main()
5 {
6     int year;
7     printf("Enter YEAR :");
8     scanf("%d", &year);
9
10    if(year %400==0)
11    {
12        printf("\n Year is a Leap year");
13    }
14    else if(year %100==0)
15    {
16        printf("\n Year is not a Leap year");
17    }
18    else if(year % 4==0)
19    {
20        printf("\n Year is a Leap year");
21    }
22    else
23    {
24        printf("\n Year is not Leap year");
25    }
26
27    return 0;
28 }
```

Output:-



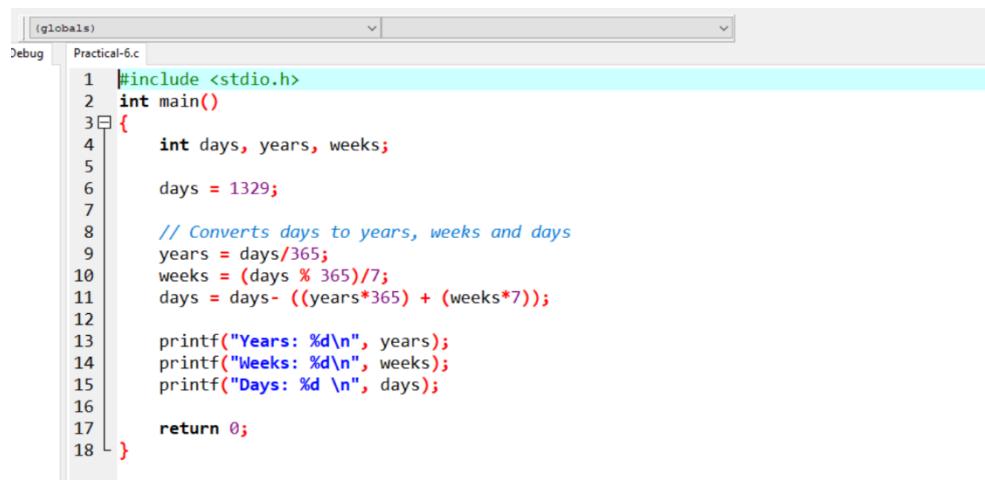
```
C:\Users\hp\OneDrive\Documents\DEV C++\Practice_Example.exe
Enter YEAR :2022

Year is not leap year
-----
Process exited after 6.565 seconds with return value 0
Press any key to continue . . .
```

6. WAP to convert years into days and days into years.

Ans:-

Practical:-



```
(globals)
Debug Practical-6.c
1 #include <stdio.h>
2 int main()
3 {
4     int days, years, weeks;
5
6     days = 1329;
7
8     // Converts days to years, weeks and days
9     years = days/365;
10    weeks = (days % 365)/7;
11    days = days- ((years*365) + (weeks*7));
12
13    printf("Years: %d\n", years);
14    printf("Weeks: %d\n", weeks);
15    printf("Days: %d \n", days);
16
17    return 0;
18 }
```

Output:-

```
C:\Users\Lenovo\Desktop\C\Module 3.1\Practical-6.exe
Years: 3
Weeks: 33
Days: 3

-----
Process exited after 0.08095 seconds with return value 0
Press any key to continue . . .
```

MODULE: 3.2 (C Language Programming with C)

1. WAP to make simple calculator (operation include Addition, Subtraction, Multiplication, Division, modulo).

Ans:-

Practical:-

```
Task_3(Arith.Operator).c
1 #include<stdio.h>
2
3 int main()
4 {
5     int a , b ;
6
7     printf("Enter the number a=");
8     scanf("%d", &a);
9     printf("Enter the number b=");
10    scanf("%d", &b);
11
12    printf(" \n \n a=%d b=%d", a,b);
13    printf(" \n \n Addition a + b = %d", a+b);
14    printf(" \n \n Substraction a - b = %d", a-b);
15    printf(" \n \n Multiplication a * b = %d", a*b);
16    printf(" \n \n Division a / b = %d", a/b);
17    printf(" \n \n Modulo a % b = %d", a%b);
18 }
```

Output:-

```
! Select C:\Users\hp\OneDrive\Documents\DEV C++\Task_3(Arith.Operator).exe
Enter the number a=20
Enter the number b=10

a=20 b=10

Addition a + b = 30

Substraction a - b = 10

Multiplication a * b = 200

Division a / b = 2

Modulo a % b = 0
-----
Process exited after 10.81 seconds with return value 19
Press any key to continue . . .
```

2. WAP to swap two numbers without using third variable.

Ans:-

Practical:-

```
Practice_Example.c
1 //WAP to swap two numbers without using third variable.
2
3 #include<stdio.h>
4
5 int main()
6 {
7     int a=20,b=10;
8     printf("\n Before swap a=%d b=%d",a,b);
9     public int __cdecl printf (const char * __restrict__ _Format, ...)
10    a=a+b;
11    b=a-b;
12    a=a-b;
13
14    printf("\n\n After swap a=%d b=%d",a,b);
15
16    return 0;
17 }
```

Output:-

 C:\Users\hp\OneDrive\Documents\DEV C++\Practice_Example.exe

```
Before swap a=20 b=10

After swap a=10 b=20
-----
Process exited after 0.06978 seconds with return value 0
Press any key to continue . . .
```

3. WAP to find number is even or odd using ternary operator.

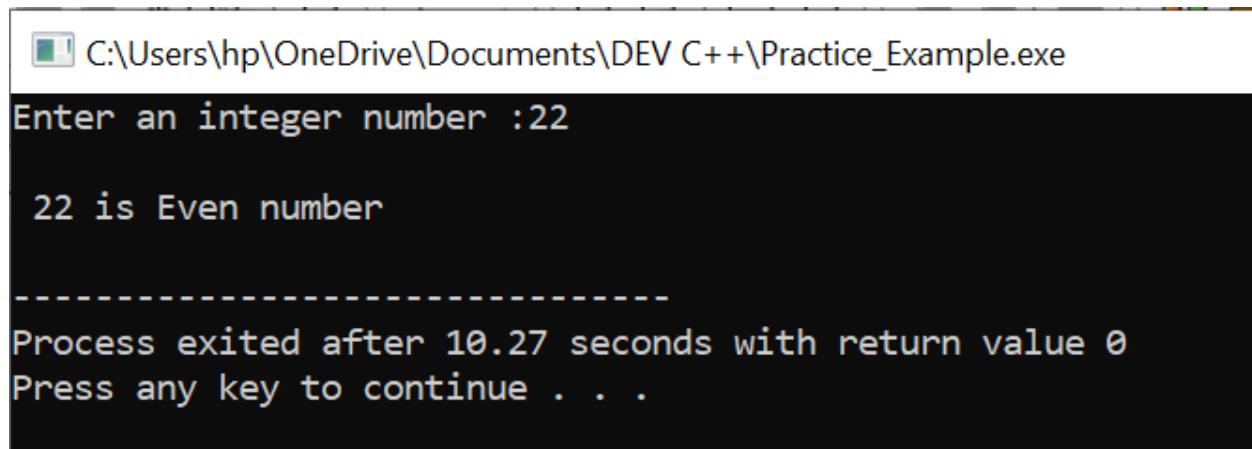
Ans:-

Practical:-

```
Practice_Example.c
1 //WAP to find number is even or odd using ternary operator.
2
3 #include<stdio.h>
4
5 int main()
6 {
7     int n;
8     printf("Enter an integer number : ",n);
9     scanf("%d",&n);
10    (n % 2==0)?(printf("\n %d is Even number\n",n)):(printf("%d Odd number\n",n));
11
12    return 0;
13 }
```

Output:-

[EVEN]:-



```
C:\Users\hp\OneDrive\Documents\DEV C++\Practice_Example.exe
Enter an integer number :22

22 is Even number

-----
Process exited after 10.27 seconds with return value 0
Press any key to continue . . .
```

[Odd]:-

```
C:\Users\hp\OneDrive\Documents\DEV C++\Practice_Example.exe
Enter an integer number :27
27 is Odd number
-----
Process exited after 2.889 seconds with return value 0
Press any key to continue . . .
```

4. WAP to show:-

- 1. Monday to Sunday using switch case.**
- 2. Vowel or Consonant using switch case.**

Ans:-

- 1. Monday to Sunday using switch case**

Practical:-

```
Practice_Example.c
1 //WAP to show Monday to Sunday using switch case.
2
3 #include <stdio.h>
4
5 int main()
6 {
7     int week;
8
9     printf("Enter Week : ");
10    scanf("%d", &week);
11
12    switch(week)
13    {
14        case 1:
15            printf("Monday");
16            break;
17        case 2:
18            printf("Tuesday");
19            break;
20        case 3:
21            printf("Wednesday");
22            break;
23        case 4:
24            printf("Thursday");
25            break;
26        case 5:
27            printf("Friday");
28            break;
29        case 6:
30            printf("Saturday");
31            break;
32        case 7:
33            printf("Sunday");
34            break;
35        default:
36            printf("Invalid input!!!");
```

```
37 }  
38  
39 }     return 0;  
40 }
```

Output:-

```
C:\Users\hp\OneDrive\Documents\DEV C++\Practice_Example.exe  
Enter Week : 4  
Thursday  
-----  
Process exited after 6.393 seconds with return value 0  
Press any key to continue . . . ■
```

```
C:\Users\hp\OneDrive\Documents\DEV C++\Practice_Example.exe  
Enter Week : 8  
Invalid input!!!  
-----  
Process exited after 4.609 seconds with return value 0  
Press any key to continue . . .
```

2. Vowel or Consonant using switch case.

Practical:-

The screenshot shows the Dev-C++ IDE interface with the following details:

- Title Bar:** \O\Module 3.2\Practical-3.2.4.c - Dev-C++ 5.11
- Menu Bar:** Project Execute Tools AStyle Window Help
- Toolbar:** Standard icons for file operations like Open, Save, Print, etc.
- Status Bar:** TDM-GCC 4.9.2 64-bit Release
- Code Editor:** Displays the C code for identifying vowels and consonants.

```
\O\Module 3.2\Practical-3.2.4.c - Dev-C++ 5.11
Project Execute Tools AStyle Window Help
File Edit View Insert Run Build Options Preferences Help
TDM-GCC 4.9.2 64-bit Release

[*] Practical-3.2.4.c
1 #include <stdio.h>
2 int main()
3 {
4     char ch;
5
6     /* Input an alphabet from user */
7     printf("Enter any alphabet: ");
8     scanf("%c", &ch);
9
10    /* Switch value of ch */
11    switch(ch)
12    {
13        case 'a':
14            printf("Vowel");
15            break;
16        case 'e':
17            printf("Vowel");
18            break;
19        case 'i':
20            printf("Vowel");
21            break;
22
23        case 'o':
24            printf("Vowel");
25            break;
26        case 'u':
27            printf("Vowel");
28            break;
29        case 'A':
30            printf("Vowel");
31            break;
32        case 'E':
33            printf("Vowel");
34            break;
35        case 'I':
36            printf("Vowel");
37            break;
38        case 'O':
39            printf("Vowel");
40            break;
41        case 'U':
42            printf("Vowel");
43            break;
44
45    default:
46        printf("Consonant");
47
48    return 0;
}
```

Output:-

```
C:\Users\Lenovo\Desktop\C\Module 3.2\Practical-3.2.4.exe
Enter any alphabet: A
Vowel
-----
Process exited after 2.864 seconds with return value 0
Press any key to continue . . .
```

```
C:\Users\Lenovo\Desktop\C\Module 3.2\Practical-3.2.4.exe
Enter any alphabet: b
Consonant
-----
Process exited after 4.003 seconds with return value 0
Press any key to continue . . .
```

5. Looping programs:

1. WAP to print 972 to 897 using for loop.
2. WAP to take 10 no. Input from user and find out..
 - i. How many Even numbers are there.
 - ii. How many odd numbers are there.
 - iii. Sum of even numbers.
 - iv. Sum of odd numbers.
 - v. WAP to print table up to given numbers.

Ans:-

1. WAP to print 972 to 897 using for loop.

Practical:-

```
Practice_Example.c Task_5.c
1 //WAP to print 972 to 897 using for Loop.
2
3 #include <stdio.h>
4
5 int main()
6 {
7     int i;
8
9     for(i=897;i<=972;i++)
10    {
11        printf("%d \t",i);
12    }
13
14    return 0;
15 }
```

Output:-

```
C:\Users\hp\OneDrive\Documents\DEV C++\Practice_Example.exe
897   898   899   900   901   902   903   904   905   906   907   908   909   910
      912   913   914   915   916   917   918   919   920   921   922   923   924
      926   927   928   929   930   931   932   933   934   935   936   937   938
      940   941   942   943   944   945   946   947   948   949   950   951   952
      954   955   956   957   958   959   960   961   962   963   964   965   966
      968   969   970   971   972

-----
Process exited after 0.07202 seconds with return value 0
Press any key to continue . . .
```

2. WAP to take 10 no. Input from user and find out..

i. How many Even numbers are there.

Practical:-

```
[*] Practice_Example.c Task_5.c Count_even_odd.c
1 //2. WAP to take 10 no. Input from user and find out How many Even numbers are there.
2 #include<stdio.h>
3 int main()
4 {
5     int num,i,count1=0,count2=0;
6     printf("Enter any ten Integer no. :\n");
7
8     for(i=1;i<=10;i++)
9     {
10        scanf("%d",&num);
11        if(num%2==0)
12        {
13            count1++;
14        }
15        else
16        {
17            count2++;
18        }
19    }
20    printf("count of even numbers : %d",count2);
21    return 0;
22 }
```

A

Output:-

```
C:\Users\hp\OneDrive\Documents\DEV C++\Count_even_odd.exe
Enter any ten Integer no. :
23
34
47
56
22
12
3
7
57
38
count of even numbers : 5
-----
Process exited after 30.94 seconds with return value 0
Press any key to continue . . .
```

ii. How many odd numbers are there.

Practical:-

```
[*] Practice_Example.c [*] Task_5.c [*] Count_even_odd.c
1 //2. WAP to take 10 no. Input from user and find out How many Odd numbers are there.
2 #include<stdio.h>
3 int main()
4 {
5     int num,i,count1=0,count2=0;
6     printf("Enter any ten Integer no. :\n");
7
8     for(i=1;i<=10;i++)
9     {
10         scanf("%d",&num);
11         if(num%2==0)
12         {
13             count1++;
14         }
15         else
16         {
17             count2++;
18         }
19     }
20     printf("count of odd numbers : %d",count2);
21     return 0;
22 }
```

Output:-

```
C:\Users\hp\OneDrive\Documents\DEV C++\Count_even_odd.exe
Enter any ten Integer no. :
23
34
47
56
22
12
3
7
57
38
count of odd numbers : 5
-----
Process exited after 24.84 seconds with return value 0
Press any key to continue . . .
```

iii. Sum of even numbers.

iv. Sum of odd numbers.

Practical:-

```
Practical-3.2.6.c
1 #include <stdio.h>
2
3 void main()
4 {
5     int i, num, odd_sum = 0, even_sum = 0;
6
7     printf("Enter the value of num\n");
8     scanf("%d", &num);
9     for (i = 1; i <= num; i++)
10    {
11        if (i % 2 == 0)
12            even_sum = even_sum + i;
13        else
14            odd_sum = odd_sum + i;
15    }
16    printf("Sum of all odd numbers = %d\n", odd_sum);
17    printf("Sum of all even numbers = %d\n", even_sum);
18 }
```

Output:-

```
C:\Users\Lenovo\Desktop\C\Module 3.2\Practical-3.2.6.exe
Enter the value of num
46
Sum of all odd numbers = 529
Sum of all even numbers = 552

-----
Process exited after 13.76 seconds with return value 30
Press any key to continue . . .
```

6. WAP to print table up to given numbers.

Practical:-

```
table.cpp
1 #include<iostream>
2 using namespace std;
3
4 int main()
5 {
6     int i,n;
7     cout<<"Enter any number:";
8     cin>>n;
9     for(i=1;i<=10;++i)
10    cout<<"\n"<<n<<" * "<<i<<" = "<<n*i;
11
12 }
```

Output:-

```
C:\Users\Lenovo\Documents\practical task\c & c++\table.exe
Enter any number: 7

7 * 1 = 7
7 * 2 = 14
7 * 3 = 21
7 * 4 = 28
7 * 5 = 35
7 * 6 = 42
7 * 7 = 49
7 * 8 = 56
7 * 9 = 63
7 * 10 = 70
-----
Process exited after 10.87 seconds with return value 0
Press any key to continue . . .
```

7. WAP to print factorial of given number.

Ans:-

Practical:-

```
Practical-3.2.8.c
1 #include <stdio.h>
2 void main(){
3     int i,f=1,num;
4
5     printf("Input the number : ");
6     scanf("%d",&num);
7
8     for(i=1;i<=num;i++)
9         f=f*i;
10
11    printf("The Factorial of %d is: %d\n",num,f);
12 }
```

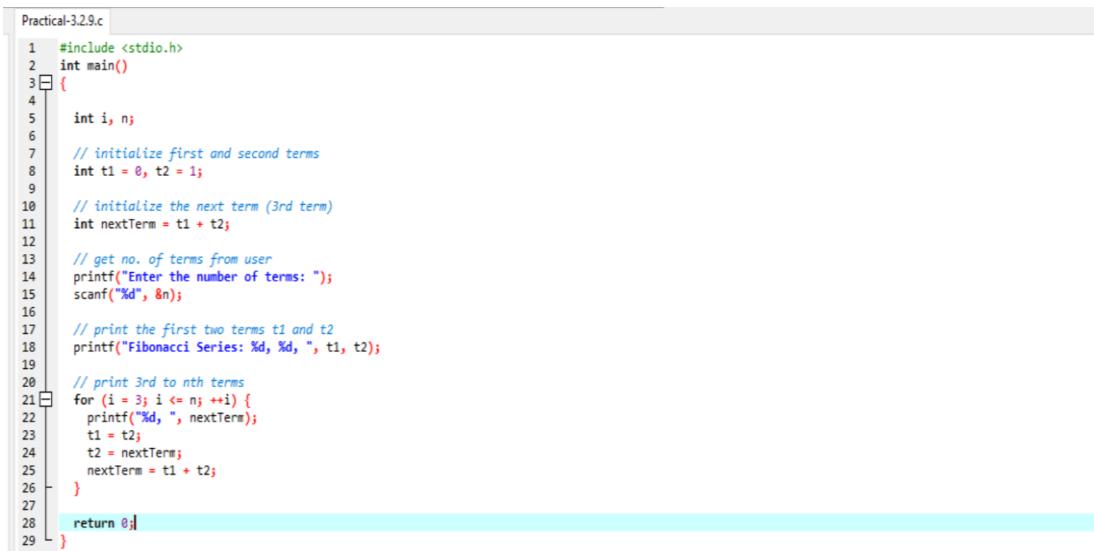
Output:-

```
C:\Users\Lenovo\Desktop\C\Module 3.2\Practical-3.2.8.exe
Input the number : 13
The Factorial of 13 is: 1932053504
-----
Process exited after 1.822 seconds with return value 35
Press any key to continue . . . ■
```

8. WAP to print Fibonacci series up to given numbers.

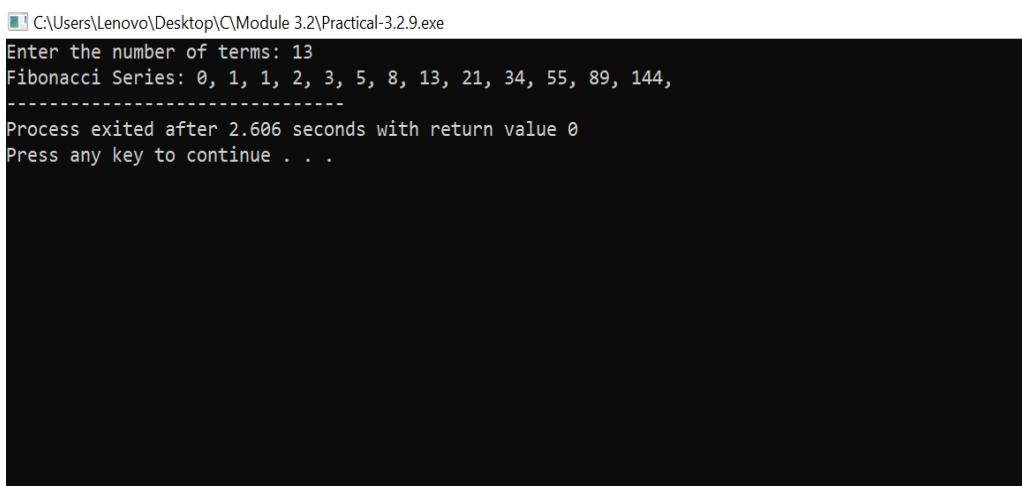
Ans:-

Practical:-



```
Practical-3.2.9.c
1 #include <stdio.h>
2 int main()
3 {
4     int i, n;
5     // initialize first and second terms
6     int t1 = 0, t2 = 1;
7
8     // initialize the next term (3rd term)
9     int nextTerm = t1 + t2;
10
11    // get no. of terms from user
12    printf("Enter the number of terms: ");
13    scanf("%d", &n);
14
15    // print the first two terms t1 and t2
16    printf("Fibonacci Series: %d, %d, ", t1, t2);
17
18    // print 3rd to nth terms
19    for (i = 3; i <= n; ++i) {
20        printf("%d, ", nextTerm);
21        t1 = t2;
22        t2 = nextTerm;
23        nextTerm = t1 + t2;
24    }
25
26    return 0;
27 }
```

Output:-



```
C:\Users\Lenovo\Desktop\C\Module 3.2\Practical-3.2.9.exe
Enter the number of terms: 13
Fibonacci Series: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144,
-----
Process exited after 2.606 seconds with return value 0
Press any key to continue . . .
```

9. WAP to print number in reverse order e.g.:
number = 64728 ---> reverse = 82746.

Ans:-

Practical:-

```
Practice_Example.c
1 //WAP to print number in reverse order e.g.: number=64728 ---> reverse=82746.
2 #include<stdio.h>
3 int main()
4 {
5     int n, reverse=0, rem;
6     printf("Enter a Number : ");
7     scanf("%d", &n);
8
9     while(n!=0)
10    {
11        rem=n%10;
12        reverse=reverse*10+rem;
13        n/=10;
14    }
15    printf("Reversed Number: %d", reverse);
16
17    return 0;
18 }
```

Activate Wir

Output:-

```
C:\Users\hp\OneDrive\Documents\DEV C++\C_Language\Practice_Example.exe
Enter a Number : 82746
Reversed Number: 64728
-----
Process exited after 13.3 seconds with return value 0
Press any key to continue . . .
```

10. Write a program to find out the max from given number (E.g., No: -1562 Max number is 6).

Ans:-

Practical:-

The screenshot shows a code editor window titled "Practical-3.2.11.c". The code is written in C and performs the following steps:

- Includes the stdio.h header.
- Defines a main function.
- Declares an array a[5] and initializes max=0 and min=0.
- Clears the screen using clrscr().
- Prompts the user to enter four values.
- Reads four integers from the user.
- Iterates through the array to find the maximum value.
- Iterates through the array to find the minimum value.
- Prints the minimum and maximum values.
- Waits for user input before exiting.

```
Practical-3.2.11.c
1 #include<stdio.h>
2 void main()
3 {
4     int a[5],i,max=0,min=0;
5     //clrscr();
6     printf("Enter Four Value :\n");
7     for(i=0;i<=3;i++)
8     {
9         scanf("%d",&a[i]);
10    }
11    for(i=0;i<=3;i++)
12    {
13        if(a[i]>max)
14        {
15            max=a[i];
16        }
17        else
18        {
19            min=a[i];
20        }
21    }
22 }
23 }
24 }
25 printf("Minium is : %d\n",min);
26 printf("Maximum is : %d\n",max);
27 getch();
```

Activate Windows

Output:-

The screenshot shows a terminal window with the following interaction:

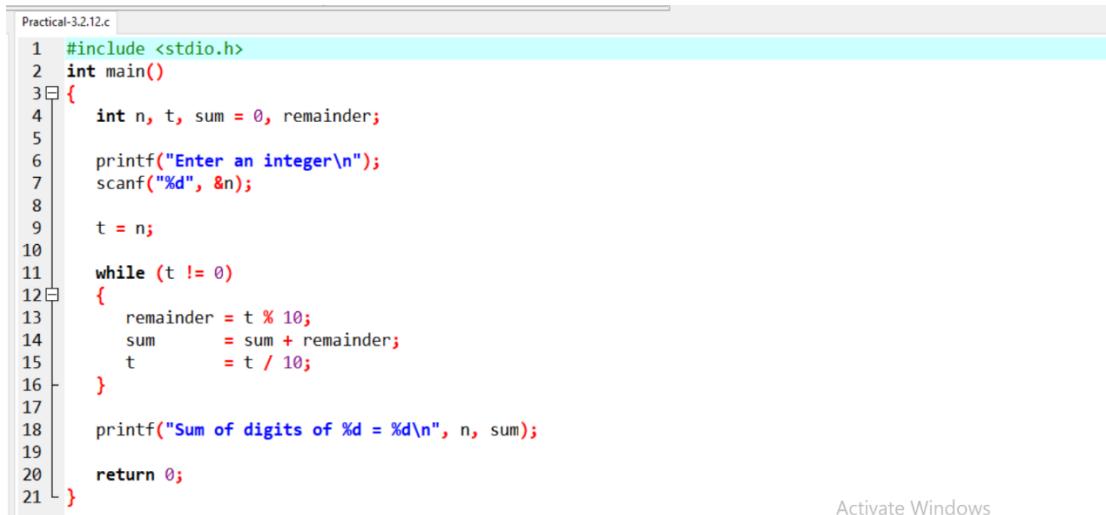
- The path C:\Users\Lenovo\Desktop\CMS\Module 3.2\Practical-3.2.11.exe is shown.
- The program prompts for four values.
- The user enters 1 5 6 2.
- The program outputs the minimum value as 2 and the maximum value as 6.

```
C:\Users\Lenovo\Desktop\CMS\Module 3.2\Practical-3.2.11.exe
Enter Four Value :
1 5 6 2
Minium is : 2
Maximum is : 6
```

11. Write a program make a summation of given number (E.g., 1523 Ans: -11).

Ans:-

Practical:-

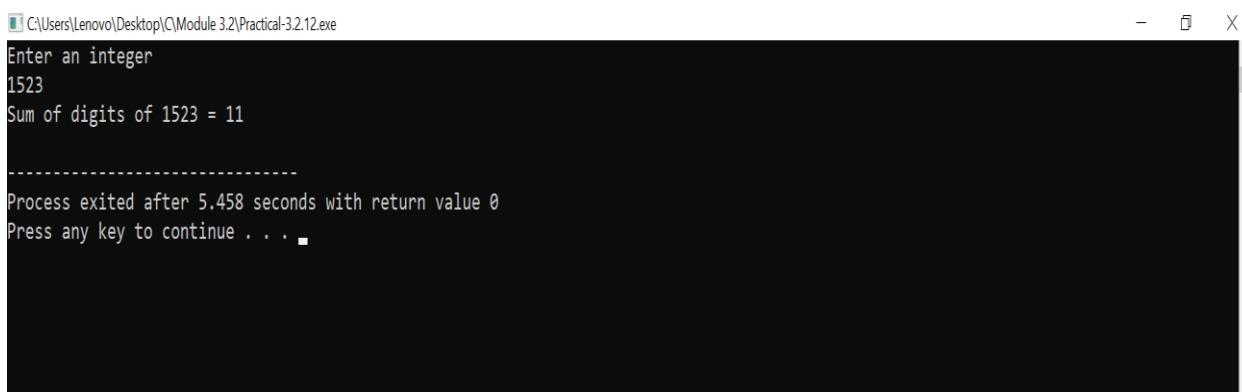


The screenshot shows a code editor window titled "Practical-3.2.12.c". The code is a C program that prompts the user to enter an integer, then calculates and prints the sum of its digits. The code uses a while loop to repeatedly extract the last digit of the number using the modulus operator (% 10) and add it to a sum variable, then divide the number by 10 using integer division (/ 10). The program ends with a return statement.

```
Practical-3.2.12.c
1 #include <stdio.h>
2 int main()
3 {
4     int n, t, sum = 0, remainder;
5
6     printf("Enter an integer\n");
7     scanf("%d", &n);
8
9     t = n;
10
11    while (t != 0)
12    {
13        remainder = t % 10;
14        sum      = sum + remainder;
15        t       = t / 10;
16    }
17
18    printf("Sum of digits of %d = %d\n", n, sum);
19
20    return 0;
21 }
```

Activate Windows

Output:-



The screenshot shows a terminal window displaying the execution of the C program. It starts with the command "C:\Users\Lenovo\Desktop\C\Module 3.2\Practical-3.2.12.exe". The program prompts the user to "Enter an integer" and receives the input "1523". It then displays the result "Sum of digits of 1523 = 11". After the output, it shows the process exiting and prompting for further input.

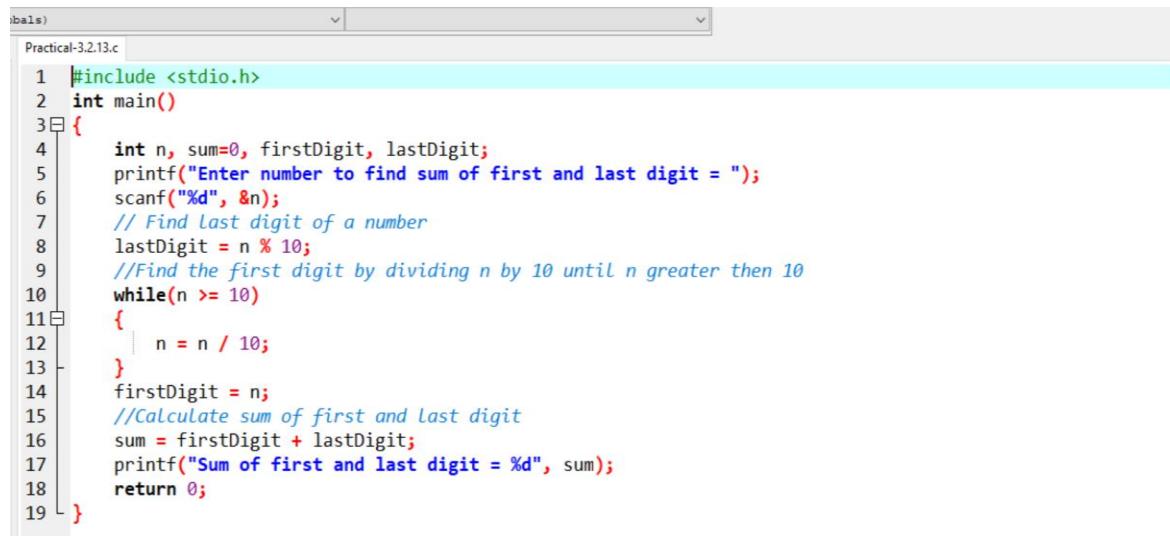
```
C:\Users\Lenovo\Desktop\C\Module 3.2\Practical-3.2.12.exe
Enter an integer
1523
Sum of digits of 1523 = 11

-----
Process exited after 5.458 seconds with return value 0
Press any key to continue . . .
```

12. Write a program you have to make a summation of first and last Digit. (E.g., 1234 Ans: -5).

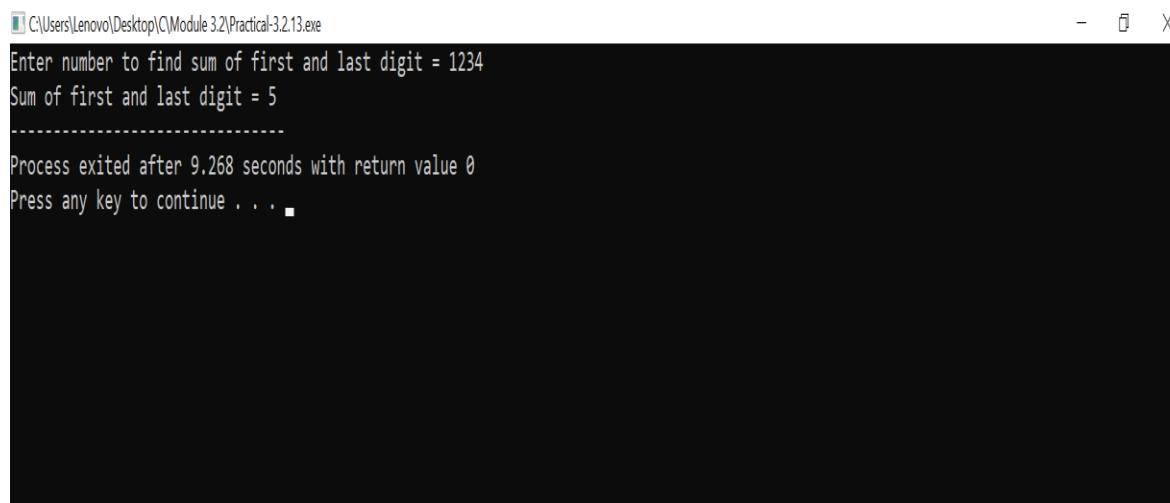
Ans:-

Practical:-



```
Practical-3.2.13.c
1 #include <stdio.h>
2 int main()
3 {
4     int n, sum=0, firstDigit, lastDigit;
5     printf("Enter number to find sum of first and last digit = ");
6     scanf("%d", &n);
7     // Find last digit of a number
8     lastDigit = n % 10;
9     //Find the first digit by dividing n by 10 until n greater than 10
10    while(n >= 10)
11    {
12        n = n / 10;
13    }
14    firstDigit = n;
15    //Calculate sum of first and Last digit
16    sum = firstDigit + lastDigit;
17    printf("Sum of first and last digit = %d", sum);
18    return 0;
19 }
```

Output:-



```
C:\Users\Lenovo\Desktop\C\Module 3.2\Practical-3.2.13.exe
Enter number to find sum of first and last digit = 1234
Sum of first and last digit = 5
-----
Process exited after 9.268 seconds with return value 0
Press any key to continue . . . ■
```

PATTERNS

1.

Practical:-

```
Practice_Example.c
1 #include<stdio.h>
2
3 int main()
4 {
5     int i, j, N;
6
7     printf("Enter N : ");
8     scanf("%d", &N);
9
10    for(i=1; i<=N; i++)
11    {
12        for(j=1; j<=i; j++)
13        {
14            if(j % 2 == 1)
15            {
16                printf("1");
17            }
18            else
19            {
20                printf("0");
21            }
22        }
23
24        printf("\n");
25    }
26
27    return 0;
28 }
```

Activate W

Activate W

Output:-

```
C:\Users\hp\OneDrive\Documents\DEV C++\Practice_Example.exe
Enter N : 6
1
10
101
1010
10101
101010
-----
Process exited after 2.984 seconds with return value 0
Press any key to continue . . .
```

2.

Practical:-

```
Practice_Example.c
1 #include <stdio.h>
2 int main()
3 {
4     int i, j;
5     int rows = 5;
6     char character = 'A';
7
8     for (i = 0; i < rows; i++)
9     {
10        for (j = 0; j <= i; j++)
11        {
12            printf("%c ", character);
13
14            // Incrementing character value so
15            // that it will print the next character
16            character++;
17        }
18        printf("\n");
19    }
20    return 0;
21 }
```

Output:-

```
C:\Users\hp\OneDrive\Documents\DEV C++\Practice_Example.exe
A
B C
D E F
G H I J
K L M N O

-----
Process exited after 0.0488 seconds with return value 0
Press any key to continue . . .
```

3.

Practical:-

```
Practice_Example.c
1 #include <stdio.h>
2 int main()
3 {
4     int i, space, rows, k = 0;
5     printf("Enter the number of rows: ");
6     scanf("%d", &rows);
7
8     for (i = 1; i <= rows; ++i, k = 0)
9     {
10        for (space = 1; space <= rows - i; ++space)
11        {
12            printf(" ");
13        }
14        while (k != 2 * i - 1) {
15            printf("* ");
16            ++k;
17        }
18        printf("\n");
19    }
20    return 0;
21 }
```

A

Output:-

```
C:\Users\hp\OneDrive\Documents\DEV C++\Practice_Example.exe
```

```
Enter the number of rows: 6
```

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

```
-----
Process exited after 34.04 seconds with return value 0
Press any key to continue . . .
```

4.

Practical:-

```
Practice_Example.c
1 #include<stdio.h>
2
3 int main()
4 {
5     int i, j, N, columns;
6
7     printf("Enter number of columns:");
8     scanf("%d",&N);
9
10    columns=1;
11    for(i=1;i<N*2;i++)
12    {
13        for(j=1; j<=columns; j++)
14        {
15            printf("*");
16        } public int __cdecl printf (const char * __restrict__ _Format, ...)
17        if(i < N)
18        {
19            columns++;
20        }
21        else
22        {
23            columns--;
24        }
25        printf("\n");
26    }
27    return 0;
28 }
```

Output:-

```
C:\Users\hp\OneDrive\Documents\DEV C++\Practice_Example.exe
Enter number of columns:6
*
**
***
****
*****
*****
****
*****
**
*
-----
Process exited after 4.782 seconds with return value 0
Press any key to continue . . .
```

5.

Practical:-

```
Practice_Example.c
1 #include <stdio.h>
2
3 int main()
4 {
5     int rows, i, j, number = 1;
6     printf("Enter the number of rows: ");
7     scanf("%d", &rows);
8
9     for (i = 1; i <= rows; i++)
10    {
11        for (j = 1; j <= i; ++j)
12        {
13            printf("%d ", number);
14            ++number;
15        }
16        printf("\n");
17    }
18    return 0;
19 }
```

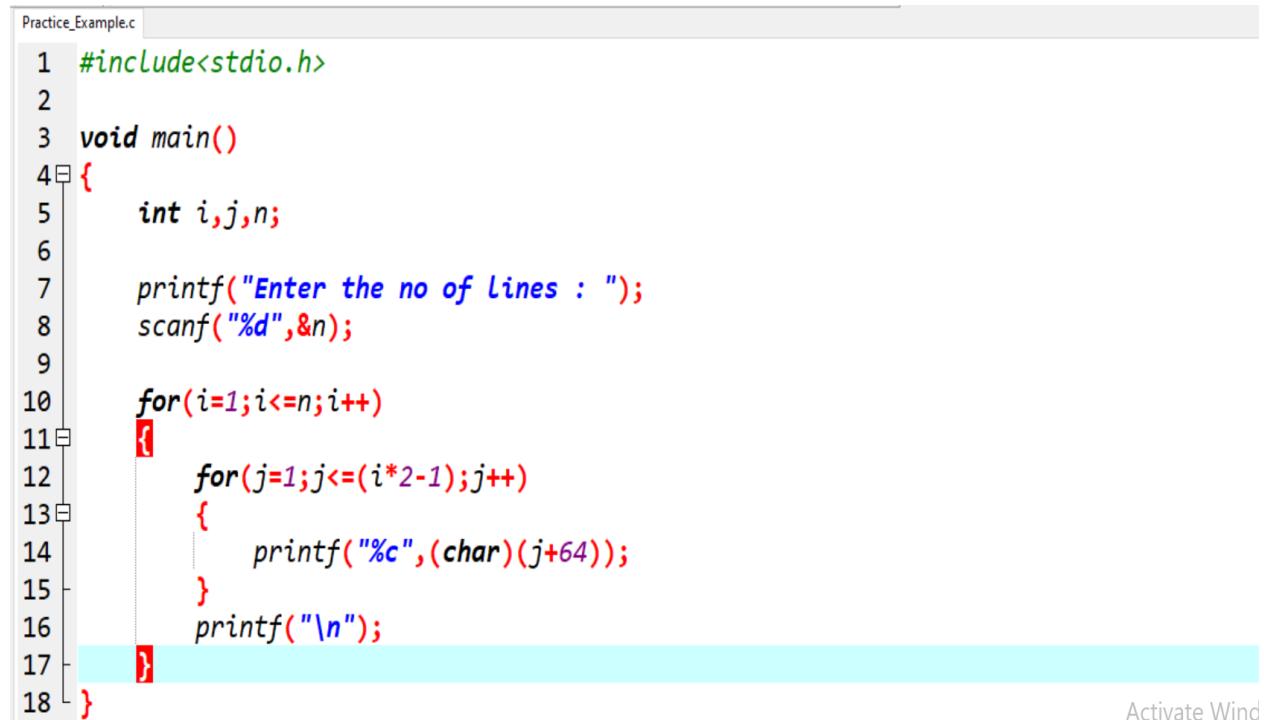
Activ

Output:-

```
C:\Users\hp\OneDrive\Documents\DEV C++\Practice_Example.exe
Enter the number of rows: 5
1
2 3
4 5 6
7 8 9 10
11 12 13 14 15
-----
Process exited after 1.791 seconds with return value 0
Press any key to continue . . .
```

7.

Practical:-



The screenshot shows a code editor window with the file name "Practice_Example.c" at the top. The code itself is as follows:

```
1 #include<stdio.h>
2
3 void main()
4 {
5     int i,j,n;
6
7     printf("Enter the no of Lines : ");
8     scanf("%d",&n);
9
10    for(i=1;i<=n;i++)
11    {
12        for(j=1;j<=(i*2-1);j++)
13        {
14            printf("%c", (char)(j+64));
15        }
16        printf("\n");
17    }
18 }
```

The code uses nested loops to print a diamond pattern of characters. The inner loop prints characters from 1 to $i^2 - 1$, and the outer loop iterates from 1 to n. The characters are printed in uppercase ASCII order starting from 65 (A).

Activate Wind

Output:-

```
C:\Users\hp\OneDrive\Documents\DEV C++\Practice_Example.exe
Enter the no of lines : 6
A
ABC
ABCDE
ABCDEFG
ABCDEFGHI
ABCDEFGHIJK
-----
Process exited after 2.166 seconds with return value 6
Press any key to continue . . .
```

MODULE: 3.3 (File Handling and Debugging)

1. Write a program to find out the max number from given array using function.

Ans:-

Practical:-

```
[*] Practical-3.3.1.c
1 #include <stdio.h>
2 int main()
3 {
4     int n;
5     double arr[100];
6     printf("Enter the number of elements (1 to 100): ");
7     scanf("%d", &n);
8
9     for (int i = 0; i < n; ++i)
10    {
11        printf("Enter number%d: ", i + 1);
12        scanf("%lf", &arr[i]);
13    }
14
15
16 // storing the Largest number to arr[0]
17 for (int i = 1; i < n; ++i) {
18     if (arr[0] < arr[i]) {
19         arr[0] = arr[i];
20     }
21 }
22
23 printf("Largest element = %.2lf", arr[0]);
24
25 return 0;
26 }
```

Activate Windows

Output:-

```
C:\Users\Lenovo\Desktop\C\Module 3.3\Practical-3.3.1.exe
Enter the number of elements (1 to 100): 4
Enter number1: 12
Enter number2: 66
Enter number3: 45
Enter number4: 13
Largest element = 66.00
-----
Process exited after 19.4 seconds with return value 0
Press any key to continue . . .
```

2. WAP of Addition, Subtraction, Multiplication and Division using Switch case.(Must Be Menu Driven).

Ans:-

Practical:-

```
Practical-2.c
1 #include<stdio.h>
2 #include<conio.h>
3
4 int main()
5 {
6     int a, b;
7     char choice;
8
9     printf("Enter your choice\n");
10    printf("(a. Addition\nb. Subtraction\nc. Multiplication\nd. Division\n");
11    scanf("%c", &choice);
12
13
14    printf("Enter 2 integer numbers\n");
15    scanf("%d %d", &a, &b);
16
17
18    switch(choice)
19    {
20        case 'a': printf("%d + %d = %d\n", a, b, (a+b));
21        break;
```

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```
[*] Practical-2.c
22
23     case 'b': printf("%d - %d = %d\n", a, b, (a-b));
24         break;
25
26     case 'c': printf("%d x %d = %d\n", a, b, (a*b));
27         break;
28
29     case 'd': if( b != 0)
30             printf("%d / %d = %d\n", a, b, (a/b));
31         else
32             printf("Number can't be divided by 0\n");
33         break;
34
35     default: printf("You entered wrong choice\n");
36         break;
37     }
38
39     return 0;
40 }
41
42 |
```

Activate Window

Output:-

```
C:\Users\Lenovo\Desktop\C\Module 3.3\Practical-2.exe
Enter your choice
a. Addition
b. Subtraction
c. Multiplication
d. Division
b
Enter 2 integer numbers
12
78
12 - 78 = -66

-----
Process exited after 10.26 seconds with return value 0
Press any key to continue . . .
```

3. WAP to find reverse of string using recursion.

Ans:-

Practical:-

```
Practical-3.3.2.cpp
1 #include <stdio.h>
2 void reverseSentence();
3 int main() {
4     printf("Enter a sentence: ");
5     reverseSentence();
6     return 0;
7 }
8
9 void reverseSentence() {
10    char c;
11    scanf("%c", &c);
12    if (c != '\n') {
13        reverseSentence();
14        printf("%c", c);
15    }
16 }
```

Output:-

```
C:\Users\Lenovo\Desktop\C\Module 3.3\Practical-3.3.2.exe
```

```
Enter a sentence: 8 6 11 4 21
12 4 11 6 8
```

```
-----
Process exited after 15.96 seconds with return value 0
Press any key to continue . . .
```

4. WAP to find factorial using recursion.

Ans:-

Practical:-

```
Practical-3.3.3.c
1 //WAP to find factorial using recursion.
2 #include<stdio.h>
3 int main()
4 {
5     int i,fact=1,number;
6     printf("Enter a number: ");
7     scanf("%d",&number);
8     for(i=1;i<=number;i++){
9         fact=fact*i;
10    }
11    printf("Factorial of %d is: %d",number,fact);
12    return 0;
13 }
```

Output:-

```
C:\Users\Lenovo\Desktop\C\Module 3.3\Practical-3.3.3.exe
Enter a number: 13
Factorial of 13 is: 1932053504
-----
Process exited after 1.365 seconds with return value 0
Press any key to continue . . .
```

5. WAP to take two Array input from user and sort them in ascending or descending order as per user's choice.

Ans:-

Practical:-

```
Practical-3.3.3.c Practical-3.3.4.c
1 #include <stdio.h> //including stdio.h for printf and other functions
2 #include<conio.h>
3
4
5 int main() //default function for call
6 {
7     int a[100],n,i,j;
8     printf("Array size: ");
9     scanf("%d",&n);
10    printf("Elements: ");
11
12    for(i=0;i<n;i++)
13    {
14        scanf("%d",&a[i]);
15    }
16    for (int i = 0; i < n; i++) //Loop for ascending ordering
17    {
18        for (int j = 0; j < n; j++) //Loop for comparing other values
19        {
20            if (a[j] > a[i]) //Comparing other array elements
21            {
22                int tmp = a[i];
23                a[i] = a[j];
24                a[j] = tmp;
25            }
26        }
27    }
28    printf("\n\nAscending : ");
29    for (int i = 0; i < n; i++)
30    {
31        printf(" %d ", a[i]);
32    }
33    for (int i = 0; i < n; i++) //Loop for descending ordering
34    {
35        for (int j = 0; j < n; j++) //Loop for comparing other values
36        {
37            if (a[j] < a[i])
38            {
39                int tmp = a[i];
40                a[i] = a[j];
41                a[j] = tmp;
42            }
43        }
44    }
45 }
```

Activate Windows

```
Practical-3.3.3.c Practical-3.3.4.c
22         int tmp = a[i]; //Using temporary variable for storing last value
23         a[i] = a[j]; //replacing value
24         a[j] = tmp; //storing last value
25     }
26 }
27 }
28 printf("\n\nAscending : ");
29 for (int i = 0; i < n; i++) //Loop for printing array data after sorting
30 {
31     printf(" %d ", a[i]);
32 }
33 for (int i = 0; i < n; i++) //Loop for descending ordering
34 {
35     for (int j = 0; j < n; j++) //Loop for comparing other values
36     {
37         if (a[j] < a[i])
38         {
39             int tmp = a[i];
40             a[i] = a[j];
41             a[j] = tmp;
42         }
43     }
44 }
```

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```

43     }
44 }
45 printf("\n\nDescending : ");
46 for (int i = 0; i < n; i++)
47 {
48     printf(" %d ", a[i]);
49 }
50
51 return 0;           //returning 0 status to system
52 getch();
53 }

```

Activate Windows

Output:-

```

Select C:\Users\Lenovo\Desktop\C\Module 3.3\Practical-3.3.4.exe
Array size: 4
Elements: 4
12
45
8

Ascending :  4  8  12  45
Descending :  45  12  8  4
-----
Process exited after 15.47 seconds with return value 0
Press any key to continue . . .

```

6. WAP to make addition, Subtraction and multiplication of two matrix using 2-D Array.

Ans:-

Practical:-

```
[*] Practical-3.3.5.c
1 #include <stdio.h>
2 int main() {
3     int r, c, a[100][100], b[100][100], sum[100][100], i, j;
4     printf("Enter the number of rows (between 1 and 100): ");
5     scanf("%d", &r);
6     printf("Enter the number of columns (between 1 and 100): ");
7     scanf("%d", &c);
8
9     printf("\nEnter elements of 1st matrix:\n");
10    for (i = 0; i < r; ++i)
11        for (j = 0; j < c; ++j) {
12            printf("Enter element a%d%d: ", i + 1, j + 1);
13            scanf("%d", &a[i][j]);
14        }
15
16    printf("\nEnter elements of 2nd matrix:\n");
17    for (i = 0; i < r; ++i)
18        for (j = 0; j < c; ++j) {
19            printf("Enter element b%d%d: ", i + 1, j + 1);
20            scanf("%d", &b[i][j]);
21        }
22
23    // adding two matrices
24    for (i = 0; i < r; ++i)
25        for (j = 0; j < c; ++j) {
26            sum[i][j] = a[i][j] + b[i][j];
27        }
28
29    // printing the result
30    printf("\nSum of two matrices: \n");
31    for (i = 0; i < r; ++i)
32        for (j = 0; j < c; ++j) {
33            printf("%d ", sum[i][j]);
34            if (j == c - 1) {
35                printf("\n\n");
36            }
37        }
38
39    return 0;
40 }
```

Activate Windows

Activate Windows

Output:-

```
C:\Users\Lenovo\Desktop\C\Module 3.3\Practical-3.3.5.exe
Enter the number of rows (between 1 and 100): 1
Enter the number of columns (between 1 and 100): 2

Enter elements of 1st matrix:
Enter element a11: 1
Enter element a12: 3
Enter elements of 2nd matrix:
Enter element b11: 2
Enter element b12: 4

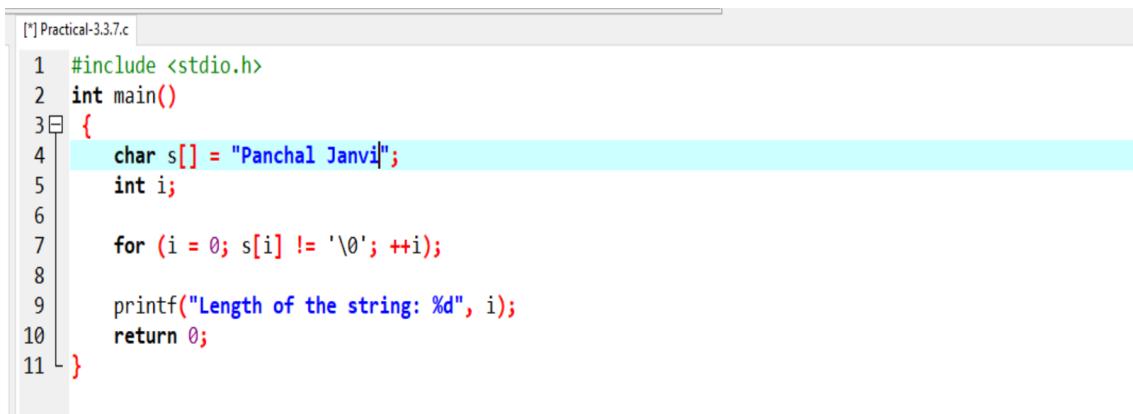
Sum of two matrices:
5 7

-----
Process exited after 7.78 seconds with return value 0
Press any key to continue . . .
```

7. WAP Find out length of string without using inbuilt function.

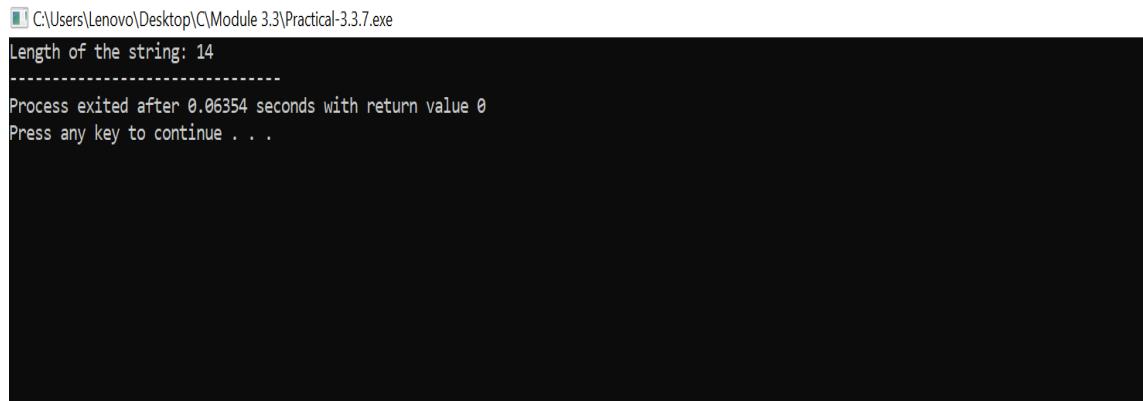
Ans:-

Practical:-



```
[*] Practical-3.3.7.c
1 #include <stdio.h>
2 int main()
3 {
4     char s[] = "Panchal Janvi";
5     int i;
6
7     for (i = 0; s[i] != '\0'; ++i);
8
9     printf("Length of the string: %d", i);
10    return 0;
11 }
```

Output:-



```
C:\Users\Lenovo\Desktop\C\Module 3.3\Practical-3.3.7.exe
```

```
Length of the string: 14
```

```
-----
```

```
Process exited after 0.06354 seconds with return value 0
```

```
Press any key to continue . . .
```

8. WAP to reverse a string and check that the string is palindrome or not.

Ans:-

Practical:-

```
[*] Practical-3.3.7.c Practical-3.3.8.c
1 #include <stdio.h>
2 #include <string.h>
3
4 int main(){
5     char string1[20];
6     int i, length;
7     int flag = 0;
8
9     printf("Enter a string:");
10    scanf("%s", string1);
11
12    length = strlen(string1);
13
14    for(i=0;i < length ;i++){
15        if(string1[i] != string1[length-i-1]){
16            flag = 1;
17            break;
18        }
19    }
20
21    if (flag) {
22        printf("%s is not a palindrome", string1);
23    }
24    else {
25        printf("%s is a palindrome", string1);
26    }
27
28 }
```

Activate Window

Output:-

```
C:\Users\Lenovo\Desktop\C\Module 3.3\Practical-3.3.8.exe
```

```
Enter a string:13
13 is not a palindrome
-----
Process exited after 2.376 seconds with return value 0
Press any key to continue . . .
```

```
C:\Users\Lenovo\Desktop\C\Module 3.3\Practical-3.3.8.exe
```

```
Enter a string:6
6 is a palindrome
-----
Process exited after 4.65 seconds with return value 0
Press any key to continue . . .
```

9. Write a program of structure employee that provides the following information -print and display empno, empname, address and age.

Ans:-

Practical:-

Output:-

```
[C] C:\Users\Lenovo\Desktop\C\Module 3.3\Practical-3.3.9.exe
Enter the id of the Employee: 2
Enter the age of the Employee: 19
Enter the name of the Employee: Janvi
Enter the designation of the Employee: developer
Enter the department of the Employee: accounts
Enter the salary of the Employee: 70,000

Employee Details:
Employee Id: 2
Employee Name: Janvi
Employee age: 19
Employee designation: developer
Employee department: accounts
Employee salary: 70

-----
Process exited after 30.06 seconds with return value 0
Press any key to continue . . .
```

10. Write a program of structure for five employee that provides the following information -print and display empno, empname, address and age.

Ans:-

Practical:-

```
[*] Practical-3.3.10.c
1 #include<stdio.h>
2 struct employee
3 {
4     int id,age,salary;
5     char name[25];
6 }emp[100];
7
8 void main()
9 {
10    int i,n;
11    printf("Enter the no of employees\n");
12    scanf("%d",&n);
13    printf("Enter employee info as id , name , age , salary\n");
14    for(i=0;i<n;i++)
15    {
16        scanf("%d %s %d %d",&emp[i].id,emp[i].name,&emp[i].age,&emp[i].salary);
17    }
18    printf("\nEMP_NAME\tEMP_NAME\tEMP_AGE\t\tEMP_SAL\n");
19    for(i=0;i<n;i++)
20    {
21        printf("%d\t\t%s\t\t%d\t\t%d\n",emp[i].id,emp[i].name,emp[i].age,emp[i].salary);
22    }
23    return 0;
24 }
```

A

Output:-

```
C:\Users\Lenovo\Desktop\C\Module 3.3\Practical-3.3.10.exe
Enter the no of employees
1
Enter employee info as id , name , age , salary
1
Janvi
19
60,000

EMP_NAME      EMP_NAME      EMP_AGE      EMP_SAL
1          Janvi           19            60

-----
Process exited after 11.78 seconds with return value 1
Press any key to continue . . .
```

11. WAP to show difference between Structure and Union.

Ans:-

Definition of Structure

A structure is a custom data type in the C language. Structures can hold multiple members of different data types under a single unit. The elements of a structure are stored in contiguous memory locations and can be retrieved and accessed at any time. Every data object in a structure is a member or field.

How to Define a Structure?

A structure is defined using the struct statement. The struct keyword defines a new data type with more than one member.

Syntax of Declaring a Structure

struct [structure name]

{

type member_1;

type member_2;

...

```
type member_n;  
};
```

Example of Structure

```
struct student  
{  
    int rollno;  
    char name[50];  
    string phone;  
};
```

Definition of Union

A Union is a user-defined data type. It is like the structure, except that all its members start at the exact location in memory. The union combines objects of different data types in the exact memory location. A user can define a union with many members, but only one member can hold a value at any given time. The storage space allocated for the union variable is equal to the total space required by the most prominent data member of the union.

Union provides such variables that can be accessed in several ways and the exact memory location simultaneously. A union provides an efficient way of using a single memory location for various tasks.

How to Define a Union?

The union statement is used for defining a union. It defines a new data type that can store multiple member variables of different data types in the exact memory location. The syntax to define a union using the union keyword is similar to defining a structure.

Syntax of Declaring a Union

```
union [union name]
{
    type member_1;
    type member_2;
    ...
    type member_n;
};
```

Example of Union

```
union Student
{
```

```
char name[32];
int age;
string email;
};
```

Similarities Between Structure and Union

The following are the similarities between structure and union:

- Both structure and union are the custom data types that store different types of data together as a single entity
- The structure and union members can be objects of any type, such as other structures, unions, or arrays.
- Both structures or unions can be passed by value to a function and returned to the value by functions. The argument will need to have the same type as the function parameter
- To access members, we use the '.' operator.

Structure	Union
We use the struct statement to define a structure.	We use the union keyword to define a union.
Every member is assigned a unique memory location.	All the data members share a memory location.
Change in the value of one data member does not affect other data members in the structure.	Change in the value of one data member affects the value of other data members.
You can initialize multiple members at a time.	You can initialize only the first member at once.
A structure can store multiple values of the different members.	A union stores one value at a time for all of its members
A structure's total size is the sum of the size of every data member.	A union's total size is the size of the largest data member.
Users can access or retrieve any member at a time.	You can access or retrieve only one member at a time.