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# Term work

on

## OOPs with C++

**(PCS 307)**

**2021-22**

**Submitted to:**

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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**GRAPHIC ERA HILL UNIVERSITY, DEHRADUN**

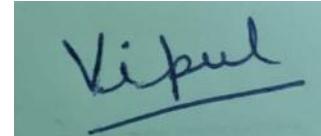
## ACKNOWLEDGMENT

I would like to particularly thank my Data Science using OOPs with C++ Lab Faculty **Mr Akash Chauhan** for his patience, support and encouragement throughout the completion of this Term work.

At last but not the least I greatly indebted to all other persons who directly or indirectly helped me during this course.



**Vipul Chauhan**



**University. Roll No.- 2018855**

**B.Tech CSE-A-III Sem**

**Session: 2021-22**

**GEHU, Dehradun**



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4	<p>Write C++ code for below mentioned tasks?</p> <p><b>add(int,int), add(float, float), both of these methods are in two different namespaces First and Second respectively.</b></p> <p><b>Task1:</b> Access these methods using scope resolution operator [::](SRO) from main method?</p> <p><b>Task2:</b> Access these methods using "using" keyword for main method?</p> <p><b>Task3:</b> Try to access these methods without using, (SRO) and "using" keyword and check how the compiler will react to it?</p> <p><b>Task4:</b> Try to access these methods for Mixed Values [Int, Float] and see how the compiler will react to it?</p>	
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	<p><b>Task1:</b> Initialise all primary data types, assign their values and print them all?  [char, bool, short, int, long, float, double, long double, wide char]</p> <p><b>Task2:</b> Apply sizeof operator on all above operators and their variables?</p> <p>Example  Int a = 10;  Cout &lt;&lt; Sizeof(int);  Cout &lt;&lt; Sizeof(a);</p>	
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	<p><b>Task6:</b> Check if string is mutable in C++ or not?</p> <pre>String a = "Hello"; Cout &lt;&lt; &amp;a; a[0] = 'J'; Cout &lt;&lt; &amp;a; Cout &lt;&lt; a;</pre> <p>What is the output?</p>	
7	<p>Write C++ code for below mentioned tasks?</p> <p><b>Array and 2D Array related Questions in C++:</b></p> <p><b>Task1:</b> Create a switch statement [Manual], In Which:</p> <ul style="list-style-type: none"> <li>a. When you pass 1 your program would print current year</li> <li>b. When you pass 2 your program would print current month</li> <li>c. When you pass 3 your program would print current day</li> <li>d. When you pass 4 your program would print Not applicable</li> </ul> <p><b>Task2:</b> Create a switch statement [Using ctime], In Which:</p> <ul style="list-style-type: none"> <li>a. When you pass 1 your program would print current year</li> <li>b. When you pass 2 your program would print current month</li> <li>c. When you pass 3 your program would print current day</li> <li>d. When you pass 4 your program would print Not applicable</li> </ul> <p><b>Task3:</b></p> <p>v1. Print using reverse method:</p> <pre>1 2 3      9 8 7 4 5 6 ==&gt;  6 5 4 7 8 9      3 2 1</pre> <p>v2. Print using (10- arr[i][j]) method:</p> <pre>1 2 3      9 8 7 4 5 6 ==&gt;  6 5 4 7 8 9      3 2 1</pre> <p>v3. Restore using reverse method [without creating new array]:</p> <pre>1 2 3      9 8 7 4 5 6 ==&gt;  6 5 4</pre>	

	7 8 9            3 2 1	
--	------------------------	--

v4. Restore using (10- arr[i][j]) method [without creating new array]:

1 2 3            9 8 7
4 5 6 ==> 6 5 4
7 8 9            3 2 1

**Task4:** Restore the same values in the same array, arr[3][3]:

1 2 3            1 1 1
4 5 6 ==> 2 2 2
7 8 9            3 3 3

- v1. Use row loop [int i, for all j]
- v2. Use arr[i][N-1]/3, at each place
- v3. Use, arr[i][j]-(2\*i+j)

**Task5:** Store these in an array[4][4] in given fassion and then print:

```

*
*
*
*
*
```

**Task6:** Store these in an array[4][4] in given fashion and then print:

```

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

**Task7:** Store these in an array[4][4] in given fashion and then print:

```

*
*
*
*
```

**Task8:** Store these in an array[4][4] in given fashion and then print:

	<pre> * * * * * * * * * *</pre>	
8	<p>Write C++ code for below mentioned tasks?</p> <p><b>Pointer, Function, Inline Function, Recursion in C++:</b></p> <p><b>Task1:</b> Will the program through an error and if yes then why?</p> <pre> int *p = {10,20,20}; cout &lt;&lt; *p; p++; cout &lt;&lt; *p;</pre> <p><b>Task2:</b> Output of this program?</p> <p><b>V1.</b> Issue?</p> <pre> int arr[] = {10,20,30}; cout &lt;&lt; *arr; cout &lt;&lt; arr; arr++; cout &lt;&lt; *arr;</pre> <p><b>V2.</b> How to resolve above issue?</p> <pre> int arr[] = {10,20,30}; cout &lt;&lt; *arr; cout &lt;&lt; arr; cout &lt;&lt; *(?);</pre> <p><b>Task3:</b> Output of this program?</p> <p><b>V1.</b> Output?</p> <pre> int a = 10; int *p; int **q; p = &amp;a; q = &amp;p; cou &lt;&lt; *p; cou &lt;&lt; **q;</pre>	

	<p><b>V2.</b> Change the value of a using q pointer to pointer.</p> <p><b>Task4:</b> Find factorial of a number using function but not recursion</p> <p><b>Task5:</b> Find factorial of a number using recursion</p> <p><b>Task6:</b> Series Problem using recursion for n series  <math>2, (2^2 + 2), (3^3 + 3), (4^4 + 4), (5^5 + 5), \dots</math></p> <p>Hint:  <math>n * ((n-1)^(n-1) + (n-1))</math></p> <p><b>Task7:</b> Perform Call by value, call by Address for swapping value of a and b:</p> <pre>int a = 10; int b = 20;</pre> <p><b>V1.</b> Swap(a,b); //call by Value [void swap(int a, int b){ }]  <b>V2.</b> Swap(a,b); //call by Value [void swap(int &amp;a, int &amp;b){ }]  <b>V3.</b> Swap(&amp;a,&amp;b); //call by Address</p>	
9	<p>Write C++ code for below mentioned tasks?</p> <p><b>Class, Object, Constructor, Static Data Members, friend function in C++:</b></p> <p><b>Task1: Class and Object in C++</b></p> <p>a. WAP to assign and print the roll number, phone number and address of two students having names "Sam" and "John" respectively by creating two objects of the class 'Student'.</p> <p>b. WAP which would contain array of objects [many objects], of a class Student. Student [Name, Age, Year, section, marks], the section would be A,B,C and D. Your program would be able to return the total marks of students in the college.</p> <p>Hint [Make a Matrix or Tabular diagram to understand the problem], all the rows will differ each other by different objects of Student class [Student s1,s2,s3,s4].</p> <p><b>Task2: Constructor in C++</b></p> <p>WAP to create a class to print the area of a square and a rectangle. The class has two functions with the same name but different number of parameters. The function for printing the area of rectangle has two parameters which are its length and breadth respectively while the other function for printing the area of square has one parameter which is the side of the square. Use multiple constructors to for the initialization.</p>	

	<p><b>Task3: Static Data Members in C++</b> WAP to count the total number of calls for a member function from more than one objects. [Lets say, from 3 such Objects]</p> <p><b>Task4: Friend Function in C++</b> WAP in which you create a Student class having basic information for each student, like name, age and marks. By using friend function add marks of all the students [lets say 3 objects] and print it.</p> <p><b>Task5: Structure in C++</b> WAP to create a College class and Student Structure in C++ in one program. By providing such suitable examples write at least 5 differences between class and struct code you have written above. Hint [Access Specifiers, Heap and Stack, large and small memory, etc.]</p> <p><b>Task6: Extra Questions:</b> WAP which would perform these tasks of your data:            a. Come to next line            b. set minimum field width            c. fill string with (*) after setw(15) function            ****1234            by using endl, setw, and setfill [Manipulators in C++]</p>	
10	<p>Write C++ code for below mentioned tasks?</p> <p><b>Array of Objects, Pointer to Object, This pointer, Operator Overloading in C++</b></p> <p><b>Task1: Array of Objects in C++</b> WAP to create a directory that contains the following information.            (a) Name of a person            (b) Address            (c) Telephone Number (if available with STD code)            (d) Mobile Number (if available)            (e) Head of the family</p> <p><b>Task2: Pointer to Object in C++</b> WAP to create print or display Student information containing in Student class by using pointers to object.</p> <p><b>Task3: This pointer in C++</b> WAP to pass two variables in a parameterized constructor during object creation and have same names variables as class member data and constructor parameters. Your job is to calculate the remainder of those two numbers.</p> <p><b>Task4: Operator Overloading in C++</b>            a). WAP, in which you write a friend function to overload a less than '&lt;' operator in C++.            b). WAP in which you can add two objects [every object would have 1 integer value] by overloading + operator, which eventually would add the data values of those two object by adding the objects.</p>	

11	<p>Write C++ code for below mentioned tasks?</p> <p><b>Task-11.1 Inheritance Basics:</b> WAP in C++ to create a Parent and Child interaction using inheritance. With this Parent and Child Interaction try to perform these tasks:</p> <ul style="list-style-type: none"> <li>a. Call Parent class method in child class function without creating an object of parent class</li> <li>b. Call Parent class method in main method by child class object</li> </ul> <p><b>Task-11.2 Multiple Inheritance in C++:</b> Create two classes named Mammals and MarineAnimals. Create another class named BlueWhale which inherits both the above classes. Now, create a function in each of these classes which prints "I am mammal", "I am a marine animal" and "I belong to both the categories: Mammals as well as Marine Animals" respectively. Now, create an object for each of the above class and try calling</p> <ul style="list-style-type: none"> <li>1 - function of Mammals by the object of Mammal</li> <li>2 - function of MarineAnimal by the object of MarineAnimal</li> <li>3 - function of BlueWhale by the object of BlueWhale</li> <li>4 - function of each of its parent by the object of BlueWhale</li> </ul> <p><b>Task-11.3 Dimond Problem in multiple inheritance using C++:</b></p> <ul style="list-style-type: none"> <li>a. WAP to illustrate Dimond Problem in multiple inheritance</li> <li>b. its solution using Virtual base classes. Write separate programs if required.</li> <li>c. What else multiple inheritance can cause in a program, explain it by providing proper solution</li> </ul>	
12	<p>Write C++ code for below mentioned tasks?</p> <p><b>Task-12.1 WAP to illustrate the role of Access Modifiers [private, public, protected] separately in:</b></p> <ul style="list-style-type: none"> <li>a. Accessing base class elements in derived class or Inheritance</li> <li>b. Accessing base class elements through object</li> </ul>	

	<p><b>Task-12.2</b> Execution flow of Constructors and Destructors in C++:</p> <ul style="list-style-type: none"> <li>a) WAP to illustrate the calling and execution flow of Constructors in inheritance. [L-2 Inheritance]</li> <li>b) WAP to illustrate the calling and execution flow of Destructors in inheritance. [L-2 Inheritance]</li> <li>c) Pass parameters to base class through derived class constructor. [L-1 Inheritance]</li> </ul>	
13	<p>Write C++ code for below mentioned tasks?</p> <p><b>Task 13.1</b> To overload add method for two parameters with int and float data types in Base class. Along with it create a Derived class from the Base class named as child. The class child should override one of the overloaded method from base class.</p> <p>Perform following tasks:</p> <ol style="list-style-type: none"> <li>1. Try calling overriding method from child class object.</li> <li>2. Write name of the method which is not seen by the child class object</li> </ol> <p>Create two versions:</p> <p>version 01: without 'using' keyword</p> <p>version 02: with 'using' keyword</p> <p><b>Task 13.2</b> Base class having a virtual and a pure virtual function. Derived class having same copy of virtual function with changed logic and definition of pure virtual function.</p> <p>Perform following tasks:</p> <ol style="list-style-type: none"> <li>1. Try to call child class overriding method from base class pointer.</li> <li>2. Try to call child class definition of pure virtual function in child class.</li> <li>3. Find out the abstraction in above implementation.</li> </ol>	
14	<p>Write C++ code for below mentioned tasks?</p> <p><b>Task 14.1</b> Illustrate the compile time and run time binding using base class pointer, which holds the address of child class</p> <p><b>Task 14.2</b> Perform the following:</p> <ol style="list-style-type: none"> <li>1. Call base class destructor from base class pointer which is holding the child class object.</li> </ol>	

	2. Call child class destructor from base class pointer which is holding the child class object.	
15	<p>Write C++ code for below mentioned tasks?</p> <p><b>Task 15.1</b> WAP in C++ to read and write from and to a file using ifstream and ofstream.</p> <p><b>Task 15.2</b> WAP in C++ to perform these tasks:</p> <ul style="list-style-type: none"> <li>a. Read from a file using fstream [char by char]</li> <li>b. Write into a file using fstream</li> <li>c. Append into a file using fstream</li> <li>d. Count total number of characters, words and lines in a file</li> </ul> <p><b>Task 15.3</b> WAP in C++ for IO manipulators mentioned below:</p> <ul style="list-style-type: none"> <li>a. <b>IOS:</b> hex,dec,skipws,noskipws</li> <li>b. <b>Istream:</b> ws</li> <li>c. <b>Ostream:</b> endl, ends, flush</li> <li>d. <b>Iomanip:</b> setW, setPrecision</li> </ul>	
16	<p>Write C++ code for below mentioned tasks?</p> <p><b>Task 16.1</b> WAP in C++ to create a generic add function for given tasks:</p> <ul style="list-style-type: none"> <li>a. Perform add over two integers and return integer</li> <li>b. Perform add over one int and one float and return double</li> </ul> <p><b>Task 16.2</b> WAP in C++ to perform these tasks:</p> <ul style="list-style-type: none"> <li>a. Catch a Divide by zero exception in <math>z = x/y</math> using "<b>throw runtime_error</b>"</li> <li>b. What will be the output of this program and why?</li> </ul> <pre>#include &lt;iostream&gt; using namespace std;</pre>	

```

int main() {

    try {
        throw 'a';
    }
    catch (int x) {

        cout << "Caught " << x;
    }

    catch (...) {
        cout << "Default Exception\n";
    }

    return 0;
}

```

c. What will be the output of this program and why?

```

#include <iostream>

using namespace std;

int main() {

    try {
        throw 'a';
    }
    catch (int x) {

        cout << "Caught ";

    }

    return 0;
}

```

d. Rethrow and catch an exception by creating a separate user defined divide function for condition divide by zero.

17	<p><b>WAP in C++ with the help of STL:</b></p> <p><b>a. List:</b></p> <ol style="list-style-type: none"> <li>1. Iterate a int list using iterator and print it</li> <li>2. Find size of a list</li> <li>3. Sort a list</li> <li>4. Reverse a list</li> </ol> <p><b>b. Vector:</b></p> <ol style="list-style-type: none"> <li>1. Insert elements into a int vector</li> <li>2. Iterate this vector using iterator and print it</li> <li>3. Find size of a capacity and max size of a vector</li> <li>4. Resize a vector</li> <li>5. checks if the vector is empty or not</li> </ol> <p><b>c. Map:</b></p> <ol style="list-style-type: none"> <li>1. Insert elements into a <code>&lt;int, string&gt;</code> map</li> <li>2. insert elements in random order</li> <li>3. Iterate this map using iterator and print its keys and values</li> <li>4. Find an element as key from this map</li> <li>5. assigning the elements from map1 to map2</li> <li>6. remove all elements with key = x (any key present in map)</li> <li>7. Find size, max size of a map</li> <li>8. checks if this map is empty or not</li> <li>9. Clear a map</li> </ol> <p><b>d. Algorithm:</b></p> <ol style="list-style-type: none"> <li>1. Convert an Array into a Vector</li> <li>2. Sort a Vector</li> <li>3. Reverse a vector</li> <li>4. Max element in a Vector</li> <li>5. Min element in a Vector</li> <li>6. Occurrences of x in a vector</li> <li>7. Sort an Array</li> <li>8. Binary Search in an Array</li> </ol>
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**DEPARTMENT OF CSE**

**B.Tech. CSE**

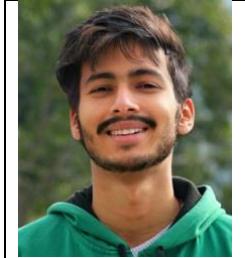
**STUDENT LAB REPORT SHEET**

Name of Student : Vipul Chauhan      Mob.No : 8979672596

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Father's Name : Brijmohan Singh Chauhan Occupation : Teacher Mob No : 9027508788

Mother's Name : Rachana Chauhan Occupation : Homemaker Mob No : 9675726212



Section : A   Branch : CSE   Semester : 3<sup>rd</sup>   Class Roll No : 62   Grade   A B C

Local Address: Bhaniyawala, Doiwala, D.Dun   Email: vipulchauhan548@gmail.com   Marks   5 3 1

S.N o.	Practical	D.O.P.	Date of Submiss ion	Grade (Viva)	Grade (Report File)	Total Marks (out of 10)	Student's Signature	Teacher's Signature
1	Practical-01	23.09.21	23.09.21				<u>Vipul</u>	
2	Practical-02	23.09.21	23.09.21				<u>Vipul</u>	
3	Practical-03	02.10.21	02.10.21				<u>Vipul</u>	
4	Practical-04	02.10.21	02.10.21				<u>Vipul</u>	
5	Practical-05	07.10.21	07.10.21				<u>Vipul</u>	
6	Practical-06	07.10.21	07.10.21				<u>Vipul</u>	
7	Practical-07	17.10.21	17.10.21				<u>Vipul</u>	
8	Practical-08	21.10.21	21.10.21				<u>Vipul</u>	
9	Practical-09	28.10.21	28.10.21				<u>Vipul</u>	
10	Practical-10	28.10.21	28.10.21				<u>Vipul</u>	
11	Practical-11	14.12.21	14.12.21				<u>Vipul</u>	
12	Practical-12	14.12.21	14.12.21				<u>Vipul</u>	
13	Practical-13	27.12.21	27.12.21				<u>Vipul</u>	
14	Practical-14	27.12.21	27.12.21				<u>Vipul</u>	
15	Practical-15	03.01.22	03.01.22				<u>Vipul</u>	
16	Practical-16	03.01.22	03.01.22				<u>Vipul</u>	
17	Practical-17	06.01.22	06.01.22				<u>Vipul</u>	

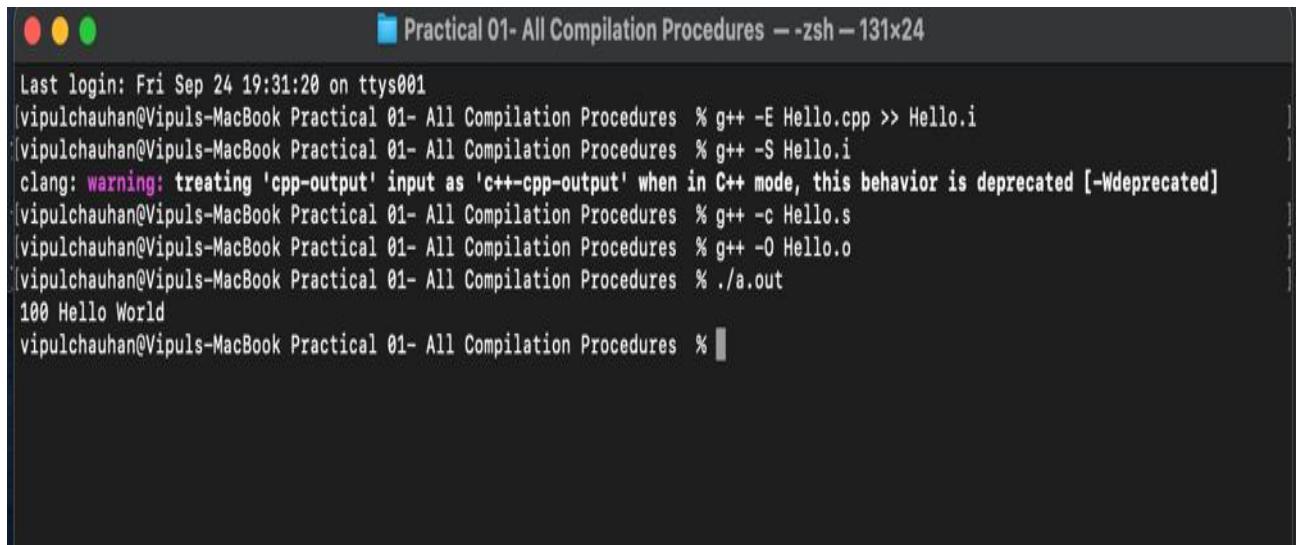
### Program 1

**Q. Write a C++ Program to print any sample message over console: Example: “Hello World!”**

### Source Code:

```
#include<iostream>
#define MAX 100
using namespace std;
int main()
{
    cout<<MAX<<" Hello World \n";
    return 0;
}
```

## Output



```
Last login: Fri Sep 24 19:31:20 on ttys001
[vipulchauhan@Vipuls-MacBook Practical 01- All Compilation Procedures % g++ -E Hello.cpp >> Hello.i
[vipulchauhan@Vipuls-MacBook Practical 01- All Compilation Procedures % g++ -S Hello.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical 01- All Compilation Procedures % g++ -c Hello.s
[vipulchauhan@Vipuls-MacBook Practical 01- All Compilation Procedures % g++ -O Hello.o
[vipulchauhan@Vipuls-MacBook Practical 01- All Compilation Procedures % ./a.out
100 Hello World
vipulchauhan@Vipuls-MacBook Practical 01- All Compilation Procedures % ]
```

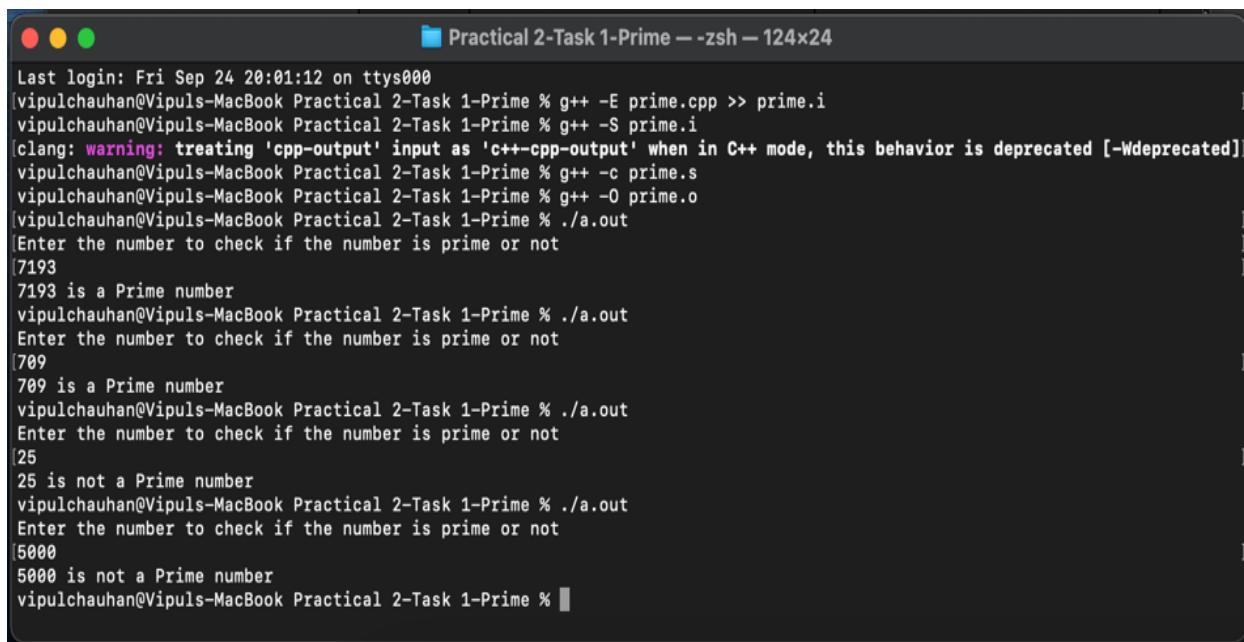
## Program 2

Q. Write an Efficient code to check if a number is prime or not.

### **Source Code:**

```
#include<iostream>
using namespace std;
float SquareRoot(float n)      //Babylonian method to find square root
{
    float x=n,y=1, e=0.000001;
    while(x-y>e)
    {
        x=(x+y)/2;
        y=n/x;
    }
    return x;
}
int isPrime(int n)
{
    for(int i=2;i<=SquareRoot(n);i++)
    {
        if(n%i==0)
        {
            return 1;
        }
    }
    return 0;
}
int main()
{
    int num;
    cout<<"Enter the number to check if the number is prime or not\n";
    cin>>num;
    if( isPrime(num)==0)
    {
        cout<<num<<" is a Prime number\n";
    }
    else
    {
        cout<<num<<" is not a Prime number\n";
    }
    return 0;
}
```

## Output



```
Last login: Fri Sep 24 20:01:12 on ttys000
[vipulchauhan@Vipuls-MacBook Practical 2-Task 1-Prime % g++ -E prime.cpp >> prime.i
vipulchauhan@Vipuls-MacBook Practical 2-Task 1-Prime % g++ -S prime.i
[clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
vipulchauhan@Vipuls-MacBook Practical 2-Task 1-Prime % g++ -c prime.s
vipulchauhan@Vipuls-MacBook Practical 2-Task 1-Prime % g++ -O prime.o
[vipulchauhan@Vipuls-MacBook Practical 2-Task 1-Prime % ./a.out
Enter the number to check if the number is prime or not
7193
7193 is a Prime number
vipulchauhan@Vipuls-MacBook Practical 2-Task 1-Prime % ./a.out
Enter the number to check if the number is prime or not
709
709 is a Prime number
vipulchauhan@Vipuls-MacBook Practical 2-Task 1-Prime % ./a.out
Enter the number to check if the number is prime or not
25
25 is not a Prime number
vipulchauhan@Vipuls-MacBook Practical 2-Task 1-Prime % ./a.out
Enter the number to check if the number is prime or not
5000
5000 is not a Prime number
vipulchauhan@Vipuls-MacBook Practical 2-Task 1-Prime % ]
```

### Program 3

**Q.** Write C++ code for below mentioned tasks?

**Task1:** How the preprocessor will react when you try to use, #include<iostream.h> instead of #include<iostream>?

**Task2:** How the preprocessor will react when you use cout but don't include #include<iostream> in your code?

**Task3:** Take a char variable and use cin to take its value from the user, cout it and it will only return one character and loss rest of the data you have entered!

**Task4:** How to resolve above issue? [Hint: by using, getline(cin, line);]

### **Task1 Source Code:**

```
#include<iostream.h>
int main()
{
    int i=10;
    cout<<i;
    return 0;
}
```

### **Task2 Source Code:**

```
int main()
{
    int i=10;
    cout<<i;
}
```

### **Task3 Source Code:**

```
#include<iostream>
using namespace std;
int main()
{
    char a;
    cin>>a;
    cout<<a<<endl;
    return 0;
}
```

## Task1 Output

```
Last login: Thu Sep 23 10:07:45 on ttys000
[vipulchauhan@Vipuls-MacBook Practical 2-Task 2-iostream_with_dot_h % g++ -E iostream_with_dot_h.cpp >> iostream_with_dot_h.i
iostream_with_dot_h.cpp:1:9: fatal error: 'iostream.h' file not found
#include<iostream.h>
          ^
1 error generated.
[vipulchauhan@Vipuls-MacBook Practical 2-Task 2-iostream_with_dot_h % g++ -S iostream_with_dot_h.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
iostream_with_dot_h.cpp:5:2: error: use of undeclared identifier 'cout'
  cout<<i;
  ^
1 error generated.
vipulchauhan@Vipuls-MacBook Practical 2-Task 2-iostream_with_dot_h %
```

## Task2 Output

```
Last login: Thu Sep 23 09:36:57 on ttys000
[vipulchauhan@Vipuls-MacBook iostream_not_used % g++ -E iostream_not_used.cpp >> iostream_not_used.i
vipulchauhan@Vipuls-MacBook iostream_not_used % g++ -S iostream_not_used.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
iostream_not_used.cpp:4:2: error: use of undeclared identifier 'cout'
  cout<<i;
  ^
1 error generated.
vipulchauhan@Vipuls-MacBook iostream_not_used %
```

## Task3 Output

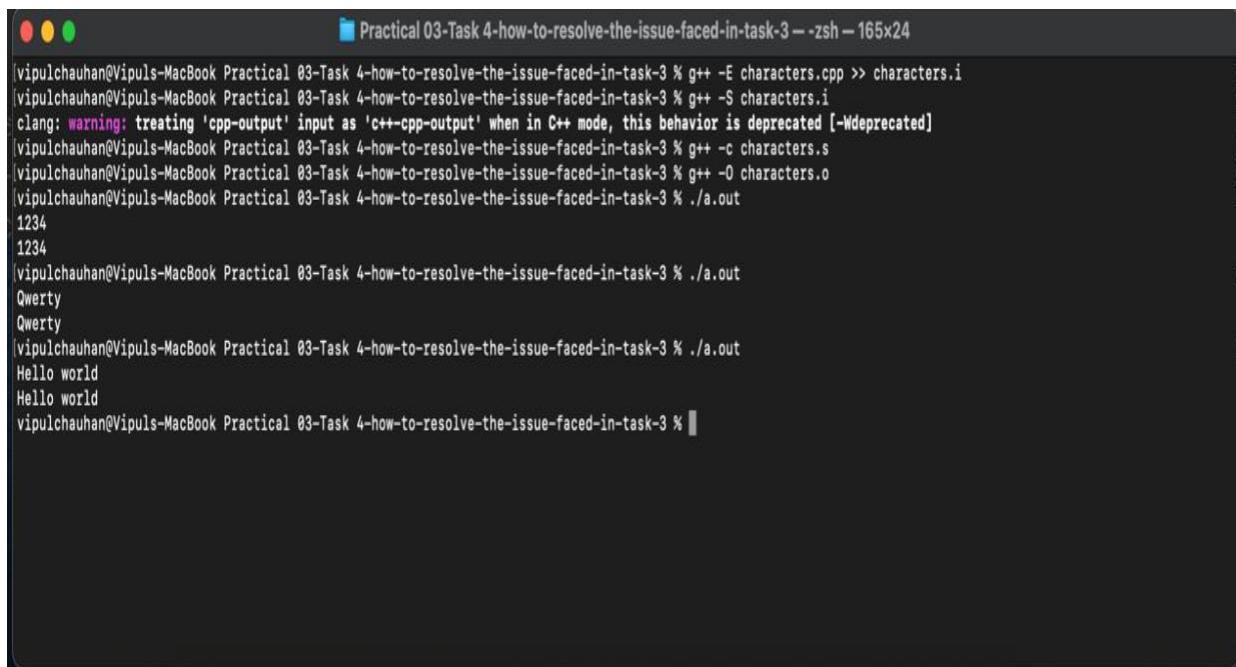
```
[vipulchauhan@Vipuls-MacBook Practical 03-Task 3-char-takes-only-one-character % g++ -E one_char.cpp >> one_char.i
[vipulchauhan@Vipuls-MacBook Practical 03-Task 3-char-takes-only-one-character % g++ -S one_char.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical 03-Task 3-char-takes-only-one-character % g++ -c one_char.s
[vipulchauhan@Vipuls-MacBook Practical 03-Task 3-char-takes-only-one-character % g++ -O one_char.o
[vipulchauhan@Vipuls-MacBook Practical 03-Task 3-char-takes-only-one-character % ./a.out
1234
1
Q
vipulchauhan@Vipuls-MacBook Practical 03-Task 3-char-takes-only-one-character % ./a.out
Qwerty
Q
vipulchauhan@Vipuls-MacBook Practical 03-Task 3-char-takes-only-one-character % ./a.out
Hello world
H
vipulchauhan@Vipuls-MacBook Practical 03-Task 3-char-takes-only-one-character %
```

### Program 3

## Task4 Source Code:

```
#include<iostream>
#define MAX 1000
using namespace std;
int main()
{
    char a[MAX];
    cin.getline(a,MAX);
    cout<<a<<endl;
    return 0;
}
```

## Task4 Output



```
vipulchauhan@Vipuls-MacBook Practical 03-Task 4-how-to-resolve-the-issue-faced-in-task-3 % g++ -E characters.cpp >> characters.i
vipulchauhan@Vipuls-MacBook Practical 03-Task 4-how-to-resolve-the-issue-faced-in-task-3 % g++ -S characters.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
vipulchauhan@Vipuls-MacBook Practical 03-Task 4-how-to-resolve-the-issue-faced-in-task-3 % g++ -c characters.s
vipulchauhan@Vipuls-MacBook Practical 03-Task 4-how-to-resolve-the-issue-faced-in-task-3 % g++ -O characters.o
vipulchauhan@Vipuls-MacBook Practical 03-Task 4-how-to-resolve-the-issue-faced-in-task-3 % ./a.out
1234
1234
vipulchauhan@Vipuls-MacBook Practical 03-Task 4-how-to-resolve-the-issue-faced-in-task-3 % ./a.out
Qwerty
Qwerty
vipulchauhan@Vipuls-MacBook Practical 03-Task 4-how-to-resolve-the-issue-faced-in-task-3 % ./a.out
Hello world
Hello world
vipulchauhan@Vipuls-MacBook Practical 03-Task 4-how-to-resolve-the-issue-faced-in-task-3 %
```

## Program 4

**Q.** Write C++ code for below mentioned tasks?

**add(int,int), add(float, float), both of these methods are in two different namespaces First and Second respectively.**

**Task1:** Access these methods using scope resolution operator [::](SRO) from main method?

**Task2:** Access these methods using "using" keyword for main method?

**Task3:** Try to access these methods without using, (SRO) and "using" keyword and check how the compiler will react to it?

**Task4:** Try to access these methods for Mixed Values [Int, Float] and see how the compiler will react to it?

### **Task1 Source Code:**

```
#include<iostream>
using namespace std;
namespace first
{
    int Add(int a,int b)
    {
        int sum=a+b;
        return sum;
    }
}
namespace second
{
    float Add(float a,float b)
    {
        float sum=a+b;
        return sum;
    }
}
int main()
{
    float a,b;
    cout<<"Enter two numbers"<<endl;
    cin>>a>>b;
    cout<<"Integer addition ="<<first::Add(a,b)<<endl;
    cout<<"Float addition ="<<second::Add(a,b)<<endl;
    return 0;
}
```

## Task1 Output

```
Practical-04-Task-1-Namespace-using-scope-resolution-operator — zsh — 120x24
[vipulchauhan@Vipuls-MacBook Practical-04-Task-1-Namespace-using-scope-resolution-operator % g++ -E Namespace_SRO.cpp >> Namespace_SRO.i
[vipulchauhan@Vipuls-MacBook Practical-04-Task-1-Namespace-using-scope-resolution-operator % g++ -S Namespace_SRO.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-04-Task-1-Namespace-using-scope-resolution-operator % g++ -c Namespace_SRO.s
[vipulchauhan@Vipuls-MacBook Practical-04-Task-1-Namespace-using-scope-resolution-operator % g++ -O Namespace_SRO.o
[vipulchauhan@Vipuls-MacBook Practical-04-Task-1-Namespace-using-scope-resolution-operator % ./a.out
Enter two numbers
18.6
17.43
Integer addition =35
Float addition =36.03
[vipulchauhan@Vipuls-MacBook Practical-04-Task-1-Namespace-using-scope-resolution-operator % ./a.out
Enter two numbers
123.11
121.12
Integer addition =244
Float addition =244.23
vipulchauhan@Vipuls-MacBook Practical-04-Task-1-Namespace-using-scope-resolution-operator % ]
```

## Program 4

### **Task2 Source Code:**

```
#include<iostream>
using namespace std;
namespace first
{
    int Add(int a,int b)
    {
        int sum=a+b;
        return sum;
    }
}
namespace second
{
    float Add(float a,float b)
    {
        float sum=a+b;
        return sum;
    }
}
int main()
{
    float a,b;
    cout<<"Enter two numbers"<<endl;
    cin>>a>>b;
    using namespace first;
    cout<<"Integer addition ="<<Add(a,b)<<endl;
    using namespace second;
    cout<<"Float addition ="<<Add(a,b)<<endl;
    return 0;
}
```

## Task2 Output

```
Practical-04-Task-2-Namespace_call_by_Using_keyword --zsh-- 119x24
vipulchauhan@Vipuls-MacBook Practical-04-Task-2-Namespace_call_by_Using_keyword % g++ -E Namespace_Using.cpp >> Namespace_Using.i
vipulchauhan@Vipuls-MacBook Practical-04-Task-2-Namespace_call_by_Using_keyword % g++ -S Namespace_Using.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
vipulchauhan@Vipuls-MacBook Practical-04-Task-2-Namespace_call_by_Using_keyword % g++ -c Namespace_Using.s
vipulchauhan@Vipuls-MacBook Practical-04-Task-2-Namespace_call_by_Using_keyword % g++ -O Namespace_Using.o
vipulchauhan@Vipuls-MacBook Practical-04-Task-2-Namespace_call_by_Using_keyword % ./a.out
Enter two numbers
12.45
13.64
Integer addition =25
Float addition =26.09
vipulchauhan@Vipuls-MacBook Practical-04-Task-2-Namespace_call_by_Using_keyword % ./a.out
Enter two numbers
23.789
123.9877
Integer addition =146
Float addition =147.777
vipulchauhan@Vipuls-MacBook Practical-04-Task-2-Namespace_call_by_Using_keyword %
```

### Program 4

## Task3 Source Code:

```
#include<iostream>
using namespace std;
namespace first
{
    int Add(int a,int b)
    {
        int sum=a+b;
        return sum;
    }
}
namespace second
{
    float Add(float a,float b)
    {
        float sum=a+b;
        return sum;
    }
}
int main()
{
    float a,b;
    cout<<"Enter two numbers"<<endl;
    cin>>a>>b;
    cout<<"Integer addition ="<<Add(a,b)<<endl;
    cout<<"Float addition ="<<Add(a,b)<<endl;
    return 0;
}
```

## Task3 Output

```
Practical-04-Task-3-without-SRO-and-Using-namespace-keyword - zsh - 122x24
vipulchauhan@Vipuls-MacBook Practical-04-Task-3-without-SRO-and-Using-namespace-keyword % g++ -E Namespace_without.cpp >> Namespace_without.i
vipulchauhan@Vipuls-MacBook Practical-04-Task-3-without-SRO-and-Using-namespace-keyword % g++ -S Namespace_without.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated-d]
Namespace_without.cpp:24:30: error: use of undeclared identifier 'Add'
cout<<"Integer addition ="<<Add(a,b)<<endl;
^
Namespace_without.cpp:25:28: error: use of undeclared identifier 'Add'
cout<<"Float addition ="<<Add(a,b)<<endl;
^
2 errors generated.
vipulchauhan@Vipuls-MacBook Practical-04-Task-3-without-SRO-and-Using-namespace-keyword %
```

**Program 4****Task4 Source Code:**

```
#include<iostream>
using namespace std;
namespace first
{
    int Add(int a,int b)
    {
        int sum=a+b;
        return sum;
    }
}
namespace second
{
    float Add(float a,float b)
    {
        float sum=a+b;
        return sum;
    }
}
using namespace first;
using namespace second;
int main()
{
    cout<<"Integer addition ="<<Add(2,2)<<endl;
    cout<<"Float addition ="<<Add(2.45,2.345)<<endl;
    cout<<"Mixed values ="<<Add(6.466,7)<<endl;
    cout<<"Mixed values ="<<Add(7,61.308)<<endl;
    return 0;
}
```

## Task4 Output

```
● ○ ● Practical-04-Task-4-methods-with-mixed-values — zsh — 122x24
vipulchauhan@Vipuls-MacBook Practical-04-Task-4-methods-with-mixed-values % g++ -E Namespace_Mixed.cpp >> Namespace_Mixed.i
vipulchauhan@Vipuls-MacBook Practical-04-Task-4-methods-with-mixed-values % g++ -S Namespace_Mixed.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated-d]
Namespace_Mixed.cpp:24:28: error: call to 'Add' is ambiguous
cout<<"Float addition ="<<Add(2.45,2.345)<<endl;
^~~
Namespace_Mixed.cpp:5:6: note: candidate function
int Add(int a,int b)
^
Namespace_Mixed.cpp:13:8: note: candidate function
float Add(float a,float b)
^
Namespace_Mixed.cpp:25:30: warning: implicit conversion from 'double' to 'int' changes value from 6.466 to 6 [-Wliteral-conversion]
cout<<"Mixed values ="<<Add(6.466,7)<<endl;
^~~ ^~~~~
Namespace_Mixed.cpp:26:32: warning: implicit conversion from 'double' to 'int' changes value from 61.308 to 61 [-Wliteral-conversion]
cout<<"Mixed values ="<<Add(7,61.308)<<endl;
^~~ ^~~~~
2 warnings and 1 error generated.
vipulchauhan@Vipuls-MacBook Practical-04-Task-4-methods-with-mixed-values %
```

## Program 5

Q. Write C++ code for below mentioned tasks?

**Primary Data Types related questions in C++:**

**Task1:** Initialise all primary data types, assign their values and print them all?  
 [char, bool, short, int, long, float, double, long double, wide char]

**Task2:** Apply sizeof operator on all above operators and their variables?

Example

```
Int a = 10;
Cout << Sizeof(int);
Cout << Sizeof(a);
```

### **Task1 Source Code:**

```
#include<iostream>
using namespace std;
void Char()
{
    char a='a';
    cout<<"Char           "<<a<<endl;
}
void Bool()
{
    bool a=true;
    cout<<"Bool           "<<a<<endl;
}
void Short()
{
    short a=2;
    cout<<"Short          "<<a<<endl;
}
void Int()
{
    int a=18;
    cout<<"Int            "<<a<<endl;
}
void Long()
{
    long a=127878;
    cout<<"Long           "<<a<<endl;
}
void Float()
```

```

{
    float a=2.30;
    cout<<"Float           "<<a<<endl;
}
void Double()
{
    double a=30.29;
    cout<<"Double          "<<a<<endl;
}
void long_double()
{
    long double a=46.90777;
    cout<<"Long double      "<<a<<endl;
}
void widechar()
{
    wchar_t a=L'¤';
    cout<<"Wide char        "<<a<<endl;
}
int main()
{
    //cout<<"Size of all data types in your computer is:"<<endl;
    cout<<endl;
    cout<<"Data Types          Values Stored in it"<<endl;
    cout<<endl;
    Char();
    Bool();
    Short();
    Int();
    Long();
    Float();
    Double();
    long_double();
    widechar();
    cout<<endl;
    return 0;
}

```

## Task1 Output

```
Practical-05-Task-1-Data_types --zsh -- 121x24
Last login: Thu Oct  7 19:22:10 on ttys000
vipulchauhan@Vipuls-MacBook Practical-05-Task-1-Data_types % g++ -E Data_Types.cpp >> Data_Types.i
vipulchauhan@Vipuls-MacBook Practical-05-Task-1-Data_types % g++ -S Data_Types.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
vipulchauhan@Vipuls-MacBook Practical-05-Task-1-Data_types % g++ -c Data_Types.s
vipulchauhan@Vipuls-MacBook Practical-05-Task-1-Data_types % g++ -O Data_Types.o
vipulchauhan@Vipuls-MacBook Practical-05-Task-1-Data_types % ./a.out
Size of all data types in your computer is:

Data Types          Values Stored in it
Char                a
Bool               1
Short              2
Int                18
Long               127878
Float              2.3
Double             30.29
Long double        46.9078
Wide char          12525

vipulchauhan@Vipuls-MacBook Practical-05-Task-1-Data_types %
```

### Program 5

## Task2 Source Code:

```
#include<iostream>
using namespace std;
void Char()
{
    char a='a';
    cout<<"Char           "<<sizeof(a)<<" Byte"<<endl;
}
void Bool()
{
    bool a=true;
    cout<<"Bool          "<<sizeof(a)<<" Byte"<<endl;
}
void Short()
{
    short a=2;
    cout<<"Short         "<<sizeof(a)<<" Byte"<<endl;
}
void Int()
{
    int a=18;
    cout<<"Int          "<<sizeof(a)<<" Byte"<<endl;
}
void Long()
{
    long a=127878;
    cout<<"Long         "<<sizeof(a)<<" Byte"<<endl;
}
void Float()
{
    float a=2.30;
    cout<<"Float        "<<sizeof(a)<<" Byte"<<endl;
}
void Double()
{
    double a=30.29;
    cout<<"Double       "<<sizeof(a)<<" Byte"<<endl;
}
```

```

void long_double()
{
    long double a=46.90777;
    cout<<"Long double           "<<sizeof(a)<<" Byte"<<endl;
}
void widechar()
{
    wchar_t a=L'□';
    cout<<"Wide char           "<<sizeof(a)<<" Byte"<<endl;
}
int main()
{
    cout<<"Size of all data types in your computer is:"<<endl;
    cout<<endl;
    cout<<"Data Types           Size"<<endl;
    cout<<endl;
    Char();
    Bool();
    Short();
    Int();
    Long();
    Float();
    Double();
    long_double();
    widechar();
    cout<<endl;
    return 0;
}

```

## Task2 Output

```
Practical-05-Task-2-Data_types_size -- zsh -- 124x24

Last login: Thu Oct  7 19:24:21 on ttys000
[vipulchauhan@Vipuls-MacBook Practical-05-Task-2-Data_types_size % g++ -E Data_Types_size.cpp >> Data_Types_size.i
[vipulchauhan@Vipuls-MacBook Practical-05-Task-2-Data_types_size % g++ -S Data_Types_size.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-05-Task-2-Data_types_size % g++ -c Data_Types_size.s
[vipulchauhan@Vipuls-MacBook Practical-05-Task-2-Data_types_size % g++ -O Data_Types_size.o
[vipulchauhan@Vipuls-MacBook Practical-05-Task-2-Data_types_size % ./a.out
Size of all data types in your computer is:

Data Types          Size
Char                1 Byte
Bool               1 Byte
Short              2 Byte
Int                4 Byte
Long               8 Byte
Float              4 Byte
Double             8 Byte
Long double        16 Byte
Wide char           4 Byte

vipulchauhan@Vipuls-MacBook Practical-05-Task-2-Data_types_size %
```

## Program 6

**Q.** Write C++ code for below mentioned tasks?

**String related Questions in C++:**

**Task1:** What happens if we add integer with a string, how the compiler would react to it?

```
String str = "ABC";
Int a = 1;
String str2 = str + a;
```

**Task2:** Check the entered string is Palindrome or not?

String str = "75457"

Output: Yes it is a palindrome or No it is not a Palindrome.

(Use, getline(sin, str1) and reverse\_iterator of string to check this)

**Task3:** Make a reverse of a string using reverse method and reverse\_iterator of string class?

**Task4:** String Compare: Check if the strings are equal or not? (do not use str1.compare(str2), do it manually)

**Task5:** String Compare: Check the possible values string.compare() function will return?

(Create cases in which compare function would return below values)

```
X>0
X<0
X==0
X = -4
X = 5
X = -2104040...
```

Also check the ASCII difference between two characters?(use int type cast)

**Task6:** Check if string is mutable in C++ or not?

```
String a = "Hello";
Cout << &a;
a[0] = 'J';
Cout << &a;
Cout << a;
```

What is the output?

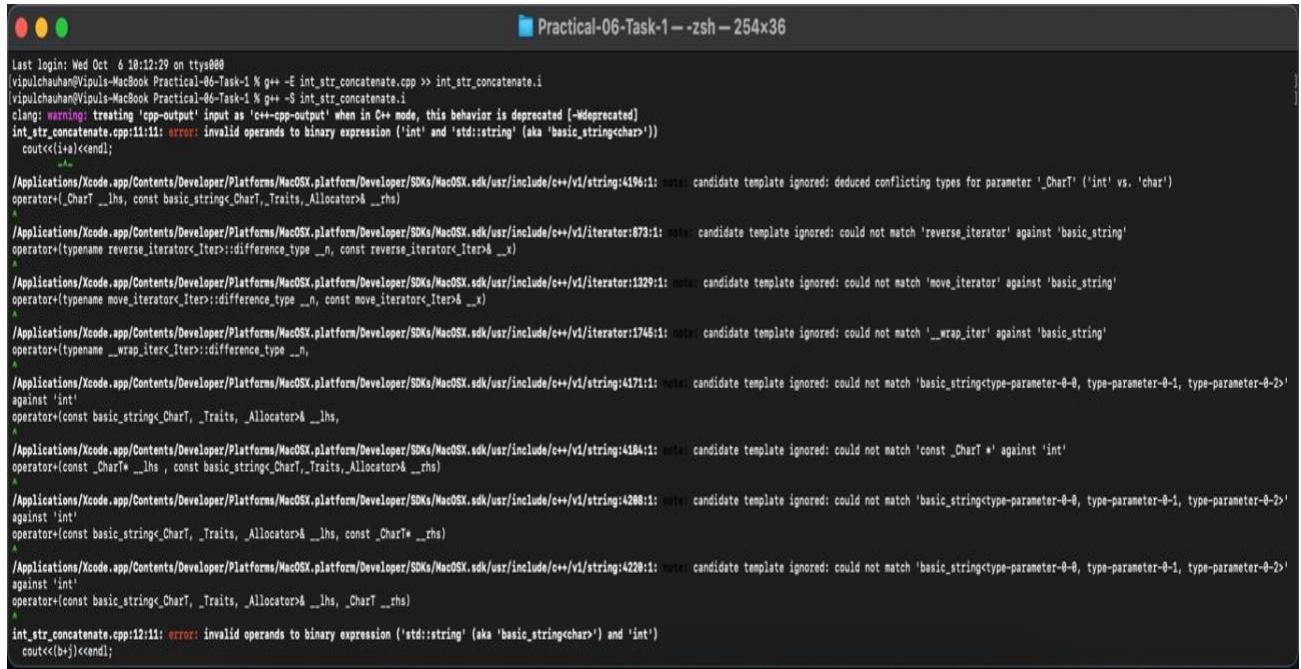
**Program 6****Task1 Source Code:**

```
#include<iostream>
#include<string>
using namespace std;
int main()
{
    int i=5,j=6;
    string a="abcd",b="efgh";
    cout<<i+j<<endl;
    cout<<(a+b)<<endl;
    //These two output statements will give the compile time error
    cout<<(i+a)<<endl;
    cout<<(b+j)<<endl;
    return 0;
}
```

**Task2 Source Code:**

```
#include<iostream>
#include<string>
using namespace std;
int main()
{
    string s,str;
    cout<<"Enter the string:";
    getline(cin,s);
    string::reverse_iterator i;
    for(i=s.rbegin();i!=s.rend();i++)
    {
        str=str+(*i);
    }
    if(str==s)
    {
        cout<<s<<" is a palindrome string"<<endl;
    }
    else
    {
        cout<<s<<" is not a palindrome string"<<endl;
    }
    return 0;
}
```

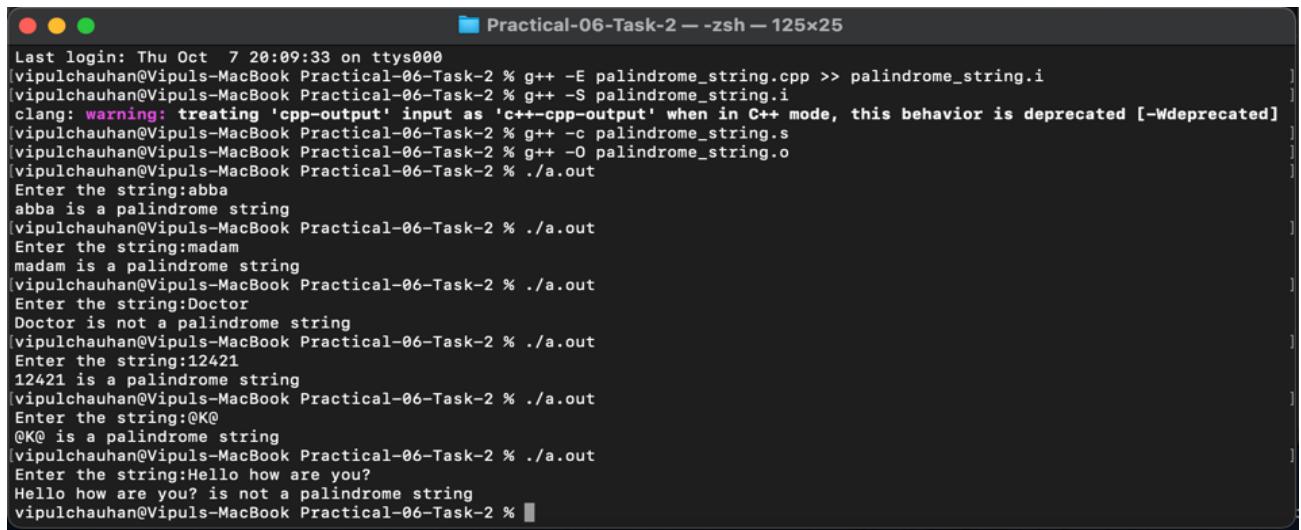
## Task1 Output



```
Last login: Wed Oct  6 10:12:29 on ttys000
[vipulchauhan@Vipuls-MacBook Practical-06-Task-1 % g++ -E int_str_concatenate.cpp >> int_str_concatenate.i
[vipulchauhan@Vipuls-MacBook Practical-06-Task-1 % g++ -S int_str_concatenate.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
int_str_concatenate.cpp:11:11: error: invalid operands to binary expression ('int' and 'std::string' (aka 'basic_string<char>'))
    cout<<(i+j)<<endl;
           ^
/Applications/Xcode.app/Contents/Developer/Platforms/MacOSX.platform/Developer/SDKs/MacOSX.sdk/usr/include/c++/v1/string:4196:1: note: candidate template ignored: deduced conflicting types for parameter '_CharT' ('int' vs. 'char')
operator+<_CharT __lhs, const basic_string<_CharT, _Traits, _Allocator>& __rhs)
^
/Applications/Xcode.app/Contents/Developer/Platforms/MacOSX.platform/Developer/SDKs/MacOSX.sdk/usr/include/c++/v1/iterator:873:1: note: candidate template ignored: could not match 'reverse_iterator' against 'basic_string'
operator+(typename reverse_iterator<_Iter>::difference_type __n, const reverse_iterator<_Iter>& __x)
^
/Applications/Xcode.app/Contents/Developer/Platforms/MacOSX.platform/Developer/SDKs/MacOSX.sdk/usr/include/c++/v1/iterator:1329:1: note: candidate template ignored: could not match 'move_iterator' against 'basic_string'
operator+(typename move_iterator<_Iter>::difference_type __n, const move_iterator<_Iter>& __x)
^
/Applications/Xcode.app/Contents/Developer/Platforms/MacOSX.platform/Developer/SDKs/MacOSX.sdk/usr/include/c++/v1/iterator:1745:1: note: candidate template ignored: could not match '__wrap_iter' against 'basic_string'
operator+(typename __wrap_iter<_Iter>::difference_type __n,
^
/Applications/Xcode.app/Contents/Developer/Platforms/MacOSX.platform/Developer/SDKs/MacOSX.sdk/usr/include/c++/v1/string:4171:1: note: candidate template ignored: could not match 'basic_string<type-parameter-0-0, type-parameter-0-1, type-parameter-0-2>' against 'int'
operator+(const basic_string<_CharT, _Traits, _Allocator>& __lhs,
^
/Applications/Xcode.app/Contents/Developer/Platforms/MacOSX.platform/Developer/SDKs/MacOSX.sdk/usr/include/c++/v1/string:4184:1: note: candidate template ignored: could not match 'const _CharT*' against 'int'
operator+(const _CharT* __lhs, const basic_string<_CharT, _Traits, _Allocator>& __rhs)
^
/Applications/Xcode.app/Contents/Developer/Platforms/MacOSX.platform/Developer/SDKs/MacOSX.sdk/usr/include/c++/v1/string:4208:1: note: candidate template ignored: could not match 'basic_string<type-parameter-0-0, type-parameter-0-1, type-parameter-0-2>' against 'int'
operator+(const basic_string<_CharT, _Traits, _Allocator>& __lhs, const _CharT* __rhs)
^
/Applications/Xcode.app/Contents/Developer/Platforms/MacOSX.platform/Developer/SDKs/MacOSX.sdk/usr/include/c++/v1/string:4229:1: note: candidate template ignored: could not match 'basic_string<type-parameter-0-0, type-parameter-0-1, type-parameter-0-2>' against 'int'
operator+(const basic_string<_CharT, _Traits, _Allocator>& __lhs, _CharT __rhs)

int_str_concatenate.cpp:12:11: error: invalid operands to binary expression ('std::string' (aka 'basic_string<char>') and 'int')
    cout<<(b+j)<<endl;
```

## Task2 Output



```
Last login: Thu Oct  7 20:09:33 on ttys000
[vipulchauhan@Vipuls-MacBook Practical-06-Task-2 % g++ -E palindrome_string.cpp >> palindrome_string.i
[vipulchauhan@Vipuls-MacBook Practical-06-Task-2 % g++ -S palindrome_string.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-06-Task-2 % g++ -c palindrome_string.s
[vipulchauhan@Vipuls-MacBook Practical-06-Task-2 % g++ -O palindrome_string.o
[vipulchauhan@Vipuls-MacBook Practical-06-Task-2 % ./a.out
Enter the string:abba
abba is a palindrome string
[vipulchauhan@Vipuls-MacBook Practical-06-Task-2 % ./a.out
Enter the string:madam
madam is a palindrome string
[vipulchauhan@Vipuls-MacBook Practical-06-Task-2 % ./a.out
Enter the string:Doctor
Doctor is not a palindrome string
[vipulchauhan@Vipuls-MacBook Practical-06-Task-2 % ./a.out
Enter the string:12421
12421 is a palindrome string
[vipulchauhan@Vipuls-MacBook Practical-06-Task-2 % ./a.out
Enter the string:@K@
@K@ is a palindrome string
[vipulchauhan@Vipuls-MacBook Practical-06-Task-2 % ./a.out
Enter the string>Hello how are you?
Hello how are you? is not a palindrome string
[vipulchauhan@Vipuls-MacBook Practical-06-Task-2 %
```

## Program 6

### Task3 Source Code:

```
#include<iostream>
#include<string>
using namespace std;
int main()
{
    string s;
    cout<<"Enter the string:";
    getline(cin,s);
    string::reverse_iterator i;
    cout<<"Reverse of a string using string iterator is : ";
    for(i=s.rbegin();i!=s.rend();i++)
    {
        cout<<*i;
    }
    cout<<endl<<"Reverse of the string using the reverse function is : ";
    reverse(s.begin(),s.end());
    cout<<s<<endl;
    return 0;
}
```

## Task3 Output

```
Practical-06-Task-3-Reverse-the-string -- zsh -- 117x21

Last login: Thu Oct  7 20:58:36 on ttys000
[vipulchauhan@Vipuls-MacBook Practical-06-Task-3-Reverse-the-string % g++ -E reverse_the_string.cpp >> reverse_the_string.i
[vipulchauhan@Vipuls-MacBook Practical-06-Task-3-Reverse-the-string % g++ -S reverse_the_string.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-06-Task-3-Reverse-the-string % g++ -c reverse_the_string.s
[vipulchauhan@Vipuls-MacBook Practical-06-Task-3-Reverse-the-string % g++ -O reverse_the_string.o
[vipulchauhan@Vipuls-MacBook Practical-06-Task-3-Reverse-the-string % ./a.out
Enter the string:12345
Reverse of a string using string iterator is : 54321
Reverse of the string using the reverse function is : 54321
[vipulchauhan@Vipuls-MacBook Practical-06-Task-3-Reverse-the-string % ./a.out
Enter the string:Vipul Chauhan
Reverse of a string using string iterator is : nahuahC lupiV
Reverse of the string using the reverse function is : nahuahC lupiV
[vipulchauhan@Vipuls-MacBook Practical-06-Task-3-Reverse-the-string % ./a.out
Enter the string:Hello, how are you?
Reverse of a string using string iterator is : ?uoy era woh ,olleH
Reverse of the string using the reverse function is : ?uoy era woh ,olleH
vipulchauhan@Vipuls-MacBook Practical-06-Task-3-Reverse-the-string %
```

## Program 6

### **Task4 Source Code:**

```
#include<iostream>
#include<string>
using namespace std;
int main()
{
    string s1,s2;
    cout<<"Enter string in s1:";
    getline(cin,s1);
    cout<<"Enter string in s2:";
    getline(cin,s2);
    if(s1.length()!=s2.length())
    {
        cout<<"s1 and s2 are not equal"<<endl;
    }
    if(s1!=s2)
    {
        cout<<"s1 and s2 are not equal"<<endl;
        if(s1>s2)
        {
            cout<<"s1 is greater than s2"<<endl;
        }
        else
        {
            cout<<"s1 is smaller than s2"<<endl;
        }
    }
    else if(s1==s2)
    {
        cout<<"s1 and s2 are equal"<<endl;
    }
    return 0;
}
```

## Task4 Output

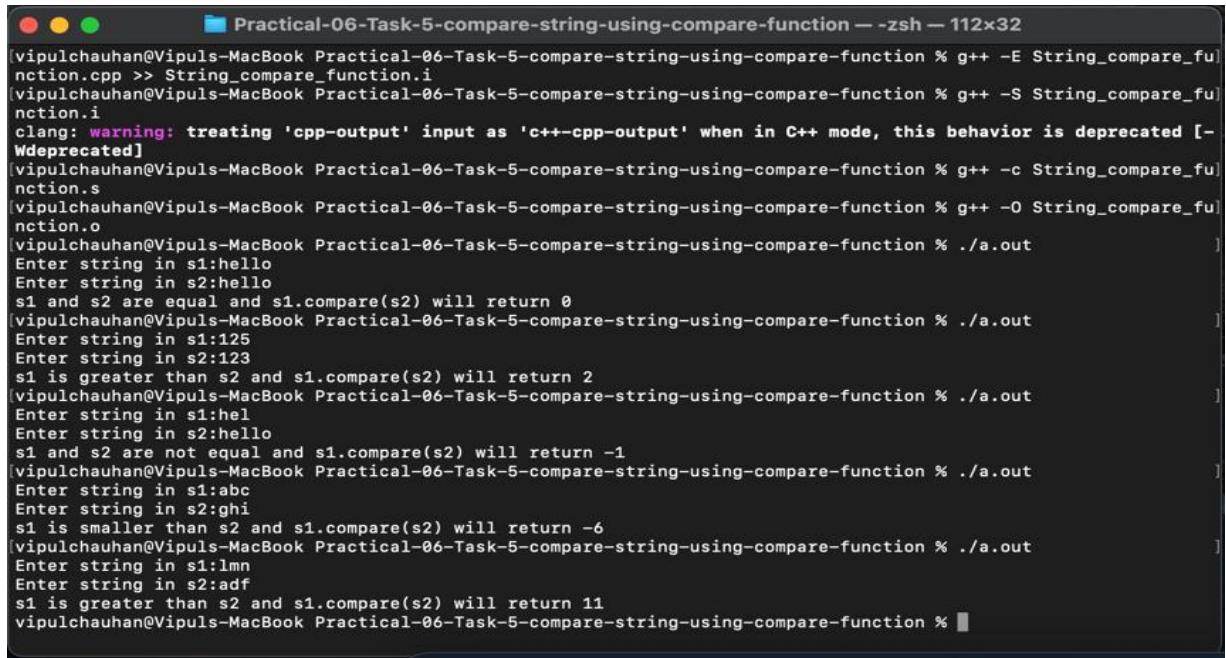
```
Practical-06-Task-4-String-compare-without-compare-function -- zsh -- 120x24
[vipulchauhan@Vipuls-MacBook Practical-06-Task-4-String-compare-without-compare-function % g++ -E String_compare.cpp >> String_compare.i
[vipulchauhan@Vipuls-MacBook Practical-06-Task-4-String-compare-without-compare-function % g++ -S String_compare.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-06-Task-4-String-compare-without-compare-function % g++ -c String_compare.s
[vipulchauhan@Vipuls-MacBook Practical-06-Task-4-String-compare-without-compare-function % g++ -O String_compare.o
[vipulchauhan@Vipuls-MacBook Practical-06-Task-4-String-compare-without-compare-function % ./a.out
Enter string in s1:hello
Enter string in s2:hello
s1 and s2 are equal
[vipulchauhan@Vipuls-MacBook Practical-06-Task-4-String-compare-without-compare-function % ./a.out
Enter string in s1:hel
Enter string in s2:are
s1 and s2 are not equal
s1 is greater than s2
[vipulchauhan@Vipuls-MacBook Practical-06-Task-4-String-compare-without-compare-function % ./a.out
Enter string in s1:123
Enter string in s2:124
s1 and s2 are not equal
s1 is smaller than s2
vipulchauhan@Vipuls-MacBook Practical-06-Task-4-String-compare-without-compare-function %
```

## Program 6

### **Task5 Source Code:**

```
#include<iostream>
#include<string>
using namespace std;
int main()
{
    string s1,s2;
    cout<<"Enter string in s1:";
    getline(cin,s1);
    cout<<"Enter string in s2:";
    getline(cin,s2);
    int x=s1.compare(s2);
    if(s1.length()!=s2.length())
    {
        cout<<"s1 and s2 are not equal and s1.compare(s2) will return ";
        cout<<x<<endl;
    }
    else
    {
        if(x>0)
        {
            cout<<"s1 is greater than s2 and s1.compare(s2) will return ";
            cout<<x<<endl;
        }
        if(x<0)
        {
            cout<<"s1 is smaller than s2 and s1.compare(s2) will return ";
            cout<<x<<endl;
        }
        if(x==0)
        {
            cout<<"s1 and s2 are equal and s1.compare(s2) will return ";
            cout<<x<<endl;
        }
    }
    return 0;
}
```

## Task5 Output



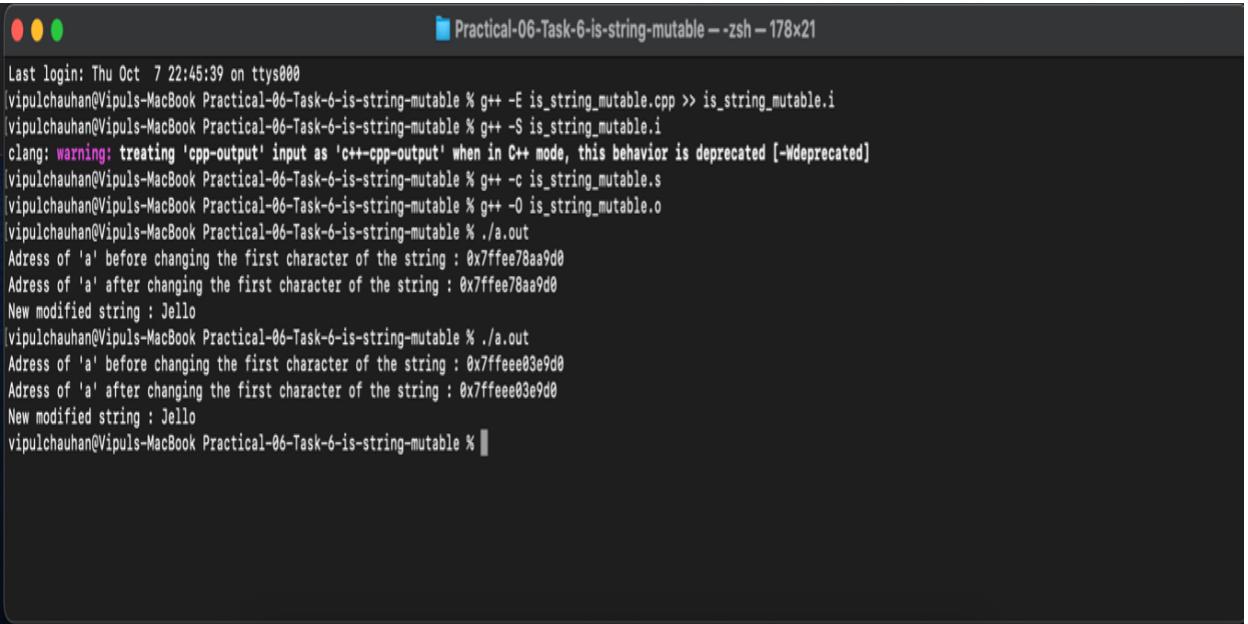
```
[vipulchauhan@Vipuls-MacBook Practical-06-Task-5-compare-string-using-compare-function % g++ -E String_compare_function.cpp >> String_compare_function.i
[vipulchauhan@Vipuls-MacBook Practical-06-Task-5-compare-string-using-compare-function % g++ -S String_compare_function.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-06-Task-5-compare-string-using-compare-function % g++ -c String_compare_function.s
[vipulchauhan@Vipuls-MacBook Practical-06-Task-5-compare-string-using-compare-function % g++ -O String_compare_function.o
[vipulchauhan@Vipuls-MacBook Practical-06-Task-5-compare-string-using-compare-function % ./a.out
Enter string in s1:hello
Enter string in s2:hello
s1 and s2 are equal and s1.compare(s2) will return 0
[vipulchauhan@Vipuls-MacBook Practical-06-Task-5-compare-string-using-compare-function % ./a.out
Enter string in s1:125
Enter string in s2:123
s1 is greater than s2 and s1.compare(s2) will return 2
[vipulchauhan@Vipuls-MacBook Practical-06-Task-5-compare-string-using-compare-function % ./a.out
Enter string in s1:hel
Enter string in s2:hello
s1 and s2 are not equal and s1.compare(s2) will return -1
[vipulchauhan@Vipuls-MacBook Practical-06-Task-5-compare-string-using-compare-function % ./a.out
Enter string in s1:abc
Enter string in s2:ghi
s1 is smaller than s2 and s1.compare(s2) will return -6
[vipulchauhan@Vipuls-MacBook Practical-06-Task-5-compare-string-using-compare-function % ./a.out
Enter string in s1:lmn
Enter string in s2:adf
s1 is greater than s2 and s1.compare(s2) will return 11
vipulchauhan@Vipuls-MacBook Practical-06-Task-5-compare-string-using-compare-function % ]
```

## Program 6

### Task6 Source Code:

```
#include<iostream>
#include<string>
using namespace std;
int main()
{
    string a = "Hello";
    cout <<"Adress of 'a' before changing the first character of the string : "<< &a<<endl;
    a[0] = 'J';
    cout <<"Adress of 'a' after changing the first character of the string : "<< &a<<endl;
    cout <<"New modified string : "<< a<<endl;
    return 0;
}
```

## Task6 Output



The screenshot shows a terminal window titled "Practical-06-Task-6-is-string-mutable --zsh - 178x21". The terminal displays the following command-line session:

```
Last login: Thu Oct 7 22:45:39 on ttys000
vipulchauhan@Vipuls-MacBook Practical-06-Task-6-is-string-mutable % g++ -E is_stringMutable.cpp >> is_stringMutable.i
vipulchauhan@Vipuls-MacBook Practical-06-Task-6-is-string-mutable % g++ -S is_stringMutable.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
vipulchauhan@Vipuls-MacBook Practical-06-Task-6-is-string-mutable % g++ -c is_stringMutable.s
vipulchauhan@Vipuls-MacBook Practical-06-Task-6-is-string-mutable % g++ -O is_stringMutable.o
vipulchauhan@Vipuls-MacBook Practical-06-Task-6-is-string-mutable % ./a.out
Address of 'a' before changing the first character of the string : 0x7ffee78aa9d0
Address of 'a' after changing the first character of the string : 0x7ffee78aa9d0
New modified string : Jello
vipulchauhan@Vipuls-MacBook Practical-06-Task-6-is-string-mutable % ./a.out
Address of 'a' before changing the first character of the string : 0x7ffeee03e9d0
Address of 'a' after changing the first character of the string : 0x7ffeee03e9d0
New modified string : Jello
vipulchauhan@Vipuls-MacBook Practical-06-Task-6-is-string-mutable %
```

## Program 7

Q. Write C++ code for below mentioned tasks?

### **Array and 2D Array related Questions in C++:**

**Task1:** Create a switch statement [Manual], In Which:

- a. When you pass 1 your program would print current year
- b. When you pass 2 your program would print current month
- c. When you pass 3 your program would print current day
- d. When you pass 4 your program would print Not applicable

**Task2:** Create a switch statement [Using ctime], In Which:

- a. When you pass 1 your program would print current year
- b. When you pass 2 your program would print current month
- c. When you pass 3 your program would print current day
- d. When you pass 4 your program would print Not applicable

### **Task3:**

v1. Print using reverse method:

1 2 3	9 8 7
4 5 6	==> 6 5 4
7 8 9	3 2 1

v2. Print using (10- arr[i][j]) method:

1 2 3	9 8 7
4 5 6	==> 6 5 4
7 8 9	3 2 1

v3. Restore using reverse method [without creating new array]:

1 2 3	9 8 7
4 5 6	==> 6 5 4
7 8 9	3 2 1

v4. Restore using (10- arr[i][j]) method [without creating new array]:

1 2 3	9 8 7
-------	-------

4 5 6 ==> 6 5 4  
 7 8 9        3 2 1

**Task4:** Restore the same values in the same array, arr[3][3]:

1 2 3        1 1 1  
 4 5 6 ==> 2 2 2  
 7 8 9        3 3 3

- v1. Use row loop [int i, for all j]
- v2. Use arr[i][N-1]/3, at each place
- v3. Use, arr[i][j]-(2\*i+j)

**Task5:** Store these in an array[4][4] in given fashion and then print:

\*  
 \* \*  
 \* \* \*  
 \* \* \* \*

**Task6:** Store these in an array[4][4] in given fashion and then print:

\* \* \* \*  
 \* \* \*  
 \* \*  
 \*

**Task7:** Store these in an array[4][4] in given fashion and then print:

\*

\* \*

\* \* \*

\* \* \* \*

**Task8:** Store these in an array[4][4] in given fashion and then print:

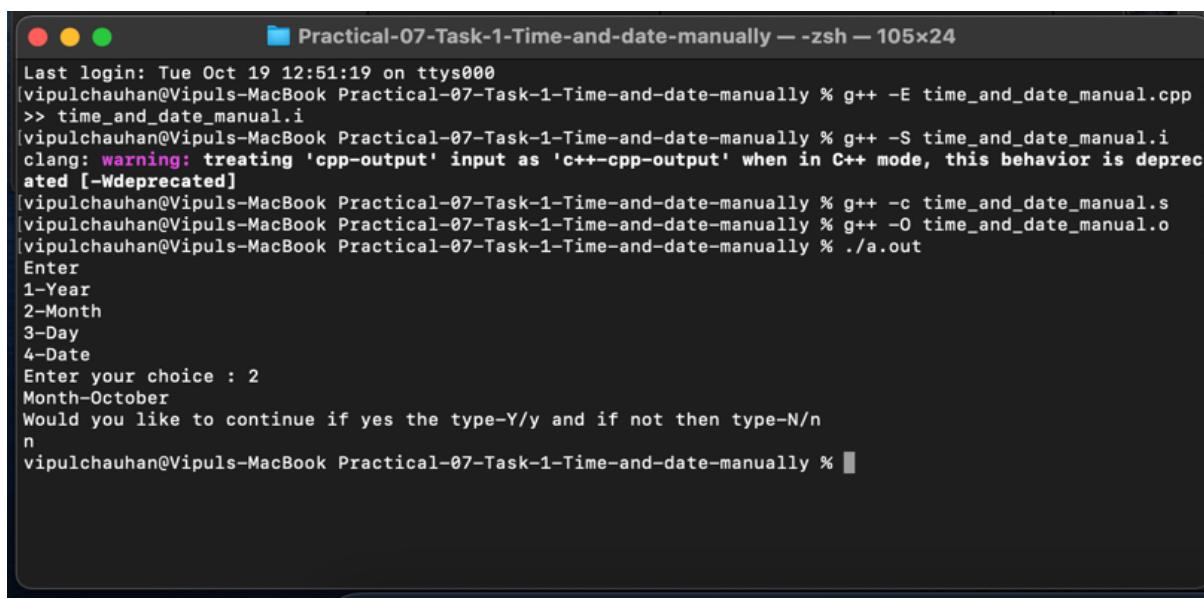
\* \* \* \*  
 \* \* \*  
 \* \*  
 \*

## Program 7

### **Task1 Source Code:**

```
#include<iostream>
using namespace std;
//Date when code was written-19 October 2021
//program to print year, month, day, date manually
int main()
{
    int choice;
    char c;
    do
    {
        cout<<"Enter"<<endl<<"1-Year"<<endl<<"2-Month"<<endl<<"3-
Day"<<endl<<"4-Date"<<endl<<"Enter your choice : ";
        cin>>choice;
        switch(choice)
        {
            case 1:
                cout<<"Year-2021"<<endl;
                break;
            case 2:
                cout<<"Month-October"<<endl;
                break;
            case 3:
                cout<<"Day-Tuesday"<<endl;
                break;
            case 4:
                cout<<"Date-19"<<endl;
                break;
            default:
                cout<<"You entered the wrong choice"<<endl;
        }
        cout<<"Would you like to continue if yes the type-Y/y and if not then type-
N/n"<<endl;
        cin>>c;
    }while(c=='y' || c=='Y');
    return 0;
}
```

## Task1 Output



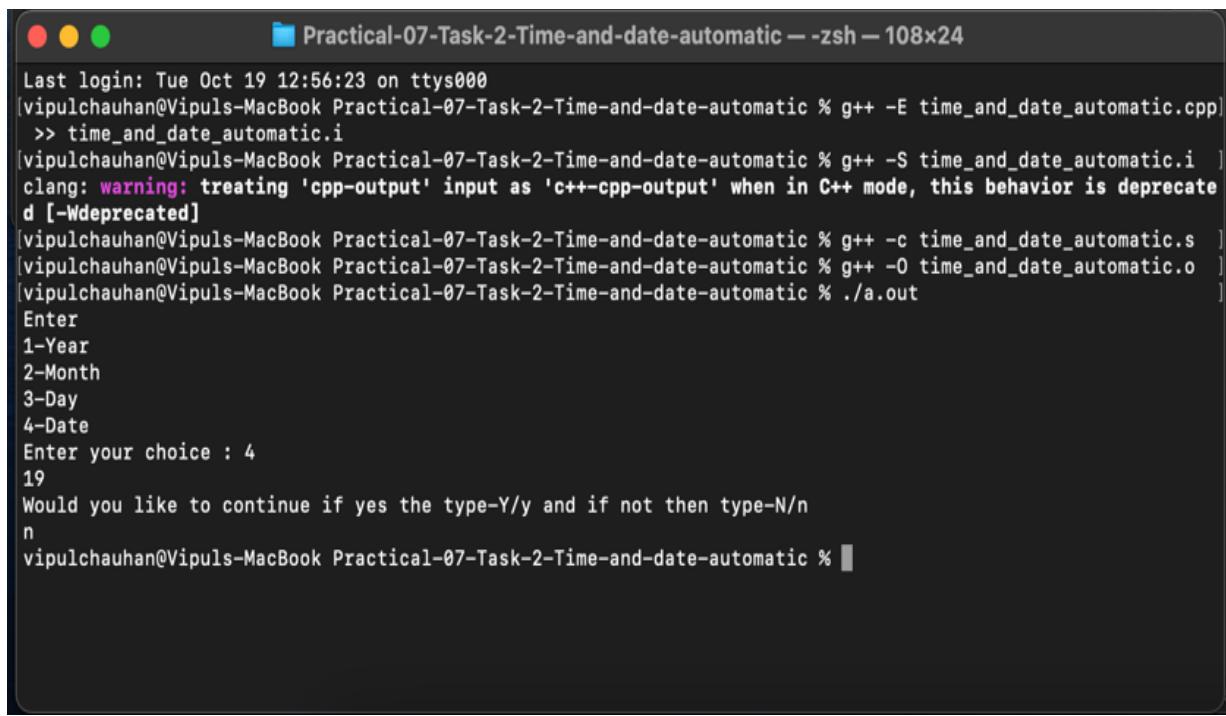
```
Last login: Tue Oct 19 12:51:19 on ttys000
[vipulchauhan@Vipuls-MacBook Practical-07-Task-1-Time-and-date-manually % g++ -E time_and_date_manual.cpp ]
>> time_and_date_manual.i
[vipulchauhan@Vipuls-MacBook Practical-07-Task-1-Time-and-date-manually % g++ -S time_and_date_manual.i ]
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-07-Task-1-Time-and-date-manually % g++ -c time_and_date_manual.s ]
[vipulchauhan@Vipuls-MacBook Practical-07-Task-1-Time-and-date-manually % g++ -O time_and_date_manual.o ]
[vipulchauhan@Vipuls-MacBook Practical-07-Task-1-Time-and-date-manually % ./a.out
Enter
1-Year
2-Month
3-Day
4-Date
Enter your choice : 2
Month-October
Would you like to continue if yes the type-Y/y and if not then type-N/n
n
vipulchauhan@Vipuls-MacBook Practical-07-Task-1-Time-and-date-manually % ]
```

## Program 7

### **Task2 Source Code:**

```
#include<iostream>
#include<string>
#include<ctime>
using namespace std;
int main()
{
    int choice;
    string ch,month,year,day,date;
    char c;
    time_t now=time(NULL);
    ch=ctime(&now);
    year=ch.substr(20,4);
    month=ch.substr(4,3);
    day=ch.substr(0,3);
    date=ch.substr(8,2);
    do
    {
        cout<<"Enter"<<endl<<"1-Year"<<endl<<"2-Month"<<endl<<"3-Day"<<endl<<"4-
Date"<<endl<<"Enter your choice : ";
        cin>>choice;
        switch(choice)
        {
            case 1:
                cout<<year<<endl;
                break;
            case 2:
                cout<<month<<endl;
                break;
            case 3:
                cout<<day<<endl;
                break;
            case 4:
                cout<<date<<endl;
                break;
            default:
                cout<<"You entered the wrong choice"<<endl;
        }
        cout<<"Would you like to continue if yes type-Y/y and if not then type-
N/n"<<endl;
        cin>>c;
    }while(c=='y' || c=='Y');
    return 0;
}
```

## Task2 Output



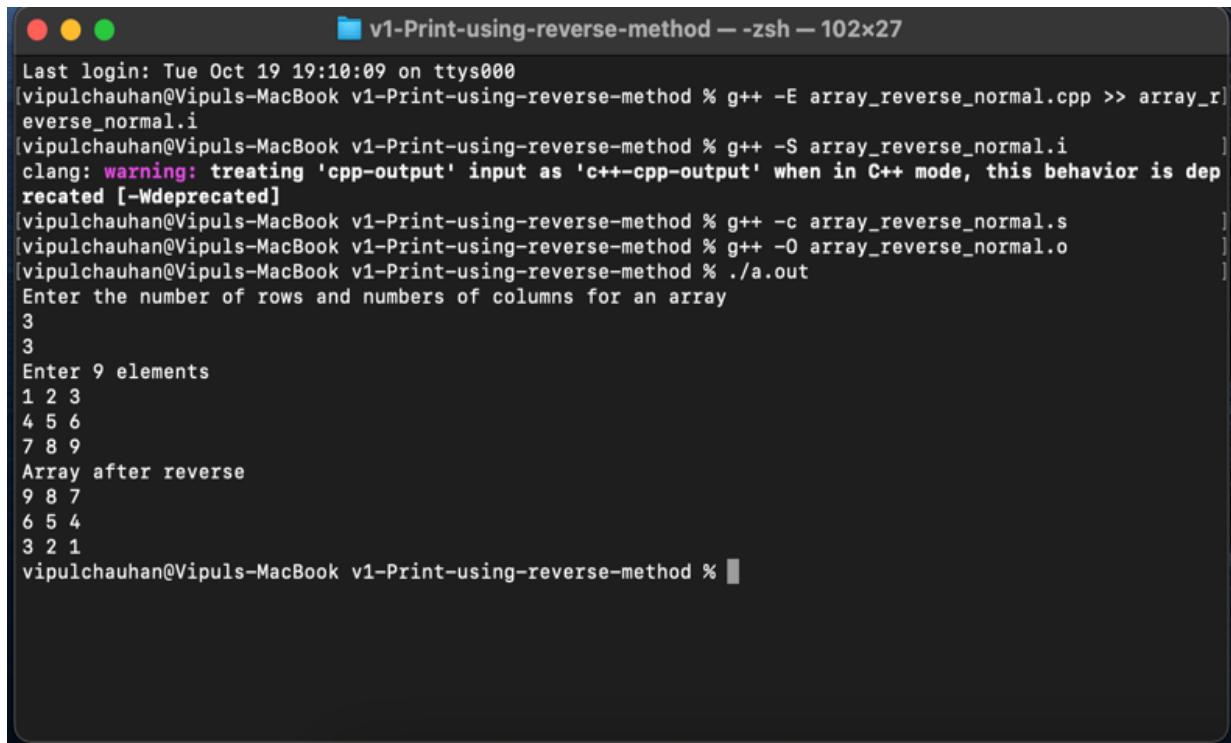
```
Last login: Tue Oct 19 12:56:23 on ttys000
[vipulchauhan@Vipuls-MacBook Practical-07-Task-2-Time-and-date-automatic % g++ -E time_and_date_automatic.cpp
>> time_and_date_automatic.i
[vipulchauhan@Vipuls-MacBook Practical-07-Task-2-Time-and-date-automatic % g++ -S time_and_date_automatic.i ]
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecate
d [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-07-Task-2-Time-and-date-automatic % g++ -c time_and_date_automatic.s ]
[vipulchauhan@Vipuls-MacBook Practical-07-Task-2-Time-and-date-automatic % g++ -O time_and_date_automatic.o ]
[vipulchauhan@Vipuls-MacBook Practical-07-Task-2-Time-and-date-automatic % ./a.out
]
Enter
1-Year
2-Month
3-Day
4-Date
Enter your choice : 4
19
Would you like to continue if yes the type-Y/y and if not then type-N/n
n
vipulchauhan@Vipuls-MacBook Practical-07-Task-2-Time-and-date-automatic % ]
```

## Program 7

### **Task3 V1: Source Code:**

```
#include<iostream>
using namespace std;
int main()
{
    int i,j,r,c,m;
    cout<<"Enter the number of rows and numbers of columns for an array"<<endl;
    cin>>r>>c;
    m=r*c;
    int arr[r][c];
    cout<<"Enter "<<m<<" elements"<<endl;
    for(i=0;i<r;i++)
    {
        for(j=0;j<c;j++)
        {
            cin>>arr[i][j];
        }
    }
    cout<<"Array after reverse"<<endl;
    for(i=r-1;i>=0;i--)
    {
        for(j=c-1;j>=0;j--)
        {
            cout<<arr[i][j]<<" ";
        }
        cout<<endl;
    }
    return 0;
}
```

## Task3 V1: Output



```
Last login: Tue Oct 19 19:10:09 on ttys000
[vipulchauhan@Vipuls-MacBook v1-Print-using-reverse-method % g++ -E array_reverse_normal.cpp >> array_r
everse_normal.i
[vipulchauhan@Vipuls-MacBook v1-Print-using-reverse-method % g++ -S array_reverse_normal.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is dep
recated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v1-Print-using-reverse-method % g++ -c array_reverse_normal.s
[vipulchauhan@Vipuls-MacBook v1-Print-using-reverse-method % g++ -O array_reverse_normal.o
[vipulchauhan@Vipuls-MacBook v1-Print-using-reverse-method % ./a.out
Enter the number of rows and numbers of columns for an array
3
3
Enter 9 elements
1 2 3
4 5 6
7 8 9
Array after reverse
9 8 7
6 5 4
3 2 1
vipulchauhan@Vipuls-MacBook v1-Print-using-reverse-method %
```

## Program 7

### **Task3 V2: Source Code:**

```

/*
for particular matrix
1      2      3
4      5      6
7      8      9
*/
#include<iostream>
using namespace std;
int main()
{
    int i,j;
    int arr[3][3]={ {1,2,3} ,
                    {4,5,6},
                    {7,8,9}};

    cout<<"Array before reverse"<<endl;
    for(i=0;i<3;i++)
    {
        for(j=0;j<3;j++)
        {
            cout<<arr[i][j]<<" ";
        }
        cout<<endl;
    }
    cout<<"Array after reverse"<<endl;
    for(i=0;i<3;i++)
    {
        for(j=0;j<3;j++)
        {
            cout<<10-arr[i][j]<<" ";
        }
        cout<<endl;
    }
    return 0;
}

```

## Task3 V2: Output

```
Last login: Tue Oct 19 19:13:21 on ttys000
[vipulchauhan@Vipuls-MacBook v2-Print-using-(10- arr[i][j])-method --zsh -- 109x24
array_reverse_minus_from_10.i
[vipulchauhan@Vipuls-MacBook v2-Print-using-(10- arr[i][j])-method % g++ -S array_reverse_minus_from_10.i      ]
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated
[-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v2-Print-using-(10- arr[i][j])-method % g++ -c array_reverse_minus_from_10.s      ]
[vipulchauhan@Vipuls-MacBook v2-Print-using-(10- arr[i][j])-method % g++ -O array_reverse_minus_from_10.o      ]
[vipulchauhan@Vipuls-MacBook v2-Print-using-(10- arr[i][j])-method % ./a.out
Array before reverse
1 2 3
4 5 6
7 8 9
Array after reverse
9 8 7
6 5 4
3 2 1
vipulchauhan@Vipuls-MacBook v2-Print-using-(10- arr[i][j])-method % ]
```

## Program 7

### **Task3 V3: Source Code:**

```
#include<iostream>
using namespace std;
int main()
{
    int i,j,r,c,m;
    cout<<"Enter the number of rows and numbers of columns for an array"<<endl;
    cin>>r>>c;
    m=r*c;
    int arr[r][c];
    cout<<"Enter "<<m<<" elements"<<endl;
    for(i=0;i<r;i++)
    {
        for(j=0;j<c;j++)
        {
            cin>>arr[i][j];
        }
    }
    cout<<"Array after reverse"<<endl;
    int res=r%2==0?r/2-1:r/2;
    for(int i=0;i<=res;i++)
    {
        for(int j=0;j<r;j++)
        {
            if(i==r-1-i && j==r-1-j)
                break;
            int temp=arr[i][j];
            arr[i][j]=arr[r-1-i][r-1-j];
            arr[r-1-i][r-1-j]=temp;
        }
    }
    for(int i=0;i<r;i++)
    {
        for(int j=0;j<c;j++)
            cout <<arr[i][j] << " ";
        cout << endl;
    }
    return 0;
}
```

## Task3 V3: Output

```
v3-Restore-using-reverse-method-[without creating new array] --zsh - 106x24
[vipulchauhan@Vipuls-MacBook v3-Restore-using-reverse-method-[without creating new array] % g++ -E array_re
verse_without_another_array.cpp >> array_reverse_without_another_array.i
[vipulchauhan@Vipuls-MacBook v3-Restore-using-reverse-method-[without creating new array] % g++ -S array_re
verse_without_another_array.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is depreca
ted [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v3-Restore-using-reverse-method-[without creating new array] % g++ -c array_re
verse_without_another_array.s
[vipulchauhan@Vipuls-MacBook v3-Restore-using-reverse-method-[without creating new array] % g++ -O array_re
verse_without_another_array.o
[vipulchauhan@Vipuls-MacBook v3-Restore-using-reverse-method-[without creating new array] % ./a.out
Enter the number of rows and numbers of columns for an array
3
3
Enter 9 elements
1 2 3
4 5 6
7 8 9
Array after reverse
9 8 7
6 5 4
3 2 1
vipulchauhan@Vipuls-MacBook v3-Restore-using-reverse-method-[without creating new array] % ]
```

## Program 7

### Task3 V4: Source Code:

```

/*
for particular matrix
1      2      3
4      5      6
7      8      9
*/
#include<iostream>
using namespace std;
int main()
{
    int i,j;
    int arr[3][3]={{1,2,3},{4,5,6},{7,8,9}};
    cout<<"Array before reverse"<<endl;
    for(i=0;i<3;i++)
    {
        for(j=0;j<3;j++)
        {
            cout<<arr[i][j]<<" ";
        }
        cout<<endl;
    }
    cout<<"Array after reverse"<<endl;
    for(i=0;i<3;i++)
    {
        for(j=0;j<3;j++)
        {
            arr[i][j]=10-arr[i][j];
            cout<<arr[i][j]<<" ";
        }
        cout<<endl;
    }
    return 0;
}

```

## Task3 V4: Output

```
● ○ ● v4-Restore-using-(10- arr[i][j])-method-[without creating new array] — zsh — 111x24
[vipulchauhan@Vipuls-MacBook v4-Restore-using-(10- arr[i][j])-method-[without creating new array]] % g++ -E array
_reverse_10_minus_store.cpp >> array_reverse_10_minus_store.i
[vipulchauhan@Vipuls-MacBook v4-Restore-using-(10- arr[i][j])-method-[without creating new array]] % g++ -S array
_reverse_10_minus_store.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v4-Restore-using-(10- arr[i][j])-method-[without creating new array]] % g++ -c array
_reverse_10_minus_store.s
[vipulchauhan@Vipuls-MacBook v4-Restore-using-(10- arr[i][j])-method-[without creating new array]] % g++ -O array
_reverse_10_minus_store.o
[vipulchauhan@Vipuls-MacBook v4-Restore-using-(10- arr[i][j])-method-[without creating new array]] % ./a.out
Array before reverse
1 2 3
4 5 6
7 8 9
Array after reverse
9 8 7
6 5 4
3 2 1
vipulchauhan@Vipuls-MacBook v4-Restore-using-(10- arr[i][j])-method-[without creating new array]] %
```

## Program 7

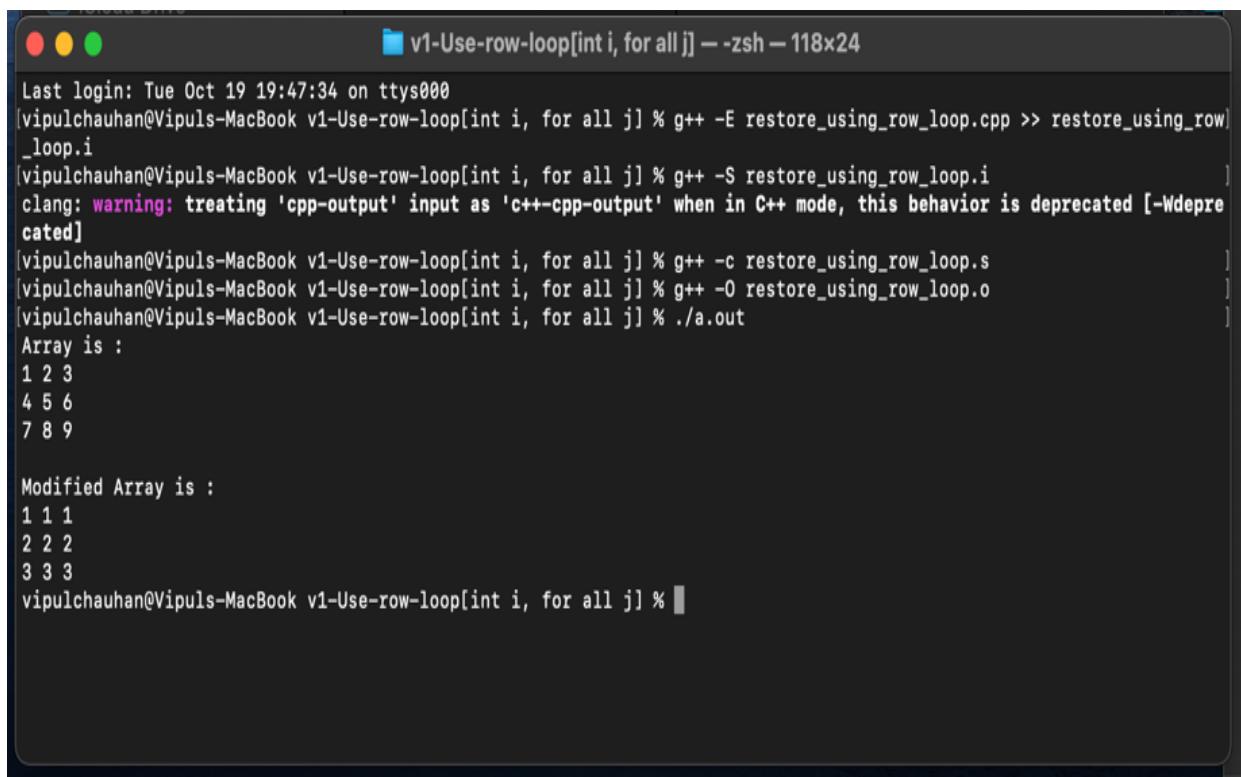
### **Task4 V1: Source Code:**

```

/*
for particular matrix
1      2      3
4      5      6
7      8      9
*/
#include <iostream>
using namespace std;
int main()
{
    int arr[3][3] = {{1, 2, 3}, {4, 5, 6}, {7, 8, 9}};
    cout << "Array is : " << endl;
    for(int i = 0; i < 3; i++)
    {
        for(int j = 0; j < 3; j++)
            cout << arr[i][j] << " ";
        cout << endl;
    }
    cout << endl;
    cout << "Modified Array is : " << endl;
    for(int i = 0; i < 3; i++)
    {
        for(int j = 0; j < 3; j++)
            cout << i+1 << " ";
        cout << endl;
    }
    return 0;
}

```

## Task4 V1: Output



```
Last login: Tue Oct 19 19:47:34 on ttys000
[vipulchauhan@Vipuls-MacBook v1-Use-row-loop[int i, for all j]] % g++ -E restore_using_row_loop.cpp >> restore_using_row_loop.i
[vipulchauhan@Vipuls-MacBook v1-Use-row-loop[int i, for all j]] % g++ -S restore_using_row_loop.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v1-Use-row-loop[int i, for all j]] % g++ -c restore_using_row_loop.s
[vipulchauhan@Vipuls-MacBook v1-Use-row-loop[int i, for all j]] % g++ -O restore_using_row_loop.o
[vipulchauhan@Vipuls-MacBook v1-Use-row-loop[int i, for all j]] % ./a.out
Array is :
1 2 3
4 5 6
7 8 9

Modified Array is :
1 1 1
2 2 2
3 3 3
vipulchauhan@Vipuls-MacBook v1-Use-row-loop[int i, for all j]] %
```

## Program 7

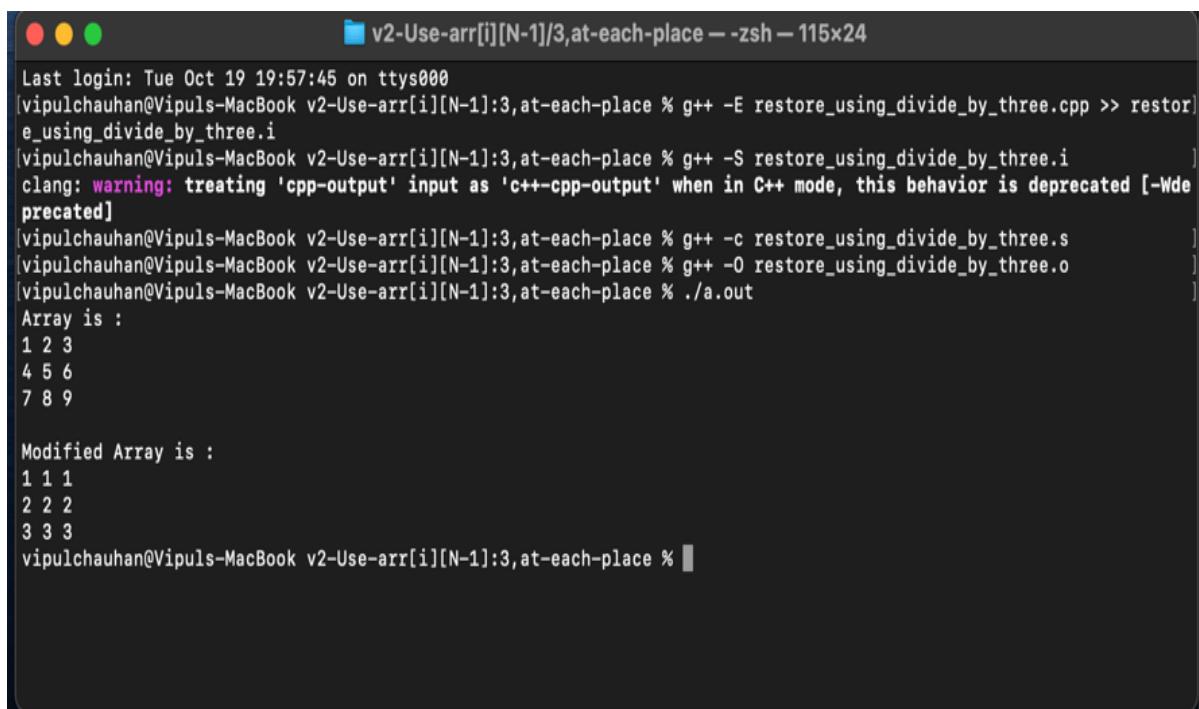
### **Task4 V2: Source Code:**

```

/*
for particular matrix
1      2      3
4      5      6
7      8      9
*/
#include <iostream>
using namespace std;
int main()
{
    int arr[3][3] = {{1, 2, 3}, {4, 5, 6}, {7, 8, 9}};
    cout << "Array is : " << endl;
    for(int i = 0; i < 3; i++)
    {
        for(int j = 0; j < 3; j++)
            cout << arr[i][j] << " ";
        cout << endl;
    }
    cout << endl;
    cout << "Modified Array is : " << endl;
    for(int i = 0; i < 3; i++)
    {
        for(int j = 0; j < 3; j++)
            cout << arr[i][2]/3 << " ";
        cout << endl;
    }
    return 0;
}

```

## Task4 V2: Output



A screenshot of a terminal window titled "v2-Use-arr[i][N-1]:3,at-each-place --zsh - 115x24". The terminal shows the following session:

```
Last login: Tue Oct 19 19:57:45 on ttys000
[vipulchauhan@Vipuls-MacBook v2-Use-arr[i][N-1]:3,at-each-place % g++ -E restore_using_divide_by_three.cpp >> restore_using_divide_by_three.i
[vipulchauhan@Vipuls-MacBook v2-Use-arr[i][N-1]:3,at-each-place % g++ -S restore_using_divide_by_three.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v2-Use-arr[i][N-1]:3,at-each-place % g++ -c restore_using_divide_by_three.s
[vipulchauhan@Vipuls-MacBook v2-Use-arr[i][N-1]:3,at-each-place % g++ -O restore_using_divide_by_three.o
[vipulchauhan@Vipuls-MacBook v2-Use-arr[i][N-1]:3,at-each-place % ./a.out
Array is :
1 2 3
4 5 6
7 8 9

Modified Array is :
1 1 1
2 2 2
3 3 3
vipulchauhan@Vipuls-MacBook v2-Use-arr[i][N-1]:3,at-each-place % ]
```

## Program 7

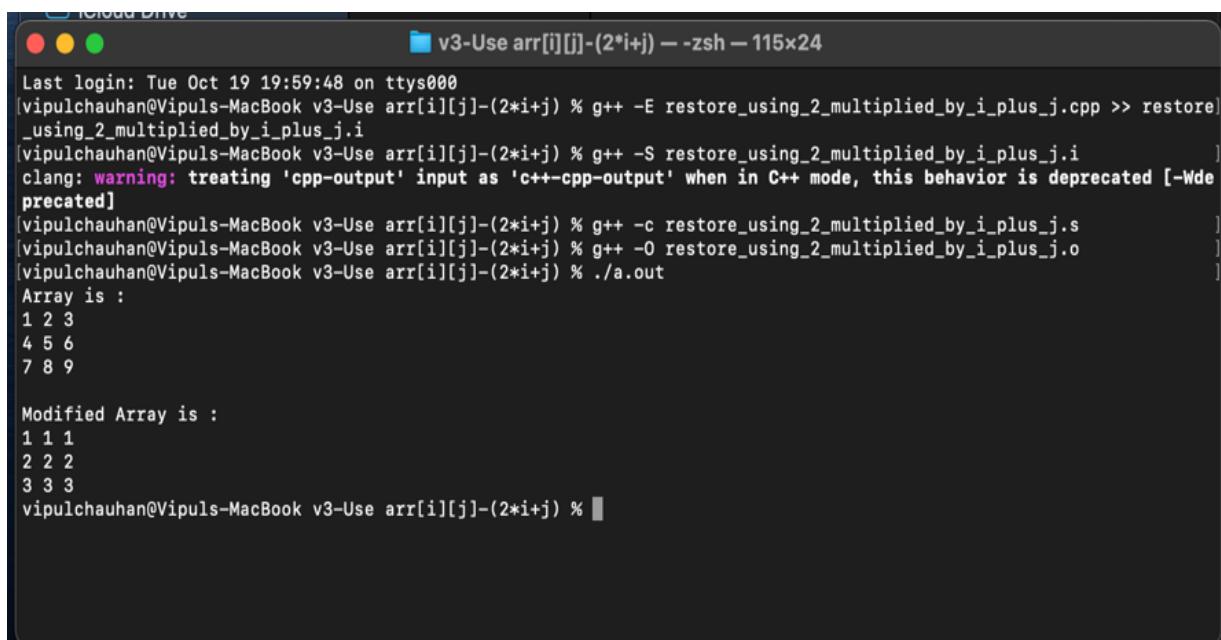
### **Task4 V3: Source Code:**

```

/*
for particular matrix
1      2      3
4      5      6
7      8      9
*/
#include <iostream>
using namespace std;
int main()
{
    int arr[3][3] = {{1, 2, 3}, {4, 5, 6}, {7, 8, 9}};
    cout << "Array is : " << endl;
    for(int i = 0; i < 3; i++)
    {
        for(int j = 0; j < 3; j++)
            cout << arr[i][j] << " ";
        cout << endl;
    }
    cout << endl;
    for(int i = 0; i < 3; i++)
    {
        for(int j = 0; j < 3; j++)
            arr[i][j] = arr[i][j] - (2*i+j);
    }
    cout << "Modified Array is : " << endl;
    for(int i = 0; i < 3; i++)
    {
        for(int j = 0; j < 3; j++)
            cout << arr[i][j] << " ";
        cout << endl;
    }
    return 0;
}

```

## Task4 V3: Output



```
Last login: Tue Oct 19 19:59:48 on ttys000
[vipulchauhan@Vipuls-MacBook v3-Use arr[i][j]-(2*i+j) % g++ -E restore_using_2_multiplied_by_i_plus_j.cpp >> restore_using_2_multiplied_by_i_plus_j.i
[vipulchauhan@Vipuls-MacBook v3-Use arr[i][j]-(2*i+j) % g++ -S restore_using_2_multiplied_by_i_plus_j.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v3-Use arr[i][j]-(2*i+j) % g++ -c restore_using_2_multiplied_by_i_plus_j.s
[vipulchauhan@Vipuls-MacBook v3-Use arr[i][j]-(2*i+j) % g++ -O restore_using_2_multiplied_by_i_plus_j.o
[vipulchauhan@Vipuls-MacBook v3-Use arr[i][j]-(2*i+j) % ./a.out
Array is :
1 2 3
4 5 6
7 8 9

Modified Array is :
1 1 1
2 2 2
3 3 3
vipulchauhan@Vipuls-MacBook v3-Use arr[i][j]-(2*i+j) %
```

## Program 7

### **Task5 Source Code:**

```

/*
    program to print the pattern of half pyramid
    *
    *      *
    *      *      *
    *      *      *      *

*/
#include<iostream>
using namespace std;
int main()
{
    int i,j;
    char arr[4][4]={' '};
    //loop to store the pattern in an array
    for(i=0;i<4;i++)
    {
        for(j=0;j<4;j++)
        {
            if(j<=i)
            {
                arr[i][j]='*';
            }
            else
            {
                arr[i][j]=' ';
            }
        }
    }
    //loop to print an array
    for(i=0;i<4;i++)
    {
        for(j=0;j<4;j++)
        {
            cout<<arr[i][j]<<' ';
        }
        cout<<endl;
    }
    return 0;
}

```

## Task5 Output

```
Last login: Mon Oct 18 13:10:48 on ttys000
[vipulchauhan@Vipuls-MacBook Practical-07-Task-5-pattern-half-pyramid % g++ -E pattern_half_pyramid.cpp >> pattern_half_pyramid.i ]
[vipulchauhan@Vipuls-MacBook Practical-07-Task-5-pattern-half-pyramid % g++ -S pattern_half_pyramid.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-07-Task-5-pattern-half-pyramid % g++ -c pattern_half_pyramid.s
[vipulchauhan@Vipuls-MacBook Practical-07-Task-5-pattern-half-pyramid % g++ -O pattern_half_pyramid.o
[vipulchauhan@Vipuls-MacBook Practical-07-Task-5-pattern-half-pyramid % ./a.out
*
*
*
*
*
vipulchauhan@Vipuls-MacBook Practical-07-Task-5-pattern-half-pyramid % ]
```

## Program 7

### **Task6 Source Code:**

```

/*
    program to print the pattern of inverted right half pyramid
        *
        *      *
        *      *
        *      *
        *

*/
#include<iostream>
using namespace std;
int main()
{
    int i,j;
    char arr[4][4]={' '};
    //loop to store the pattern in an array
    for(i=0;i<4;i++)
    {
        for(j=0;j<4;j++)
        {
            if(j>=i)
            {
                arr[i][j]='*';
            }
            else
            {
                arr[i][j]=' ';
            }
        }
    }
    //loop to print an array
    for(i=0;i<4;i++)
    {
        for(j=0;j<4;j++)
        {
            cout<<arr[i][j]<<' ';
        }
        cout<<endl;
    }
    return 0;
}

```

## Task6 Output

```
● ● ● Practical-07-Task-6-pattern-inverted-right-half-pyramid -- zsh - 127x24
[vipulchauhan@Vipuls-MacBook Practical-07-Task-6-pattern-inverted-right-half-pyramid % g++ -E pattern_inverted_right_half_pyrami]
d.cpp >> pattern_inverted_right_half_pyramid.i
[vipulchauhan@Vipuls-MacBook Practical-07-Task-6-pattern-inverted-right-half-pyramid % g++ -S pattern_inverted_right_half_pyrami]
d.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-07-Task-6-pattern-inverted-right-half-pyramid % g++ -c pattern_inverted_right_half_pyrami]
d.s
[vipulchauhan@Vipuls-MacBook Practical-07-Task-6-pattern-inverted-right-half-pyramid % g++ -O pattern_inverted_right_half_pyrami]
d.o
[vipulchauhan@Vipuls-MacBook Practical-07-Task-6-pattern-inverted-right-half-pyramid % ./a.out
* * *
* *
*
*
vipulchauhan@Vipuls-MacBook Practical-07-Task-6-pattern-inverted-right-half-pyramid % ]
```

## Program 7

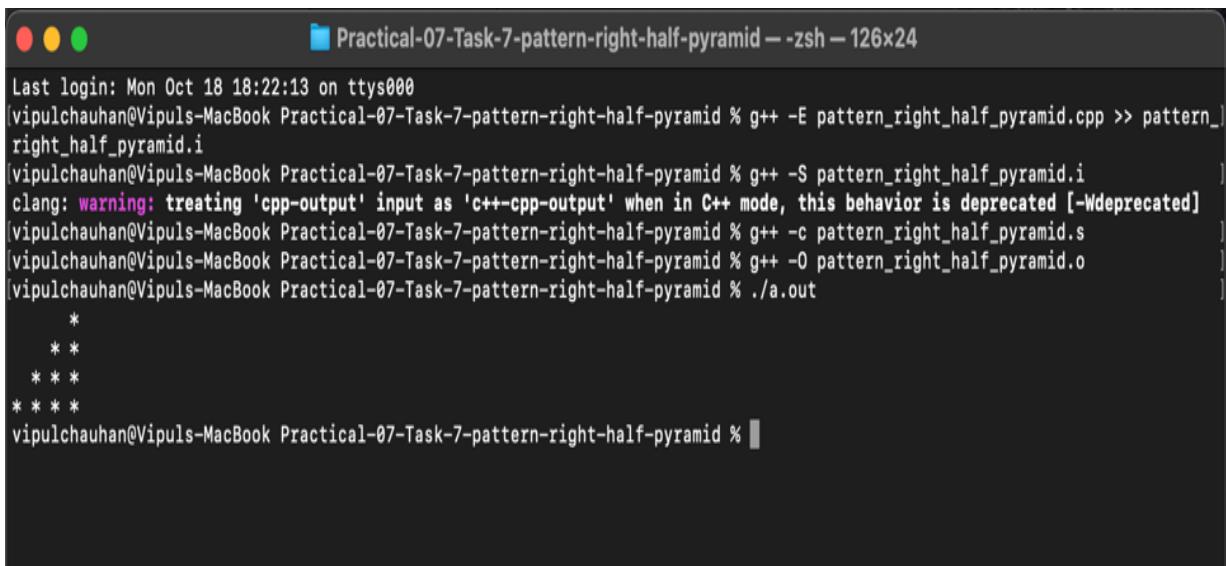
### Task7 Source Code:

```

/*
    program to print the pattern of inverted right half pyramid
        *
        *
        *
        *
        *
        *
        *
        *
        *
        *
#include<iostream>
using namespace std;
int main()
{
    int i,j;
    char arr[4][4];
    //loop to store the pattern in an array
    for(i=0;i<4;i++)
    {
        for(j=0;j<4;j++)
        {
            if(i+j>=3)
            {
                arr[i][j]='*';
            }
            else
            {
                arr[i][j]=' ';
            }
        }
    }
    //loop to print an array
    for(i=0;i<4;i++)
    {
        for(j=0;j<4;j++)
        {
            cout<<arr[i][j]<<' ';
        }
        cout<<endl;
    }
    return 0;
}

```

## Task7 Output



A screenshot of a terminal window titled "Practical-07-Task-7-pattern-right-half-pyramid --zsh -- 126x24". The terminal shows the following command-line session:

```
Last login: Mon Oct 18 18:22:13 on ttys000
[vipulchauhan@Vipuls-MacBook Practical-07-Task-7-pattern-right-half-pyramid % g++ -E pattern_right_half_pyramid.cpp >> pattern_right_half_pyramid.i
[vipulchauhan@Vipuls-MacBook Practical-07-Task-7-pattern-right-half-pyramid % g++ -S pattern_right_half_pyramid.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-07-Task-7-pattern-right-half-pyramid % g++ -c pattern_right_half_pyramid.s
[vipulchauhan@Vipuls-MacBook Practical-07-Task-7-pattern-right-half-pyramid % g++ -O pattern_right_half_pyramid.o
[vipulchauhan@Vipuls-MacBook Practical-07-Task-7-pattern-right-half-pyramid % ./a.out
*
*
*
*
vipulchauhan@Vipuls-MacBook Practical-07-Task-7-pattern-right-half-pyramid % ]
```

## Program 7

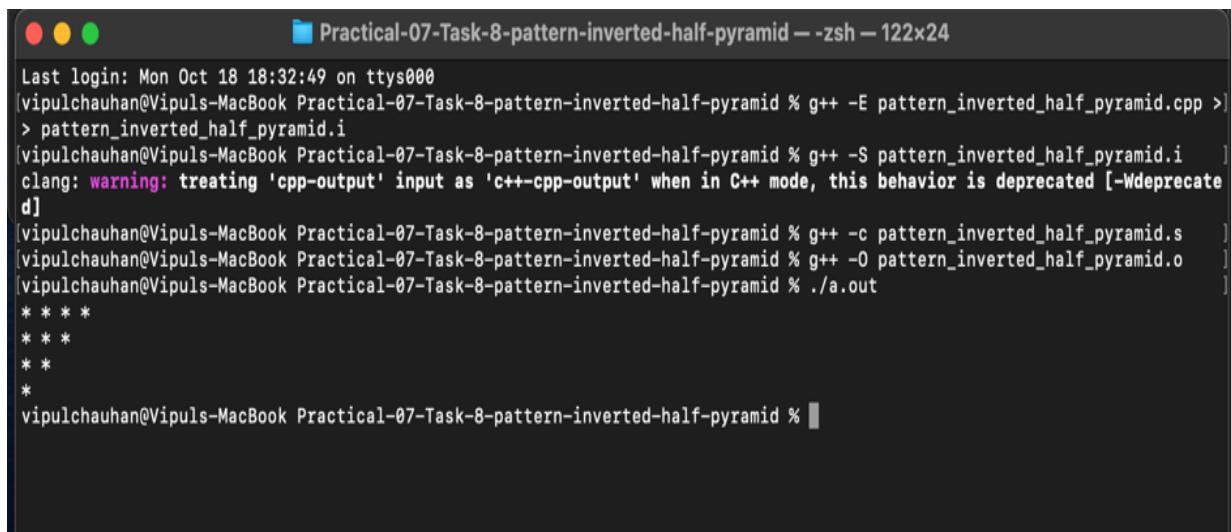
### **Task8 Source Code:**

```

/*
program to print the pattern of inverted right half pyramid
*      *      *      *
*      *      *
*      *
*
*/
#include<iostream>
using namespace std;
int main()
{
    int i,j;
    char arr[4][4];
    //loop to store the pattern in an array
    for(i=0;i<4;i++)
    {
        for(j=0;j<4;j++)
        {
            if(i+j<=3)
            {
                arr[i][j]='*';
            }
            else
            {
                arr[i][j]=' ';
            }
        }
    }
    //loop to print an array
    for(i=0;i<4;i++)
    {
        for(j=0;j<4;j++)
        {
            cout<<arr[i][j]<<' ';
        }
        cout<<endl;
    }
    return 0;
}

```

## Task8 Output



A screenshot of a terminal window titled "Practical-07-Task-8-pattern-inverted-half-pyramid -- zsh -- 122x24". The terminal shows the following command-line session:

```
Last login: Mon Oct 18 18:32:49 on ttys000
[vipulchauhan@Vipuls-MacBook Practical-07-Task-8-pattern-inverted-half-pyramid % g++ -E pattern_inverted_half_pyramid.cpp >]
> pattern_inverted_half_pyramid.i
[vipulchauhan@Vipuls-MacBook Practical-07-Task-8-pattern-inverted-half-pyramid % g++ -S pattern_inverted_half_pyramid.i      ]
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated-d]
[vipulchauhan@Vipuls-MacBook Practical-07-Task-8-pattern-inverted-half-pyramid % g++ -c pattern_inverted_half_pyramid.s      ]
[vipulchauhan@Vipuls-MacBook Practical-07-Task-8-pattern-inverted-half-pyramid % g++ -O pattern_inverted_half_pyramid.o      ]
[vipulchauhan@Vipuls-MacBook Practical-07-Task-8-pattern-inverted-half-pyramid % ./a.out
* * *
* *
*
vipulchauhan@Vipuls-MacBook Practical-07-Task-8-pattern-inverted-half-pyramid % ]
```

## Program 8

**Q.** Write C++ code for below mentioned tasks?

**Pointer, Function, Inline Function, Recursion in C++:**

**Task1:** Will the program through an error and if yes then why?

```
int *p = { 10,20,20 };
cout << *p;
p++;
cout << *p;
```

**Task2:** Output of this program?

**V1.** Issue?

```
int arr[] = { 10,20,30 };
cout << *arr;
cout << arr;
arr++;
cout << *arr;
```

**V2.** How to resolve above issue?

```
int arr[] = { 10,20,30 };
cout << *arr;
cout << arr;
cout << *(?);
```

**Task3:** Output of this program?

**V1.** Output?

```
int a = 10;
int *p;
int **q;
p = &a;
q = &p;
cou << *p;
cou << **q;
```

**V2.** Change the value of a using q pointer to pointer.

**Task4:** Find factorial of a number using function but not recursion

**Task5:** Find factorial of a number using recursion

**Task6:** Series Problem using recursion for n series

$2, (2^2 + 2), (3^3 + 3), (4^4 + 4), (5^5 + 5), \dots$

Hint:

$n * ((n-1)^(n-1) + (n-1))$

**Task7:** Perform Call by value, call by Address for swapping value of a and b:

int a = 10;

int b = 20;

**V1.** Swap(a,b); //call by Value [void swap(int a, int b){ }]

**V2.** Swap(a,b); //call by Value [void swap(int &a, int &b){ }]

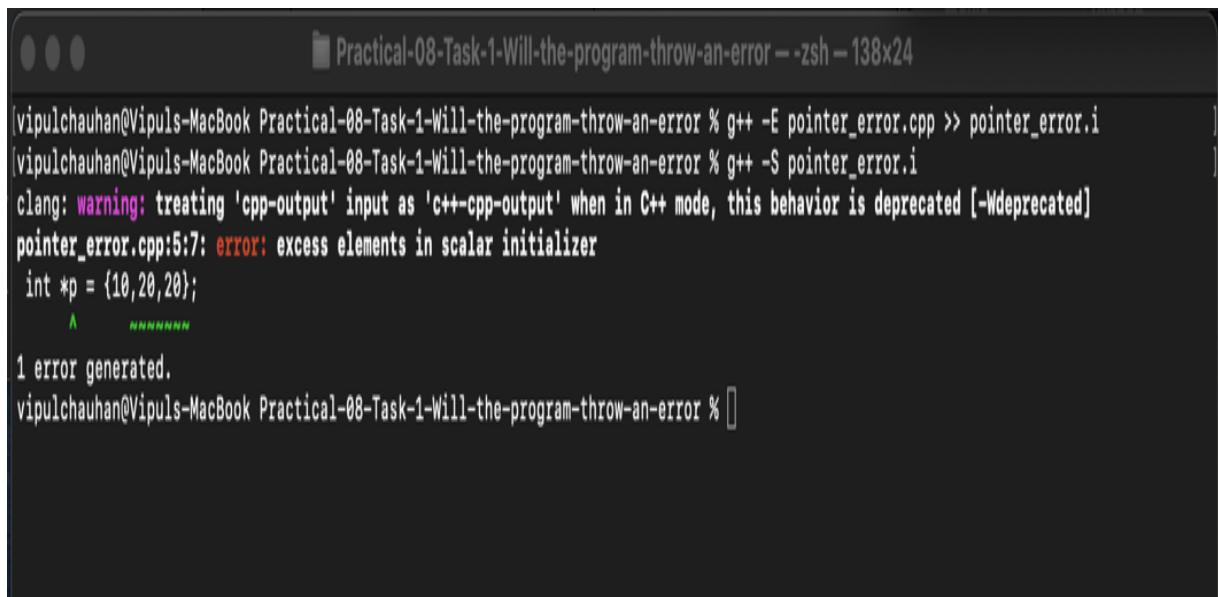
**V3.** Swap(&a,&b); //call by Address

## Program 8

### Task1 Source Code:

```
#include<iostream>
using namespace std;
int main()
{
    int *p = {10,20,20};
    cout << *p;
    p++;
    cout << *p;
    return 0;
}
```

## Task1 Output



A screenshot of a terminal window titled "Practical-08-Task-1-Will-the-program-throw-an-error - zsh - 138x24". The terminal shows the following command and its output:

```
[vipulchauhan@Vipuls-MacBook Practical-08-Task-1-Will-the-program-throw-an-error % g++ -E pointer_error.cpp >> pointer_error.i]
[vipulchauhan@Vipuls-MacBook Practical-08-Task-1-Will-the-program-throw-an-error % g++ -S pointer_error.i]
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
pointer_error.cpp:5:7: error: excess elements in scalar initializer
int *p = {10,20,20};
          ^   ~~~~~
1 error generated.
vipulchauhan@Vipuls-MacBook Practical-08-Task-1-Will-the-program-throw-an-error % ]
```

## Program 8

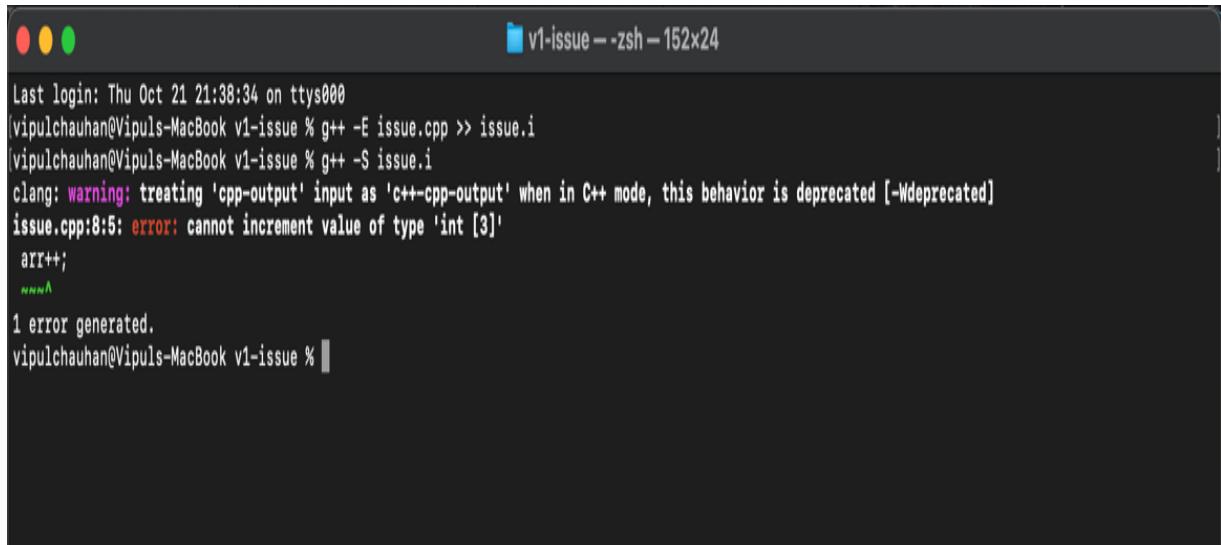
### **Task2 V1: Source Code:**

```
#include<iostream>
using namespace std;
int main()
{
    int arr[] = {10,20,30};
    cout << *arr;
    cout << arr;
    arr++;
    cout << *arr;
    return 0;
}
```

### **Task2 V2: Source Code:**

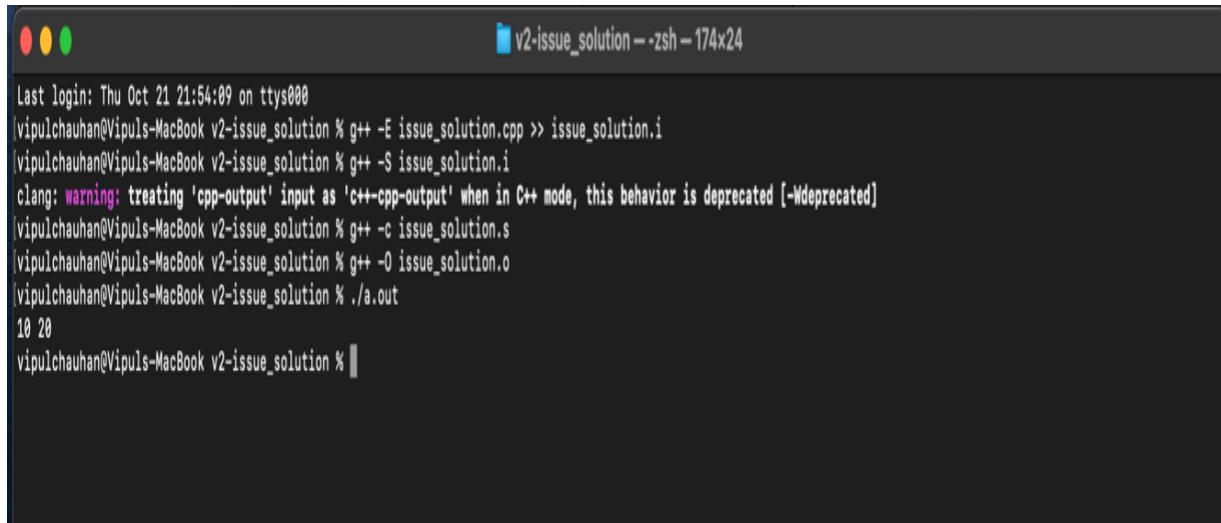
```
#include<iostream>
using namespace std;
int main()
{
    int arr[]={10,20,30};
    int *p;
    p=&arr[0];
    cout<<*p<<" ";
    p++;
    cout<<*p<<endl;
}
```

## Task2 V1: Output



A terminal window titled "v1-issue - zsh - 152x24". The session starts with the system login information: "Last login: Thu Oct 21 21:38:34 on ttys000". The user then runs the command "g++ -E issue.cpp >> issue.i". This command generates assembly code from the C++ source. A warning message appears: "clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]". An error message follows: "issue.cpp:8:5: error: cannot increment value of type 'int [3]'". The user then increments a variable "arr++;" and receives another error message: "1 error generated.". Finally, the user types "vipulchauhan@Vipuls-MacBook v1-issue %" to end the session.

## Task2 V2: Output



A terminal window titled "v2-issue\_solution - zsh - 174x24". The session starts with the system login information: "Last login: Thu Oct 21 21:54:09 on ttys000". The user runs the command "g++ -E issue\_solution.cpp >> issue\_solution.i", which generates assembly code. A warning message appears: "clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]". The user then runs "g++ -S issue\_solution.i" to generate assembly code. Next, "g++ -c issue\_solution.s" is run to generate object code. Finally, "g++ -O issue\_solution.o" is run to optimize the object code. The user then executes the program with "./a.out", resulting in the output "10 20". The user ends the session with "vipulchauhan@Vipuls-MacBook v2-issue\_solution %".

## Program 8

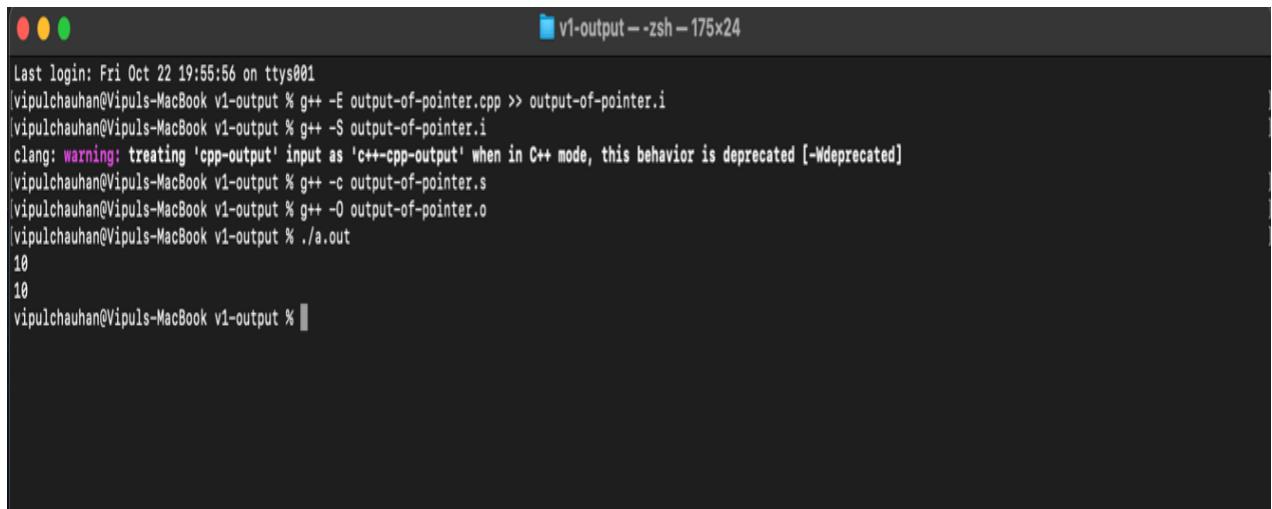
### **Task3 V1: Source Code:**

```
#include<iostream>
using namespace std;
int main()
{
    int a = 10;
    int *p;
    int **q;
    p = &a;
    q = &p;
    cout << *p << endl;
    cout << **q << endl;
    return 0;
}
```

### **Task3 V2: Source Code:**

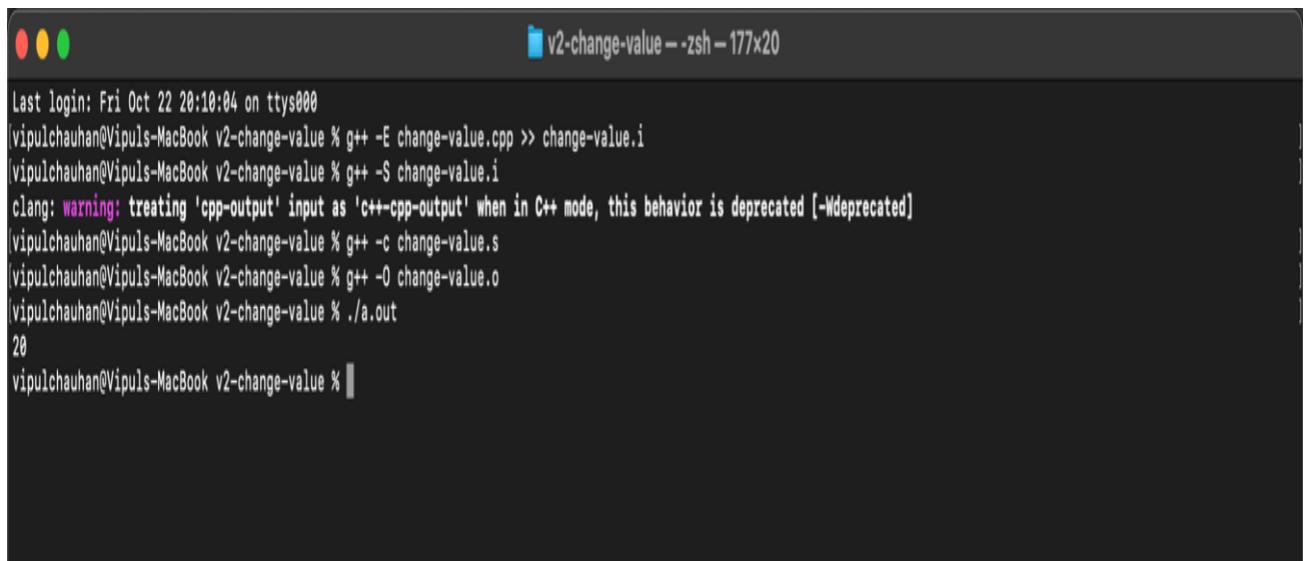
```
#include<iostream>
using namespace std;
int main()
{
    int a = 10;
    int *p;
    int **q;
    p = &a;
    q = &p;
    //changing value of a using pointer to pointer
    **q=20;
    cout << a << endl;
    return 0;
}
```

## Task3 V1: Output



```
Last login: Fri Oct 22 19:55:56 on ttys001
[vipulchauhan@Vipuls-MacBook v1-output % g++ -E output-of-pointer.cpp >> output-of-pointer.i
[vipulchauhan@Vipuls-MacBook v1-output % g++ -S output-of-pointer.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v1-output % g++ -c output-of-pointer.s
[vipulchauhan@Vipuls-MacBook v1-output % g++ -O output-of-pointer.o
[vipulchauhan@Vipuls-MacBook v1-output % ./a.out
10
10
vipulchauhan@Vipuls-MacBook v1-output % ]
```

## Task3 V2: Output



```
Last login: Fri Oct 22 20:10:04 on ttys000
[vipulchauhan@Vipuls-MacBook v2-change-value % g++ -E change-value.cpp >> change-value.i
[vipulchauhan@Vipuls-MacBook v2-change-value % g++ -S change-value.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v2-change-value % g++ -c change-value.s
[vipulchauhan@Vipuls-MacBook v2-change-value % g++ -O change-value.o
[vipulchauhan@Vipuls-MacBook v2-change-value % ./a.out
20
20
vipulchauhan@Vipuls-MacBook v2-change-value % ]
```

**Program 8****Task4 Source Code:**

```
#include<iostream>
using namespace std;
long long int factorial(int n)
{
    long long int fact=1;
    for(int i=2;i<=n;i++)
    {
        fact*=i;
    }
    return fact;
}
int main()
{
    int n;
    cout<<"Enter the number of which you want to find the factorial:";
    cin>>n;
    cout<<"Factorial of "<<n<<" = "<<factorial(n)<<endl;
    return 0;
}
```

## Task4 Output

```
Practical-08-Task-4-Factorial-using-function -- zsh -- 117x24

Last login: Fri Oct 22 20:15:17 on ttys000
[vipulchauhan@Vipuls-MacBook Practical-08-Task-4-Factorial-using-function % g++ -E factorial-function.cpp >> factorial]
-function.i
[vipulchauhan@Vipuls-MacBook Practical-08-Task-4-Factorial-using-function % g++ -S factorial-function.i ]]
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-08-Task-4-Factorial-using-function % g++ -c factorial-function.s ]]
[vipulchauhan@Vipuls-MacBook Practical-08-Task-4-Factorial-using-function % g++ -O factorial-function.o ]]
[vipulchauhan@Vipuls-MacBook Practical-08-Task-4-Factorial-using-function % ./a.out ]]
Enter the number of which you want to find the factorial:5
Factorial of 5 = 120
[vipulchauhan@Vipuls-MacBook Practical-08-Task-4-Factorial-using-function % ./a.out ]]
Enter the number of which you want to find the factorial:6
Factorial of 6 = 720
[vipulchauhan@Vipuls-MacBook Practical-08-Task-4-Factorial-using-function % ./a.out ]]
Enter the number of which you want to find the factorial:4
Factorial of 4 = 24
[vipulchauhan@Vipuls-MacBook Practical-08-Task-4-Factorial-using-function % ./a.out ]]
Enter the number of which you want to find the factorial:1
Factorial of 1 = 1
[vipulchauhan@Vipuls-MacBook Practical-08-Task-4-Factorial-using-function % ./a.out ]]
Enter the number of which you want to find the factorial:2
Factorial of 2 = 2
[vipulchauhan@Vipuls-MacBook Practical-08-Task-4-Factorial-using-function % ]]
```

**Program 8****Task5 Source Code:**

```
#include<iostream>
using namespace std;
long long int factorial(int n)
{
    if(n==1)
    {
        return 1;
    }
    else
    {
        return n*factorial(n-1);
    }
}
int main()
{
    int n;
    cout<<"Enter the number of which you want to find the factorial:";
    cin>>n;
    cout<<"Factorial of "<<n<<" = "<<factorial(n)<<endl;
    return 0;
}
```

## Task5 Output

```
Practical-08-Task-5-Factorial-using-recursion -- zsh - 120x24

Last login: Fri Oct 22 20:39:40 on ttys000
[vipulchauhan@Vipuls-MacBook Practical-08-Task-5-Factorial-using-recursion % g++ -E factorial-recursion.cpp >> factorial-
recursion.i
[vipulchauhan@Vipuls-MacBook Practical-08-Task-5-Factorial-using-recursion % g++ -S factorial-recursion.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdepreca-
ted]
[vipulchauhan@Vipuls-MacBook Practical-08-Task-5-Factorial-using-recursion % g++ -c factorial-recursion.s
[vipulchauhan@Vipuls-MacBook Practical-08-Task-5-Factorial-using-recursion % g++ -O factorial-recursion.o
[vipulchauhan@Vipuls-MacBook Practical-08-Task-5-Factorial-using-recursion % ./a.out
Enter the number of which you want to find the factorial:5
Factorial of 5 = 120
[vipulchauhan@Vipuls-MacBook Practical-08-Task-5-Factorial-using-recursion % ./a.out
Enter the number of which you want to find the factorial:6
Factorial of 6 = 720
[vipulchauhan@Vipuls-MacBook Practical-08-Task-5-Factorial-using-recursion % ./a.out
Enter the number of which you want to find the factorial:4
Factorial of 4 = 24
[vipulchauhan@Vipuls-MacBook Practical-08-Task-5-Factorial-using-recursion % ./a.out
Enter the number of which you want to find the factorial:1
Factorial of 1 = 1
[vipulchauhan@Vipuls-MacBook Practical-08-Task-5-Factorial-using-recursion % ./a.out
Enter the number of which you want to find the factorial:2
Factorial of 2 = 2
vipulchauhan@Vipuls-MacBook Practical-08-Task-5-Factorial-using-recursion % ]
```

## Program 8

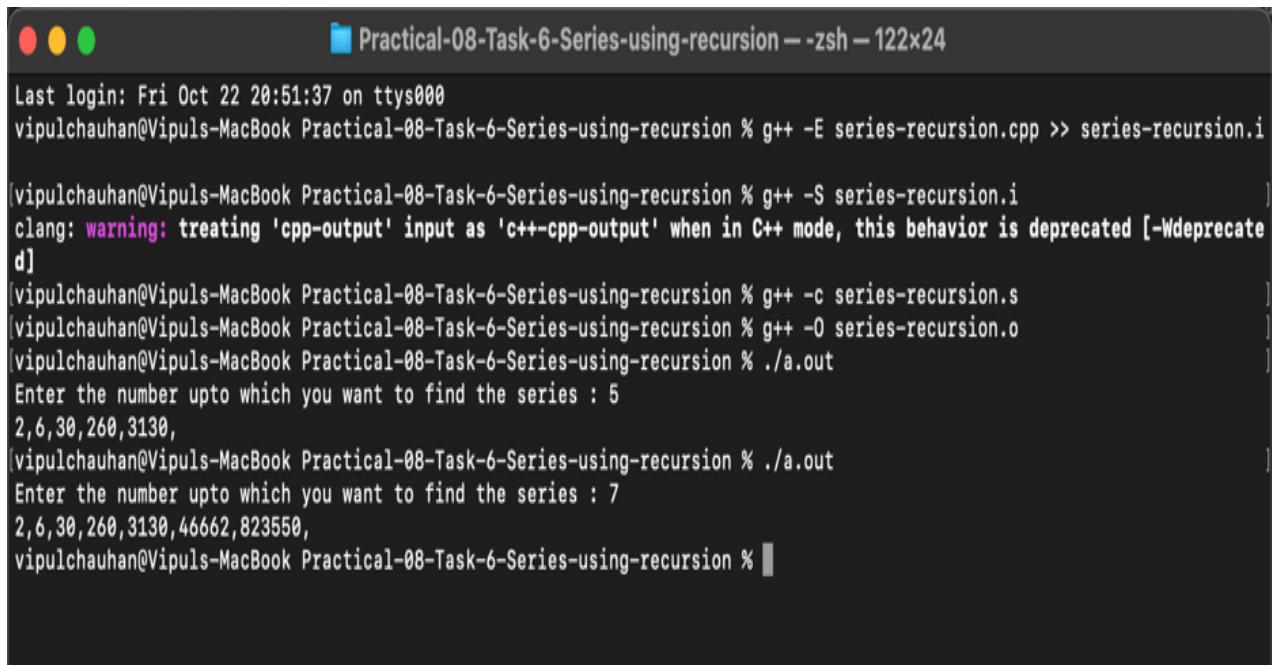
### **Task6 Source Code:**

```

/*
series is
2, (2^2 + 2), (3^3 + 3), (4^4 + 4), (5^5 + 5), .....
*/
#include<iostream>
#include<cmath>
using namespace std;
int series(int n)
{
    if(n==2)
    {
        cout<<n<<" ";
        return pow(n,n)+n;
    }
    else
    {
        cout<<series(n-1)<<" ";
    }
    return pow(n,n)+n;
}
int main()
{
    int n;
    cout<<"Enter the number upto which you want to find the series : ";
    cin>>n;
    series(n+1);
    cout<<endl;
    return 0;
}

```

## Task6 Output



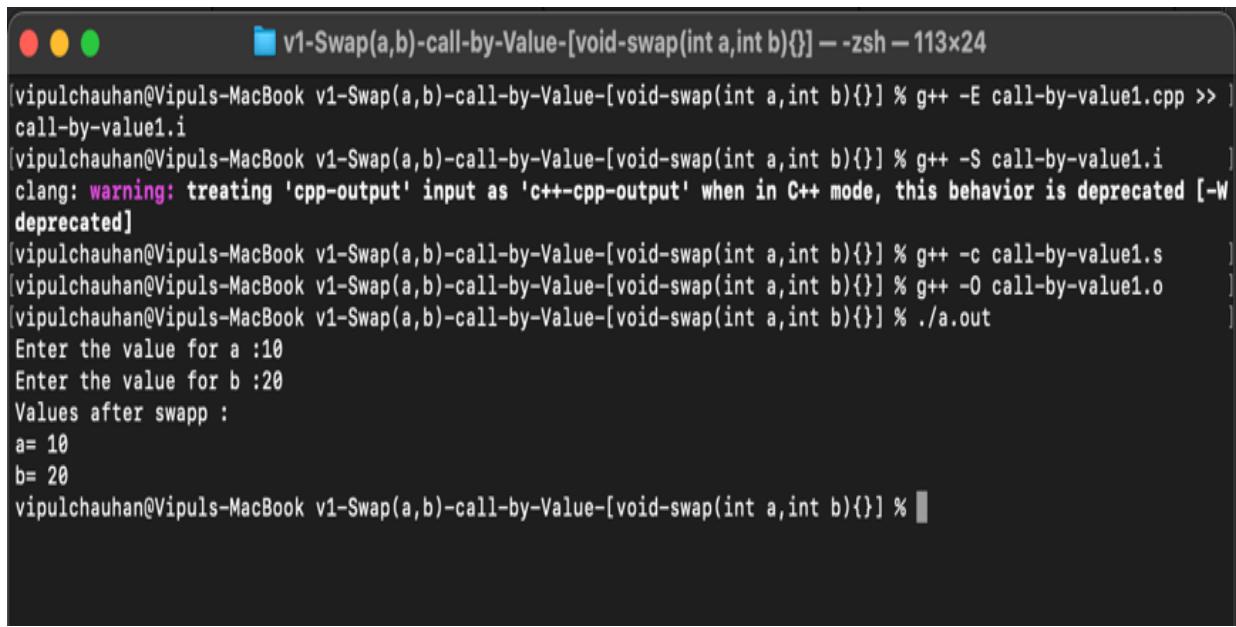
```
Last login: Fri Oct 22 20:51:37 on ttys000
vipulchauhan@Vipuls-MacBook Practical-08-Task-6-Series-using-recursion % g++ -E series-recursion.cpp >> series-recursion.i
[vipulchauhan@Vipuls-MacBook Practical-08-Task-6-Series-using-recursion % g++ -S series-recursion.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated-d]
[vipulchauhan@Vipuls-MacBook Practical-08-Task-6-Series-using-recursion % g++ -c series-recursion.s
[vipulchauhan@Vipuls-MacBook Practical-08-Task-6-Series-using-recursion % g++ -O series-recursion.o
[vipulchauhan@Vipuls-MacBook Practical-08-Task-6-Series-using-recursion % ./a.out
Enter the number upto which you want to find the series : 5
2,6,30,260,3130,
[vipulchauhan@Vipuls-MacBook Practical-08-Task-6-Series-using-recursion % ./a.out
Enter the number upto which you want to find the series : 7
2,6,30,260,3130,46662,823550,
vipulchauhan@Vipuls-MacBook Practical-08-Task-6-Series-using-recursion % ]
```

## Program 8

### **Task7 V1: Source Code:**

```
#include<iostream>
using namespace std;
void swapp(int a,int b)
{
    a=a+b;
    b=a-b;
    a=a-b;
}
int main()
{
    int a,b;
    cout<<"Enter the value for a :";
    cin>>a;
    cout<<"Enter the value for b :";
    cin>>b;
    cout<<"Values after swapp :"<<endl;
    /*here the swapping of two variable will not be reflected back in the main function
therefor the result after the swapp will be same*/
    swapp(a,b);
    cout<<"a= "<<a<<endl;
    cout<<"b= "<<b<<endl;
    return 0;
}
```

## Task7 V1: Output



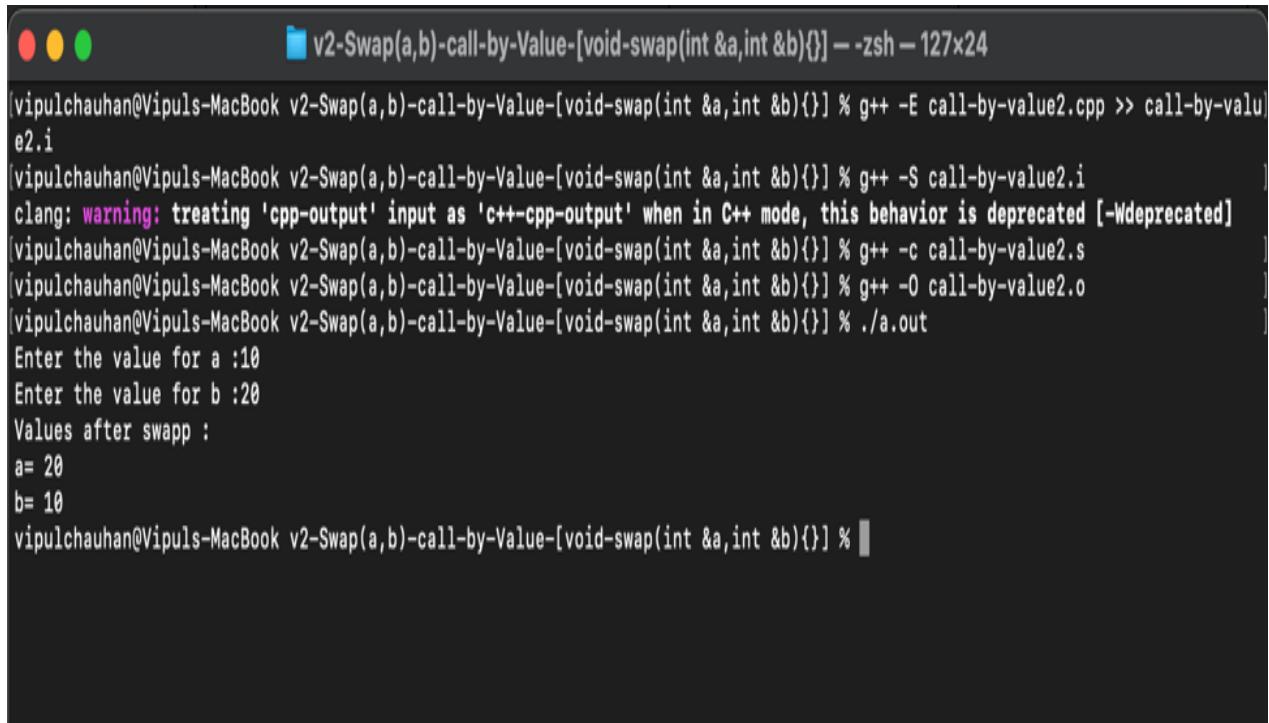
```
v1-Swap(a,b)-call-by-Value-[void-swap(int a,int b){}] --zsh - 113x24
[vipulchauhan@Vipuls-MacBook v1-Swap(a,b)-call-by-Value-[void-swap(int a,int b){}]] % g++ -E call-by-value1.cpp >> call-by-value1.i
[vipulchauhan@Vipuls-MacBook v1-Swap(a,b)-call-by-Value-[void-swap(int a,int b){}]] % g++ -S call-by-value1.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v1-Swap(a,b)-call-by-Value-[void-swap(int a,int b){}]] % g++ -c call-by-value1.s
[vipulchauhan@Vipuls-MacBook v1-Swap(a,b)-call-by-Value-[void-swap(int a,int b){}]] % g++ -O call-by-value1.o
[vipulchauhan@Vipuls-MacBook v1-Swap(a,b)-call-by-Value-[void-swap(int a,int b){}]] % ./a.out
Enter the value for a :10
Enter the value for b :20
Values after swapp :
a= 10
b= 20
vipulchauhan@Vipuls-MacBook v1-Swap(a,b)-call-by-Value-[void-swap(int a,int b){}] %
```

## Program 8

### Task7 V2: Source Code:

```
#include<iostream>
using namespace std;
void swapp(int &a,int &b)
{
    a=a+b;
    b=a-b;
    a=a-b;
}
int main()
{
    int a,b;
    cout<<"Enter the value for a :";
    cin>>a;
    cout<<"Enter the value for b :";
    cin>>b;
    cout<<"Values after swapp :"<<endl;
    swapp(a,b);
    cout<<"a= "<<a<<endl;
    cout<<"b= "<<b<<endl;
    return 0;
}
```

## Task7 V2: Output



A screenshot of a terminal window titled "v2-Swap(a,b)-call-by-Value-[void-swap(int &a,int &b){}] --zsh - 127x24". The terminal shows the following command sequence:

```
[vipulchauhan@Vipuls-MacBook v2-Swap(a,b)-call-by-Value-[void-swap(int &a,int &b){}]] % g++ -E call-by-value2.cpp >> call-by-value2.i
[vipulchauhan@Vipuls-MacBook v2-Swap(a,b)-call-by-Value-[void-swap(int &a,int &b){}]] % g++ -S call-by-value2.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v2-Swap(a,b)-call-by-Value-[void-swap(int &a,int &b){}]] % g++ -c call-by-value2.s
[vipulchauhan@Vipuls-MacBook v2-Swap(a,b)-call-by-Value-[void-swap(int &a,int &b){}]] % g++ -O call-by-value2.o
[vipulchauhan@Vipuls-MacBook v2-Swap(a,b)-call-by-Value-[void-swap(int &a,int &b){}]] % ./a.out
Enter the value for a :10
Enter the value for b :20
Values after swapp :
a= 20
b= 10
[vipulchauhan@Vipuls-MacBook v2-Swap(a,b)-call-by-Value-[void-swap(int &a,int &b){}]] %
```

## Program 8

### Task7 V3: Source Code:

```
#include<iostream>
using namespace std;
void swapp(int *a,int *b)
{
    *a=*a+*b;
    *b=*a-*b;
    *a=*a-*b;
}
int main()
{
    int a,b;
    cout<<"Enter the value for a :";
    cin>>a;
    cout<<"Enter the value for b :";
    cin>>b;
    cout<<"Values after swapp :"<<endl;
    swapp(&a,&b);
    cout<<"a= "<<a<<endl;
    cout<<"b= "<<b<<endl;
    return 0;
}
```

## Task7 V3: Output



v3-Swap(&a,&b)-call-by-Address --zsh - 127x24

```
Last login: Fri Oct 22 22:02:31 on ttys000
[vipulchauhan@Vipuls-MacBook v3-Swap(&a,&b)-call-by-Address % g++ -E call-by-address.cpp >> call-by-address.i
[vipulchauhan@Vipuls-MacBook v3-Swap(&a,&b)-call-by-Address % g++ -S call-by-address.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v3-Swap(&a,&b)-call-by-Address % g++ -c call-by-address.s
[vipulchauhan@Vipuls-MacBook v3-Swap(&a,&b)-call-by-Address % g++ -O call-by-address.o
[vipulchauhan@Vipuls-MacBook v3-Swap(&a,&b)-call-by-Address % ./a.out
Enter the value for a :10
Enter the value for b :20
Values after swapp :
a= 20
b= 10
vipulchauhan@Vipuls-MacBook v3-Swap(&a,&b)-call-by-Address %
```

## Program 9

Q. Write C++ code for below mentioned tasks?

**Class, Object, Constructor, Static Data Members, friend function in C++:**

**Task1: Class and Object in C++**

- a. WAP to assign and print the roll number, phone number and address of two students having names "Sam" and "John" respectively by creating two objects of the class 'Student'.
- b. WAP which would contain array of objects [many objects], of a class Student. Student [Name, Age, Year, section, marks], the section would be A,B,C and D. Your program would be able to return the total marks of students in the college.

Hint [Make a Matrix or Tabular diagram to understand the problem], all the rows will differ each other by different objects of Student class [Student s1,s2,s3,s4].

**Task2: Constructor in C++**

WAP to create a class to print the area of a square and a rectangle. The class has two functions with the same name but different number of parameters. The function for printing the area of rectangle has two parameters which are its length and breadth respectively while the other function for printing the area of square has one parameter which is the side of the square. Use multiple constructors to for the initialization.

**Task3: Static Data Members in C++**

WAP to count the total number of calls for a member function from more than one objects. [Lets say, from 3 such Objects]

**Task4: Friend Function in C++**

WAP in which you create a Student class having basic information for each student, like name, age and marks. By using friend function add marks of all the students [lets say 3 objects] and print it.

**Task5: Structure in C++**

WAP to create a College class and Student Structure in C++ in one program. By providing such suitable examples write at least 5 differences between class and struct code your have written above.

Hint [Access Specifiers, Heap and Stack, large and small memory, etc.]

**Task6: Extra Questions:**

WAP which would perform these tasks of your data:

- a. Come to next line
- b. set minimum field width
- c. fill string with (\*) after setw(15) function  
\*\*\*\*\*1234

by using endl, setw, and setfill [Manipulators in C++]

## Program 9

### **Task1 V1: Source Code:**

```

/*
    WAP to assign and print the roll number, phone number and address of two students
    having names "Sam" and "John" respectively by creating two objects of the class 'Student'.
*/
#include<iostream>
#include<string>
using namespace std;
class students
{
public:
    int roll_number;
    long int phone_number;
    string address;
};

int main()
{
    students Sam,John;
    cout<<"Enter rollnumber of Sam :";
    cin>>Sam.roll_number;
    cout<<"Enter the phone number of Sam :";
    cin>>Sam.phone_number;
    fflush(stdin);
    cout<<"Enter the address of Sam :";
    getline(cin,Sam.address);
    cout<<"Enter rollnumber of John:";
    cin>>John.roll_number;
    cout<<"Enter the phone number of John :";
    cin>>John.phone_number;
    fflush(stdin);
    cout<<"Enter the address of John :";
    getline(cin,John.address);
    cout<<"Name - Sam ,Roll number - "<<Sam.roll_number<<" ,Phone number -
    "<<Sam.phone_number<<" ,Address - "<<Sam.address<<endl;
    cout<<"Name - John ,Roll number - "<<John.roll_number<<" ,Phone number -
    "<<John.phone_number<<" ,Address - "<<John.address<<endl;
    return 0;
}

```

## Task1 V1: Output

```
v1-class-object-1 -- zsh -- 92x24
Last login: Mon Nov  1 20:23:23 on ttys000
[vipulchauhan@Vipuls-MacBook v1-class-object-1 % g++ -E class-object-for-two.cpp >> class-object-for-two.i
[vipulchauhan@Vipuls-MacBook v1-class-object-1 % g++ -S class-object-for-two.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v1-class-object-1 % g++ -c class-object-for-two.s
[vipulchauhan@Vipuls-MacBook v1-class-object-1 % g++ -O class-object-for-two.o
[vipulchauhan@Vipuls-MacBook v1-class-object-1 % ./a.out
Enter rollnumber of Sam :20
Enter the phone number of Sam :8976474893
Enter the address of Sam :Washington Dc
Enter rollnumber of John:30
Enter the phone number of John :9837659483
Enter the address of John :New York City
Name - Sam ,Roll number - 20 ,Phone number - 8976474893 ,Address - Washington Dc
Name - John ,Roll number - 30 ,Phone number - 9837659483 ,Address - New York City
vipulchauhan@Vipuls-MacBook v1-class-object-1 % ]
```

## Program 9

### **Task1 V2: Source Code:**

```

/*
WAP which would contain array of objects [many objects], of a class Student.
Student [Name, Age, Year, section], the section would be A,B,C and D. Your program would
be able to return the total number of students in the college.

Hint [Make a Matrix or Tabular diagram to understand the problem], each row will
differ each other by different objects of Student class [Student s1,s2,s3,s4].
*/
#include<iostream>
#include<string>
using namespace std;
class students
{
public:
    string name;
    int age;
    int year;
    char section;
};

int main()
{
    int n;
    cout<<"Enter the number of students in a class :";
    cin>>n;
    students s[n];
    for(int i=0;i<n;i++)
    {
        fflush(stdin);
        cout<<"Enter the name of the student "<<(i+1)<<" :";
        getline(cin,s[i].name);
        cout<<"Enter the age of student :";
        cin>>s[i].age;
        cout<<"Enter the year of admission :";
        cin>>s[i].year;
        cout<<"Enter the section of the student in uppercase :";
        cin>>s[i].section;
    }
    cout<<endl;
    for(int i=0;i<n;i++)
    {
}

```

```
cout<<"Student - "<<(i+1)<<endl;
cout<<"Name - "<<s[i].name<<endl;
cout<<"Age - "<<s[i].age<<endl;
cout<<"Year of admission - "<<s[i].year<<endl;
cout<<"Section - "<<s[i].section<<endl;
cout<<endl;
}
return 0;
}
```

## Task1 V2: Output

```
v2-class-object-2 — zsh — 96x33
Last login: Mon Nov  1 20:53:15 on ttys000
[vipulchauhan@Vipuls-MacBook v2-class-object-2 % g++ -E class-object-for-more.cpp >> class-object
-for-more.i
[vipulchauhan@Vipuls-MacBook v2-class-object-2 % g++ -S class-object-for-more.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior
is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v2-class-object-2 % g++ -c class-object-for-more.s
[vipulchauhan@Vipuls-MacBook v2-class-object-2 % g++ -O class-object-for-more.o
[vipulchauhan@Vipuls-MacBook v2-class-object-2 % ./a.out
Enter the number of students in a class :2
Enter the name of the student 1 :Sam
Enter the age of student :14
Enter the year of admission :2015
Enter the section of the student in uppercase :A
Enter the name of the student 2 :John
Enter the age of student :16
Enter the year of admission :2016
Enter the section of the student in uppercase :C
Student - 1
Name - Sam
Age - 14
Year of admission - 2015
Section - A

Student - 2
Name - John
Age - 16
Year of admission - 2016
Section - C
vipulchauhan@Vipuls-MacBook v2-class-object-2 %
```

### Program 9

## **Task2 Source Code:**

```

/*
    WAP to create a class to print the area of a square and a rectangle. The class has two
functions with the same name but different number of parameters. The function for printing
the area of rectangle has two parameters which are its length and breadth respectively while
the other function for printing the area of square has one parameter which is the side of the
square. Use multiple constructors to for the initialization.
*/
#include<iostream>
using namespace std;
class area
{
public:
    void output(int l,int b)
    {
        cout<<"Area of Rectangel is = "<<l*b<<" meter square"<<endl;
    }
    void output(int s)
    {
        cout<<"Area of square is = "<<s*s<<" meter square"<<endl;
    }
};
int main()
{
    int choice;
    cout<<"Enter"<<endl<<"1 to find the area of Rectangle"<<endl<<"2 to area of the
Square"<<endl;
    cout<<"Enter your choice:";
    cin>>choice;
    area ob;
    switch(choice)
    {
        case 1:
            int l,b;
            cout<<"Enter the length of the rectangle :";
            cin>>l;
            cout<<"Enter the breadth of the rectangle :";
            cin>>b;
            ob.output(l,b);
            break;
    }
}

```

```
case 2:  
    int s;  
    cout<<"Enter the side of the square :";  
    cin>>s;  
    ob.output(s);  
    break;  
default :  
    cout<<"You entered the wrong choice :"<<endl;  
}  
return 0;  
}
```

## Task2 Output

```
Practical-09-Task-2-Constructor — zsh — 94x27
Last login: Mon Nov  1 20:54:27 on ttys000
[vipulchauhan@Vipuls-MacBook Practical-09-Task-2-Constructor % g++ -E constructor.cpp >> constructor.i
[vipulchauhan@Vipuls-MacBook Practical-09-Task-2-Constructor % g++ -S constructor.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-09-Task-2-Constructor % g++ -c constructor.s
[vipulchauhan@Vipuls-MacBook Practical-09-Task-2-Constructor % g++ -O constructor.o
[vipulchauhan@Vipuls-MacBook Practical-09-Task-2-Constructor % ./a.out
Enter
1 to find the area of Rectangle
2 to area of the Square
Enter your choice:1
Enter the length of the rectangle :4
Enter the breadth of the rectangle :6
Area of Rectangel is = 24 meter square
[vipulchauhan@Vipuls-MacBook Practical-09-Task-2-Constructor % ./a.out
Enter
1 to find the area of Rectangle
2 to area of the Square
Enter your choice:2
Enter the side of the square :7
Area of square is = 49 meter square
vipulchauhan@Vipuls-MacBook Practical-09-Task-2-Constructor % ]
```

## Program 9

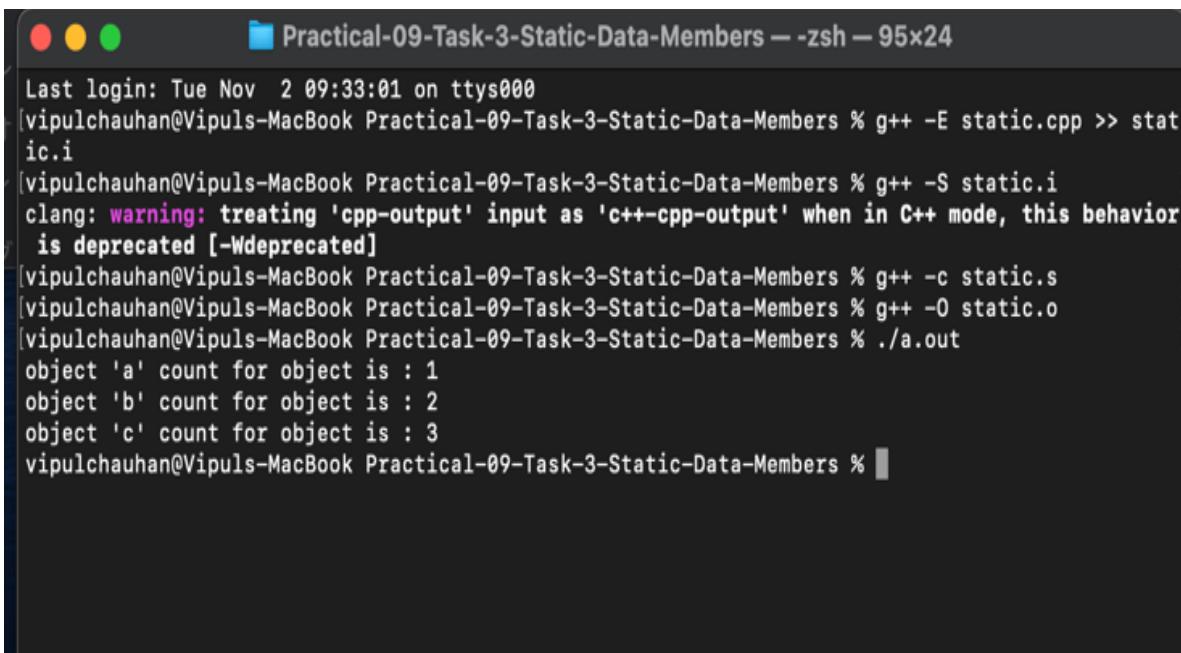
### Task3 Source Code:

```

/*
    WAP to count the total number of calls for a member function from more than one
objects. [Lets say, from 3 such Objects]
*/
#include<iostream>
using namespace std;
class Member
{
public:
    void name()
    {
        static int a=0;
        a++;
        cout<<"count for object is :"<<a<<endl;
    }
};
int main()
{
    Member a,b,c;
    cout<<"object 'a' ";
    a.name();
    cout<<"object 'b' ";
    b.name();
    cout<<"object 'c' ";
    c.name();
    return 0;
}

```

## Task3 Output



A screenshot of a terminal window titled "Practical-09-Task-3-Static-Data-Members --zsh-- 95x24". The terminal shows the following command-line session:

```
Last login: Tue Nov  2 09:33:01 on ttys000
[vipulchauhan@Vipuls-MacBook Practical-09-Task-3-Static-Data-Members % g++ -E static.cpp >> static.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior
is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-09-Task-3-Static-Data-Members % g++ -S static.i
[vipulchauhan@Vipuls-MacBook Practical-09-Task-3-Static-Data-Members % g++ -O static.o
[vipulchauhan@Vipuls-MacBook Practical-09-Task-3-Static-Data-Members % ./a.out
object 'a' count for object is : 1
object 'b' count for object is : 2
object 'c' count for object is : 3
vipulchauhan@Vipuls-MacBook Practical-09-Task-3-Static-Data-Members % ]
```

## Program 9

### **Task4 Source Code:**

```

/*
    WAP in which you create a Student class having basic information for each student, like
name, age and marks. By using friend function add marks of all the students [lets say 3 objects]
and print it.
*/
#include <iostream>
#include<string>
using namespace std;
class Student
{
private:
    string name;
    int age;
    int marks;
    static int sum;
public:
    void setname()
    {
        fflush(stdin);
        getline(cin,name);
    }
    void setage()
    {
        cin>>age;
    }
    void setmarks()
    {
        cin>>marks;
    }
    string getname()
    {
        return name;
    }
    int getage()
    {
        return age;
    }
    int getmarks()
    {

```

```

        return marks;
    }
    int getsum()
    {
        return sum;
    }
    friend void add(Student &s);
};

int Student::sum=0;           //initialization of the static private variable
void add(Student &s) // friend function definition
{
    s.sum=s.sum+s.marks;
}
int main()
{
    int n,i;
    cout<<"Enter the total number of student :";
    cin>>n;
    Student s[n];
    cout<<"Enter the details of "<<n<<" students :"<<endl;
    for(i=1;i<=n;i++)
    {
        cout<<"Enter the name of Student "<<i<<" :";
        s[i].setname();
        cout<<"Enter the age of Student "<<i<<" :";
        s[i].setage();
        cout<<"Enter the marks of Student "<<i<<" :";
        s[i].setmarks();
        cout<<endl;
        add(s[i]);
    }
    cout<<endl;
    cout<<"The deatails of "<<n<<" Students are :"<<endl;
    for(i=1;i<=n;i++)
    {
        cout<<"Name of Student "<<i<<" is : "<<s[i].getname()<<endl;
        cout<<"Age of Student "<<i<<" is : "<<s[i].getage()<<endl;
        cout<<"Marks of Student "<<i<<" is : "<<s[i].getmarks()<<endl;
        cout<<endl;
    }
    cout<<endl;
    cout<<"Total marks of "<<n<<" Students are : "<<s[i].getsum()<<endl;
    return 0;
}

```

## Task4 Output

```
Practical-09-Task-4-Friend-Function -- zsh -- 110x47

Last login: Tue Nov  2 10:17:30 on ttys000
vipulchauhan@Vipuls-MacBook Practical-09-Task-4-Friend-Function % g++ -E friend.cpp >> friend.i
[vipulchauhan@Vipuls-MacBook Practical-09-Task-4-Friend-Function % g++ -S friend.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated
[-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-09-Task-4-Friend-Function % g++ -c friend.s
[vipulchauhan@Vipuls-MacBook Practical-09-Task-4-Friend-Function % g++ -O friend.o
[vipulchauhan@Vipuls-MacBook Practical-09-Task-4-Friend-Function % ./a.out
Enter the total number of student :3
Enter the details of 3 students :
Enter the name of Student 1 :Ram Singh
Enter the age of Student 1 :24
Enter the marks of Student 1 :89

Enter the name of Student 2 :Rahul Arya
Enter the age of Student 2 :23
Enter the marks of Student 2 :97

Enter the name of Student 3 :Vivek Jain
Enter the age of Student 3 :21
Enter the marks of Student 3 :78

The deatails of 3 Students are :
Name of Student 1 is : Ram Singh
Age of Student 1 is : 24
Marks of Student 1 is : 89

Name of Student 2 is : Rahul Arya
Age of Student 2 is : 23
Marks of Student 2 is : 97

Name of Student 3 is : Vivek Jain
Age of Student 3 is : 21
Marks of Student 3 is : 78

Total marks of 3 Students are : 264
vipulchauhan@Vipuls-MacBook Practical-09-Task-4-Friend-Function %
```

## Program 9

### **Task5 Source Code:**

```

/*
WAP to create a College class and Student Structure in C++ in one program.
By providing such suitable examples write at least 5 differences between class and struct
code you have written above.
Hint [Access Specifiers, Heap and Stack, large and small memory, etc.]
*/
#include<iostream>
using namespace std;
class College
{
private:
    string name;
    int roll;
    int marks;
public:
    void setname()
    {
        fflush(stdin);
        getline(cin,name);
    }
    void setroll()
    {
        cin>>roll;
    }
    void setmarks()
    {
        cin>>marks;
    }
    string getname()
    {
        return name;
    }
    int getroll()
    {
        return roll;
    }
    int getmarks()
    {
        return marks;
    }
}

```

```

    }

};

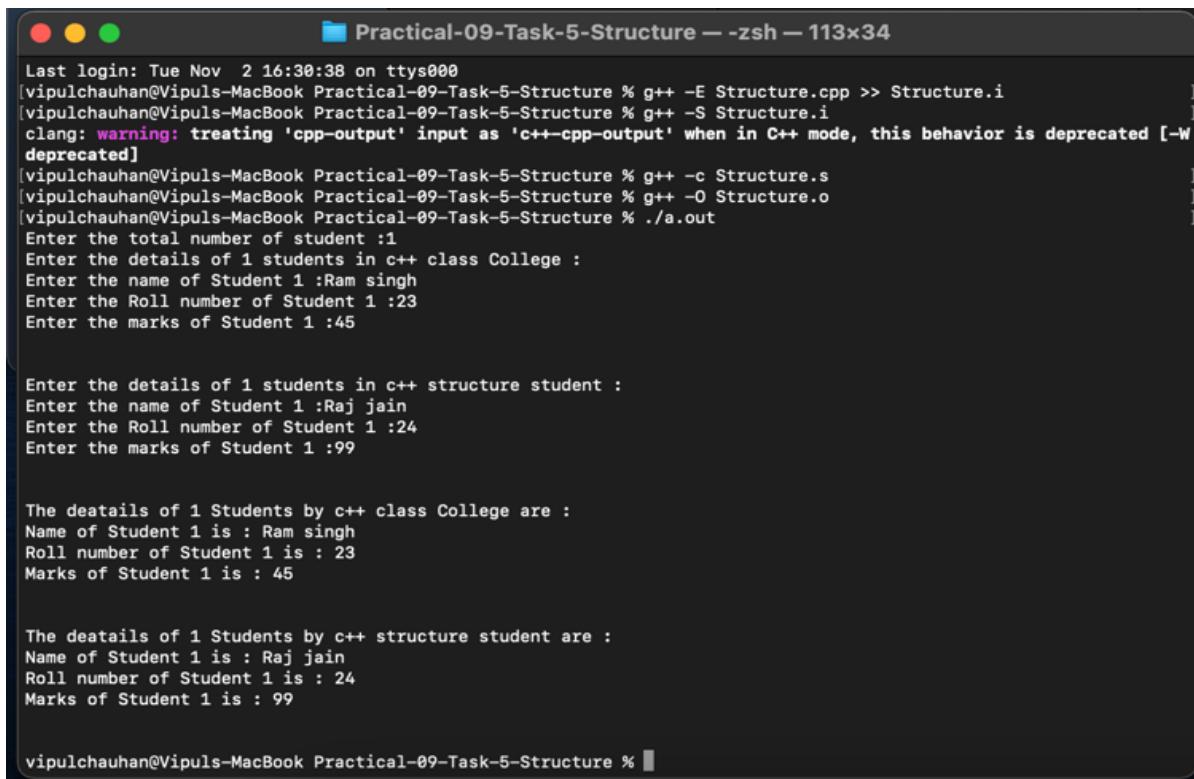
struct student
{
    string name;
    int roll;
    float marks;
};

int main()
{
    int n,i;
    cout<<"Enter the total number of student :";
    cin>>n;
    College s[n];
    student S[n];
    cout<<"Enter the details of "<<n<<" students in c++ class College :"<<endl;
    for(i=1;i<=n;i++)
    {
        cout<<"Enter the name of Student "<<i<<" :";
        s[i].setname();
        cout<<"Enter the Roll number of Student "<<i<<" :";
        s[i].setroll();
        cout<<"Enter the marks of Student "<<i<<" :";
        s[i].setmarks();
        cout<<endl;
    }
    cout<<endl;
    cout<<"Enter the details of "<<n<<" students in c++ structure student :"<<endl;
    for(i=1;i<=n;i++)
    {
        fflush(stdin);
        cout<<"Enter the name of Student "<<i<<" :";
        getline(cin,S[i].name);
        cout<<"Enter the Roll number of Student "<<i<<" :";
        cin>>S[i].roll;
        cout<<"Enter the marks of Student "<<i<<" :";
        cin>>S[i].marks;
        cout<<endl;
    }
    cout<<endl;
    cout<<"The deatails of "<<n<<" Students by c++ class College are :"<<endl;
    for(i=1;i<=n;i++)
    {

```

```
cout<<"Name of Student "<<i<<" is : "<<s[i].getname()<<endl;
cout<<"Roll number of Student "<<i<<" is : "<<s[i].getroll()<<endl;
cout<<"Marks of Student "<<i<<" is : "<<s[i].getmarks()<<endl;
cout<<endl;
}
cout<<endl;
cout<<"The deatails of "<<n<<" Students by c++ structure student are :"<<endl;
for(i=1;i<=n;i++)
{
    cout<<"Name of Student "<<i<<" is : "<<S[i].name<<endl;
    cout<<"Roll number of Student "<<i<<" is : "<<S[i].roll<<endl;
    cout<<"Marks of Student "<<i<<" is : "<<S[i].marks<<endl;
    cout<<endl;
}
cout<<endl;
return 0;
}
```

## Task5 Output



```
Last login: Tue Nov  2 16:30:38 on ttys000
[vipulchauhan@Vipuls-MacBook Practical-09-Task-5-Structure % g++ -E Structure.cpp >> Structure.i
[vipulchauhan@Vipuls-MacBook Practical-09-Task-5-Structure % g++ -S Structure.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-09-Task-5-Structure % g++ -c Structure.s
[vipulchauhan@Vipuls-MacBook Practical-09-Task-5-Structure % g++ -O Structure.o
[vipulchauhan@Vipuls-MacBook Practical-09-Task-5-Structure % ./a.out
Enter the total number of student :1
Enter the details of 1 students in c++ class College :
Enter the name of Student 1 :Ram singh
Enter the Roll number of Student 1 :23
Enter the marks of Student 1 :45

Enter the details of 1 students in c++ structure student :
Enter the name of Student 1 :Raj jain
Enter the Roll number of Student 1 :24
Enter the marks of Student 1 :99

The deatails of 1 Students by c++ class College are :
Name of Student 1 is : Ram singh
Roll number of Student 1 is : 23
Marks of Student 1 is : 45

The deatails of 1 Students by c++ structure student are :
Name of Student 1 is : Raj jain
Roll number of Student 1 is : 24
Marks of Student 1 is : 99

vipulchauhan@Vipuls-MacBook Practical-09-Task-5-Structure %
```

## Program 9

### **Task6 Source Code:**

```

/*
    WAP which would perform these tasks of your data:
a. Come to next line
b. set minimum field width
c. fill string with (*) after setw(15) function
*****1234
by using endl, setw, and setfill [Manipulators in C++]
*/
#include<iostream>
#include <iomanip>
using namespace std;
int main()
{
    //Come to next line
    cout<<"Line 1"<<endl<<"Line 2"<<endl;

    //set minimum field width
    cout<<setw(10)<<5<<endl;

    //fill string with (*) after setw(15) function
    cout<<setfill('*')<<setw(15)<<1234<<endl;
    return 0;
}

```

## Task6 Output

```
Last login: Tue Nov  2 21:53:18 on ttys000
[vipulchauhan@Vipuls-MacBook Practical-09-Task-6-Extra-Questions % g++ -E Extra.cpp >> Extra.i ]
[vipulchauhan@Vipuls-MacBook Practical-09-Task-6-Extra-Questions % g++ -S Extra.i ]
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior
is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-09-Task-6-Extra-Questions % g++ -c Extra.s ]
[vipulchauhan@Vipuls-MacBook Practical-09-Task-6-Extra-Questions % g++ -O Extra.o ]
[vipulchauhan@Vipuls-MacBook Practical-09-Task-6-Extra-Questions % ./a.out
Line 1
Line 2
      5
*****
1234
vipulchauhan@Vipuls-MacBook Practical-09-Task-6-Extra-Questions % ]
```

## Program 10

**Q.** Write C++ code for below mentioned tasks?

**Array of Objects, Pointer to Object, This pointer, Operator Overloading in C++**

**Task1: Array of Objects in C++**

WAP to create a directory that contains the following information.

- (a) Name of a person
- (b) Address
- (c) Telephone Number (if available with STD code)
- (d) Mobile Number (if available)
- (e) Head of the family

**Task2: Pointer to Object in C++**

WAP to create print or display Student information containing in Student class by using pointers to object.

**Task3: This pointer in C++**

WAP to pass two variables in a parameterized constructor during object creation and have same names variables as class member data and constructor parameters. Your job is to calculate the remainder of those two numbers.

**Task4: Operator Overloading in C++**

- a). WAP, in which you write a friend function to overload a less than '**<**' operator in C++.
- b). WAP in which you can add two objects [every object would have 1 integer value] by overloading + operator, which eventually would add the data values of those two object by adding the objects.

## Program 10

### **Task1 Source Code:**

```

/*
WAP to create a directory that contains the following information.
(a) Name of a person
(b) Address
(c) Telephone Number (if available with STD code)
(d) Mobile Number (if available)
(e) Head of the family
*/
#include<iostream>
#include<string>
using namespace std;
class Directory
{
private:
    string name,address,telephone_number,mobile_number,head_of_family;
public:
    void setname()
    {
        getline(cin,name);
    }
    void setaddress()
    {
        getline(cin,address);
    }
    void settelephone_number()
    {
        getline(cin,telephone_number);
    }
    void setmobile_number()
    {
        getline(cin,mobile_number);
    }
    void sethead_of_family()
    {
        getline(cin,head_of_family);
    }
    string getname()
    {
        return name;
    }
}

```

```

        }
        string getaddress()
        {
            return address;
        }
        string gettelephone_number()
        {
            return telephone_number;
        }
        string getmobile_number()
        {
            return mobile_number;
        }
        string gethead_of_family()
        {
            return head_of_family;
        }

};

int main()
{
    int n,i;
    cout<<"The directory contains "<<endl<<"1-Name of a person"<<endl<<"2-
Address"<<endl<<"3-Telephone Number"<<endl<<"4-Mobile Number"<<endl<<"5-Head of
the family"<<endl;
    cout<<"Enter the number of contacts you want to save in the directory :";
    cin>>n;
    Directory s[n];
    cout<<endl;
    for(i=0;i<n;i++)
    {
        fflush(stdin);
        cout<<"Enter the name of contact "<<i+1<<" :";
        s[i].setname();
        fflush(stdin);
        cout<<"Enter the Address of contact "<<i+1<<" :";
        s[i].setaddress();
        fflush(stdin);
        cout<<"Enter the telephone number with STD code of contact "<<i+1<<" :";
        s[i].settelephone_number();
        fflush(stdin);
        cout<<"Enter the Mobile number of the contact "<<i+1<<" :";
        s[i].setmobile_number();
        fflush(stdin);
    }
}

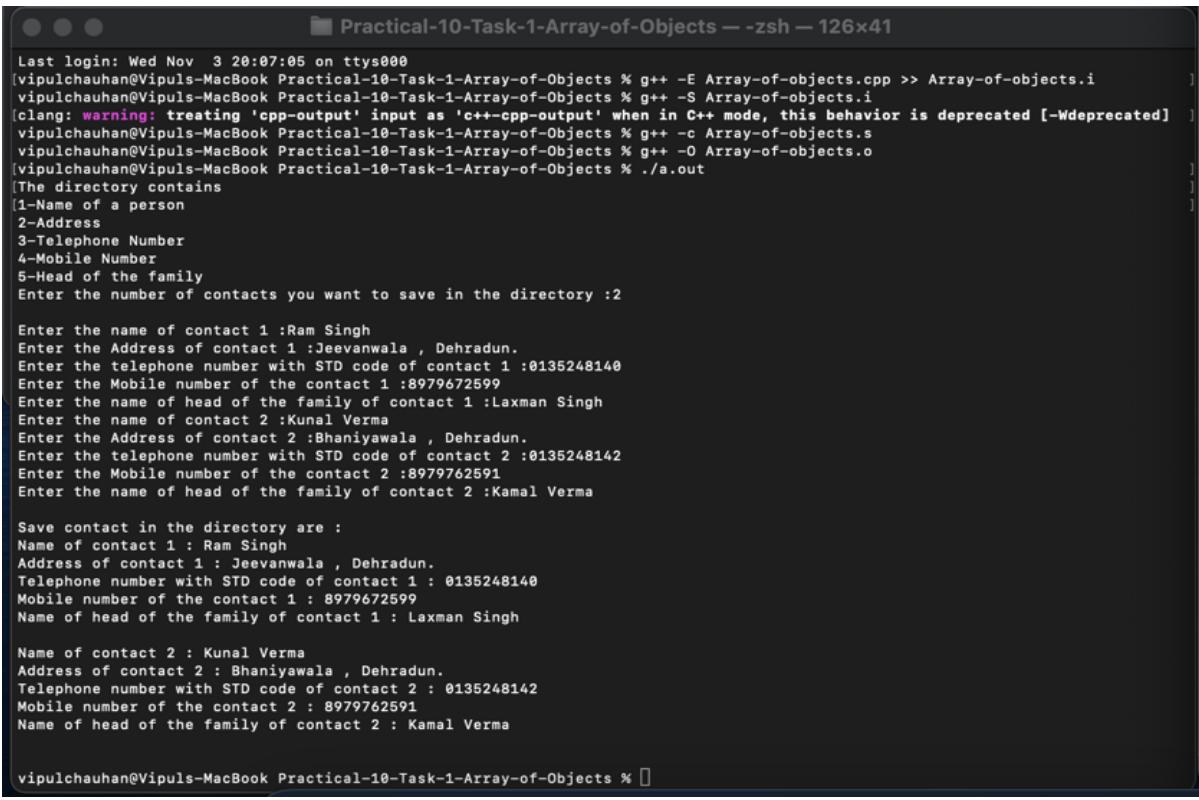
```

```

cout<<"Enter the name of head of the family of contact "<<i+1<<" :";
s[i].sethead_of_family();
}
cout<<endl;
cout<<"Save contact in the directory are :"<<endl;
for(i=0;i<n;i++)
{
    cout<<"Name of contact "<<i+1<<" : "<<s[i].getname()<<endl;
    cout<<"Address of contact "<<i+1<<" : "<<s[i].getaddress()<<endl;
    cout<<"Telephone number with STD code of contact "<<i+1<<" :
"<<s[i].gettelephone_number()<<endl;
    cout<<"Mobile number of the contact "<<i+1<<" :
"<<s[i].getmobile_number()<<endl;
    cout<<"Name of head of the family of contact "<<i+1<<" :
"<<s[i].gethead_of_family()<<endl;
    cout<<endl;
}
cout<<endl;
return 0;
}

```

## Task1 Output



```

Practical-10-Task-1-Array-of-Objects — zsh — 126x41

Last login: Wed Nov  3 20:07:05 on ttys000
[vipulchauhan@Vipuls-MacBook Practical-10-Task-1-Array-of-Objects % g++ -E Array-of-objects.cpp >> Array-of-objects.i
vipulchauhan@Vipuls-MacBook Practical-10-Task-1-Array-of-Objects % g++ -S Array-of-objects.i
[clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated] ]
vipulchauhan@Vipuls-MacBook Practical-10-Task-1-Array-of-Objects % g++ -c Array-of-objects.s
vipulchauhan@Vipuls-MacBook Practical-10-Task-1-Array-of-Objects % g++ -O Array-of-objects.o
[vipulchauhan@Vipuls-MacBook Practical-10-Task-1-Array-of-Objects % ./a.out
[The directory contains
[1-Name of a person
2-Address
3-Telephone Number
4-Mobile Number
5-Head of the family
Enter the number of contacts you want to save in the directory :2

Enter the name of contact 1 :Ram Singh
Enter the Address of contact 1 :Jeevanwala , Dehradun.
Enter the telephone number with STD code of contact 1 :0135248140
Enter the Mobile number of the contact 1 :8979672599
Enter the name of head of the family of contact 1 :Laxman Singh
Enter the name of contact 2 :Kunal Verma
Enter the Address of contact 2 :Bhaniyawala , Dehradun.
Enter the telephone number with STD code of contact 2 :0135248142
Enter the Mobile number of the contact 2 :8979762591
Enter the name of head of the family of contact 2 :Kamal Verma

Save contact in the directory are :
Name of contact 1 : Ram Singh
Address of contact 1 : Jeevanwala , Dehradun.
Telephone number with STD code of contact 1 : 0135248140
Mobile number of the contact 1 : 8979672599
Name of head of the family of contact 1 : Laxman Singh

Name of contact 2 : Kunal Verma
Address of contact 2 : Bhaniyawala , Dehradun.
Telephone number with STD code of contact 2 : 0135248142
Mobile number of the contact 2 : 8979762591
Name of head of the family of contact 2 : Kamal Verma

vipulchauhan@Vipuls-MacBook Practical-10-Task-1-Array-of-Objects %

```

## Program 10

### **Task2 Source Code:**

```

/*
 WAP to create print or display Student information containing in Student class by using
 pointers to object.
*/
#include <iostream>
#include<string>
using namespace std;
class Student
{
private:
    string name;
    int age;
    int marks;
public:
    void setname()
    {
        fflush(stdin);
        getline(cin,name);
    }
    void setage()
    {
        cin>>age;
    }
    void setmarks()
    {
        cin>>marks;
    }
    string getname()
    {
        return name;
    }
    int getage()
    {
        return age;
    }
    int getmarks()
    {
        return marks;
    }
}

```

```

};

int main()
{
    int n,i;
    cout<<"Enter the total number of student :";
    cin>>n;
    Student s[n];
    Student *a;
    a=s;
    cout<<"Enter the details of "<<n<<" students :"<<endl;
    for(i=1;i<=n;i++,a++)
    {
        cout<<"Enter the name of Student "<<i<<" :";
        a->setname();
        cout<<"Enter the age of Student "<<i<<" :";
        a->setage();
        cout<<"Enter the marks of Student "<<i<<" :";
        a->setmarks();
        cout<<endl;
    }
    cout<<endl;
    cout<<"The deatails of "<<n<<" Students are :"<<endl;
    a=s;
    for(i=1;i<=n;i++,a++)
    {
        cout<<"Name of Student "<<i<<" is : "<<a->getname()<<endl;
        cout<<"Age of Student "<<i<<" is : "<<a->getage()<<endl;
        cout<<"Marks of Student "<<i<<" is : "<<a->getmarks()<<endl;
        cout<<endl;
    }
    cout<<endl;
    return 0;
}

```

## Task2 Output

```
Practical-10-Task-2-Pointer-to-Object -- zsh -- 96x32
Last login: Wed Nov  3 20:34:04 on ttys001
[vipulchauhan@Vipuls-MacBook Practical-10-Task-2-Pointer-to-Object % g++ -E Pointer-to-object.cpp]
>> Pointer-to-object.i
[vipulchauhan@Vipuls-MacBook Practical-10-Task-2-Pointer-to-Object % g++ -S Pointer-to-object.i ]
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior
is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-10-Task-2-Pointer-to-Object % g++ -c Pointer-to-object.s ]
[vipulchauhan@Vipuls-MacBook Practical-10-Task-2-Pointer-to-Object % g++ -O Pointer-to-object.o ]
[vipulchauhan@Vipuls-MacBook Practical-10-Task-2-Pointer-to-Object % ./a.out
]
Enter the total number of student :2
Enter the details of 2 students :
Enter the name of Student 1 :Rahul Arya
Enter the age of Student 1 :18
Enter the marks of Student 1 :89

Enter the name of Student 2 :Rishab Jain
Enter the age of Student 2 :20
Enter the marks of Student 2 :79

The deatails of 2 Students are :
Name of Student 1 is : Rahul Arya
Age of Student 1 is : 18
Marks of Student 1 is : 89

Name of Student 2 is : Rishab Jain
Age of Student 2 is : 20
Marks of Student 2 is : 79

vipulchauhan@Vipuls-MacBook Practical-10-Task-2-Pointer-to-Object %
```

## Program 10

### **Task3 Source Code:**

```

/*
 WAP to pass two variables in a parameterized constructor during object creation
 and have same names variables as class member data and constructor parameters.

 Your job is to calculate the remainder of those two numbers.

*/
#include<iostream>
using namespace std;
class Remainder
{
private:
    int a,b,rem;
public:
    Remainder(int a,int b)
    {
        this->a=a;
        this->b=b;
        rem=a%b;
    }
    int getrem()
    {
        return rem;
    }
};
int main()
{
    int a,b;
    cout<<"Enter two numbers to find out the remainder :"<<endl;
    cout<<"Enter the first number :";
    cin>>a;
    cout<<"Enter the second number :";
    cin>>b;
    Remainder s(a,b);
    cout<<"Remainder of "<<a<<"/"<<b<<" = "<<s.getrem()<<endl;
    return 0;
}

```

## Task3 Output

```
Practical-10-Task-3-This-pointer --zsh-- 100x28
Last login: Wed Nov 3 20:35:34 on ttys001
[vipulchauhan@Vipuls-MacBook Practical-10-Task-3-This-pointer % g++ -E this-pointer.cpp >> this-pointer.i
[vipulchauhan@Vipuls-MacBook Practical-10-Task-3-This-pointer % g++ -S this-pointer.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-10-Task-3-This-pointer % g++ -c this-pointer.s
[vipulchauhan@Vipuls-MacBook Practical-10-Task-3-This-pointer % g++ -O this-pointer.o
[vipulchauhan@Vipuls-MacBook Practical-10-Task-3-This-pointer % ./a.out
Enter two numbers to find out the remainder :
Enter the first number :5
Enter the second number :2
Remainder of 5/2 = 1
[vipulchauhan@Vipuls-MacBook Practical-10-Task-3-This-pointer % ./a.out
Enter two numbers to find out the remainder :
Enter the first number :5
Enter the second number :5
Remainder of 5/5 = 0
[vipulchauhan@Vipuls-MacBook Practical-10-Task-3-This-pointer % ./a.out
Enter two numbers to find out the remainder :
Enter the first number :12
Enter the second number :5
Remainder of 12/5 = 2
vipulchauhan@Vipuls-MacBook Practical-10-Task-3-This-pointer %
```

## Program 10

### Task4 V1: Source Code:

```

/*
 WAP,in which you write a friend function to overload a less than '<' operator in C++
*/
#include<iostream>
using namespace std;
class overload
{
private:
    int a,b;
public:
    overload(int a, int b)
    {
        this->a = a;
        this->b = b;
    }
    friend bool operator<(overload &s,overload &s2);
};

bool operator<(overload &s,overload &s2)
{
    if(s.a<s2.a)
    {
        return true;
    }
    if(s.a==s2.a && s.b < s2.a)
    {
        return true;
    }
    return false;
}
int main()
{
    int a,b;
    cout<<"Enter the value of a and b simultaneously :"<<endl;
    cin>>a>>b;
    overload a1(a,b),a2(a+1,b+1);
    //operator overloading to compare the objects
    if(a1<a2)

```

```
{  
    cout<<b<<" is big"<<endl;  
}  
else if (a2<a1)  
{  
    cout<<a<<" is big"<<endl;  
}  
return 0;  
}
```

## Task4 V1: Output

```
● ● ● v1-operator< -- -zsh -- 91x33
Last login: Wed Nov  3 21:19:28 on ttys001
[vipulchauhan@Vipuls-MacBook v1-operator< % g++ -E friend_function_to_overload_operator.cpp ]
>> friend_function_to_overload_operator.i
[vipulchauhan@Vipuls-MacBook v1-operator< % g++ -S friend_function_to_overload_operator.i ]
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this beha
vior is deprecated [-Wdeprecated]
vipulchauhan@Vipuls-MacBook v1-operator< % g++ -c friend_function_to_overload_operator.s
[vipulchauhan@Vipuls-MacBook v1-operator< % g++ -O friend_function_to_overload_operator.o
vipulchauhan@Vipuls-MacBook v1-operator< % ./a.out
[Enter the value of a and b simultaneously :
1
2
2 is big
[vipulchauhan@Vipuls-MacBook v1-operator< % ./a.out
Enter the value of a and b simultaneously :
2
1
1 is big
[vipulchauhan@Vipuls-MacBook v1-operator< % ./a.out
Enter the value of a and b simultaneously :
4
4
4 is big
[vipulchauhan@Vipuls-MacBook v1-operator< % ./a.out
Enter the value of a and b simultaneously :
10
0
0 is big
vipulchauhan@Vipuls-MacBook v1-operator< % ]
```

## Program 10

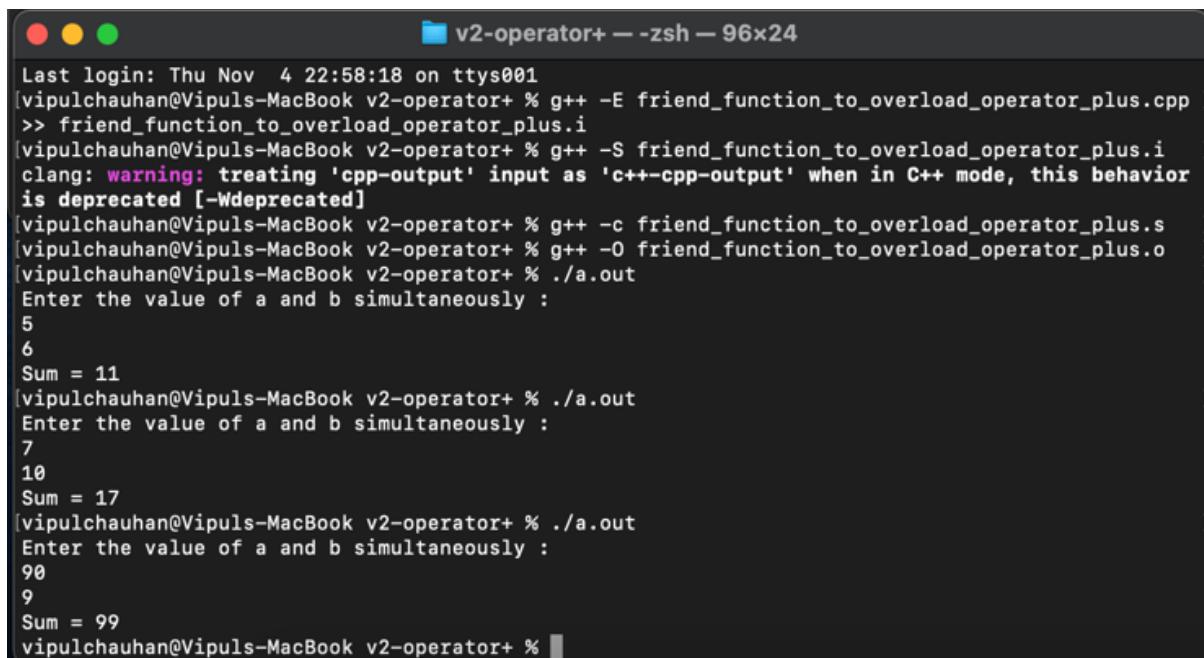
### **Task4 V2: Source Code:**

```

/*
 WAP in which you can add two objects [every object would have 1 integer value] by
 overloading + operator, which eventually would add the data values of those two object by
 adding the objects.
*/
#include<iostream>
using namespace std;
class overload
{
private:
    int a;
public:
    overload(int a)
    {
        this->a = a;
    }
    friend int operator+(overload &s,overload &s2);
};
int operator+(overload &s,overload &s2)
{
    return(s.a+s2.a);
}
int main()
{
    int a,b;
    cout<<"Enter the value of a and b simultaneously :"<<endl;
    cin>>a>>b;
    overload a1(a),a2(b);
    //operator overloading to plus the objects
    cout<<"Sum = "<<a1+a2<<endl;
    return 0;
}

```

## Task4 V2: Output



```
Last login: Thu Nov  4 22:58:18 on ttys001
[vipulchauhan@Vipuls-MacBook v2-operator+ % g++ -E friend_function_to_overload_operator_plus.cpp ]>> friend_function_to_overload_operator_plus.i
[vipulchauhan@Vipuls-MacBook v2-operator+ % g++ -S friend_function_to_overload_operator_plus.i ] clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v2-operator+ % g++ -c friend_function_to_overload_operator_plus.s ]>
[vipulchauhan@Vipuls-MacBook v2-operator+ % g++ -O friend_function_to_overload_operator_plus.o ]>
[vipulchauhan@Vipuls-MacBook v2-operator+ % ./a.out ]>
Enter the value of a and b simultaneously :
5
6
Sum = 11
[vipulchauhan@Vipuls-MacBook v2-operator+ % ./a.out ]>
Enter the value of a and b simultaneously :
7
10
Sum = 17
[vipulchauhan@Vipuls-MacBook v2-operator+ % ./a.out ]>
Enter the value of a and b simultaneously :
90
9
Sum = 99
vipulchauhan@Vipuls-MacBook v2-operator+ % ]>
```

## Program 11

**Q.** Write C++ code for below mentioned tasks?

**Task-11.1 Inheritance Basics:**

WAP in C++ to create a Parent and Child interaction using inheritance. With this Parent and Child Interaction try to perform these tasks:

- a. Call Parent class method in child class function without creating an object of parent class
- b. Call Parent class method in main method by child class object

**Task-11.2 Multiple Inheritance in C++:**

Create two classes named Mammals and MarineAnimals. Create another class named BlueWhale which inherits both the above classes. Now, create a function in each of these classes which prints "I am mammal", "I am a marine animal" and "I belong to both the categories: Mammals as well as Marine Animals" respectively. Now, create an object for each of the above class and try calling

- 1 - function of Mammals by the object of Mammal
- 2 - function of MarineAnimal by the object of MarineAnimal
- 3 - function of BlueWhale by the object of BlueWhale
- 4 - function of each of its parent by the object of BlueWhale

**Task-11.3 Dimond Problem in multiple inheritance using C++:**

- a. WAP to illustrate Dimond Problem in multiple inheritance
- b. its solution using Virtual base classes. Write separate programs if required.
- c. What else multiple inheritance can cause in a program, explain it by providing proper solution

## Program 11

### **Task1 V1: Source Code:**

```

//call the parent class method in child class function without creating an object of parent class

#include<iostream>

using namespace std;

class parent{

protected:

void display_parent()

{



cout<<"Class parent method called." << endl;

}

};

class child : public parent

{



public:

void display_child()

{



cout<<"Calling of class parent method from class child method without creating the object of
class parent" << endl;

display_parent();

}

};

int main(){

child a;

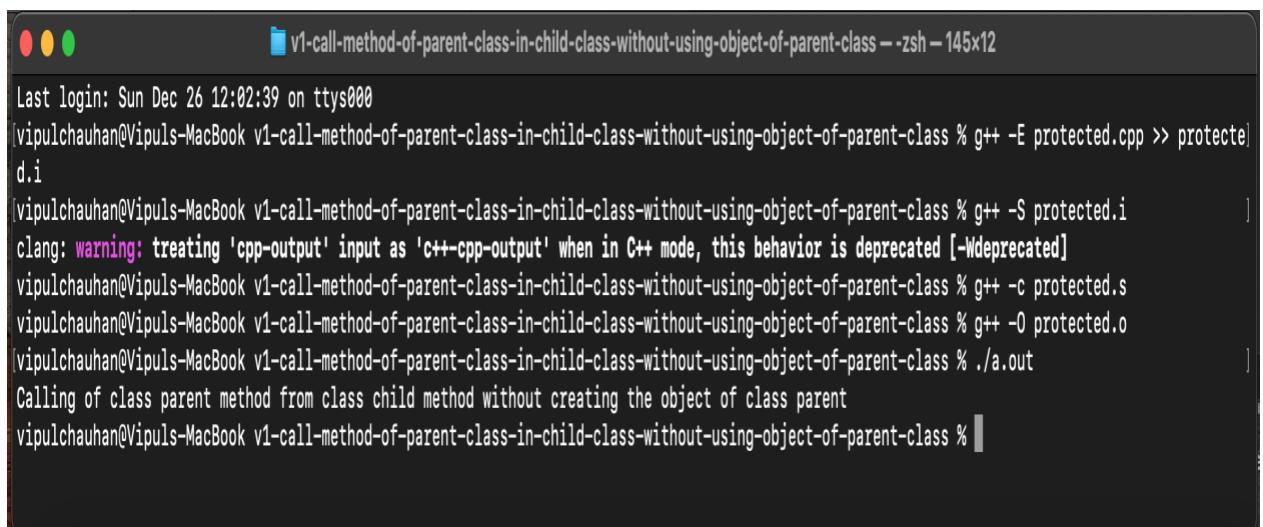
a.display_child();

return 0;

}

```

## Task1 V1: Output



```
Last login: Sun Dec 26 12:02:39 on ttys000
[vipulchauhan@Vipuls-MacBook v1-call-method-of-parent-class-in-child-class-without-using-object-of-parent-class % g++ -E protected.cpp >> protected.i
[vipulchauhan@Vipuls-MacBook v1-call-method-of-parent-class-in-child-class-without-using-object-of-parent-class % g++ -S protected.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
vipulchauhan@Vipuls-MacBook v1-call-method-of-parent-class-in-child-class-without-using-object-of-parent-class % g++ -c protected.s
vipulchauhan@Vipuls-MacBook v1-call-method-of-parent-class-in-child-class-without-using-object-of-parent-class % g++ -O protected.o
[vipulchauhan@Vipuls-MacBook v1-call-method-of-parent-class-in-child-class-without-using-object-of-parent-class % ./a.out
Calling of class parent method from class child method without creating the object of class parent
vipulchauhan@Vipuls-MacBook v1-call-method-of-parent-class-in-child-class-without-using-object-of-parent-class % ]
```

**Program 11****Task1 V2: Source Code:**

```
//call the parent class method in main method by the object of child class

#include<iostream>

using namespace std;

class parent

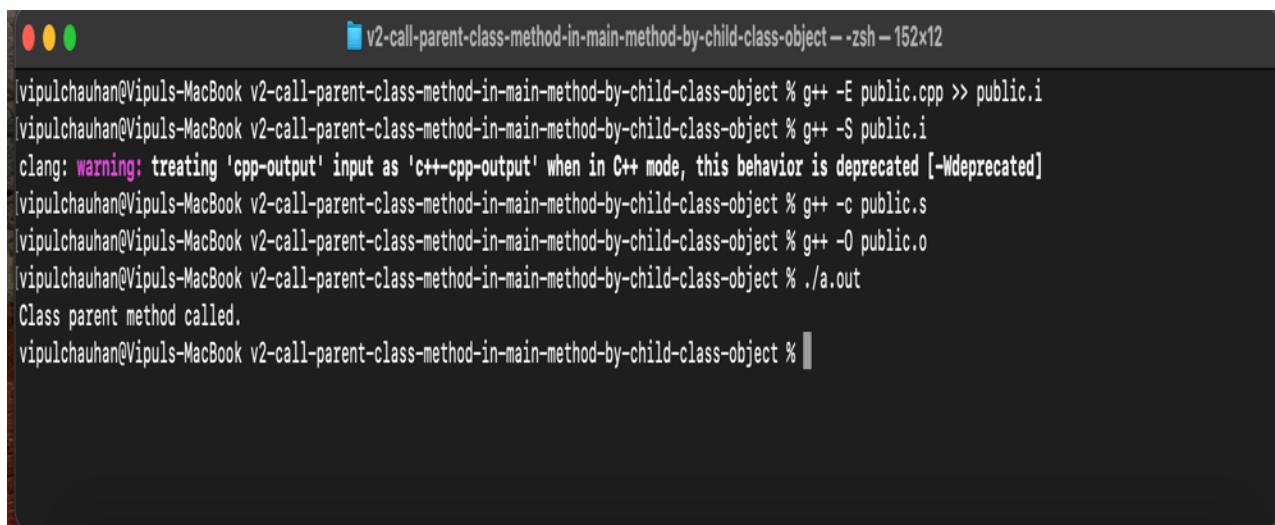
{
public:
    void display_parent()
    {
        cout<<"Class parent method called." << endl;
    }
};

class child : public parent

{
public:
    void display_child()
    {
        cout<<"Class child method called."<<endl;
    }
};

int main(){
    child a;
    a.display_parent();
    return 0;
}
```

## Task1 V2: Output



```
v2-call-parent-class-method-in-main-method-by-child-class-object --zsh - 152x12
[vipulchauhan@Vipuls-MacBook v2-call-parent-class-method-in-main-method-by-child-class-object % g++ -E public.cpp >> public.i
[vipulchauhan@Vipuls-MacBook v2-call-parent-class-method-in-main-method-by-child-class-object % g++ -S public.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v2-call-parent-class-method-in-main-method-by-child-class-object % g++ -c public.s
[vipulchauhan@Vipuls-MacBook v2-call-parent-class-method-in-main-method-by-child-class-object % g++ -O public.o
[vipulchauhan@Vipuls-MacBook v2-call-parent-class-method-in-main-method-by-child-class-object % ./a.out
Class parent method called.
vipulchauhan@Vipuls-MacBook v2-call-parent-class-method-in-main-method-by-child-class-object % ]
```

**Program 11****Task2 : Source Code:**

```
//Program to demonstrate multiple inheritance

#include <iostream>

using namespace std;

class MarrineAnimals

{
public:
    void display_Marine_Animals()

    {
        cout<<"I am Marrine Animal "<<endl;
    }
};

class Mammals

{
public:
    void display_Mammals()

    {
        cout<<"I am Mammal "<<endl;
    }
};

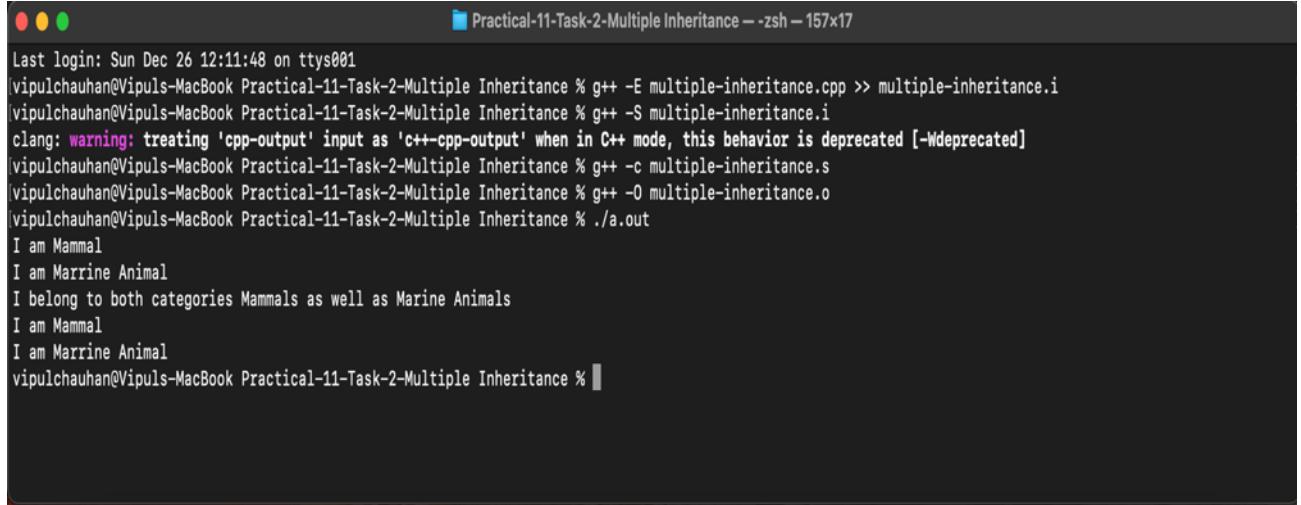
class BlueWhale:public MarrineAnimals,public Mammals

{
public:
    void display_Blue_Whale()

```

```
{  
    cout<<"I belong to both categories Mammals as well as Marine Animals "<<endl;  
}  
};  
  
int main()  
{  
    Mammals ob1;  
    MarrineAnimals ob2;  
    BlueWhale ob3;  
  
    ob1.display_Mammals();  
    ob2.display_Marine_Animals();  
    ob3.display_Blue_Whale();  
  
    ob3.display_Mammals();  
    ob3.display_Marine_Animals();  
  
    return 0;  
}
```

## Task2 : Output



```
Last login: Sun Dec 26 12:11:48 on ttys001
vipulchauhan@Vipuls-MacBook Practical-11-Task-2-Multiple Inheritance % g++ -E multiple-inheritance.cpp >> multiple-inheritance.i
vipulchauhan@Vipuls-MacBook Practical-11-Task-2-Multiple Inheritance % g++ -S multiple-inheritance.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
vipulchauhan@Vipuls-MacBook Practical-11-Task-2-Multiple Inheritance % g++ -c multiple-inheritance.s
vipulchauhan@Vipuls-MacBook Practical-11-Task-2-Multiple Inheritance % g++ -O multiple-inheritance.o
vipulchauhan@Vipuls-MacBook Practical-11-Task-2-Multiple Inheritance % ./a.out
I am Mammal
I am Marrine Animal
I belong to both categories Mammals as well as Marine Animals
I am Mammal
I am Marrine Animal
vipulchauhan@Vipuls-MacBook Practical-11-Task-2-Multiple Inheritance %
```

**Program 11****Task3 V1: Source Code:**

```

//Dimond problem

#include <iostream>

using namespace std;

class A

{
public:
    int k;

    void displayA()
    {
        cout<<"k = "<<k<<endl;
    }
};

class B:public A

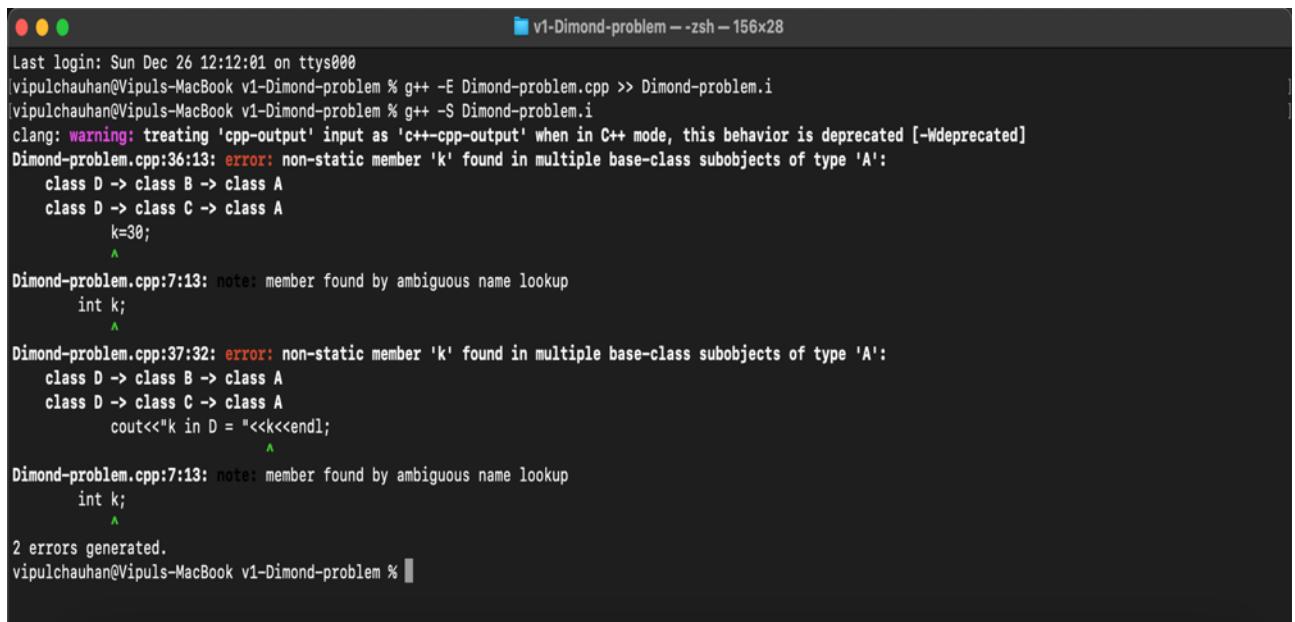
{
public:
    void displayB()
    {
        k=10;
        cout << "k in B= " << k << endl;
    }
};

class C:public A
{

```

```
public:  
void displayC()  
{  
    k=20;  
    cout<<"k in C ="<<k<<endl;  
}  
};  
  
class D:public B,public C  
{  
public:  
void displayD()  
{  
    k=30;  
    cout<<"k in D = "<<k<<endl;  
}  
};  
  
int main()  
{  
    D obj;  
    obj.displayD();  
    return 0;  
}
```

## Task3 V1: Output



```
Last login: Sun Dec 26 12:12:01 on ttys000
vipulchauhan@Vipuls-MacBook v1-Dimond-problem % g++ -E Dimond-problem.cpp >> Dimond-problem.i
vipulchauhan@Vipuls-MacBook v1-Dimond-problem % g++ -S Dimond-problem.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
Dimond-problem.cpp:36:13: error: non-static member 'k' found in multiple base-class subobjects of type 'A':
    class D -> class B -> class A
                           ^
    class D -> class C -> class A
                           k=30;
                           ^
Dimond-problem.cpp:7:13: note: member found by ambiguous name lookup
    int k;
               ^
Dimond-problem.cpp:37:32: error: non-static member 'k' found in multiple base-class subobjects of type 'A':
    class D -> class B -> class A
                           ^
    class D -> class C -> class A
                           cout<<"K in D = "<<k<<endl;
                           ^
Dimond-problem.cpp:7:13: note: member found by ambiguous name lookup
    int k;
               ^
2 errors generated.
vipulchauhan@Vipuls-MacBook v1-Dimond-problem %
```

**Program 11****Task3 V2: Source Code:**

```
//use of virtual base class to solve Dimond problem
```

```
#include <iostream>
```

```
using namespace std;
```

```
class A
```

```
{
```

```
public:
```

```
    int k;
```

```
    void displayA()
```

```
{
```

```
    cout<<"k = "<<k<<endl;
```

```
}
```

```
};
```

```
class B:virtual public A
```

```
{
```

```
public:
```

```
    void displayB()
```

```
{
```

```
    k=10;
```

```
    cout << "k in B= " << k << endl;
```

```
}
```

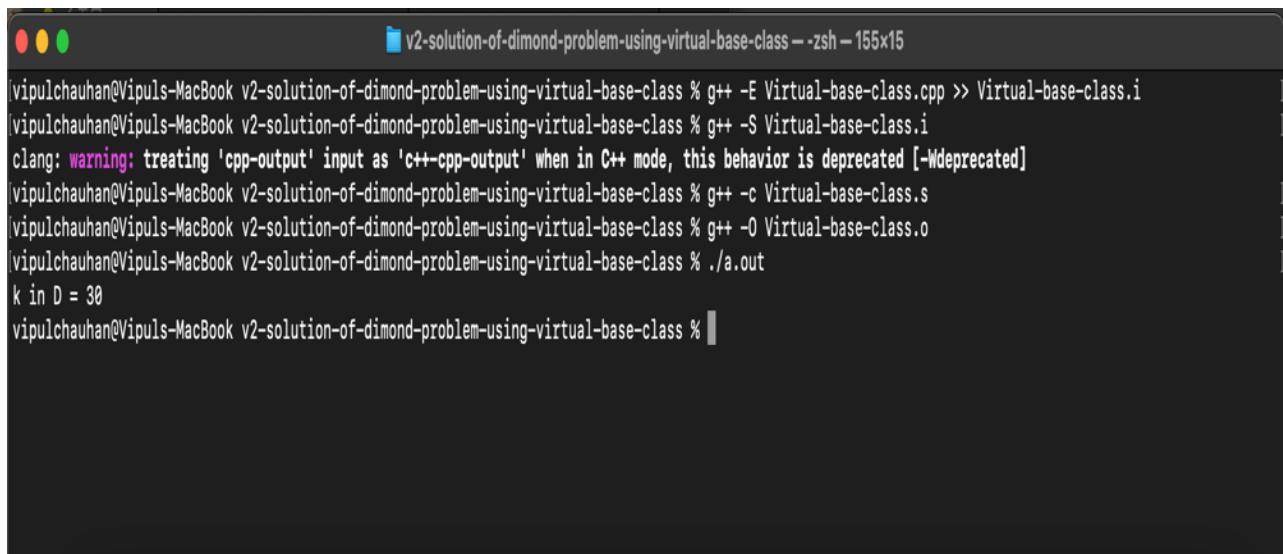
```
};
```

```
class C:virtual public A
```

```
{
```

```
public:  
void displayC()  
{  
    k=20;  
    cout<<"k in C ="<<k<<endl;  
}  
};  
  
class D:public B,public C  
{  
public:  
void displayD()  
{  
    k=30;  
    cout<<"k in D = "<<k<<endl;  
}  
};  
  
int main()  
{  
    D obj;  
    obj.displayD();  
    return 0;  
}
```

## Task3 V2: Output



A screenshot of a terminal window titled "v2-solution-of-diamond-problem-using-virtual-base-class --zsh - 155x15". The terminal shows the following command-line session:

```
vipulchauhan@Vipuls-MacBook v2-solution-of-diamond-problem-using-virtual-base-class % g++ -E Virtual-base-class.cpp >> Virtual-base-class.i  
vipulchauhan@Vipuls-MacBook v2-solution-of-diamond-problem-using-virtual-base-class % g++ -S Virtual-base-class.i  
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]  
vipulchauhan@Vipuls-MacBook v2-solution-of-diamond-problem-using-virtual-base-class % g++ -c Virtual-base-class.s  
vipulchauhan@Vipuls-MacBook v2-solution-of-diamond-problem-using-virtual-base-class % g++ -O Virtual-base-class.o  
vipulchauhan@Vipuls-MacBook v2-solution-of-diamond-problem-using-virtual-base-class % ./a.out  
k in D = 30  
vipulchauhan@Vipuls-MacBook v2-solution-of-diamond-problem-using-virtual-base-class %
```

**Program 11****Task3 V3: Source Code:**

```
//what else can multiple inheritance can cause in a program
```

```
#include <iostream>
```

```
using namespace std;
```

```
class B
```

```
{
```

```
public:
```

```
    int k;
```

```
    void displayB()
```

```
{
```

```
    cout<<"k in B= "<<k<<endl;
```

```
}
```

```
};
```

```
class C
```

```
{
```

```
public:
```

```
    int k;
```

```
    void displayC()
```

```
{
```

```
    cout<<"k in C = "<<k<<endl;
```

```
}
```

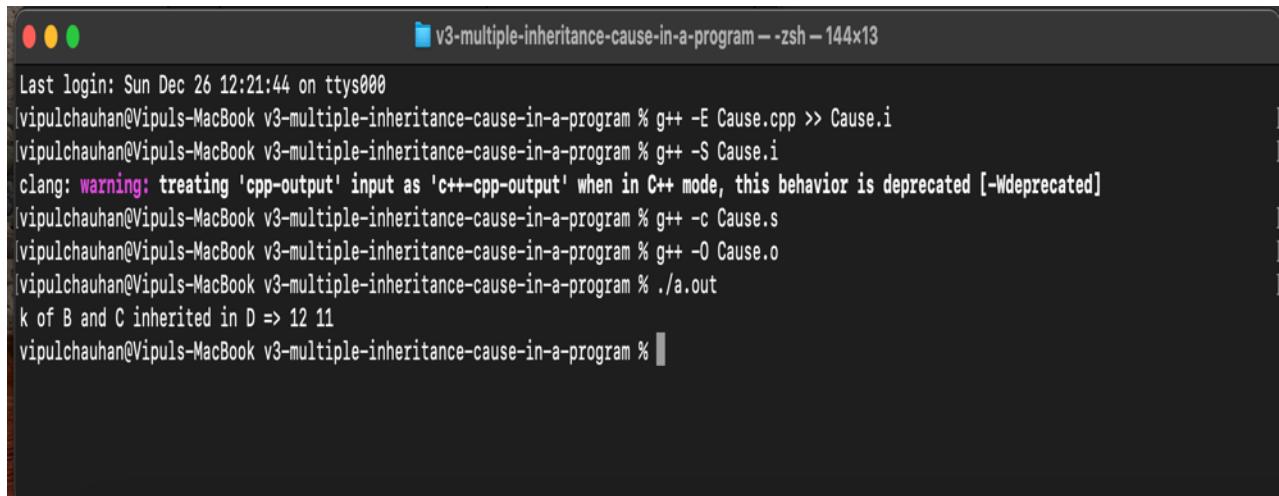
```
};
```

```
class D:public B,public C
```

```
{
```

```
public:  
    void displayD()  
    {  
        cout<<"k of B and C inherited in D => "<<B::k<<" "<<C::k<<endl;  
    }  
};  
  
int main()  
{  
    D obj;  
    obj.B::k=12;  
    obj.C::k=11;  
    obj.displayD();  
    return 0;  
}
```

## Task3 V3: Output



```
Last login: Sun Dec 26 12:21:44 on ttys000
[vipulchauhan@Vipuls-MacBook v3-multiple-inheritance-cause-in-a-program % g++ -E Cause.cpp >> Cause.i
[vipulchauhan@Vipuls-MacBook v3-multiple-inheritance-cause-in-a-program % g++ -S Cause.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v3-multiple-inheritance-cause-in-a-program % g++ -c Cause.s
[vipulchauhan@Vipuls-MacBook v3-multiple-inheritance-cause-in-a-program % g++ -O Cause.o
[vipulchauhan@Vipuls-MacBook v3-multiple-inheritance-cause-in-a-program % ./a.out
k of B and C inherited in D => 12 11
vipulchauhan@Vipuls-MacBook v3-multiple-inheritance-cause-in-a-program % ]
```

## Program 12

Q. Write C++ code for below mentioned tasks?

**Task-12.1** WAP to illustrate the role of Access Modifiers [private, public, protected] separately in:

- a. Accessing base class elements in derived class or Inheritance
- b. Accessing base class elements through object

**Task-12.2** Execution flow of Constructors and Destructors in C++:

- a) WAP to illustrate the calling and execution flow of Constructors in inheritance. [L-2 Inheritance]
- b) WAP to illustrate the calling and execution flow of Destructors in inheritance. [L-2 Inheritance]
- c) Pass parameters to base class through derived class constructor. [L-1 Inheritance]

**Program 12****Task1 V1: Source Code:**

```
//accessing base class elements in child class
```

```
#include<iostream>
```

```
using namespace std;
```

```
class A{
```

```
private:
```

```
    int a; //inaccessible in child class
```

```
public:
```

```
    int b;
```

```
protected:
```

```
    int c;
```

```
};
```

```
class B:protected A{
```

```
public:
```

```
    void display(){
```

```
        b=10;
```

```
        c=15;
```

```
        cout<<"b="<<b<<" c="<<c<<endl;
```

```
}
```

```
};
```

```
int main(){
```

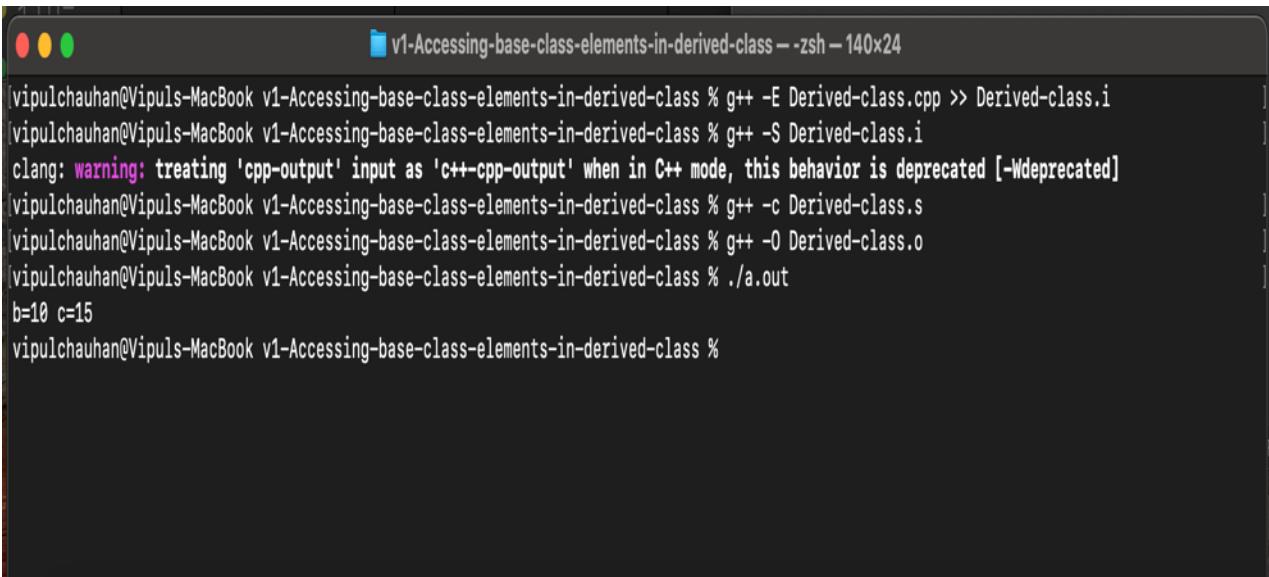
```
    B obj;
```

```
    obj.display();
```

```
    return 0;
```

```
}
```

## Task1 V1: Output



```
v1-Accessing-base-class-elements-in-derived-class --zsh - 140x24
[vipulchauhan@Vipuls-MacBook v1-Accessing-base-class-elements-in-derived-class % g++ -E Derived-class.cpp >> Derived-class.i
[vipulchauhan@Vipuls-MacBook v1-Accessing-base-class-elements-in-derived-class % g++ -S Derived-class.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v1-Accessing-base-class-elements-in-derived-class % g++ -c Derived-class.s
[vipulchauhan@Vipuls-MacBook v1-Accessing-base-class-elements-in-derived-class % g++ -O Derived-class.o
[vipulchauhan@Vipuls-MacBook v1-Accessing-base-class-elements-in-derived-class % ./a.out
b=10 c=15
vipulchauhan@Vipuls-MacBook v1-Accessing-base-class-elements-in-derived-class %
```

### Program 12

## **Task1 V2: Source Code:**

```

//accessing base class objects through child class objects

#include<iostream>

using namespace std;

class A{

private:
    int a; //inaccessible through child object

public:
    int b;

protected:
    int c; //inaccessible through child object

};

class B:public A{

public:
    void display()
    {
        cout<<"b="<<b<<endl;
    }

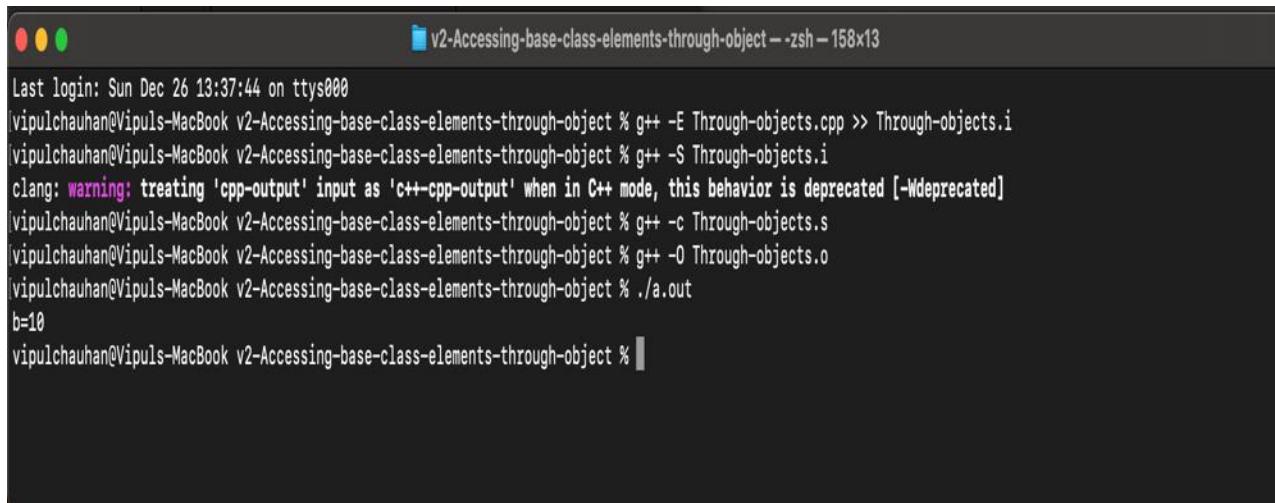
};

int main(){

    B obj;
    obj.b=10;
    obj.display();
    return 0;
}

```

## Task1 V2: Output



A screenshot of a terminal window titled "v2-Accessing-base-class-elements-through-object -- zsh - 158x13". The window shows the following command-line session:

```
Last login: Sun Dec 26 13:37:44 on ttys000
|vipulchauhan@Vipuls-MacBook v2-Accessing-base-class-elements-through-object % g++ -E Through-objects.cpp >> Through-objects.i
|vipulchauhan@Vipuls-MacBook v2-Accessing-base-class-elements-through-object % g++ -S Through-objects.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
|vipulchauhan@Vipuls-MacBook v2-Accessing-base-class-elements-through-object % g++ -c Through-objects.s
|vipulchauhan@Vipuls-MacBook v2-Accessing-base-class-elements-through-object % g++ -O Through-objects.o
|vipulchauhan@Vipuls-MacBook v2-Accessing-base-class-elements-through-object % ./a.out
b=10
vipulchauhan@Vipuls-MacBook v2-Accessing-base-class-elements-through-object %
```

### Program 12

## **Task2 V1: Source Code:**

//illustration of the calling and execution flow of constructors in inheritance

```
#include <iostream>
```

```
using namespace std;
```

```
class A
```

```
{
```

```
public:
```

```
    A()
```

```
{
```

```
    cout<<"Execution of Class A Constructor"<<endl;
```

```
}
```

```
};
```

```
class B:public A
```

```
{
```

```
public:
```

```
    B()
```

```
{
```

```
    cout<<"Execution of Class B Constructor"<<endl;
```

```
}
```

```
};
```

```
class C:public B
```

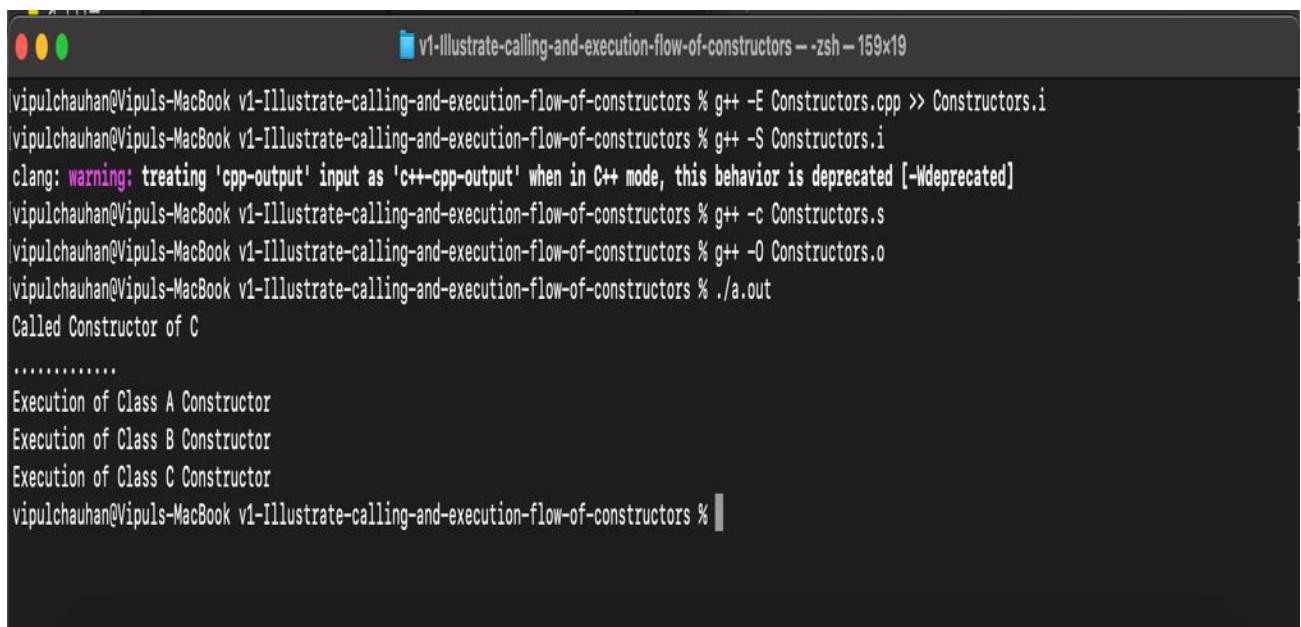
```
{
```

```
public:
```

```
    C()
```

```
{  
    cout << "Execution of Class C Constructor" << endl;  
}  
};  
  
int main()  
{  
    cout<<"Called Constructor of C"<<endl<<"....."  
    C obj;  
    return 0;  
}
```

## Task2 V1: Output



A screenshot of a terminal window titled "v1-illustrate-calling-and-execution-flow-of-constructors --zsh - 159x19". The terminal shows the following command sequence and output:

```
vipulchauhan@Vipuls-MacBook v1-Illustrate-calling-and-execution-flow-of-constructors % g++ -E Constructors.cpp >> Constructors.i
vipulchauhan@Vipuls-MacBook v1-Illustrate-calling-and-execution-flow-of-constructors % g++ -S Constructors.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
vipulchauhan@Vipuls-MacBook v1-Illustrate-calling-and-execution-flow-of-constructors % g++ -c Constructors.s
vipulchauhan@Vipuls-MacBook v1-Illustrate-calling-and-execution-flow-of-constructors % g++ -O Constructors.o
vipulchauhan@Vipuls-MacBook v1-Illustrate-calling-and-execution-flow-of-constructors % ./a.out
Called Constructor of C
.....
Execution of Class A Constructor
Execution of Class B Constructor
Execution of Class C Constructor
vipulchauhan@Vipuls-MacBook v1-Illustrate-calling-and-execution-flow-of-constructors %
```

### Program 12

## **Task2 V2: Source Code:**

```
//illustration of the calling and execution flow of destructors in inheritance
```

```
#include <iostream>
```

```
using namespace std;
```

```
class A
```

```
{
```

```
public:
```

```
~A()
```

```
{
```

```
cout<<"Execution of Class A Destructor"<<endl;
```

```
}
```

```
};
```

```
class B:public A
```

```
{
```

```
public:
```

```
~B()
```

```
{
```

```
cout<<"Execution of Class B Destructor"<<endl;
```

```
}
```

```
};
```

```
class C:public B
```

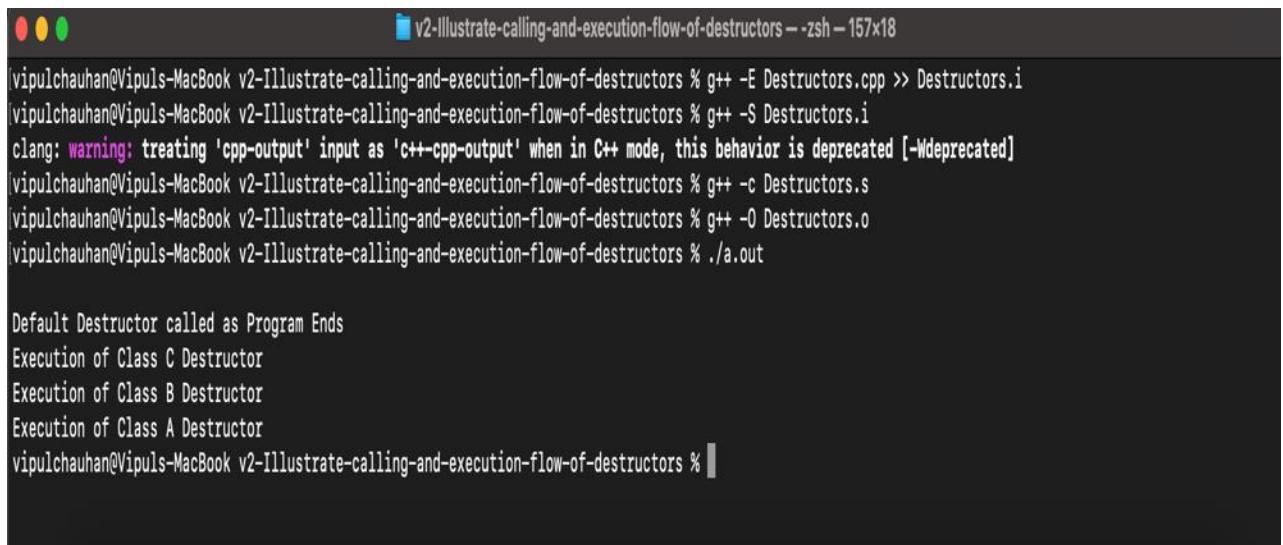
```
{
```

```
public:
```

```
~C()
```

```
{  
    cout<<"Execution of Class C Destructor"<<endl;  
}  
};  
  
int main()  
{  
    C obj;  
    cout<<endl<<"Default Destructor called as Program Ends"<<endl;  
    return 0;  
}
```

## Task2 V2: Output



The screenshot shows a terminal window titled "v2-Illustrate-calling-and-execution-flow-of-destructors --zsh - 157x18". The terminal displays the following command-line session:

```
vipulchauhan@Vipuls-MacBook v2-Illustrate-calling-and-execution-flow-of-destructors % g++ -E Destructors.cpp >> Destructors.i
vipulchauhan@Vipuls-MacBook v2-Illustrate-calling-and-execution-flow-of-destructors % g++ -S Destructors.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
vipulchauhan@Vipuls-MacBook v2-Illustrate-calling-and-execution-flow-of-destructors % g++ -c Destructors.s
vipulchauhan@Vipuls-MacBook v2-Illustrate-calling-and-execution-flow-of-destructors % g++ -O Destructors.o
vipulchauhan@Vipuls-MacBook v2-Illustrate-calling-and-execution-flow-of-destructors % ./a.out

Default Destructor called as Program Ends
Execution of Class C Destructor
Execution of Class B Destructor
Execution of Class A Destructor
vipulchauhan@Vipuls-MacBook v2-Illustrate-calling-and-execution-flow-of-destructors %
```

The output of the program shows the destruction of objects in reverse order of their creation: Class C, Class B, and Class A.

**Program 12****Task2 V3: Source Code:**

```
//passing parameters of base class through derived class constructors

#include <iostream>

using namespace std;

class A

{
public:
    int a;
    A(int k)
    {
        a=k;
        cout<<"a ="<<a<<endl;
    }
};

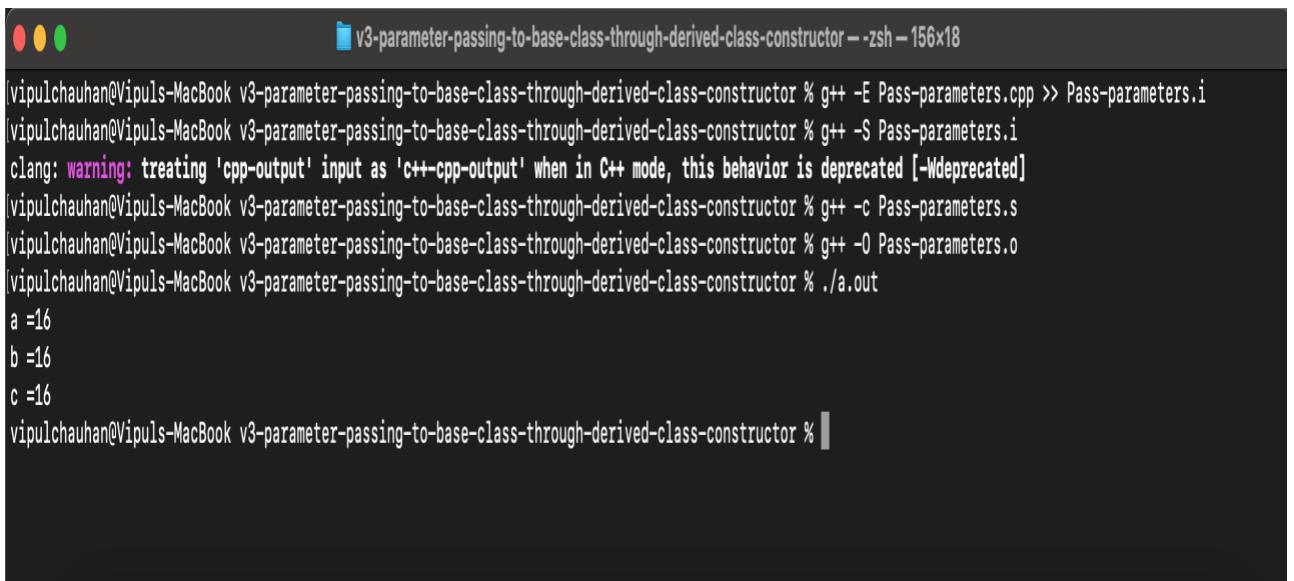
class B:public A
{
public:
    int b;
    B(int k):A(k)
    {
        b=k;
        cout<<"b ="<<b<<endl;
    }
};


```

```
class C:public B
{
public:
    int c;
    C(int k):B(k)
    {
        c=k;
        cout<<"c ="<<c<<endl;
    }
};

int main()
{
    C obj(16);
    return 0;
}
```

## Task2 V3: Output



```
v3-parameter-passing-to-base-class-through-derived-class-constructor % g++ -E Pass-parameters.cpp >> Pass-parameters.i
v3-parameter-passing-to-base-class-through-derived-class-constructor % g++ -S Pass-parameters.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
v3-parameter-passing-to-base-class-through-derived-class-constructor % g++ -c Pass-parameters.s
v3-parameter-passing-to-base-class-through-derived-class-constructor % g++ -O Pass-parameters.o
v3-parameter-passing-to-base-class-through-derived-class-constructor % ./a.out
a =16
b =16
c =16
v3-parameter-passing-to-base-class-through-derived-class-constructor %
```

## Program 13

**Q.** Write C++ code for below mentioned tasks?

Task 13.1 To overload add method for two parameters with int and float data types in Base class. Along with it create a Derived class from the Base class named as child. The class child should override one of the overloaded method from base class.

Perform following tasks:

1. Try calling overriding method from child class object.
2. Write name of the method which is not seen by the child class object

Create two versions:

version 01: without 'using' keyword

version 02: with 'using' keyword

Task 13.2 Base class having a virtual and a pure virtual function. Derived class having same copy of virtual function with changed logic and definition of pure virtual function.

Perform following tasks:

1. Try to call child class overriding method from base class pointer.
2. Try to call child class definition of pure virtual function in child class. 3. Find out the abstraction in above implementation.

## Program 13

### **Task1 V1: Source Code:**

```
/*
try to calling override method from child and base class.
without using
*/

```

```
#include <iostream>
```

```
#include <string>
```

```
using namespace std;
```

```
class Base
```

```
{
```

```
public:
```

```
//This will not be visible to the object of chid class as it has been overrided in the child
class
```

```
int add(int a, int b)
```

```
{
```

```
    return a+b;
```

```
}
```

```
//This will not be visible to the object of chid class as it has been overrided in the child
class
```

```
float add(float a, float b)
```

```
{
```

```
    return a+b;
```

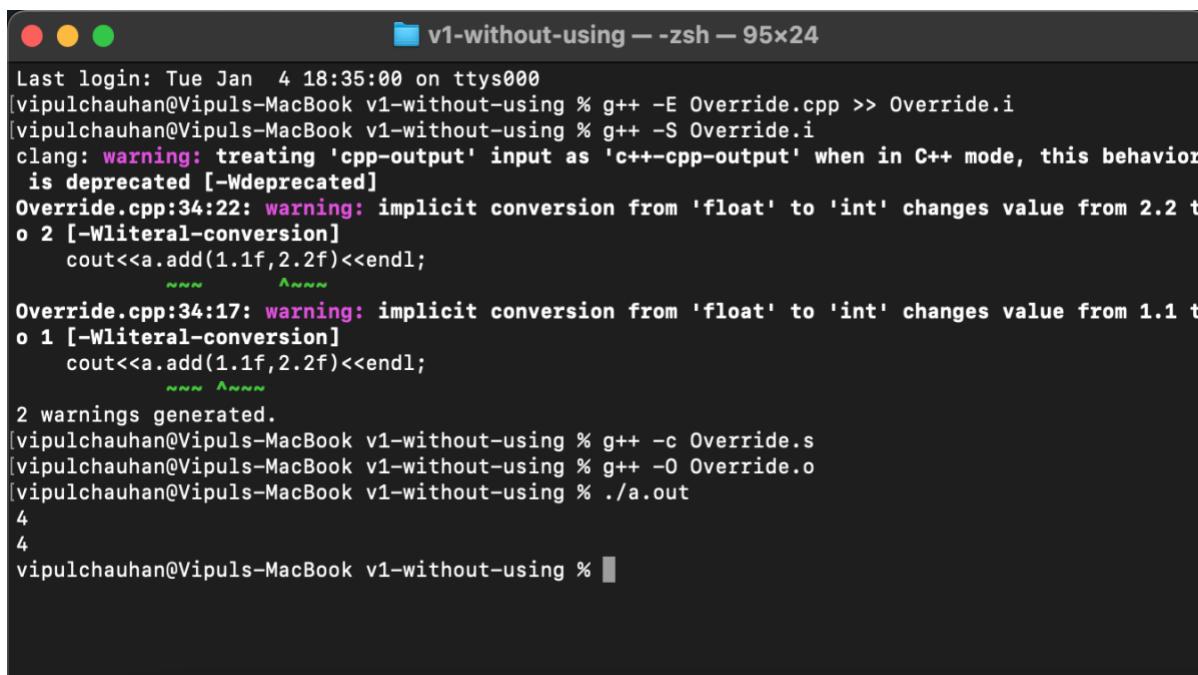
```
}
```

```
};
```

```
class Child:public Base
```

```
{  
public:  
    int add(int a, int b)  
    {  
        return a+b+1;  
    }  
};  
  
int main()  
{  
    Child a;  
    cout<<a.add(1,2)<<endl;  
    cout<<a.add(1.1f,2.2f)<<endl;  
    return 0;  
}
```

## Task1 V1: Output



A screenshot of a macOS terminal window titled "v1-without-using — zsh — 95x24". The window displays the following command-line session:

```
Last login: Tue Jan  4 18:35:00 on ttys000
[vipulchauhan@Vipuls-MacBook v1-without-using % g++ -E Override.cpp >> Override.i
[vipulchauhan@Vipuls-MacBook v1-without-using % g++ -S Override.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior
is deprecated [-Wdeprecated]
Override.cpp:34:22: warning: implicit conversion from 'float' to 'int' changes value from 2.2 t
o 2 [-Wliteral-conversion]
    cout<<a.add(1.1f,2.2f)<<endl;
    ~~~~ ^~~~
Override.cpp:34:17: warning: implicit conversion from 'float' to 'int' changes value from 1.1 t
o 1 [-Wliteral-conversion]
    cout<<a.add(1.1f,2.2f)<<endl;
    ~~~~ ^~~~
2 warnings generated.
[vipulchauhan@Vipuls-MacBook v1-without-using % g++ -c Override.s
[vipulchauhan@Vipuls-MacBook v1-without-using % g++ -O Override.o
[vipulchauhan@Vipuls-MacBook v1-without-using % ./a.out
4
4
vipulchauhan@Vipuls-MacBook v1-without-using %
```

**Program 13****Task1 V2: Source Code:**

```

/*
try to calling override method from child and base class.
with using
*/
#include <iostream>
#include <string>
using namespace std;

class Base
{
public:
    //This will not be visible to the object of chid class as it has been overrided in the child
    class
    int add(int a, int b)
    {
        return a+b;
    }
    float add(float a, float b)
    {
        return a+b;
    }
};

class Child:public Base
{
public:

```

```
using Base::add;

int add(int a, int b)

{

    return a+b+1;

}

};

int main()

{

    Child a;

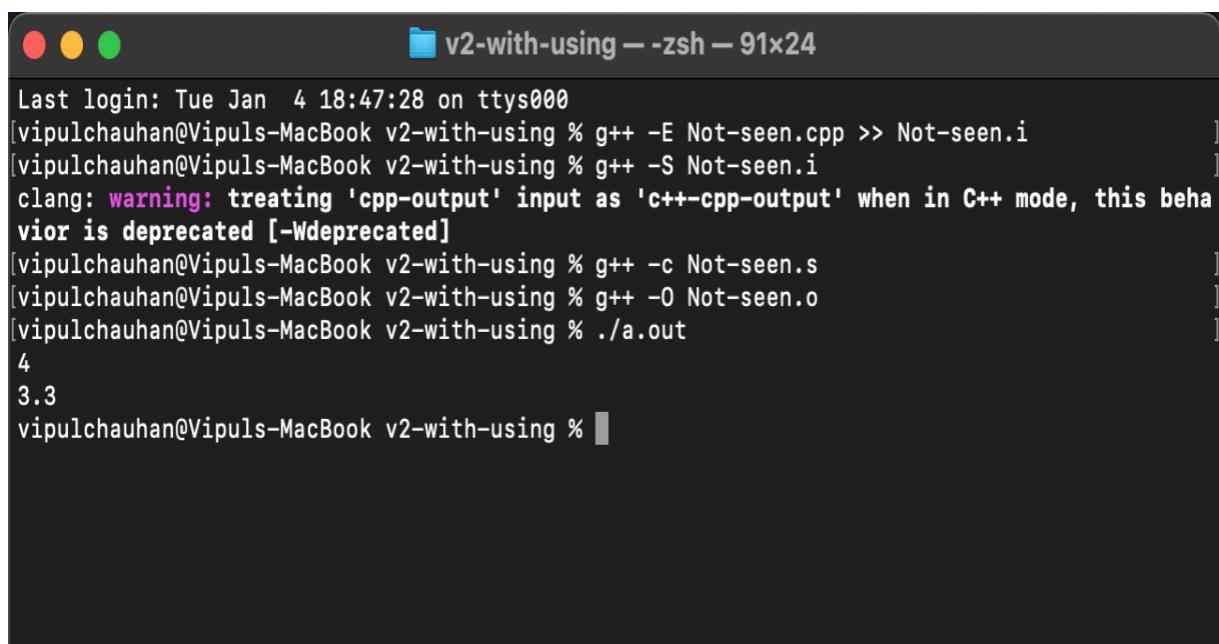
    cout<<a.add(1,2)<<endl;

    cout<<a.add(1.1f,2.2f)<<endl;

    return 0;

}
```

## Task1 V2: Output



A screenshot of a terminal window titled "v2-with-using — zsh — 91x24". The window shows a command-line session where a user is compiling a C++ program named "Not-seen.cpp" into an executable "a.out". The session includes a warning from the clang compiler about treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, which is deprecated. The user then runs the executable and sees the output "3.3".

```
Last login: Tue Jan  4 18:47:28 on ttys000
[vipulchauhan@Vipuls-MacBook v2-with-using % g++ -E Not-seen.cpp >> Not-seen.i
[vipulchauhan@Vipuls-MacBook v2-with-using % g++ -S Not-seen.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this beha
avior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v2-with-using % g++ -c Not-seen.s
[vipulchauhan@Vipuls-MacBook v2-with-using % g++ -O Not-seen.o
[vipulchauhan@Vipuls-MacBook v2-with-using % ./a.out
4
3.3
vipulchauhan@Vipuls-MacBook v2-with-using % ]
```

**Program 13****Task2 V1: Source Code:**

```

/*
to call child class overriding method from base class pointer
*/
#include<iostream>
using namespace std;
class Base
{
public:
    virtual int add(int a,int b)
    {
        return (a+b);
    }
};

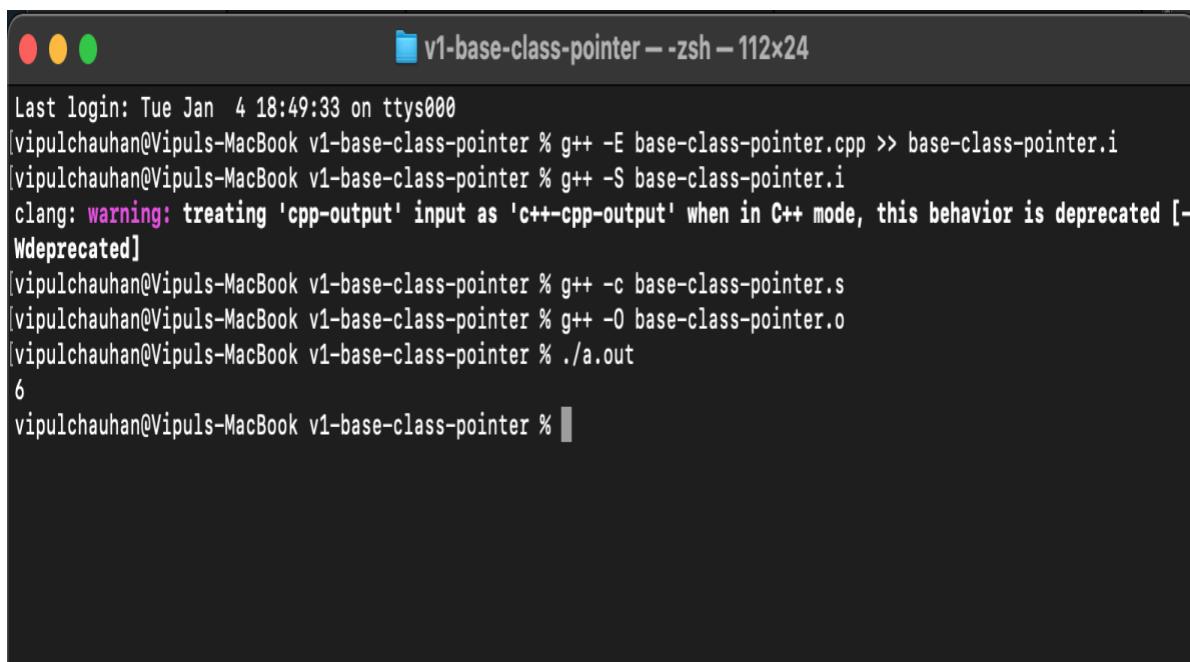
class Child:public Base
{
public:
    int add(int a,int b)
    {
        return (a+b+1);
    }
};

int main()
{

```

```
Base *p;  
Child c;  
p=&c;  
cout<<p->add(2,3)<<endl;  
return 0;  
}
```

## Task2 V1: Output



A screenshot of a terminal window titled "v1-base-class-pointer --zsh - 112x24". The window shows the following command-line session:

```
Last login: Tue Jan  4 18:49:33 on ttys000
[vipulchauhan@Vipuls-MacBook v1-base-class-pointer % g++ -E base-class-pointer.cpp >> base-class-pointer.i
[vipulchauhan@Vipuls-MacBook v1-base-class-pointer % g++ -S base-class-pointer.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v1-base-class-pointer % g++ -c base-class-pointer.s
[vipulchauhan@Vipuls-MacBook v1-base-class-pointer % g++ -O base-class-pointer.o
[vipulchauhan@Vipuls-MacBook v1-base-class-pointer % ./a.out
6
vipulchauhan@Vipuls-MacBook v1-base-class-pointer % ]
```

**Program 13****Task2 V2: Source Code:**

```

/*
 to call child class overriding method from base class pointer
 */

#include<iostream>

using namespace std;

class Base

{
public:
    virtual int add(int a,int b)
    {
        return (a+b);
    }

    virtual int multi(int a, int b)=0; // due to abstraction complier will not bind this function
    at compile time it will bind during runtime
};

class Child:public Base

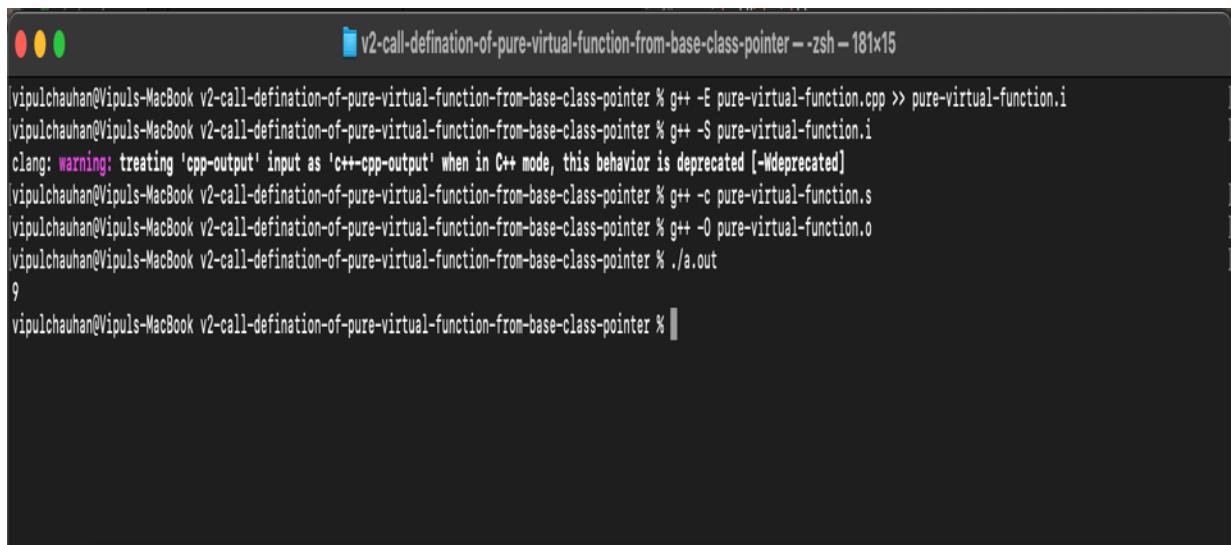
{
public:
    int add(int a,int b)
    {
        return (a+b+1);
    }

    int multi(int a, int b)
    {

```

```
    return a * b;  
}  
};  
  
int main()  
{  
    Base *p;  
    Child c;  
    p=&c;  
    cout<<p->multi(3,3)<<endl;  
    return 0;  
}
```

## Task2 V2: Output



A screenshot of a terminal window titled "v2-call-defination-of-pure-virtual-function-from-base-class-pointer --zsh - 18x15". The terminal shows the following command sequence:

```
vipulchauhan@Vipuls-MacBook v2-call-defination-of-pure-virtual-function-from-base-class-pointer % g++ -E pure-virtual-function.cpp >> pure-virtual-function.i  
vipulchauhan@Vipuls-MacBook v2-call-defination-of-pure-virtual-function-from-base-class-pointer % g++ -S pure-virtual-function.i  
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]  
vipulchauhan@Vipuls-MacBook v2-call-defination-of-pure-virtual-function-from-base-class-pointer % g++ -c pure-virtual-function.s  
vipulchauhan@Vipuls-MacBook v2-call-defination-of-pure-virtual-function-from-base-class-pointer % g++ -O pure-virtual-function.o  
vipulchauhan@Vipuls-MacBook v2-call-defination-of-pure-virtual-function-from-base-class-pointer % ./a.out  
9  
vipulchauhan@Vipuls-MacBook v2-call-defination-of-pure-virtual-function-from-base-class-pointer %
```

**Program 13****Task2 V3: Source Code:**

```

/*
 to show where the abstraction was implemented

#include <iostream>

#include <string>

using namespace std;

class base

{
public:
    virtual int add(int a, int b) // due to virtual keyword complier will ignore it during compile
    time
    {
        return a + b;
    }

    virtual int multi(int a, int b) = 0; // due to abstraction complier will not bind this function at
    compile time it will bind during runtime
};

class child : public base

{
public:
    int add(int a, int b) // during runtime this definition will be followed
    {
        return a + b + 1;
    }
}

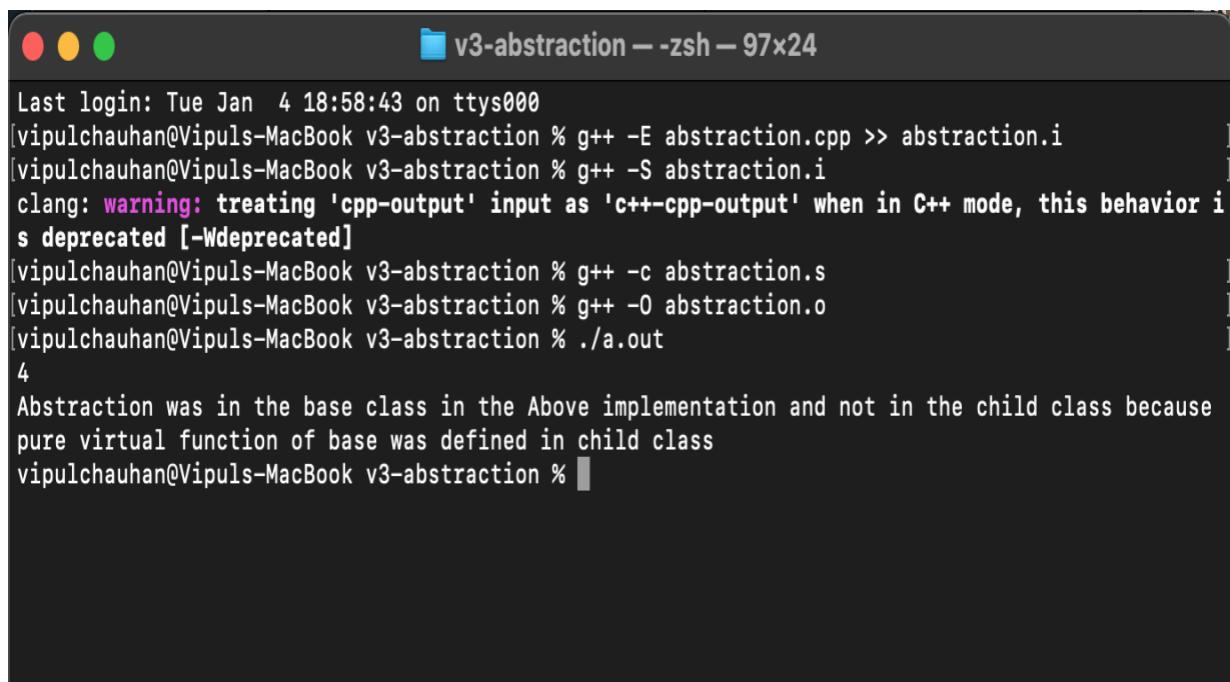
```

```
int multi(int a, int b)
{
    return a * b;
}

};

int main()
{
    base *p;
    child c;
    p = &c;
    cout<<p->multi(2,2)<<endl;
    cout<<"Abstraction was in the base class in the Above implementation and not in the child
class because pure virtual function of base was defined in child class"<<endl;
}
```

## Task2 V3: Output



```
Last login: Tue Jan  4 18:58:43 on ttys000
[vipulchauhan@Vipuls-MacBook v3-abstraction % g++ -E abstraction.cpp >> abstraction.i
[vipulchauhan@Vipuls-MacBook v3-abstraction % g++ -S abstraction.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v3-abstraction % g++ -c abstraction.s
[vipulchauhan@Vipuls-MacBook v3-abstraction % g++ -O abstraction.o
[vipulchauhan@Vipuls-MacBook v3-abstraction % ./a.out
4
Abstraction was in the base class in the Above implementation and not in the child class because
pure virtual function of base was defined in child class
vipulchauhan@Vipuls-MacBook v3-abstraction %
```

## Program 14

**Q.** Write C++ code for below mentioned tasks?

Task 14.1 Illustrate the compile time and run time binding using base class pointer, which holds the address of child class

Task 14.2 Perform the following:

1. Call base class destructor from base class pointer which is holding the child class object.
2. Call child class destructor from base class pointer which is holding the child class object.

## Program 14

### **Task1 V1: Source Code:**

```
#include<iostream>

using namespace std;

class Base

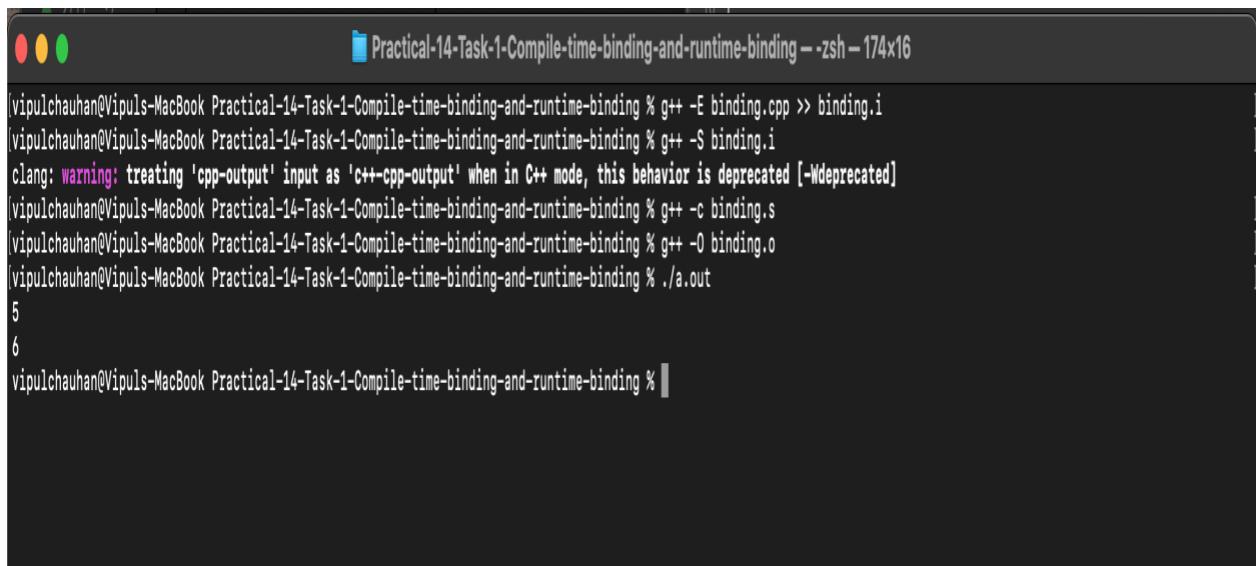
{
public:
    //Virtual base class
    //Late binding
    virtual int add(int a,int b)
    {
        return (a+b);
    }
    //Early binding
    int multi(int a,int b)
    {
        return (a*b);
    }
};

class Child:public Base
{
public:
    int add(int a,int b)
    {
        return (a+b+1);
    }
};


```

```
    }  
};  
  
int main()  
{  
    Base *p;  
    Child c;  
  
    p=&c;  
  
    cout<<p->add(2,2)<<endl; //Early binding or compile time binding  
  
    cout<<p->multi(2,3)<<endl;//Late binding or Dynamic binding  
  
    return 0;  
}
```

## Task1 V1: Output



```
vipulchauhan@Vipuls-MacBook Practical-14-Task-1-Compile-time-binding-and-runtime-binding % g++ -E binding.cpp >> binding.i
vipulchauhan@Vipuls-MacBook Practical-14-Task-1-Compile-time-binding-and-runtime-binding % g++ -S binding.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
vipulchauhan@Vipuls-MacBook Practical-14-Task-1-Compile-time-binding-and-runtime-binding % g++ -c binding.s
vipulchauhan@Vipuls-MacBook Practical-14-Task-1-Compile-time-binding-and-runtime-binding % g++ -O binding.o
vipulchauhan@Vipuls-MacBook Practical-14-Task-1-Compile-time-binding-and-runtime-binding % ./a.out
5
6
vipulchauhan@Vipuls-MacBook Practical-14-Task-1-Compile-time-binding-and-runtime-binding %
```

**Program 14****Task2 V1: Source Code:**

```

/*
 call parent or base class destructor from Base class pointer which is holding child class
object

*/
#include<iostream>

using namespace std;

class Base

{
public:
    Base()
    {
        cout<<"Base constructor"<<endl;
    }
    ~Base()
    {
        cout<<"Base destructor"<<endl;
    }
};

class Child:public Base
{
public:
    Child()
    {
        cout<<"Child constructor"<<endl;
    }
};


```

```
    }

~Child()

{

    cout<<"Child destructor"<<endl;

}

};

int main()

{

Base *p;

Child c;

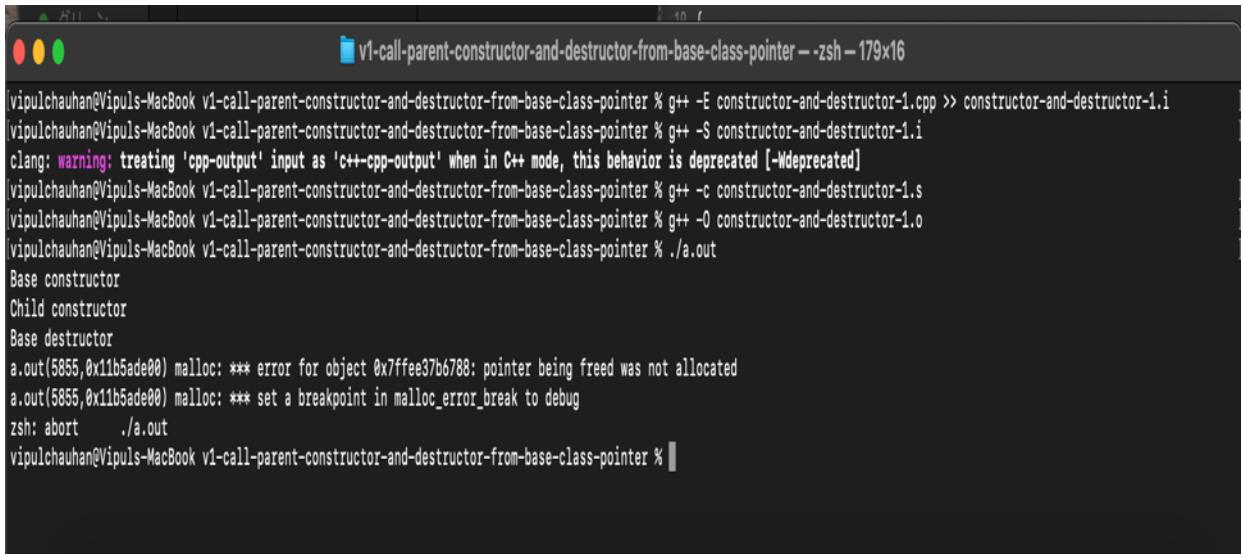
p=&c;

delete p;

return 0;

}
```

## Task2 V1: Output



A screenshot of a terminal window titled "v1-call-parent-constructor-and-destructor-from-base-class-pointer --zsh - 179x16". The terminal shows the following command-line session:

```
vipulchauhan@Vipuls-MacBook v1-call-parent-constructor-and-destructor-from-base-class-pointer % g++ -E constructor-and-destructor-1.cpp >> constructor-and-destructor-1.i
vipulchauhan@Vipuls-MacBook v1-call-parent-constructor-and-destructor-from-base-class-pointer % g++ -S constructor-and-destructor-1.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
vipulchauhan@Vipuls-MacBook v1-call-parent-constructor-and-destructor-from-base-class-pointer % g++ -c constructor-and-destructor-1.s
vipulchauhan@Vipuls-MacBook v1-call-parent-constructor-and-destructor-from-base-class-pointer % g++ -O constructor-and-destructor-1.o
vipulchauhan@Vipuls-MacBook v1-call-parent-constructor-and-destructor-from-base-class-pointer % ./a.out
Base constructor
Child constructor
Base destructor
a.out(5855,0x11b5ade00) malloc: *** error for object 0x7ffee37b6788: pointer being freed was not allocated
a.out(5855,0x11b5ade00) malloc: *** set a breakpoint in malloc_error_break to debug
zsh: abort      ./a.out
vipulchauhan@Vipuls-MacBook v1-call-parent-constructor-and-destructor-from-base-class-pointer %
```

## Program 14

### **Task2 V2: Source Code:**

```

/*
 call Child class destructor and then Base class destructor from Base class pointer which is
 holding child class object

*/
#include<iostream>

using namespace std;

class Base

{
public:
    Base()
    {
        cout<<"Base constructor"<<endl;
    }
    virtual ~Base()
    {
        cout<<"Base destructor"<<endl;
    }
};

class Child:public Base

{
public:
    Child()
    {

```

```
cout<<"Child constructor"<<endl;  
}  
  
~Child()  
{  
    cout<<"Child destructor"<<endl;  
}  
};  
  
int main()  
{  
    Base *p;  
    Child c;  
    p=&c;  
    delete p;  
    return 0;  
}
```

## Task2 V2: Output

```
vipulchauhan@Vipuls-MacBook v2-call-child-class-destructor-and-the-base-class-destructor-from-base-class-pointer % g++ -E constructor-and-destructor-2.cpp >> constructor-and-destructor-2.i
vipulchauhan@Vipuls-MacBook v2-call-child-class-destructor-and-the-base-class-destructor-from-base-class-pointer % g++ -S constructor-and-destructor-2.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
vipulchauhan@Vipuls-MacBook v2-call-child-class-destructor-and-the-base-class-destructor-from-base-class-pointer % g++ -c constructor-and-destructor-2.s
vipulchauhan@Vipuls-MacBook v2-call-child-class-destructor-and-the-base-class-destructor-from-base-class-pointer % g++ -O constructor-and-destructor-2.o
vipulchauhan@Vipuls-MacBook v2-call-child-class-destructor-and-the-base-class-destructor-from-base-class-pointer % ./a.out
Base constructor
Child constructor
Child destructor
Base destructor
a.out(5902,0x10eaf1e00) malloc: *** error for object 0x7ffee20e7758: pointer being freed was not allocated
a.out(5902,0x10eaf1e00) malloc: *** set a breakpoint in malloc_error_break to debug
zsh: abort      ./a.out
vipulchauhan@Vipuls-MacBook v2-call-child-class-destructor-and-the-base-class-destructor-from-base-class-pointer %
```

### **Program 15**

Q. Write C++ code for below mentioned tasks?

Task 15.1 WAP in C++ to read and write from and to a file using ifstream and ofstream.

Task 15.2 WAP in C++ to perform these tasks:

- a. Read from a file using fstream [char by char]
- b. Write into a file using fstream
- c. Append into a file using fstream
- d. Count total number of characters, words and lines in a file

Task 15.3 WAP in C++ for IO manipulators mentioned below:

- a. IOS: hex,dec,skipws,noskipws
- b. Istream: ws
- c. Ostream: endl, ends, flush
- d. Iomanip: setW, setPrecision

## Program 15

### **Task1 : Source Code:**

```

/*
program to read and write into the file using ifstream and ofstream

*/
#include<iostream>
#include<fstream>
using namespace std;
int main()
{
    ofstream write;
    ifstream read;
    string s,s2;
    cout<<"Enter the string : ";
    getline(cin,s);
    write.open("file.txt");
    write<<s;
    write.close();
    read.open("file.txt");
    getline(read,s2);
    read.close();
    cout<<"Content of file is : ";
    cout<<s2<<endl;
    return 0;
}

```

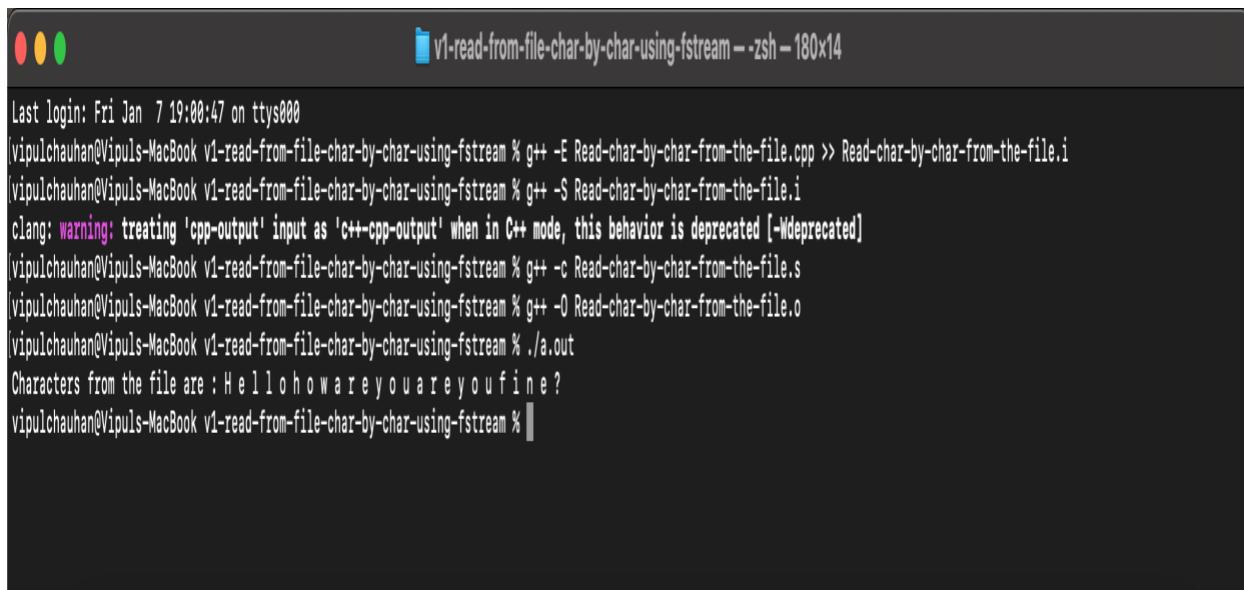
## Task1 : Output

```
vipulchauhan@Vipuls-MacBook Practical-15-Task-1-read-and-write-to-the-file-using-ifstream-and-ofstream % g++ -E Read-and-write-to-the-file.cpp >> Read-and-write-to-the-file.i
vipulchauhan@Vipuls-MacBook Practical-15-Task-1-read-and-write-to-the-file-using-ifstream-and-ofstream % g++ -S Read-and-write-to-the-file.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
vipulchauhan@Vipuls-MacBook Practical-15-Task-1-read-and-write-to-the-file-using-ifstream-and-ofstream % g++ -c Read-and-write-to-the-file.s
vipulchauhan@Vipuls-MacBook Practical-15-Task-1-read-and-write-to-the-file-using-ifstream-and-ofstream % g++ -O Read-and-write-to-the-file.o
vipulchauhan@Vipuls-MacBook Practical-15-Task-1-read-and-write-to-the-file-using-ifstream-and-ofstream % ./a.out
Enter the string : Hello how are you are you fine?
Content of file is : Hello how are you are you fine?
vipulchauhan@Vipuls-MacBook Practical-15-Task-1-read-and-write-to-the-file-using-ifstream-and-ofstream %
```

**Program 15****Task2 V1: Source Code:**

```
/*
program to read from the file character by character using fstream
*/
#include<iostream>
#include<fstream>
using namespace std;
int main()
{
    ifstream read;
    char s;
    read.open("file.txt");
    cout<<"Characters from the file are : ";
    while(read>>s)
    {
        cout<<s<<" ";
    }
    cout<<endl;
    read.close();
}
```

## Task2 V1: Output



The screenshot shows a terminal window titled "v1-read-from-file-char-by-char-using-fstream - zsh - 180x14". The terminal displays the following command-line session:

```
Last login: Fri Jan  7 19:00:47 on ttys000
[vipulchauhan@Vipuls-MacBook v1-read-from-file-char-by-char-using-fstream % g++ -E Read-char-by-char-from-the-file.cpp >> Read-char-by-char-from-the-file.i
[vipulchauhan@Vipuls-MacBook v1-read-from-file-char-by-char-using-fstream % g++ -S Read-char-by-char-from-the-file.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v1-read-from-file-char-by-char-using-fstream % g++ -c Read-char-by-char-from-the-file.s
[vipulchauhan@Vipuls-MacBook v1-read-from-file-char-by-char-using-fstream % g++ -O Read-char-by-char-from-the-file.o
[vipulchauhan@Vipuls-MacBook v1-read-from-file-char-by-char-using-fstream % ./a.out
Characters from the file are : H e l l o h o w a r e y o u a r e y o u f i n e ?
vipulchauhan@Vipuls-MacBook v1-read-from-file-char-by-char-using-fstream % ]
```

**Program 15****Task2 V2: Source Code:**

```
/*
program to write to the file using fstream

*/
#include<iostream>

#include<fstream>

using namespace std;

int main()

{

    fstream write;

    string s;

    cout<<"Enter the string : ";

    getline(cin,s);

    write.open("file.txt",ios::out);

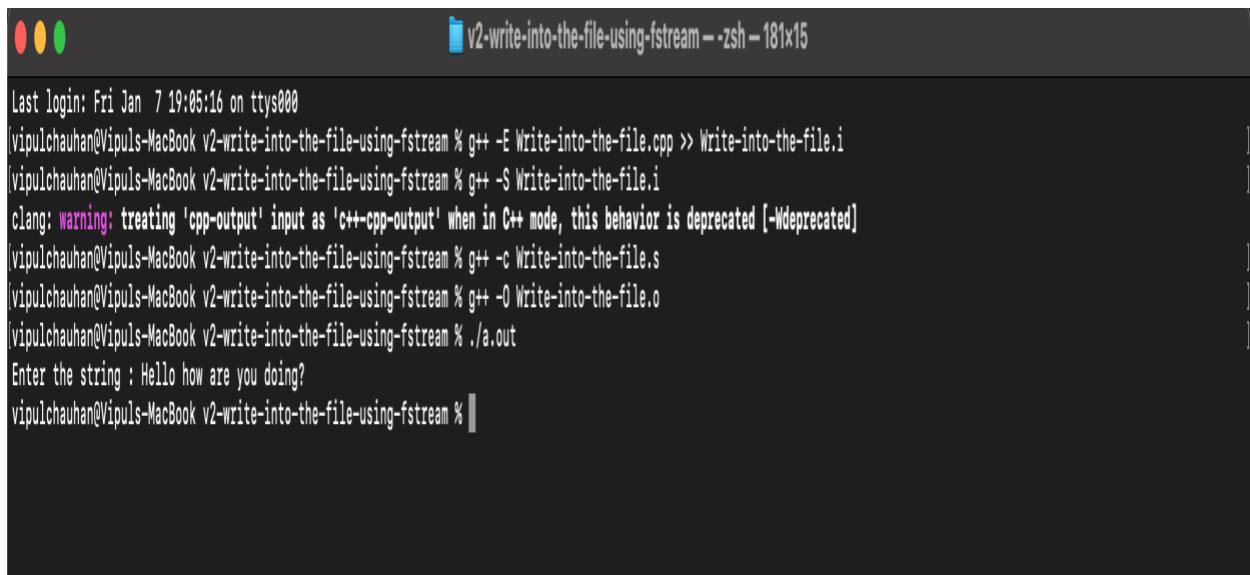
    write<<s;

    write.close();

    return 0;

}
```

## **Task2 V2: Output**



A screenshot of a terminal window titled "v2-write-into-the-file-using-fstream - zsh - 181x15". The terminal shows the following command-line session:

```
Last login: Fri Jan 7 19:05:16 on ttys000
[vipulchauhan@Vipuls-MacBook v2-write-into-the-file-using-fstream % g++ -E Write-into-the-file.cpp >> Write-into-the-file.i
[vipulchauhan@Vipuls-MacBook v2-write-into-the-file-using-fstream % g++ -S Write-into-the-file.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v2-write-into-the-file-using-fstream % g++ -c Write-into-the-file.s
[vipulchauhan@Vipuls-MacBook v2-write-into-the-file-using-fstream % g++ -O Write-into-the-file.o
[vipulchauhan@Vipuls-MacBook v2-write-into-the-file-using-fstream % ./a.out
Enter the string : Hello how are you doing?
vipulchauhan@Vipuls-MacBook v2-write-into-the-file-using-fstream % ]
```

**Program 15****Task2 V3: Source Code:**

```
/*
program to append to a file using fstream

#include<iostream>

#include<fstream>

using namespace std;

int main()

{

    fstream write;

    string s;

    cout<<"Enter the string : ";

    getline(cin,s);

    write.open("file.txt",ios::out | ios::app);

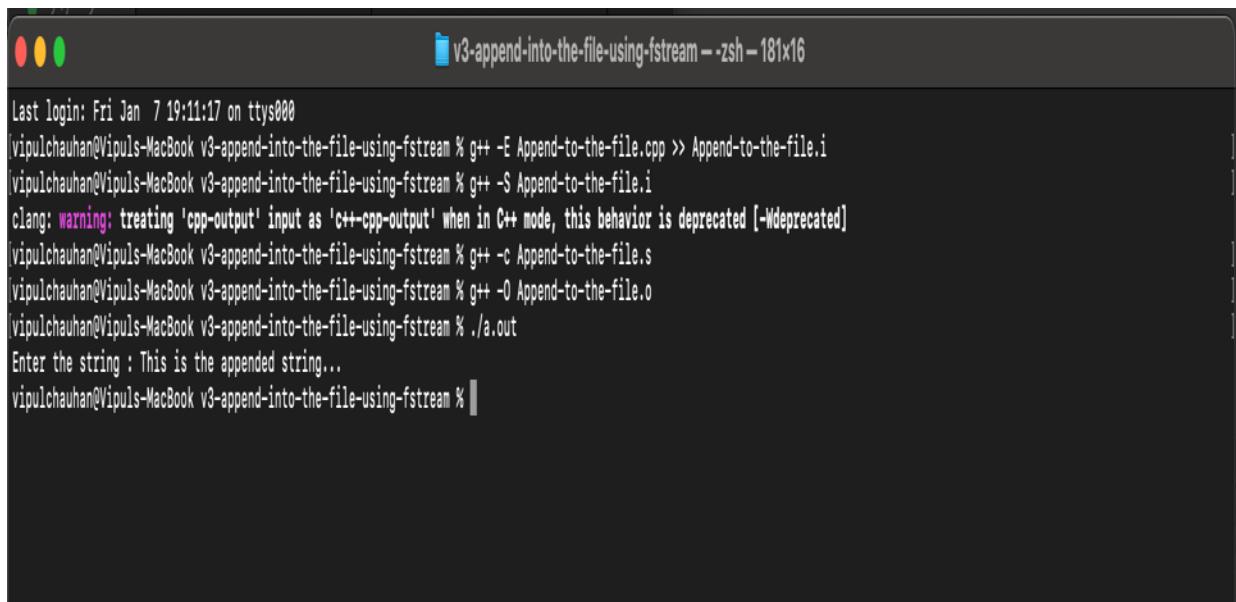
    write<< " "<<s;

    write.close();

    return 0;

}
```

## Task2 V3: Output



A screenshot of a terminal window titled "v3-append-into-the-file-using-fstream -- zsh - 181x16". The window shows the following command-line session:

```
Last login: Fri Jan  7 19:11:17 on ttys000
vipulchauhan@Vipuls-MacBook v3-append-into-the-file-using-fstream % g++ -E Append-to-the-file.cpp >> Append-to-the-file.i
vipulchauhan@Vipuls-MacBook v3-append-into-the-file-using-fstream % g++ -S Append-to-the-file.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
vipulchauhan@Vipuls-MacBook v3-append-into-the-file-using-fstream % g++ -c Append-to-the-file.s
vipulchauhan@Vipuls-MacBook v3-append-into-the-file-using-fstream % g++ -O Append-to-the-file.o
vipulchauhan@Vipuls-MacBook v3-append-into-the-file-using-fstream % ./a.out
Enter the string : This is the appended string...
vipulchauhan@Vipuls-MacBook v3-append-into-the-file-using-fstream %
```

**Program 15****Task2 V4: Source Code:**

```
#include<iostream>
#include<fstream>
#include<cstring>
#include<cstdlib>

using namespace std;

int main()
{
    int chr=0,word=0,line=1;

    FILE *fr;
    char ch;

    fr=fopen("file.txt","r");

    ch=fgetc(fr);

    while(ch!=EOF)
    {
        if(ch!=' '&& ch!='\n')
            chr++;

        if(ch==' ')
            word++;

        if(ch=='\n')
        {
            line++;
            word++;
        }
    }
}
```

```
}

ch=fgetc(fr);

}

fclose(fr);

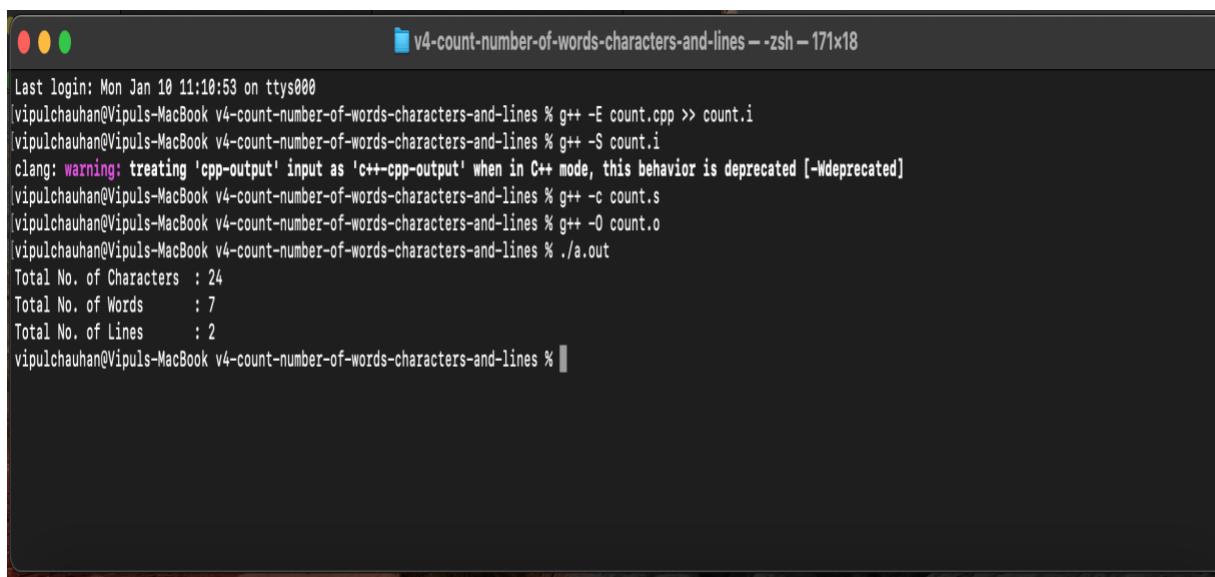
cout<<"Total No. of Characters : "<<chr<<endl;

cout<<"Total No. of Words      : "<<word<<endl;

cout<<"Total No. of Lines       : "<<line<<endl;

}
```

## Task2 V4: Output



The screenshot shows a terminal window titled "v4-count-number-of-words-characters-and-lines -- zsh - 171x18". The terminal displays the following command-line session:

```
Last login: Mon Jan 10 11:10:53 on ttys000
[vipulchauhan@Vipuls-MacBook v4-count-number-of-words-characters-and-lines % g++ -E count.cpp >> count.i
[vipulchauhan@Vipuls-MacBook v4-count-number-of-words-characters-and-lines % g++ -S count.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v4-count-number-of-words-characters-and-lines % g++ -c count.s
[vipulchauhan@Vipuls-MacBook v4-count-number-of-words-characters-and-lines % g++ -O count.o
[vipulchauhan@Vipuls-MacBook v4-count-number-of-words-characters-and-lines % ./a.out
Total No. of Characters : 24
Total No. of Words       : 7
Total No. of Lines        : 2
vipulchauhan@Vipuls-MacBook v4-count-number-of-words-characters-and-lines % ]
```

**Program 15****Task3 V1: Source Code:**

```

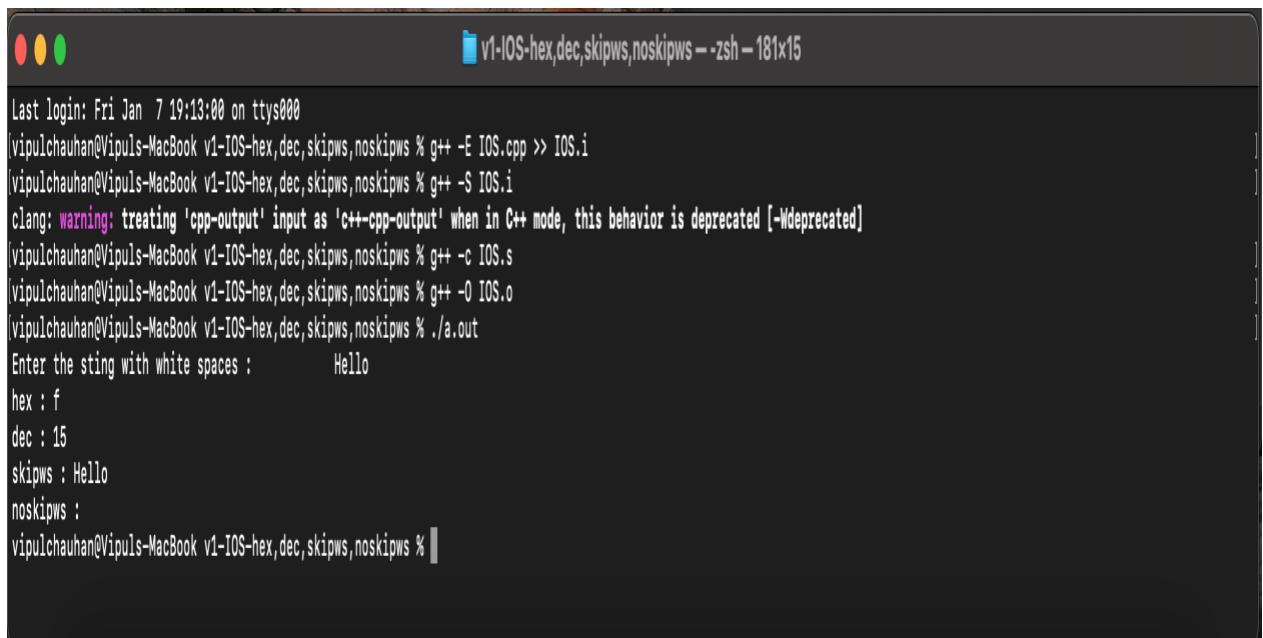
/*
program to use IO manipulators
IOS:hex,dec,skipws,noskipws

*/
#include<iostream>
#include<sstream>
using namespace std;

int main()
{
    int N=15;
    string s,s2,s3;
    cout<<"Enter the sting with white spaces : ";
    getline(cin,s2);
    stringstream ss(s2);
    ss>>skipws>>s;
    ss>>noskipws>>s3;
    cout<<"hex : "<<hex<<N<<endl;
    cout<<"dec : "<<dec<<N<<endl;
    cout<<"skipws : "<<s<<endl;
    cout<<"noskipws : "<<s3<<endl;
    return 0;
}

```

### **Task3 V1: Output**



A screenshot of a terminal window titled "v1-IOS-hex,dec,skipws,noskipws --zsh - 181x15". The terminal shows the following session:

```
Last login: Fri Jan  7 19:13:00 on ttys000
[vipulchauhan@Vipuls-MacBook v1-IOS-hex,dec,skipws,noskipws % g++ -E IOS.cpp >> IOS.i
[vipulchauhan@Vipuls-MacBook v1-IOS-hex,dec,skipws,noskipws % g++ -S IOS.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v1-IOS-hex,dec,skipws,noskipws % g++ -c IOS.s
[vipulchauhan@Vipuls-MacBook v1-IOS-hex,dec,skipws,noskipws % g++ -O IOS.o
[vipulchauhan@Vipuls-MacBook v1-IOS-hex,dec,skipws,noskipws % ./a.out
Enter the sting with white spaces :      Hello
hex : f
dec : 15
skipws : Hello
noskipws :
vipulchauhan@Vipuls-MacBook v1-IOS-hex,dec,skipws,noskipws %
```

**Program 15****Task3 V2: Source Code:**

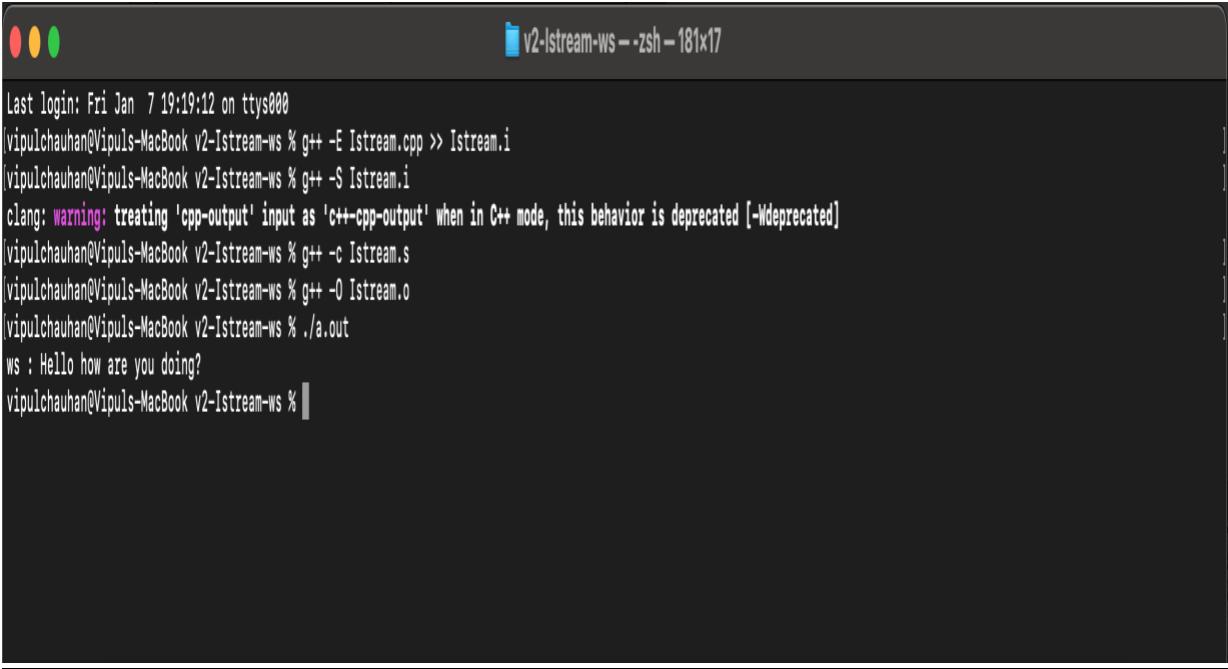
```
/*
program to use IO manipulators

Istream:ws

*/
#include<iostream>
#include<fstream>
using namespace std;

int main()
{
    ifstream read;
    read.open("file.txt");
    string s;
    getline(read>>ws,s);
    cout<<"ws : "<<s<<endl;
    read.close();
    return 0;
}
```

## Task3 V2: Output



```
Last login: Fri Jan  7 19:19:12 on ttys000
|vipulchauhan@Vipuls-MacBook v2-Istream-ws % g++ -E Istream.cpp >> Istream.i
|vipulchauhan@Vipuls-MacBook v2-Istream-ws % g++ -S Istream.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
|vipulchauhan@Vipuls-MacBook v2-Istream-ws % g++ -c Istream.s
|vipulchauhan@Vipuls-MacBook v2-Istream-ws % g++ -O Istream.o
|vipulchauhan@Vipuls-MacBook v2-Istream-ws % ./a.out
ws : Hello how are you doing?
vipulchauhan@Vipuls-MacBook v2-Istream-ws % |
```

## Program 15

### **Task3 V3: Source Code:**

```

/*
program to use IO manipulators

Ostream: endl, ends, flush

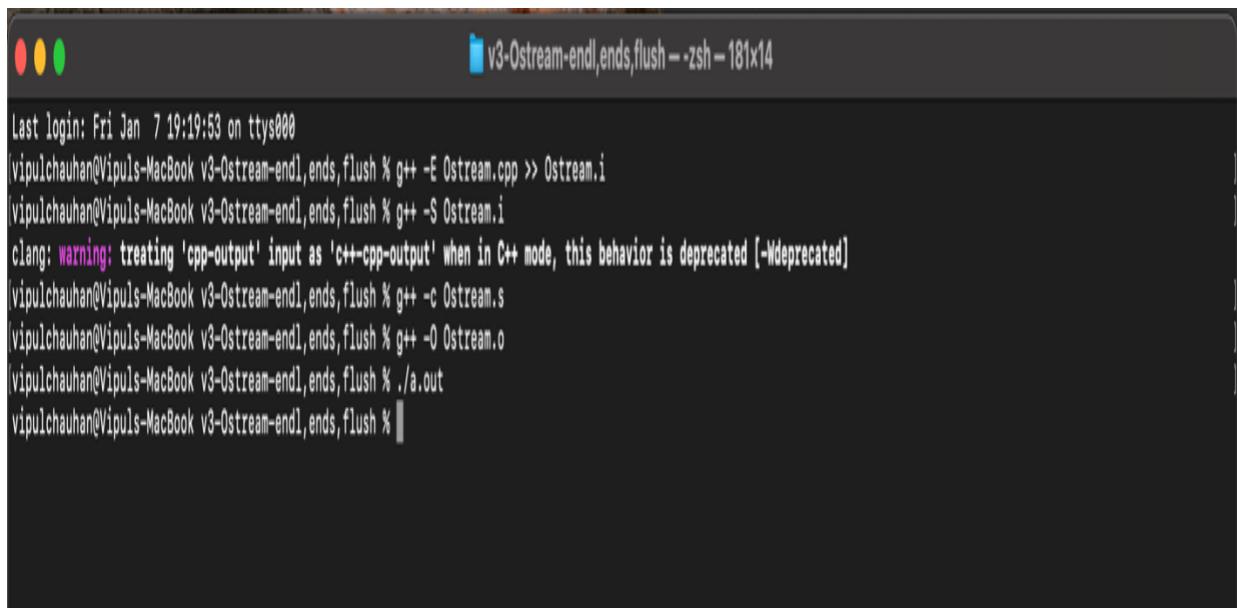
*/
#include<iostream>
#include<sstream>
#include<fstream>

using namespace std;

int main()
{
    ofstream write;
    write.open("file.txt");
    for(int n=0;n<10;n++)
    {
        write<<n<<ends;
        write<<n+1<<endl;
        write.flush();
    }
    write.close();
    return 0;
}

```

### **Task3 V3: Output**



A screenshot of a terminal window titled "v3-Ostream-endl,ends,flush - zsh - 181x14". The window shows the following command-line session:

```
Last login: Fri Jan  7 19:19:53 on ttys000
|vipulchauhan@Vipuls-MacBook v3-Ostream-> g++ -E Ostream.cpp >> Ostream.i
|vipulchauhan@Vipuls-MacBook v3-Ostream-> g++ -S Ostream.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
|vipulchauhan@Vipuls-MacBook v3-Ostream-> g++ -c Ostream.s
|vipulchauhan@Vipuls-MacBook v3-Ostream-> g++ -O Ostream.o
|vipulchauhan@Vipuls-MacBook v3-Ostream-> ./a.out
vipulchauhan@Vipuls-MacBook v3-Ostream->
```

**Program 15****Task3 V4: Source Code:**

```
/*
program to use IO manipulators

Iomanip:setW,setPrecision

*/
#include<iostream>

#include<iomanip>

using namespace std;

int main()

{

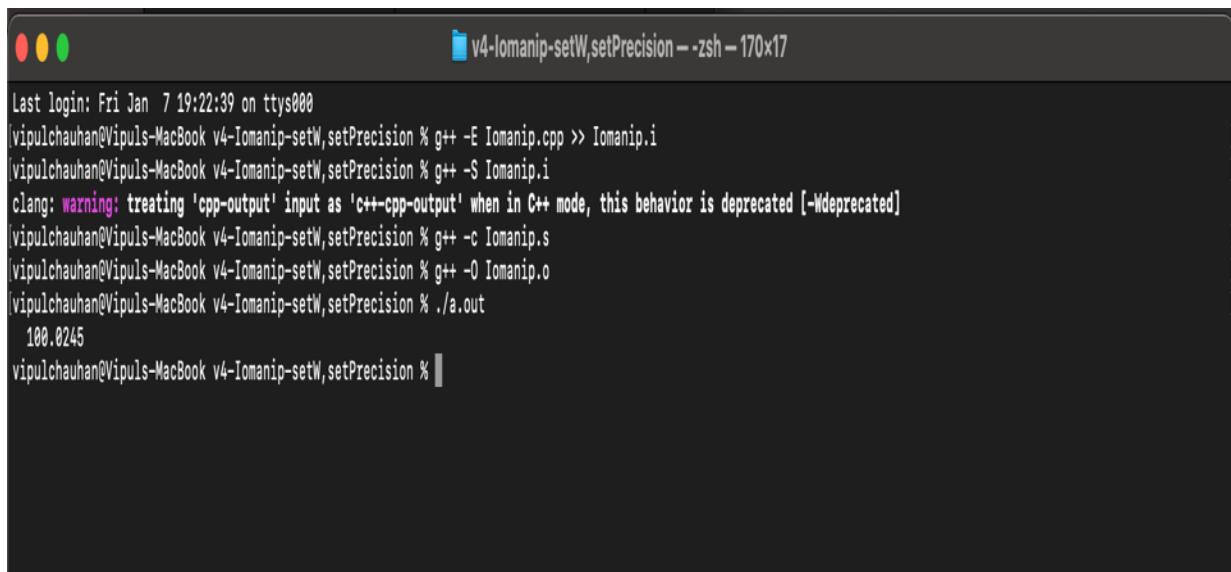
    float a=100.0245;

    cout<<setw(10)<<setprecision(4)<<fixed<<a<<endl;

    return 0;

}
```

### **Task3 V4: Output**



```
Last login: Fri Jan  7 19:22:39 on ttys000
[vipulchauhan@Vipuls-MacBook v4-Iomanip-setW,setPrecision % g++ -E Iomanip.cpp >> Iomanip.i
[vipulchauhan@Vipuls-MacBook v4-Iomanip-setW,setPrecision % g++ -S Iomanip.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v4-Iomanip-setW,setPrecision % g++ -c Iomanip.s
[vipulchauhan@Vipuls-MacBook v4-Iomanip-setW,setPrecision % g++ -O Iomanip.o
[vipulchauhan@Vipuls-MacBook v4-Iomanip-setW,setPrecision % ./a.out
 100.0245
vipulchauhan@Vipuls-MacBook v4-Iomanip-setW,setPrecision % ]
```

## Program 16

**Q.** Write C++ code for below mentioned tasks?

Task 16.1 WAP in C++ to create a generic add function for given tasks:

- Perform add over two integers and return integer
- Perform add over one int and one float and return double

Task 16.2 WAP in C++ to perform these tasks:

- Catch a Divide by zero exception in  $z = x/y$  using "throw runtime\_error"
- What will be the output of this program and why?

```
#include <iostream>
using namespace std;
int main() {
    try {
        throw 'a';
    }
    catch (int x) {
        cout << "Caught " << x;
    }
    catch (...) {
        cout << "Default Exception\n";
    }
    return 0;
}
```

- What will be the output of this program and why?

```
#include <iostream>
using namespace std;
int main() {
    try {
        throw 'a';
    }
    catch (int x) {
        cout << "Caught ";
    }
    return 0;
}
```

- Rethrow and catch an exception by creating a separate user defined divide function for condition divide by zero.

**Program 16****Task1 V1: Source Code:**

```

/*
    program to create a generic function to add two integers numbers and return integer
number

*/
#include<iostream>

using namespace std;

template <typename A>

A add(A a,A b)

{
    return (a+b);

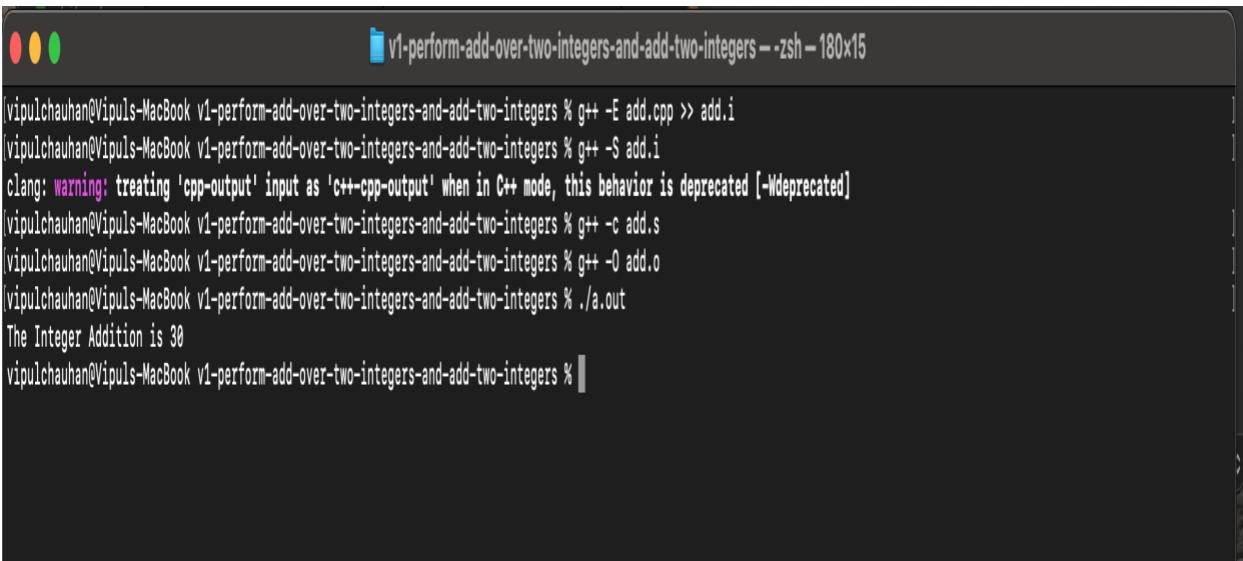
}

int main()

{
    int x=10,y=20;
    cout<<"The Integer Addition is "<<add(x,y)<<endl;
    return 0;
}

```

## Task1 V1: Output



A screenshot of a terminal window titled "v1-perform-add-over-two-integers-and-add-two-integers --zsh - 180x15". The terminal shows the following command-line session:

```
vipulchauhan@Vipuls-MacBook v1-perform-add-over-two-integers-and-add-two-integers % g++ -E add.cpp >> add.i  
vipulchauhan@Vipuls-MacBook v1-perform-add-over-two-integers-and-add-two-integers % g++ -S add.i  
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]  
vipulchauhan@Vipuls-MacBook v1-perform-add-over-two-integers-and-add-two-integers % g++ -c add.s  
vipulchauhan@Vipuls-MacBook v1-perform-add-over-two-integers-and-add-two-integers % g++ -O add.o  
vipulchauhan@Vipuls-MacBook v1-perform-add-over-two-integers-and-add-two-integers % ./a.out  
The Integer Addition is 30  
vipulchauhan@Vipuls-MacBook v1-perform-add-over-two-integers-and-add-two-integers %
```

**Program 16****Task1 V2: Source Code:**

```

/*
    program to create a generic function to add one integer and float numbers and return
double number

*/
#include<iostream>
#include<iomanip>
using namespace std;

template <typename A,typename B,typename C>
C add(A a,B b)

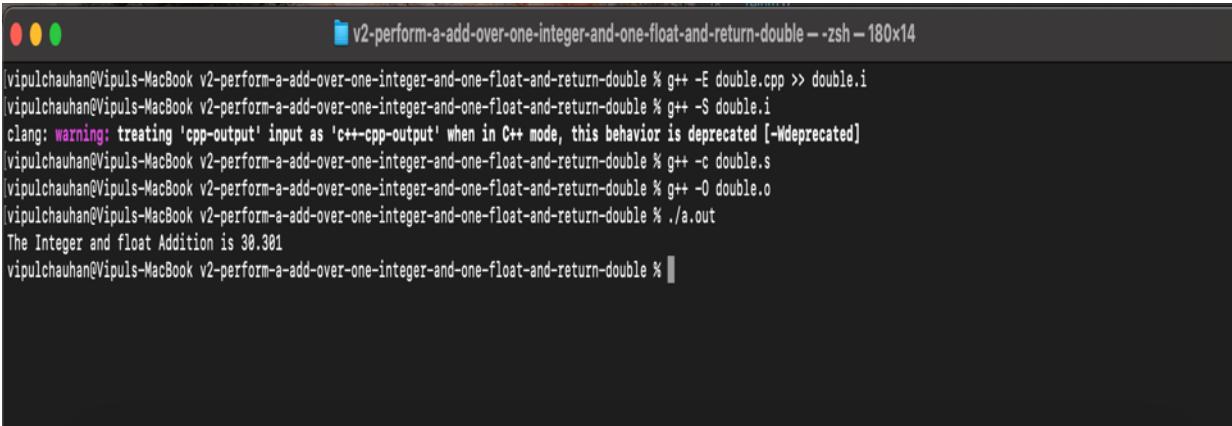
{
    return (a+b);

}

int main()
{
    int x=10;
    float y=20.301;
    cout<<"The Integer and float Addition is
"<<setprecision(3)<<fixed<<add<int,float,double>(x,y)<<endl;
    return 0;
}

```

## Task1 V2: Output



```
v2-perform-a-add-over-one-integer-and-one-float-and-return-double -- zsh - 180x14
[vipulchauhan@Vipuls-MacBook v2-perform-a-add-over-one-integer-and-one-float-and-return-double % g++ -E double.cpp >> double.i
[vipulchauhan@Vipuls-MacBook v2-perform-a-add-over-one-integer-and-one-float-and-return-double % g++ -S double.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook v2-perform-a-add-over-one-integer-and-one-float-and-return-double % g++ -c double.s
[vipulchauhan@Vipuls-MacBook v2-perform-a-add-over-one-integer-and-one-float-and-return-double % g++ -O double.o
[vipulchauhan@Vipuls-MacBook v2-perform-a-add-over-one-integer-and-one-float-and-return-double % ./a.out
The Integer and float Addition is 30.301
vipulchauhan@Vipuls-MacBook v2-perform-a-add-over-one-integer-and-one-float-and-return-double % ]
```

**Program 16****Task2 V1: Source Code:**

```

/*
program to Catch a Divide by zero exception in z=x/y using "throw runtime_error"

*/
#include <iostream>
#include <stdexcept>
using namespace std;

float Division(float num,float den)

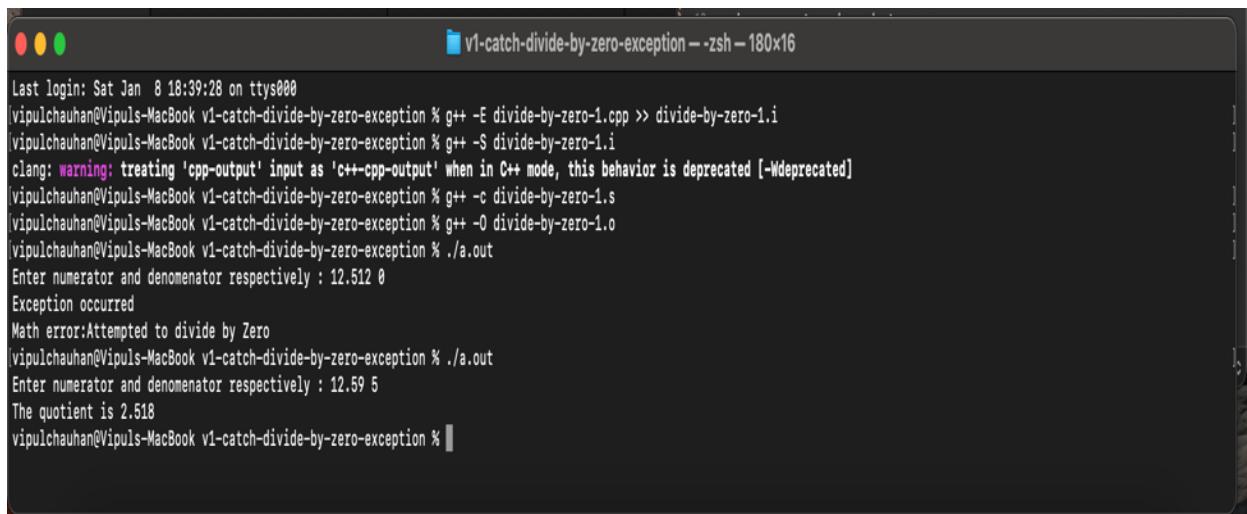
{
    if(den==0)
    {
        throw runtime_error("Math error:Attempted to divide by Zero\n");
    }
    return(num/den);
}

int main()
{
    float numerator,denominator,result;
    cout<<"Enter numerator and denominator respectively : ";
    cin>>numerator>>denominator;
    try
    {
        result=Division(numerator,denominator);
        cout<<"The quotient is "<<result<<endl;
    }
}

```

```
    }  
  
    catch(runtime_error& e)  
  
    {  
  
        cout<<"Exception occurred"<<endl<<e.what();  
  
    }  
  
    return 0;  
  
}
```

## Task2 V1: Output



A terminal window titled "v1-catch-divide-by-zero-exception --zsh - 180x16". The window displays the following text:

```
Last login: Sat Jan  8 18:39:28 on ttys000
vipulchauhan@Vipuls-MacBook v1-catch-divide-by-zero-exception % g++ -E divide-by-zero-1.cpp >> divide-by-zero-1.i
vipulchauhan@Vipuls-MacBook v1-catch-divide-by-zero-exception % g++ -S divide-by-zero-1.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
vipulchauhan@Vipuls-MacBook v1-catch-divide-by-zero-exception % g++ -c divide-by-zero-1.s
vipulchauhan@Vipuls-MacBook v1-catch-divide-by-zero-exception % g++ -O divide-by-zero-1.o
vipulchauhan@Vipuls-MacBook v1-catch-divide-by-zero-exception % ./a.out
Enter numerator and denominator respectively : 12.512 0
Exception occurred
Math error:Attempted to divide by Zero
vipulchauhan@Vipuls-MacBook v1-catch-divide-by-zero-exception % ./a.out
Enter numerator and denominator respectively : 12.59 5
The quotient is 2.518
vipulchauhan@Vipuls-MacBook v1-catch-divide-by-zero-exception %
```

**Program 16****Task2 V2: Source Code:**

```
/*

```

What will be the output of this program and why?

```
*/

```

```
#include <iostream>
```

```
using namespace std;
```

```
int main()
```

```
{
```

```
try
```

```
{
```

```
    throw 'a';
```

```
}
```

```
catch(int x)
```

```
{
```

```
    cout<<"Caught "<<x;
```

```
}
```

```
catch(...)
```

```
{
```

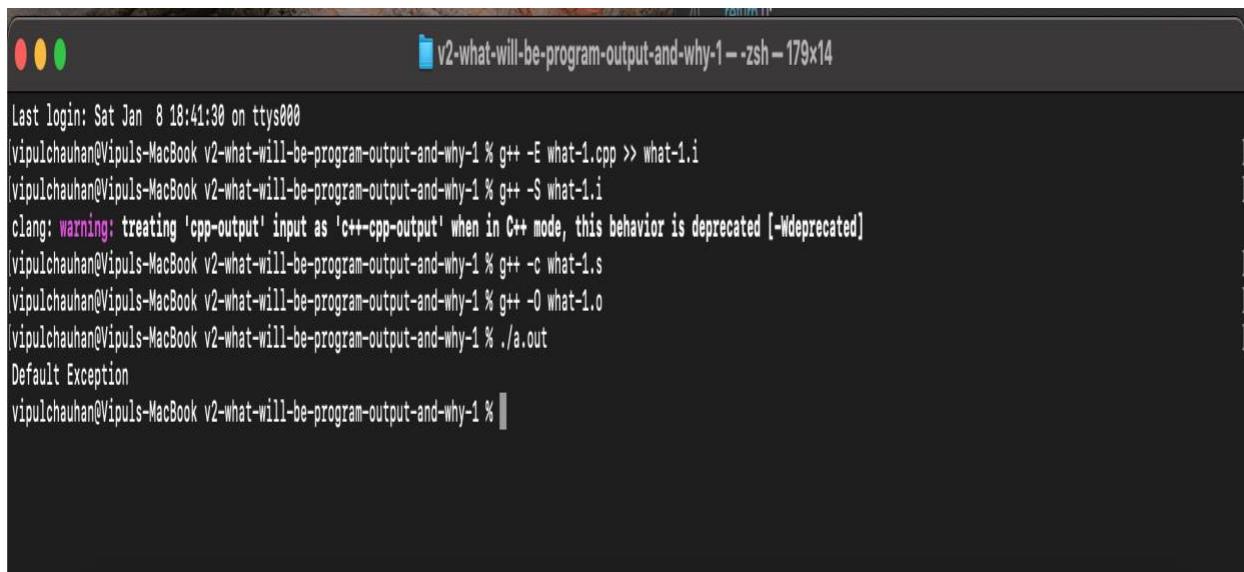
```
    cout<<"Default Exception\n";
```

```
}
```

```
return 0;
```

```
}
```

## Task2 V2: Output



```
Last login: Sat Jan  8 18:41:30 on ttys000
|vipulchauhan@Vipuls-MacBook v2-what-will-be-program-output-and-why-1 % g++ -E what-1.cpp >> what-1.i
|vipulchauhan@Vipuls-MacBook v2-what-will-be-program-output-and-why-1 % g++ -S what-1.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
|vipulchauhan@Vipuls-MacBook v2-what-will-be-program-output-and-why-1 % g++ -c what-1.s
|vipulchauhan@Vipuls-MacBook v2-what-will-be-program-output-and-why-1 % g++ -O what-1.o
|vipulchauhan@Vipuls-MacBook v2-what-will-be-program-output-and-why-1 % ./a.out
Default Exception
vipulchauhan@Vipuls-MacBook v2-what-will-be-program-output-and-why-1 % |
```

**Program 16****Task2 V3: Source Code:**

```
/*
```

What will be the output of this program and why?

```
*/
```

```
#include <iostream>
```

```
using namespace std;
```

```
int main()
```

```
{
```

```
    try
```

```
    {
```

```
        throw 'a';
```

```
}
```

```
    catch(int x)
```

```
{
```

```
        cout<<"Caught ";
```

```
}
```

```
    return 0;
```

```
}
```

## Task2 V3: Output

```
Last login: Sat Jan  8 18:45:09 on ttys000
|vipulchauhan@Vipuls-MacBook v3-what-will-be-program-output-and-why-2 % g++ -E what-2.cpp >> what-2.i
|vipulchauhan@Vipuls-MacBook v3-what-will-be-program-output-and-why-2 % g++ -S what-2.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
|vipulchauhan@Vipuls-MacBook v3-what-will-be-program-output-and-why-2 % g++ -c what-2.s
|vipulchauhan@Vipuls-MacBook v3-what-will-be-program-output-and-why-2 % g++ -O what-2.o
|vipulchauhan@Vipuls-MacBook v3-what-will-be-program-output-and-why-2 % ./a.out
libc++abi: terminating with uncaught exception of type char
zsh: abort      ./a.out
vipulchauhan@Vipuls-MacBook v3-what-will-be-program-output-and-why-2 %
```

## Program 16

### **Task2 V4: Source Code:**

```

/*
    program to Rethrow and catch an exception by creating a separate user defined divide
function for condition divide by zero.

*/
#include <iostream>

using namespace std;

float Division(float num,float den)

{
    if(den==0)

    {
        throw 0;
    }

    return(num/den);
}

int main()

{
    float numerator,denominator,result;

    cout<<"Enter numerator and denominator respectively : ";

    cin>>numerator>>denominator;

    try
    {
        try

```

```
{  
    if(denominator==0)  
    {  
        throw 0;  
    }  
}  
  
catch(int x)  
{  
    cout<<"Can't divide a number by zero."<<endl;  
}  
  
result=Division(numerator,denominator);  
  
cout<<"The quotient is "<<result<<endl;  
}  
  
catch(int x)  
{  
    cout<<"Exception occurred"<<endl<<"Math error:Attempted to divide by Zero"<<endl;  
}  
  
return 0;  
}
```

## Task2 V4: Output

The screenshot shows a terminal window titled "v4-rethrow-divide-by-zero --zsh - 178x18". The terminal output is as follows:

```
Last login: Sat Jan  8 18:48:12 on ttys000
[vipulchauhan@ipuls-MacBook v4-rethrow-divide-by-zero % g++ -E divide-by-zero-2.cpp >> divide-by-zero-2.i
[vipulchauhan@ipuls-MacBook v4-rethrow-divide-by-zero % g++ -S divide-by-zero-2.s
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@ipuls-MacBook v4-rethrow-divide-by-zero % g++ -c divide-by-zero-2.s
[vipulchauhan@ipuls-MacBook v4-rethrow-divide-by-zero % g++ -O divide-by-zero-2.o
[vipulchauhan@ipuls-MacBook v4-rethrow-divide-by-zero % ./a.out
Enter numerator and denominator respectively : 12.59 0
Can't divide a number by zero.
Exception occurred
Math error:Attempted to divide by Zero
[vipulchauhan@ipuls-MacBook v4-rethrow-divide-by-zero % ./a.out
Enter numerator and denominator respectively : 12.38 2
The quotient is 6.15
vipulchauhan@ipuls-MacBook v4-rethrow-divide-by-zero % ]
```

## Program 17

**Q.** WAP in C++ with the help of STL:

a. List:

- 1.Iterate a int list using iterator and print it
- 2.Find size of a list
- 3.Sort a list
- 4.Reverse a list

b. Vector:

- 1.Insert elements into a int vector
- 2.Iterate this vector using iterator and print it
- 3.Find size of a capacity and max size of a vector
- 4.Resize a vector
- 5.checks if the vector is empty or not

c. Map:

- 1.Insert elements into a `<int, string>` map
- 2.insert elements in random order
- 3.Iterate this map using iterator and print its keys and values
- 4.Find an element as key from this map
- 5.assigning the elements from map1 to map2
- 6.remove all elements with key = x (any key present in map)
- 7.Find size, max size of a map
- 8.checks if this map is empty or not
- 9.Clear a map

d. Algorithm:

- 1.Covert an Array into a Vector
- 2.Sort a V ector
- 3.Reverse a vector
- 4.Max element in a Vector
- 5.Min element in a Vector
- 6.Occurrences of x in a vector
- 7.Sort an Array
- 8.Binary Search in an Array

## Program 17

### **Task1 : Source Code:**

```
/*

```

program to

1. Iterate a int list using iterator and print it
2. Find size of a list
3. Sort a list
4. Reverse a list

```
*/

```

```
#include<iostream>

#include<list>

#include<algorithm>

#include<iterator>

using namespace std;

void printlist(list<int> g)

{

    //v1-Iterate a int list using iterator and print it

    list<int>::iterator i;

    for(i=g.begin();i!=g.end();i++)

        cout<<" " <<*i;

    cout<<endl;

}

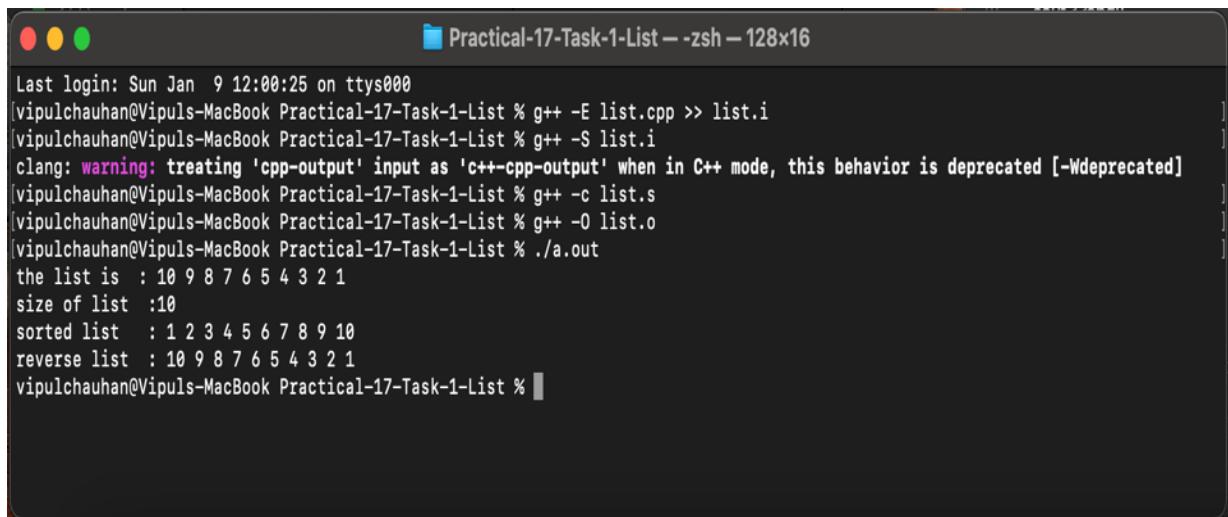
int main()

{

    list<int> a;
```

```
for(int i=10;i>0;i--)  
{  
    a.push_back(i);  
}  
  
cout<<"the list is :";  
  
printlist(a);  
  
cout<<"size of list :"<<a.size()<<endl;//v2-Find size of a list  
  
a.sort();//v3-Sort a list  
  
cout<<"sorted list :";  
  
printlist(a);  
  
cout<<"reverse list :";  
  
a.reverse();//v4-Reverse a list  
  
printlist(a);  
  
return 0;  
}
```

## Task1 : Output



```
Last login: Sun Jan  9 12:00:25 on ttys000
[vipulchauhan@Vipuls-MacBook Practical-17-Task-1-List % g++ -E list.cpp >> list.i
[vipulchauhan@Vipuls-MacBook Practical-17-Task-1-List % g++ -S list.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-17-Task-1-List % g++ -c list.s
[vipulchauhan@Vipuls-MacBook Practical-17-Task-1-List % g++ -O list.o
[vipulchauhan@Vipuls-MacBook Practical-17-Task-1-List % ./a.out
the list is : 10 9 8 7 6 5 4 3 2 1
size of list :10
sorted list  : 1 2 3 4 5 6 7 8 9 10
reverse list : 10 9 8 7 6 5 4 3 2 1
vipulchauhan@Vipuls-MacBook Practical-17-Task-1-List % ]
```

**Program 17****Task2 : Source Code:**

```

/*
program to
1.Insert elements into a int vector
2.Iterate this vector using iterator and print it
3.Find size of a capacity and max size of a vector
4.Resize a vector
5.Checks if the vector is empty or not
*/
#include<iostream>
#include<vector>
#include<algorithm>
using namespace std;

int main()
{
    vector<int> a={2,4,6,5,3,62,33,100};
    //v1-Insert elements into a int vector
    a.push_back(12);
    //v2-Iterate this vector using iterator and print it
    vector<int>::iterator i;
    cout<<"The vector is : ";
    for(i=a.begin();i!=a.end();i++)
    {
        cout<<*i<<" ";
    }
}

```

```

}

//v3-Find size of a capacity and max size of a vector

cout<<endl<<"Size of capacity : "<<a.capacity()<<endl;

cout<<"Max size : "<<a.max_size()<<endl;

//v4-Resize a vector

a.resize(5);

cout<<"The vector after resize of 5 is : ";

for(i =a.begin();i!=a.end();i++)

{

    cout<<*i<<" ";

}

//v5-Checks if the vector is empty or not

if(a.empty())

    cout<<endl<<"the vector is empty"<<endl;

else

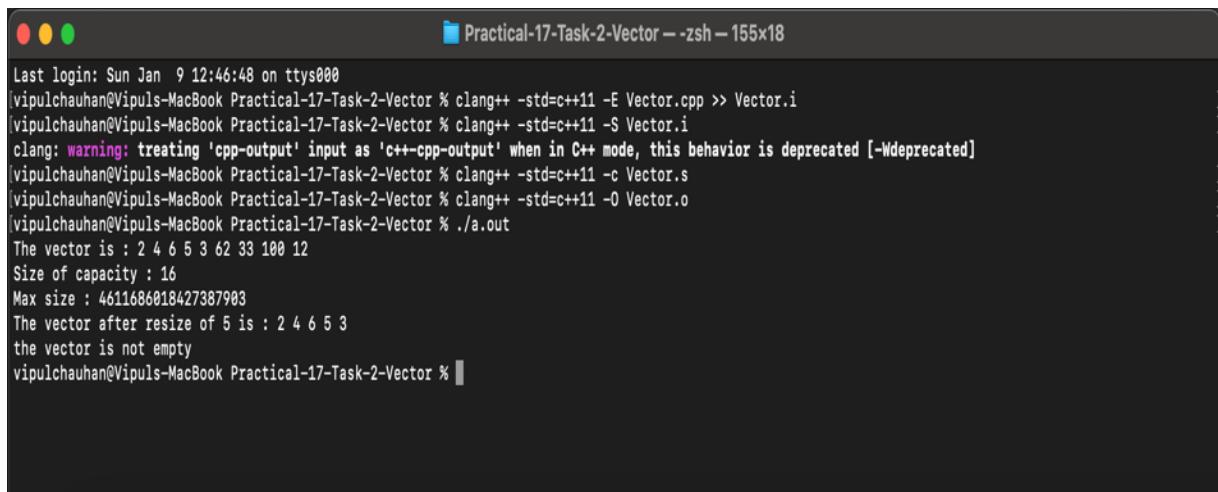
    cout<<endl<<"the vector is not empty"<<endl;

return 0;

}

```

## Task2 : Output



```
Last login: Sun Jan  9 12:46:48 on ttys000
[vipulchauhan@Vipuls-MacBook Practical-17-Task-2-Vector % clang++ -std=c++11 -E Vector.cpp >> Vector.i
[vipulchauhan@Vipuls-MacBook Practical-17-Task-2-Vector % clang++ -std=c++11 -S Vector.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-17-Task-2-Vector % clang++ -std=c++11 -c Vector.s
[vipulchauhan@Vipuls-MacBook Practical-17-Task-2-Vector % clang++ -std=c++11 -O Vector.o
[vipulchauhan@Vipuls-MacBook Practical-17-Task-2-Vector % ./a.out
The vector is : 2 4 6 5 3 62 33 100 12
Size of capacity : 16
Max size : 4611686018427387903
The vector after resize of 5 is : 2 4 6 5 3
the vector is not empty
vipulchauhan@Vipuls-MacBook Practical-17-Task-2-Vector % ]
```

**Program 17****Task3 : Source Code:**

```
/*
program to
1.Insert elements into a <int, string> map
2.Insert elements in random order
3.Iterate this map using iterator and print its keys and values
4.Find an element as key from this map
5.Assigning the elements from map1 to map2
6.Remove all elements with key = x (any key present in map)
7.Find size, max size of a map
8.Checks if this map is empty or not
9.Clear a map
```

```
*/
```

```
#include<iostream>
#include<map>
#include<iterator>
using namespace std;
int main()
{
    map<int,string> a;
    //v1-Insert elements into a <int, string> map
    //v2-Insert elements in random order
    a.insert(pair<int,string>(1,"name"));
```

```
a.insert(pair<int,string>(5,"Vipul"));
a.insert({2,"is"});
a.insert({0,"My"});
a.insert({10,"Chauhan"});
```

//v3-Iterate this map using iterator and print its keys and values

```
map<int,string>::iterator i;
cout<<"Elements of the maps are :"<<endl;
cout<<"keys\tvalue"<<endl;
for(i=a.begin();i!=a.end();i++)
{
    cout<<i->first<<"\t"<<i->second<<endl;
}
```

//v4-Find an element as key from this map

```
cout<<endl<<"finding the element with key 10 :"<<endl;
cout<<"keys\tvalue"<<endl;
for(auto it=a.find(10);it!=a.end();it++)
{
    cout<<it->first<<"\t"<<it->second<<endl;
}
```

//v5-Assigning the elements from map1 to map2

```
map<int,string>b(a.begin(),a.end());
cout<<endl<<endl<<"The map after assigning the values from a to b :"<<endl;
```

```

cout<<"keys\values"<<endl;
for(auto j=b.begin();j!=b.end();j++)
{
    cout<<j->first<<"\t"<<j->second<<endl;
}

```

//v6-Remove all elements with key = x (any key present in map)

```

b.erase(5);
cout<<endl<<endl<<"After removing element with key 5 in b"<<endl;
cout<<"keys\value"<<endl;
for(auto j=b.begin();j!=b.end();j++)
{
    cout<<j->first<<"\t"<<j->second<<endl;
}

```

//v7-Find size, max size of a map

```

cout<<"size of map a : "<<a.size()<<endl;
cout<<"max size of map a : "<<a.max_size()<<endl;

```

//v8-Checks if this map is empty or not

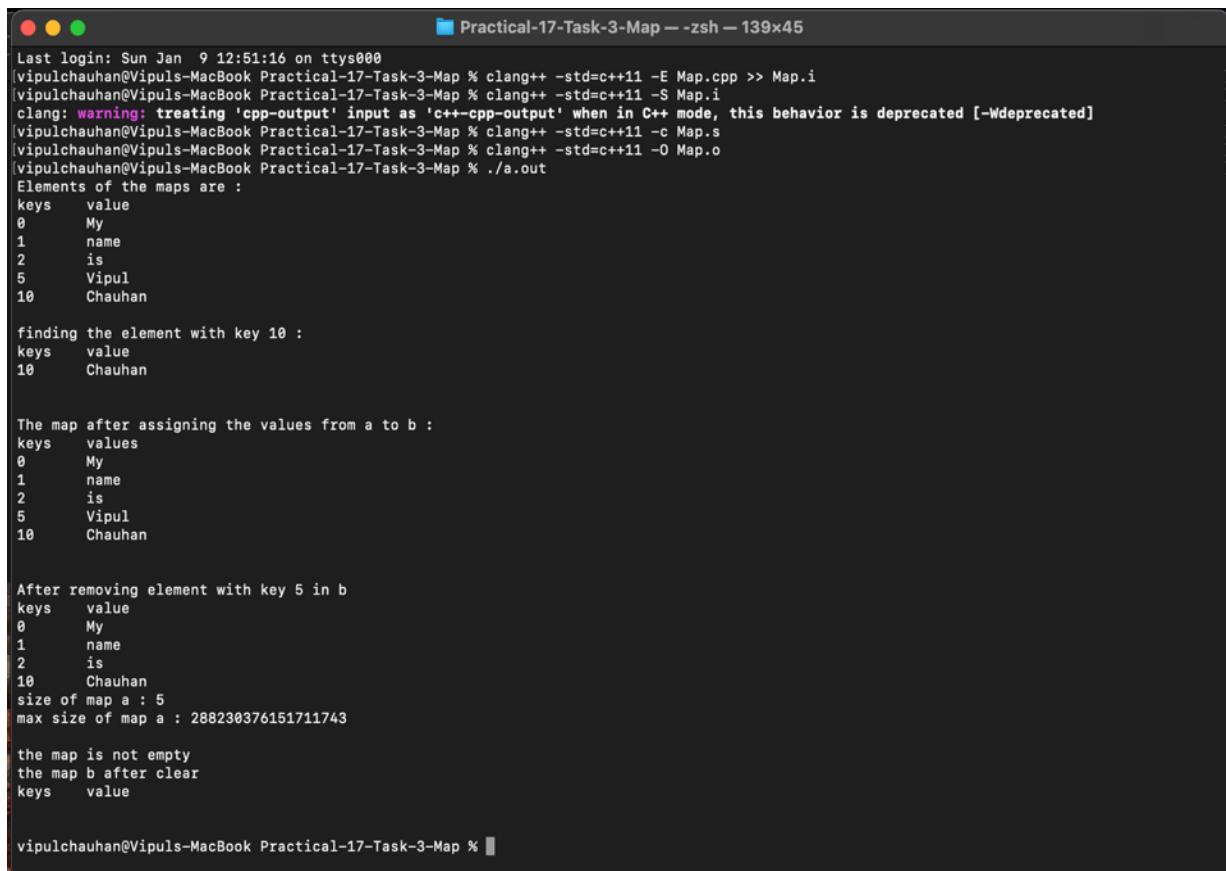
```

if(a.empty())
{
    cout<<endl<<"the map is empty"<<endl;
}
else
{
    cout<<endl<<"the map is not empty"<<endl;
}

```

```
//v9-Clear a map  
b.clear();  
  
cout<<"the map b after clear "<<endl<<"keys\tvalue"<<endl;  
  
for(auto j=b.begin();j!=b.end();j++)  
  
{  
  
    cout<<j->first<<"\t"<<j->second<<endl;  
  
}  
  
cout<<endl<<endl;  
  
return 0;  
}
```

## Task3 : Output



```

Last login: Sun Jan  9 12:51:16 on ttys000
[vipulchauhan@Vipuls-MacBook Practical-17-Task-3-Map % clang++ -std=c++11 -E Map.cpp >> Map.i
[vipulchauhan@Vipuls-MacBook Practical-17-Task-3-Map % clang++ -std=c++11 -S Map.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
[vipulchauhan@Vipuls-MacBook Practical-17-Task-3-Map % clang++ -std=c++11 -c Map.s
[vipulchauhan@Vipuls-MacBook Practical-17-Task-3-Map % clang++ -std=c++11 -O Map.o
[vipulchauhan@Vipuls-MacBook Practical-17-Task-3-Map % ./a.out
Elements of the maps are :
keys      value
0        My
1        name
2        is
5        Vipul
10       Chauhan

finding the element with key 10 :
keys      value
10       Chauhan

The map after assigning the values from a to b :
keys      values
0        My
1        name
2        is
5        Vipul
10       Chauhan

After removing element with key 5 in b
keys      value
0        My
1        name
2        is
10       Chauhan
size of map a : 5
max size of map a : 288230376151711743

the map is not empty
the map b after clear
keys      value

vipulchauhan@Vipuls-MacBook Practical-17-Task-3-Map %

```

**Program 17****Task4 : Source Code:**

```
/*
program to
1.Covert Array into Vector
2.Sort an Vector
3.Reverse a vector
4.Max element in a Vector
5.Min element in a Vector
6.Occurrences of x in vector
7.Sort an Array
8.Binary Search in an Array
```

```
*/
#include<iostream>
#include<vector>
#include<algorithm>
#include<iterator>
using namespace std;
int main()
{
    int array[]={36,59,60,29,63,12,19,30,1,7,5,56};
    int n=sizeof(array)/sizeof(array[0]);
    //v1-Covert Array into Vector
    vector<int>v(array,array+n);
```

```

cout<<"The array is : ";
for(int i=0;i<n;i++)
    cout<<array[i]<<" ";

```

**//v2-Sort an Vector**

```

sort(v.begin(),v.end());
cout<<endl<<endl<<"The vector after sorting : ";
for(auto i=v.begin();i!=v.end();i++)
    cout<<*i <<" ";

```

**//v3-Reverse a vector**

```

reverse(v.begin(),v.end());
cout<<endl<<endl<<"The vector after reversing : ";
for(auto i=v.begin();i!=v.end();i++)
    cout<<*i <<" ";

```

**//v4-Max element in a Vector**

```

cout<<endl<<endl<<"Maximum element of vector is : ";
cout<<*max_element(v.begin(),v.end());

```

**//v5-Min element in a Vector**

```
cout<<endl<<endl<<"Minimum element of vector is : ";
```

```
cout<<*min_element(v.begin(),v.end());
```

//v6-Occurrences of x in vector

```
cout<<endl<<endl<<"The occurrence of 56 in the vector is : "
"<<count(v.begin(),v.end(),56);
```

//v7-Sort an Array

```
sort(array,array+n);
```

```
cout<<endl<<endl<<"The sorted array is : ";
```

```
for(int i=0;i<n;i++)
```

```
cout<<array[i]<<" ";
```

//v8-Binary Search in an Array

```
cout<<endl<<endl<<"Searching for 56 : ";
```

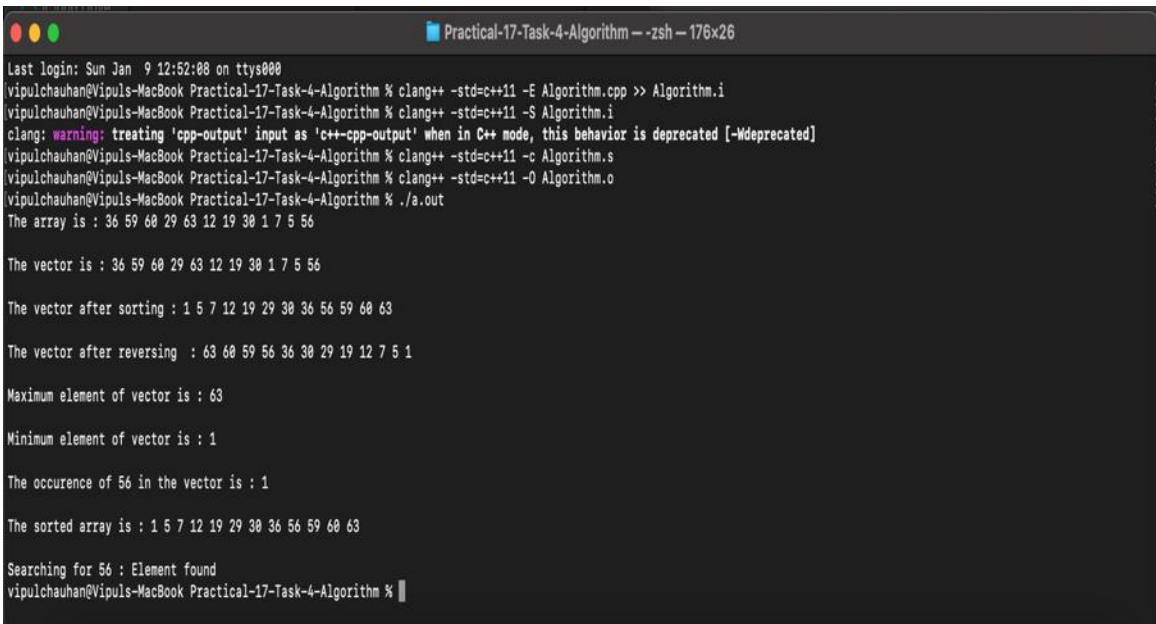
```
binary_search(array,array+n,56)?cout<<"Element found":cout<<"Element not found";
```

```
cout<<endl;
```

```
return 0;
```

```
}
```

## Task4 : Output



A screenshot of a terminal window titled "Practical-17-Task-4-Algorithm -- zsh - 176x26". The window displays the following text:

```
Last login: Sun Jan 9 12:52:08 on ttys000
vipulchauhan@Vipuls-MacBook:~/Desktop$ clang++ -std=c++11 -E Algorithm.cpp >> Algorithm.i
vipulchauhan@Vipuls-MacBook:~/Desktop$ clang++ -std=c++11 -S Algorithm.i
clang: warning: treating 'cpp-output' input as 'c++-cpp-output' when in C++ mode, this behavior is deprecated [-Wdeprecated]
vipulchauhan@Vipuls-MacBook:~/Desktop$ clang++ -std=c++11 -c Algorithm.s
vipulchauhan@Vipuls-MacBook:~/Desktop$ clang++ -std=c++11 -O Algorithm.o
vipulchauhan@Vipuls-MacBook:~/Desktop$ ./a.out
The array is : 36 59 60 29 63 12 19 30 1 7 5 56

The vector is : 36 59 60 29 63 12 19 30 1 7 5 56

The vector after sorting : 1 5 7 12 19 29 30 36 56 59 60 63

The vector after reversing : 63 60 59 56 36 30 29 19 12 7 5 1

Maximum element of vector is : 63

Minimum element of vector is : 1

The occurrence of 56 in the vector is : 1

The sorted array is : 1 5 7 12 19 29 30 36 56 59 60 63

Searching for 56 : Element found
vipulchauhan@Vipuls-MacBook:~/Desktop$
```