



Graphic Era
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Term work

on

OOPs with C++

(PCS 307)

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GRAPHIC ERA HILL UNIVERSITY, DEHRADUN

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I would like to particularly thank my Data Science using OOPs with C++ Lab Faculty **Mr Aakash 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.

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B. Tech CSE-A-III Sem

Session: 2021-22

GEHU, Dehradun



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	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>Pointer, Function, Inline Function, Recursion in C++:</p> <p>Task1: Will the program through an error and if yes then why?</p> <pre> int *p = {10,20,20}; cout << *p; p++; cout << *p;</pre> <p>Task2: Output of this program?</p> <p>V1. Issue?</p> <pre> int arr[] = {10,20,30}; cout << *arr; cout << arr; arr++; cout << *arr;</pre> <p>V2. How to resolve above issue?</p> <pre> int arr[] = {10,20,30}; cout << *arr; cout << arr; cout << *(?);</pre> <p>Task3: Output of this program?</p> <p>V1. Output?</p> <pre> int a = 10; int *p; int **q; p = &a; q = &p; cou << *p; cou << **q;</pre>	67

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9	<p>Write C++ code for below mentioned tasks?</p> <p>Class, Object, Constructor, Static Data Members, friend function in C++:</p> <p>Task1: Class and Object in C++</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>Task2: Constructor in C++</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>	84

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10	<p>Write C++ code for below mentioned tasks?</p> <p>Array of Objects, Pointer to Object, This pointer, Operator Overloading in C++</p> <p>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</p> <p>Task2: Pointer to Object in C++ WAP to create print or display Student information containing in Student class by using pointers to object.</p> <p>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.</p> <p>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 objects by adding the objects.</p>	97

11	<p>Write C++ code for below mentioned tasks?</p> <p>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</p> <p>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</p> <p>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</p>	112
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13	<p>Write C++ code for below mentioned tasks?</p> <p>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.</p> <p>Perform following tasks:</p> <ol style="list-style-type: none"> 1. Try calling overriding method from child class object. 2. Write name of the method which is not seen by the child class object <p>Create two versions:</p> <ul style="list-style-type: none"> version 01: without 'using' keyword version 02: with 'using' keyword <p>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.</p> <p>Perform following tasks:</p> <ol style="list-style-type: none"> 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. 	134
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16	<p>Write C++ code for below mentioned tasks?</p> <p>Task 16.1 WAP in C++ to create a genetic add function for given tasks:</p> <ul style="list-style-type: none"> a. Perform add over two integers and return integer b. Perform add over one int and one float and return double <p>Task 16.2 WAP in C++ to perform these tasks:</p> <ul style="list-style-type: none"> a. Catch a Divide by zero exception in $z = x/y$ using "throw runtime_error" b. What will be the output of this program and why? <pre>#include <iostream> using namespace std; int main() { try { throw 'a'; } catch (int x) { cout << "Caught " << x; } catch (...) { cout << "Default Exception\n"; } return 0; }</pre> <p>c. What will be the output of this program and why?</p> <pre>#include <iostream> using namespace std; int main() { try { throw 'a'; } catch (int x) { cout << "Caught "; } return 0; }</pre>	152

<p>}</p> <p>d. Rethrow and catch an exception by creating a separate user defined divide function for condition divide by zero.</p> <p>17 WAP in C++ with the help of STL:</p> <p>a. List:</p> <ul style="list-style-type: none"> 1. Iterate a int list using iterator and print it 2. Find size of a list 3. Sort a list 4. Reverse a list <p>b. Vector:</p> <ul style="list-style-type: none"> 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 <p>c. Map:</p> <ul style="list-style-type: none"> 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 <p>d. Algorithm:</p> <ul style="list-style-type: none"> 1. Covert an Array into a Vector 2. Sort a Vector 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 	<p>164</p>
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DEPARTMENT OF CSE

B.Tech. CSE

STUDENT LAB REPORT SHEET

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Photograph
Passport Size

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S.N o.	Practical	D.O.P.	Date of Submission	Grade (Viva)	Grade (Report File)	Total Marks (out of 10)	Student's Signature	Teacher's Signature
1	Practical-01	23.09.2021	23.09.2021				<u>Vaibhav</u>	
2	Practical-02	23.09.2021	23.09.2021				<u>Vaibhav</u>	
3	Practical-03	2.10.2021	2.10.2021				<u>Vaibhav</u>	
4	Practical-04	2.10.2021	2.10.2021				<u>Vaibhav</u>	
5	Practical-05	7.10.2021	7.10.2021				<u>Vaibhav</u>	
6	Practical-06	7.10.2021	7.10.2021				<u>Vaibhav</u>	
7	Practical-07	17.10.2021	18.10.2021				<u>Vaibhav</u>	
8	Practical-08	21.10.2021	22.10.2021				<u>Vaibhav</u>	
9	Practical-09	28.10.2021	28.10.2021				<u>Vaibhav</u>	
10	Practical-10	28.10.2021	28.10.2021				<u>Vaibhav</u>	
11	Practical-11	14.12.2021	14.12.2021				<u>Vaibhav</u>	
12	Practical-12	14.12.2021	14.12.2021				<u>Vaibhav</u>	

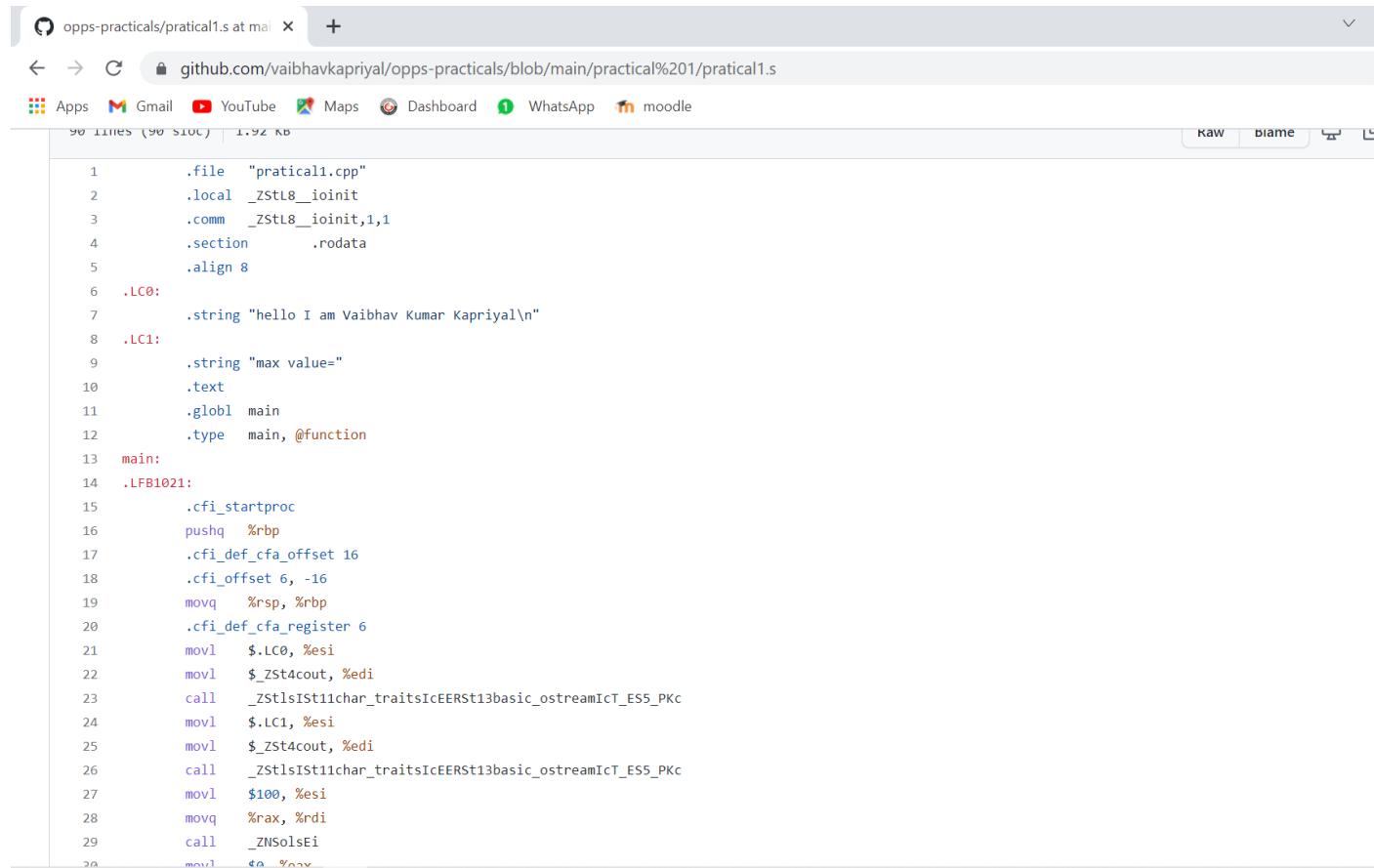
13	Practical-13	27.12.2 021	27.12.20 21				<u>Vaibhav</u>	
14	Practical-14	27.12.2 021	27.12.20 21				<u>Vaibhav</u>	
15	Practical-15	3.01.20 22	3.01.202 2				<u>Vaibhav</u>	
16	Practical-16	3.01.20 22	3.01.202 2				<u>Vaibhav</u>	
17	Practical-17	6.01.20 22	6.01.202 2				<u>Vaibhav</u>	

Practical 1

Source Code:

```
#include
<iostream>
using namespace std;
#define MAX 100;
int main()
{
    cout<<"hello I am Vaibhav Kumar Kapriyal\n";
    cout<<"max value=" <<MAX;
    return 0;
}
```

Output



The screenshot shows a browser window with the URL github.com/vaibhavkapriyal/opps-practicals/blob/main/practical%201/practical1.s. The page displays the assembly code generated from the C++ source code. The assembly code includes directives like .file, .local, .comm, .section, .align, .LC0, .LC1, and .text, along with various instructions such as pushq, movq, and call.

```
1      .file   "practical1.cpp"
2      .local  _ZStl8__ioinit
3      .comm   _ZStl8__ioinit,1,1
4      .section      .rodata
5      .align 8
6      .LC0:
7      .string "hello I am Vaibhav Kumar Kapriyal\n"
8      .LC1:
9      .string "max value="
10     .text
11     .globl  main
12     .type   main, @function
13     main:
14     .LFB1021:
15     .cfi_startproc
16     pushq   %rbp
17     .cfi_def_cfa_offset 16
18     .cfi_offset 6, -16
19     movq   %rsp, %rbp
20     .cfi_def_cfa_register 6
21     movl   $.LC0, %esi
22     movl   $.ZSt4cout, %edi
23     call   _ZStlsISt11char_traitsIcEERSt13basic_ostreamIcT_E5_PKc
24     movl   $.LC1, %esi
25     movl   $.ZSt4cout, %edi
26     call   _ZStlsISt11char_traitsIcEERSt13basic_ostreamIcT_E5_PKc
27     movl   $100, %esi
28     movq   %rax, %rdi
29     call   _ZNsolsEi
30     movl   $0, %eax
```



```

18100 lines (12839 SLOC) | 418 KB
1 # 1 "practical1.cpp"
2 # 1 "<built-in>"
3 # 1 "<command-line>"
4 # 1 "/usr/include/stdc-predef.h" 1 3 4
5 # 1 "<command-line>" 2
6 # 1 "practical1.cpp"
7 # 1 "/usr/include/c++/5/iostream" 1 3
8 # 36 "/usr/include/c++/5/iostream" 3
9
10 # 37 "/usr/include/c++/5/iostream" 3
11
12 # 1 "/usr/include/x86_64-linux-gnu/c++/5/bits/c++config.h" 1 3
13 # 194 "/usr/include/x86_64-linux-gnu/c++/5/bits/c++config.h" 3
14
15 # 194 "/usr/include/x86_64-linux-gnu/c++/5/bits/c++config.h" 3
16 namespace std
17 {
18     typedef long unsigned int size_t;
19     typedef long int ptrdiff_t;
20
21
22
23
24 }
25 # 216 "/usr/include/x86_64-linux-gnu/c++/5/bits/c++config.h" 3
26 namespace std
27 {
28     inline namespace __cxx11 __attribute__((__abi_tag__("cxx11"))) { }
29 }
30 #pragma GCC CXX

```

The screenshot shows a terminal window with a dark background. At the top, there are several icons and the text "sammei@kali: ~/Desktop". Below the title bar, the terminal prompt is "(sammei㉿kali)-[~/Desktop]". The user has run the command "\$ g++ t4_1.cpp" to compile a C++ program named t4_1.cpp. After compilation, they run "\$./a.out" to execute it. The output of the program is "hello I am Vaibhav Kumar Kapriyal max value=100". The terminal window also displays a file tree on the left side, showing a folder named "sammei" containing files like "199 GB Volume", "Windows", and "C++".

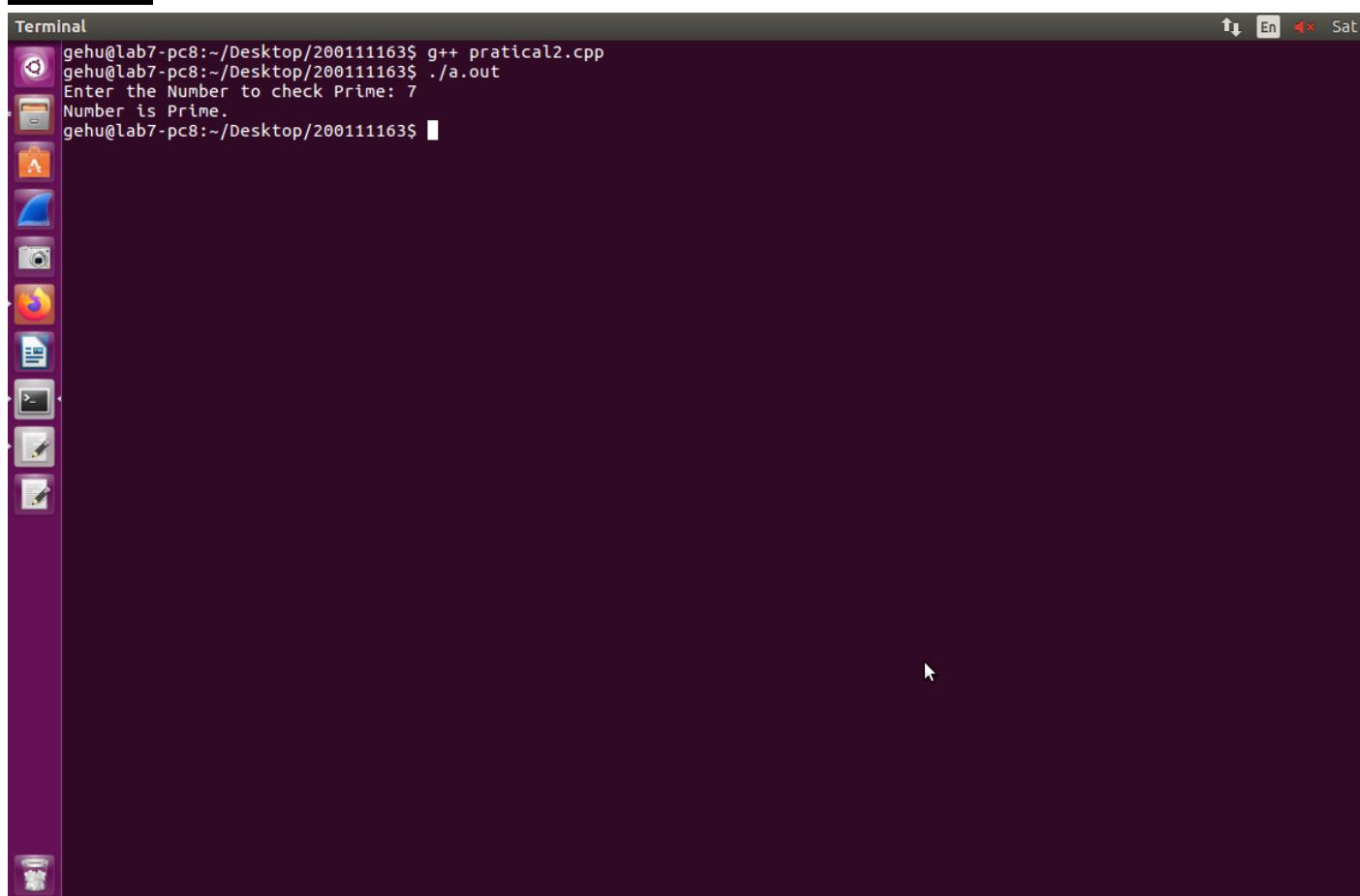
Practical 2

Source Code:

```
#include
<iostream>

using namespace std;
int main()
{
    int n, i, m=0, flag=0;
    cout << "Enter the Number to check Prime: ";
    cin >> n;
    m=n/2;
    for(i = 2; i <= m; i++)
    {
        if(n % i == 0)
        {
            cout<<"Number is not Prime."<<endl;
            flag=1;
            break;
        }
    }
    if (flag==0)
        cout << "Number is Prime."<<endl;
    return 0;
}
```

Output



A screenshot of a Linux desktop environment. On the left is a vertical dock containing icons for various applications like a terminal, file manager, and media players. The main window is a terminal window titled "Terminal". The terminal output is as follows:

```
gehu@lab7-pc8:~/Desktop/200111163$ g++ practical2.cpp
gehu@lab7-pc8:~/Desktop/200111163$ ./a.out
Enter the Number to check Prime: 7
Number is Prime.
gehu@lab7-pc8:~/Desktop/200111163$
```

Practical 3

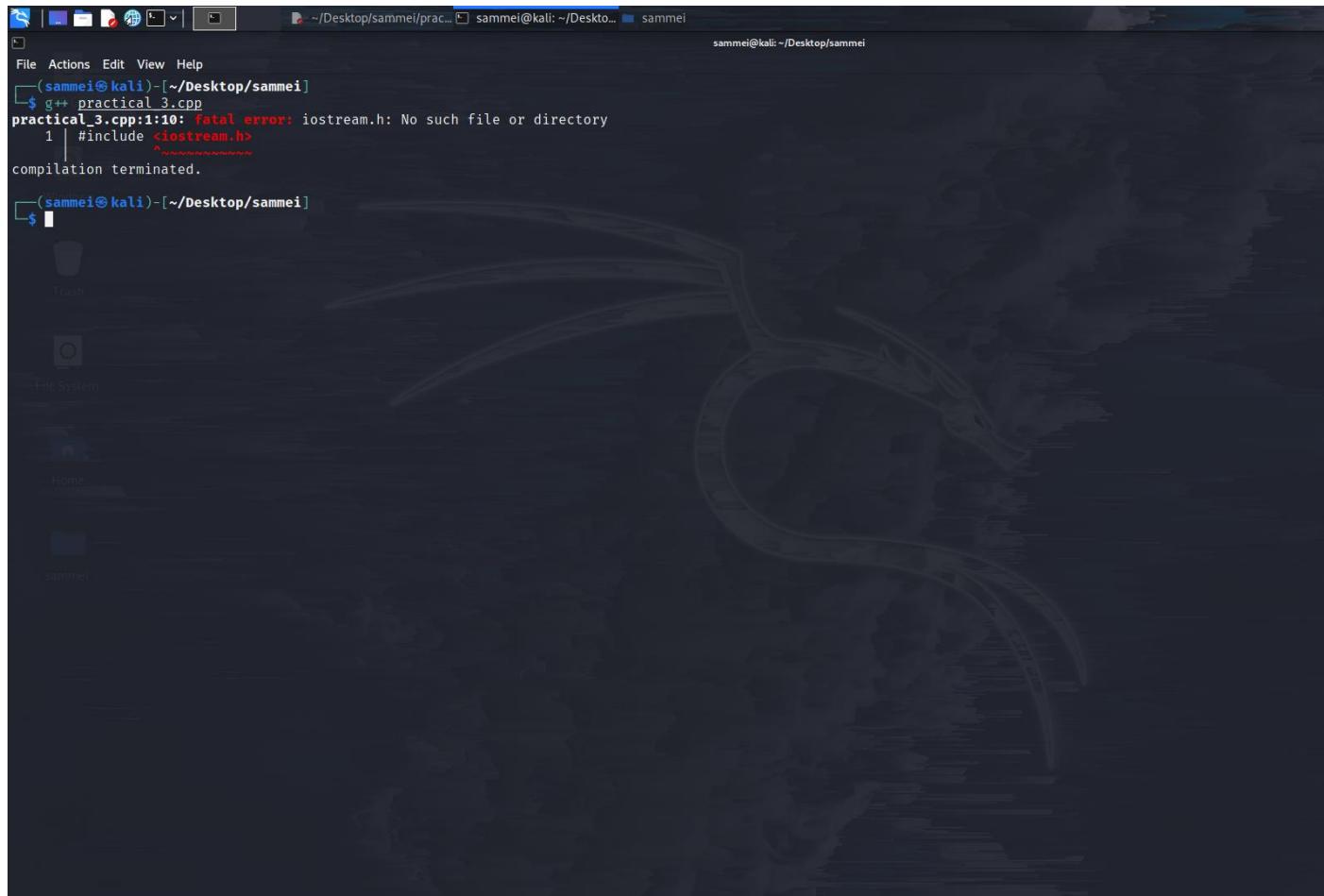
Task 1

Source Code:

```
#include
<iostream.h>

using namespace std;
int main
{
    int a=60;
    cout<<"Vaibhav Kumar Kapriyal Roll no.-"<<a<<"\n";
    return 0;
}
```

Output



```
(sammei㉿kali)-[~/Desktop/sammei]
$ g++ practical_3.cpp
practical_3.cpp:1:10: fatal error: iostream.h: No such file or directory
  1 | #include <iostream.h>
compilation terminated.

[sammei@kali: ~]$
```

Practical 3

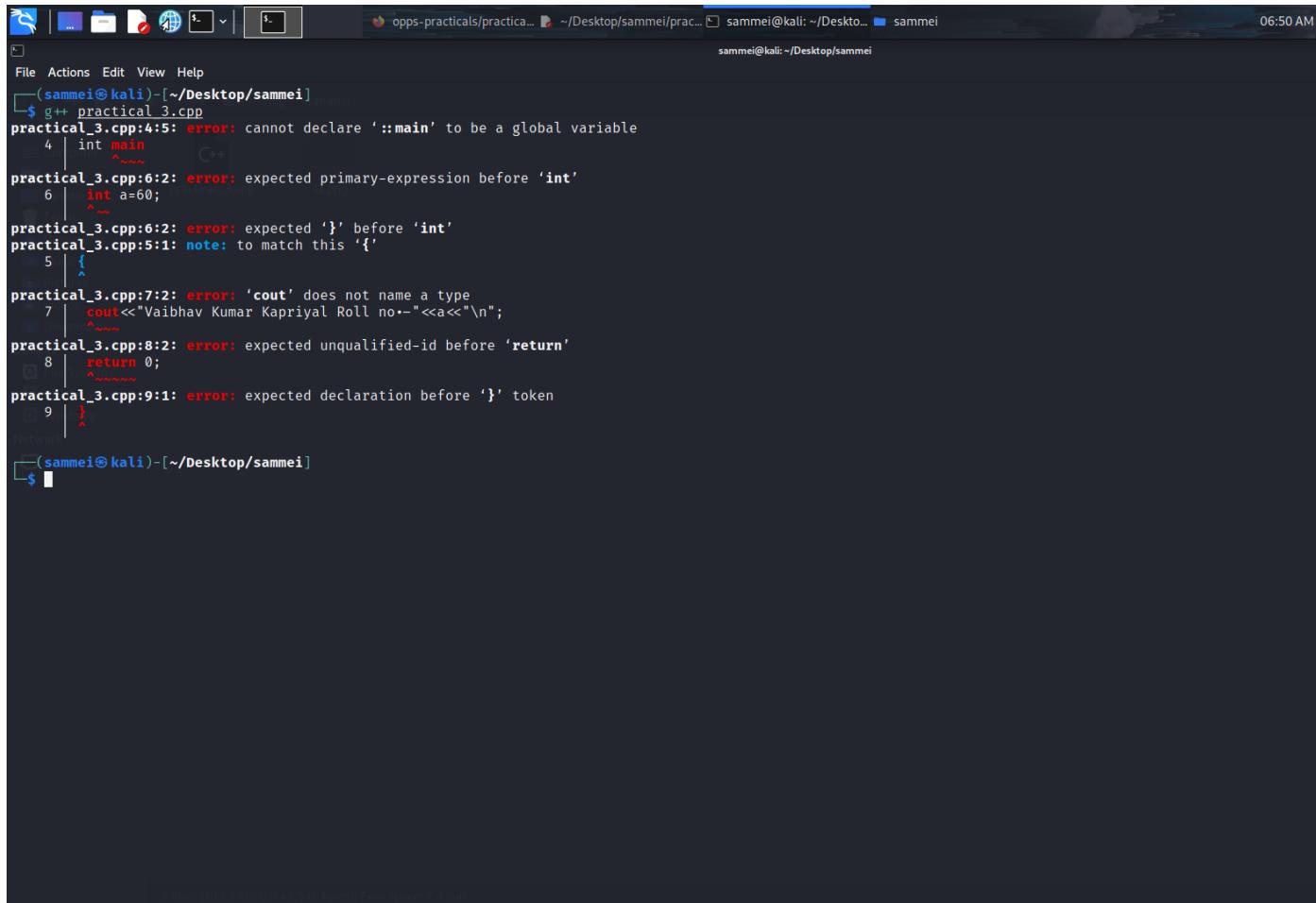
Task 2

Source Code:

```
//#include
<iostream.h>

        using namespace std;
        int main
        {
            int a=60;
            cout<<"Vaibhav Kumar Kapriyal Roll no.-"<<a<<"\n";
            return 0;
        }
```

Output



The screenshot shows a terminal window on a Kali Linux desktop environment. The terminal is running in a terminal emulator window titled 'sammei@kali: ~/Desktop/sammei'. The command entered is \$ g++ practical_3.cpp. The output shows several compilation errors from the g++ compiler:

```
practical_3.cpp:4:5: error: cannot declare '::main' to be a global variable
4 | int main
   ^~~~
```

```
practical_3.cpp:6:2: error: expected primary-expression before 'int'
6 | int a=60;
   ^~~~
```

```
practical_3.cpp:6:2: error: expected ')' before 'int'
practical_3.cpp:5:1: note: to match this '{'
5 | {
```

```
practical_3.cpp:7:2: error: 'cout' does not name a type
7 | cout<<"Vaibhav Kumar Kapriyal Roll no.-"<<a<<"\n";
   ^~~~
```

```
practical_3.cpp:8:2: error: expected unqualified-id before 'return'
8 | return 0;
   ^~~~~~
```

```
practical_3.cpp:9:1: error: expected declaration before ')' token
9 | }
```

The terminal prompt is sammei@kali: ~/Desktop/sammei\$

Practical 3

Task 3

Source Code:

```
#include
<iostream>

using namespace std;

int main()
{
    char c;
    cout<<"Enter a series of character\n";
    cin>>c;
    cout<<"Display:- "<<c<<"\n";
    return 0;
}
```

Output

```
(sammei㉿kali)-[~/Desktop/sammei]
$ g++ practical 3.cpp
(sammei㉿kali)-[~/Desktop/sammei]
$ ./a.out
Enter a series of character
abcd
Display:-a
[sammei㉿kali]-[~/Desktop/sammei]
$ ls
```

The screenshot shows a terminal window with a dark theme. The terminal title is 'oppo-practicals/t1.cpp at...'. The command 'g++ practical 3.cpp' is run, followed by 'ls' to show the file 'a.out'. The user then enters 'abcd' when prompted to 'Enter a series of character', and the output 'Display:-a' is shown.

Practical 3

Task 4

Source Code:

```
#include
<iostream>
#include <string>

using namespace std;

int main()
{
    string str;
    cout<<"Enter a series of character\n";
    getline(cin,str);
    cout<<"Display:- "<<str<<"\n";
    return 0;
}
```

Output

```
(sammei㉿kali)-[~/Desktop/sammei]
$ g++ practical_3.cpp
(sammei㉿kali)-[~/Desktop/sammei]
$ ./a.out
Enter a series of character
abcd
Display:-abcd
```

Practical 4

Task 1

Source Code:

```
#include
<iostream>

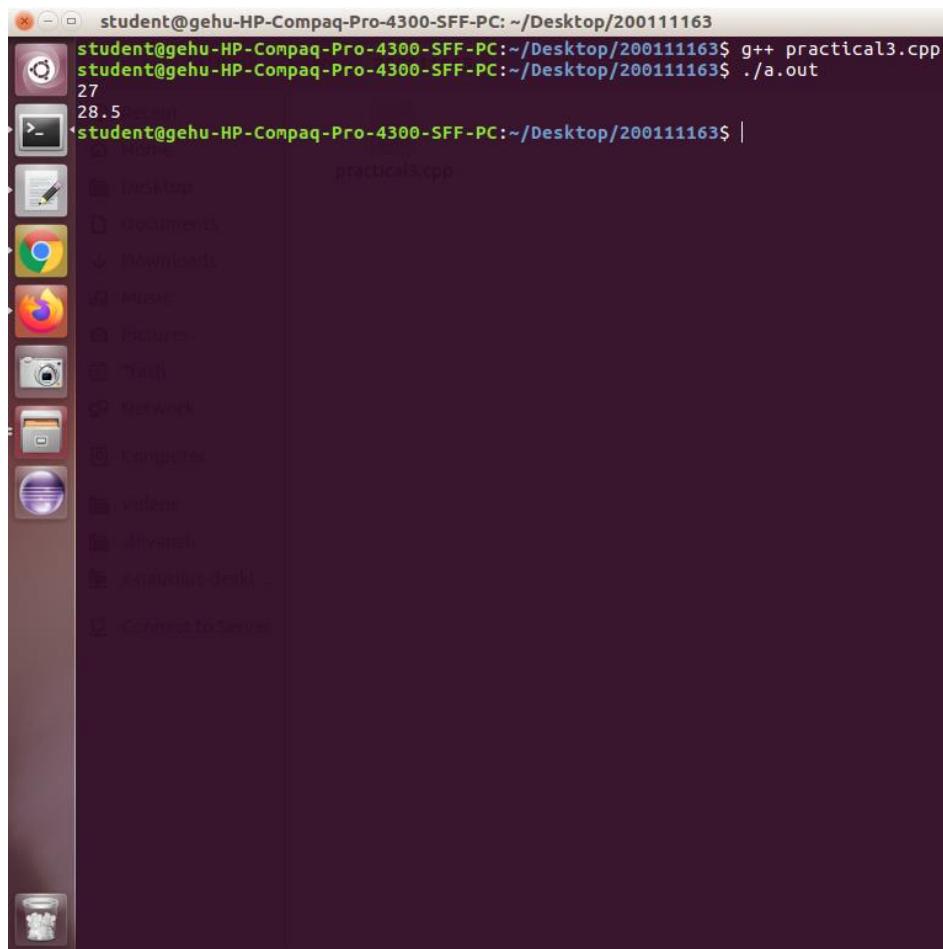
using namespace std;

namespace first
{
    int add(int a,int b)
    {
        return a+b;
    }
}

namespace second
{
    float add(float a,float b)
    {
        return a+b;
    }
}

int main()
{
    cout<<first::add(12,15)<<"\n";
    cout<<second::add(12.6,15.9)<<"\n";
    return 0;
}
```

Output



A screenshot of a Linux desktop environment. On the left is a dark brown vertical dock containing icons for various applications like a terminal, file manager, and media players. The main window is a terminal window titled 'student@gehu-HP-Compaq-Pro-4300-SFF-PC: ~/Desktop/200111163'. The terminal displays the following command-line session:

```
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ g++ practical3.cpp
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ ./a.out
27
28.5
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ |
```

Practical 4

Task 2

Source Code:

```
#include
<iostream>

using namespace std;

namespace first
{
    int add(int a,int b)
    {
        return a+b;
    }
}

namespace second
{
    float add(float a,float b)
    {
        return a+b;
    }
}

using namespace second;

int main()
{
    cout<<add(12,15)<<"\n";
    cout<<add(12.5,15)<<"\n";
    cout<<add(12,15.7)<<"\n";
    cout<<add(12.9,15.3)<<"\n";
    cout<<add(12.0,15.0)<<"\n";
    return 0;
}
```

Output

A screenshot of a Linux desktop environment. On the left is a vertical dock containing icons for various applications like a terminal, file manager, and system settings. The main area shows a terminal window with the following text:

```
student@gehu-HP-Compaq-Pro-4300-SFF-PC: ~/Desktop/200111163
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ g++ practical3.cpp
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ ./a.out
27
27.7 Recent
27.4
28.2 Home
27
0
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ |
```

The terminal also lists recent files: 27.7 Recent, 27.4, 28.2 Home, 27, and 0.

Practical 4

Task 3

Source Code:

```
#include
<iostream>

using namespace std;

namespace first
{
    int add(int a,int b)
    {
        return a+b;
    }
}

namespace second
{
    float add(float a,float b)
    {
        return a+b;
    }
}

int main()
{
    cout<<add(12,15)<<"\n";
    cout<<add(12.5,15)<<"\n";
    cout<<add(12,15.7)<<"\n";
    cout<<add(12.9,15.3)<<"\n";
    cout<<add(12.0,15.0)<<"\n";
    return 0;
}
```

Output

A screenshot of a Linux desktop environment. On the left is a dark brown vertical dock containing icons for various applications: a terminal, a file manager (Nautilus), a web browser (Chrome), a mail client (Evolution), a camera, a folder, a terminal, and a trash can. The main window shows a terminal session with the following text:

```
student@gehu-HP-Compaq-Pro-4300-SFF-PC: ~/Desktop/200111163
practical3.cpp: In function 'int main()':
practical3.cpp:22:17: error: 'add' was not declared in this scope
    cout<<add(12,15)<<"\n";
                  ^
practical3.cpp:22:17: note: suggested alternatives:
practical3.cpp:6:6: note: acti'first::add'
    int add(int a,int b)
                  ^
practical3.cpp:13:8: note:   'second::add'
    float add(float a,float b)
                  ^
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ |
```

Practical 5

Task 1

Source Code:

```
#include
<iostream>

using namespace std;
void intfun()
{
    int a=5657865;
    cout<<a<<'\n';
}
void charfun ()
{
    char i='b';
    cout<<i<<'\n';
}
void boolfun ()
{
    bool b=1;
    cout<<b<<'n';
}
void shortfun()
{
    short s=100;
    cout<<s<<'n';
}
void floatfun()
{
    float f=12.6474f;
    cout<<f<<'\n';
}
void longfun()
{
    long l=64579745756;
    cout<<l<<'\n';
}
void doublefun()
{
    double d=3255.65658;
    cout<<d<<'n';
}
void longdoublefun()
{
    long double lb=43254.8788;
```

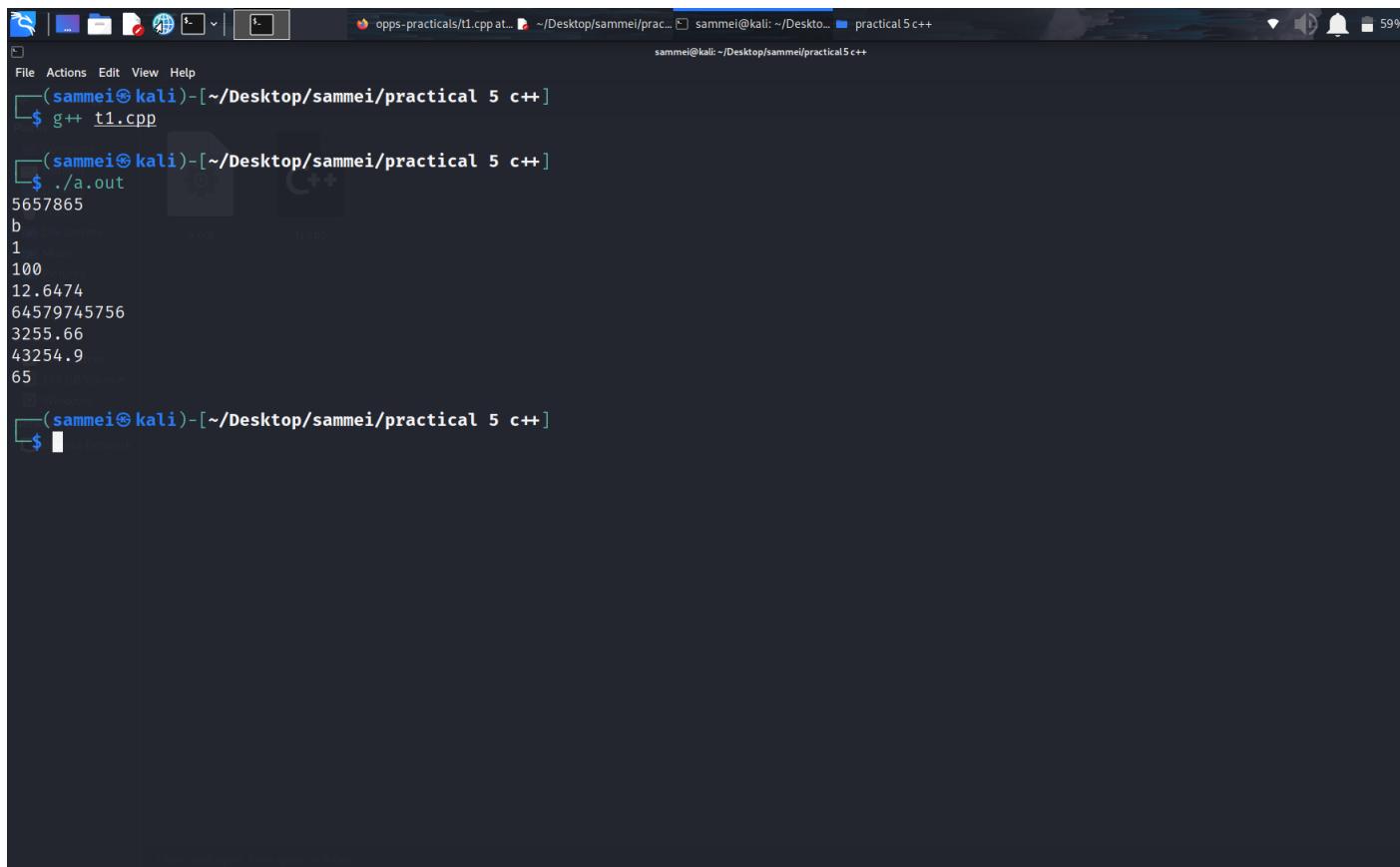
```

        cout<<lb<<'n';
    }
    void widecharfun()
    {
        wchar_t ch=L'\0';
        cout<<ch<<'n';
    }

    int main()
    {
        intfun();
        charfun ();
        boolfun ();
        shortfun();
        floatfun();
        longfun();
        doublefun();
        longdoublefun();
        widecharfun();
        return 0;
    }
}

```

Output



```

(sammei㉿kali)-[~/Desktop/sammei/practical 5 c++]
$ g++ t1.cpp
(sammei㉿kali)-[~/Desktop/sammei/practical 5 c++]
$ ./a.out
5657865
b
1
100
12.6474
64579745756
3255.66
43254.9
65

```

Practical 5

Task 2

Source Code:

```
#include
<iostream>

using namespace std;
void intfun()
{
    int a=5657865;
    cout<<a<<" size= ";
    cout<<sizeof(a)<<'\n';
    cout<<"size of int = "<<sizeof(int)<<'\n';
}
void charfun ()
{
    char i='b';
    cout<<i<<" size= ";
    cout<<sizeof(i)<<'\n';
    cout<<"size of character = "<<sizeof(char)<<'\n';
}
void boolfun ()
{
    bool b=1;
    cout<<b<<" size= ";
    cout<<sizeof(b)<<'\n';
    cout<<"size of boolean = "<<sizeof(bool)<<'\n';
}
void shortfun()
{
    short s=100;
    cout<<s<<" size= ";
    cout<<sizeof(s)<<'\n';
    cout<<"size of short int = "<<sizeof(short)<<'\n';
}
void floatfun()
{
    float f=12.6474f;
    cout<<f<<" size= ";
    cout<<sizeof(f)<<'\n';
    cout<<"size of float = "<<sizeof(float)<<'\n';
}
void longfun()
{
    long l=64579745756;
```

```

        cout<<l<<"  size=  ";
        cout<<sizeof(l)<<'\n';
        cout<<"size of long int = "<<sizeof(long)<<'\n';
    }
    void doublefun()
    {
        double d=3255.65658;
        cout<<d<<"  size=  ";
        cout<<sizeof(d)<<'\n';
        cout<<"size of double = "<<sizeof(double)<<'\n';
    }
    void longdoublefun()
    {
        long double lb=43254.8788;
        cout<<lb<<"  size=  ";
        cout<<sizeof(lb)<<'\n';
        cout<<"size of long double = "<<sizeof(long double)<<'\n';
    }
    void widecharfun()
    {
        wchar_t ch=L'\0';
        cout<<ch<<"  size=  ";
        cout<<sizeof(ch)<<'\n';
        cout<<"size of wide character = "<<sizeof(wchar_t)<<'\n';
    }

int main()
{
    intfun();
    charfun ();
    boolfun ();
    shortfun();
    floatfun();
    longfun();
    doublefun();
    longdoublefun();
    widecharfun();
    return 0;
}

```

Output

```
(sammei㉿kali)-[~/Desktop/sammei/practical 5 c++]
$ g++ t2.cpp
(sammei㉿kali)-[~/Desktop/sammei/practical 5 c++]
$ ./a.out
5657865  size= 4
size of int = 4
b  size= 1
size of character = 1
1  size= 1
size of boolean = 1
100  size= 2
size of short int = 2
12.6474  size= 4
size of float = 4
64579745756  size= 8
size of long int = 8
3255.66  size= 8
size of double = 8
43254.9  size= 16
size of long double = 16
65  size= 4
size of wide character = 4
```

Practical 6

Task 1

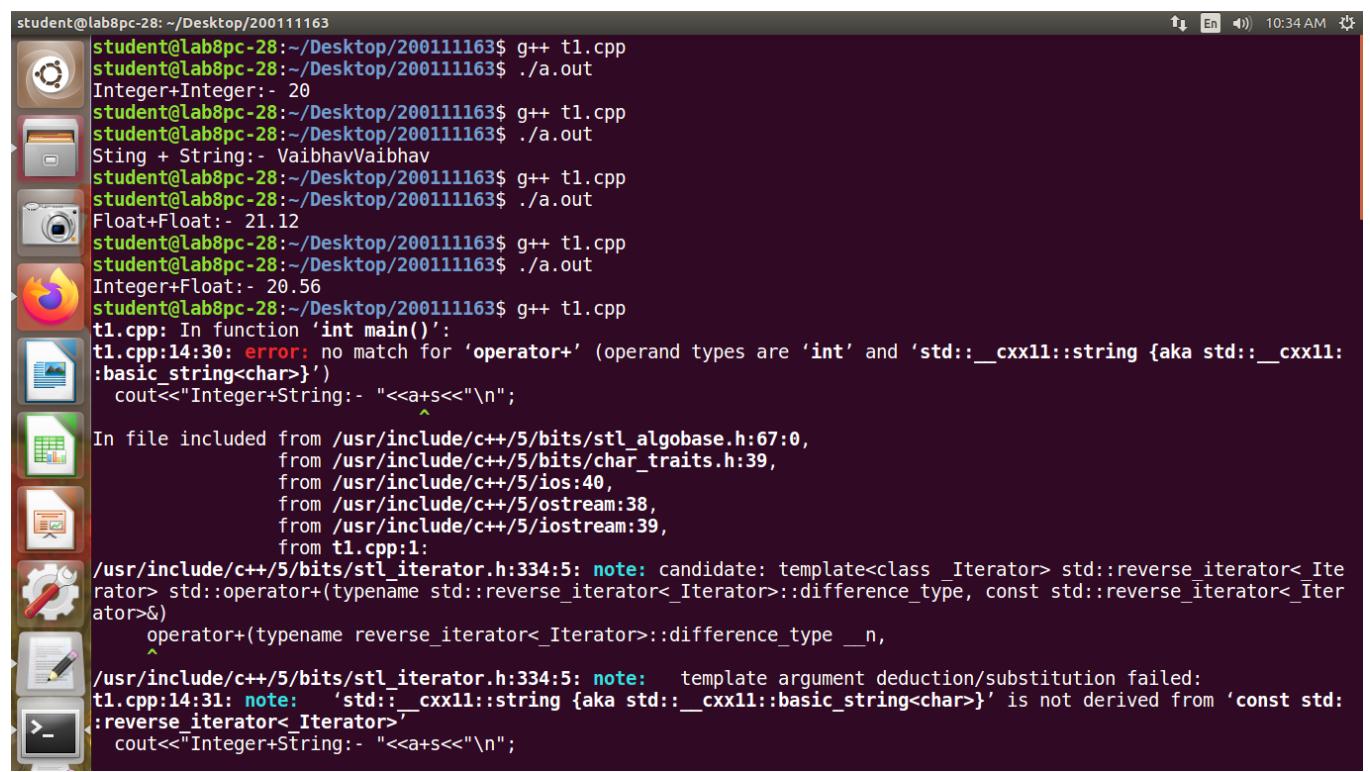
Source Code:

```
#include
<iostream>

using namespace std;

int main()
{
    int a=10;
    string s="Vaibhav";
    float f=10.56;
    //cout<<"Integer+Integer:- "<<a+a<<"\n";
    //cout<<"String + String:- "<<s+s<<"\n";
    //cout<<"Float+Float:- "<<f+f<<"\n";
    //cout<<"Integer+Float:- "<<a+f<<"\n";
    cout<<"Integer+String:- "<<a+s<<"\n";
    return 0;
}
```

Output



```
student@lab8pc-28:~/Desktop/200111163$ g++ t1.cpp
student@lab8pc-28:~/Desktop/200111163$ ./a.out
Integer+Integer:- 20
student@lab8pc-28:~/Desktop/200111163$ g++ t1.cpp
student@lab8pc-28:~/Desktop/200111163$ ./a.out
String + String:- VaibhavVaibhav
student@lab8pc-28:~/Desktop/200111163$ g++ t1.cpp
student@lab8pc-28:~/Desktop/200111163$ ./a.out
Float+Float:- 21.12
student@lab8pc-28:~/Desktop/200111163$ g++ t1.cpp
student@lab8pc-28:~/Desktop/200111163$ ./a.out
Integer+Float:- 20.56
student@lab8pc-28:~/Desktop/200111163$ g++ t1.cpp
t1.cpp: In function 'int main()':
t1.cpp:14:30: error: no match for 'operator+' (operand types are 'int' and 'std::__cxx11::string {aka std::__cxx11::basic_string<char>}')
        cout<<"Integer+String:- "<<a+s<<"\n";
                                                ^
In file included from /usr/include/c++/5/bits/stl_algobase.h:67:0,
                 from /usr/include/c++/5/bits/char_traits.h:39,
                 from /usr/include/c++/5/ios:40,
                 from /usr/include/c++/5/ostream:38,
                 from /usr/include/c++/5/iostream:39,
                 from t1.cpp:1:
/usr/include/c++/5/bits/stl_iterator.h:334:5: note: candidate: template<class _Iterator> std::reverse_iterator<_Iterator> std::operator+(typename std::reverse_iterator<_Iterator>::difference_type, const std::reverse_iterator<_Iterator>&)
        operator+(typename reverse_iterator<_Iterator>::difference_type __n,
                    ^
/usr/include/c++/5/bits/stl_iterator.h:334:5: note:   template argument deduction/substitution failed:
t1.cpp:14:31: note:   'std::__cxx11::string {aka std::__cxx11::basic_string<char>}' is not derived from 'const std::reverse_iterator<_Iterator>'
        cout<<"Integer+String:- "<<a+s<<"\n";
```

Practical 6

Task 2

Source Code:

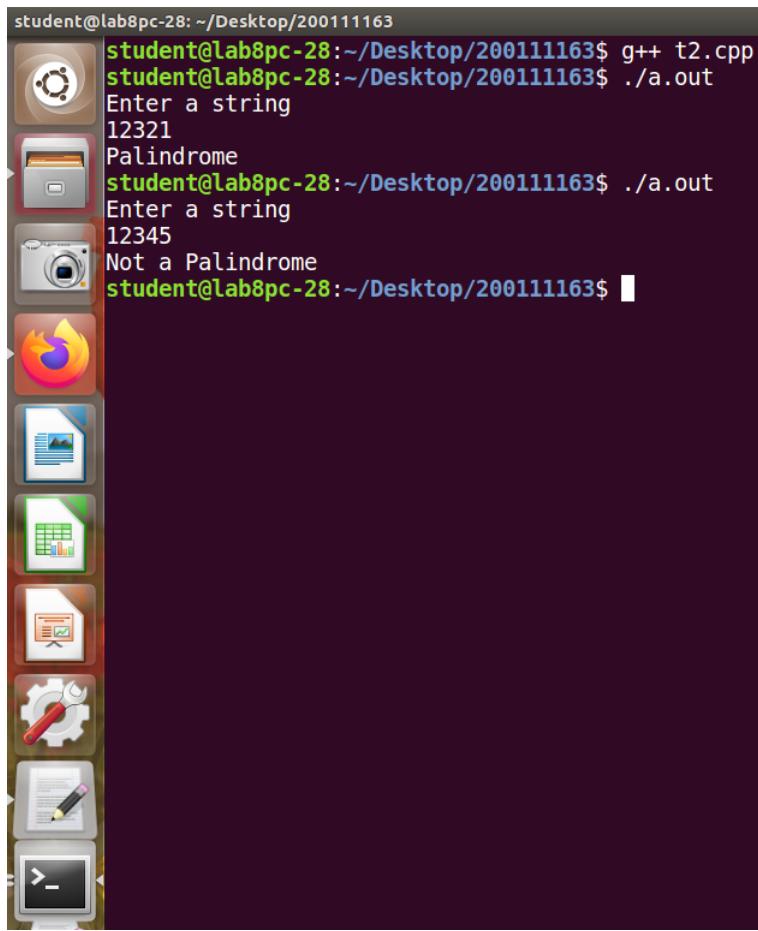
```
#include
<iostream>
#include <string>

using namespace std;

int main()
{
    string s,temp;
    cout<<"Enter a string\n";
    getline(cin,s);
    int l=0,i;
    l=s.length();
    for(i=l-1;i>=0;i--)
    {
        temp=temp+s[i];
    }
    if(temp==s)
        cout<<"Palindrome\n";
    else
        cout<<"Not a Palindrome\n";
    return 0;
}
```

Output

```
student@lab8pc-28:~/Desktop/200111163$ g++ t2.cpp
student@lab8pc-28:~/Desktop/200111163$ ./a.out
Enter a string
12321
Palindrome
student@lab8pc-28:~/Desktop/200111163$ ./a.out
Enter a string
12345
Not a Palindrome
student@lab8pc-28:~/Desktop/200111163$
```



Practical 6

Task 3

Source Code:

```
#include
<iostream>

#include <string>
#include <bits/stdc++.h>

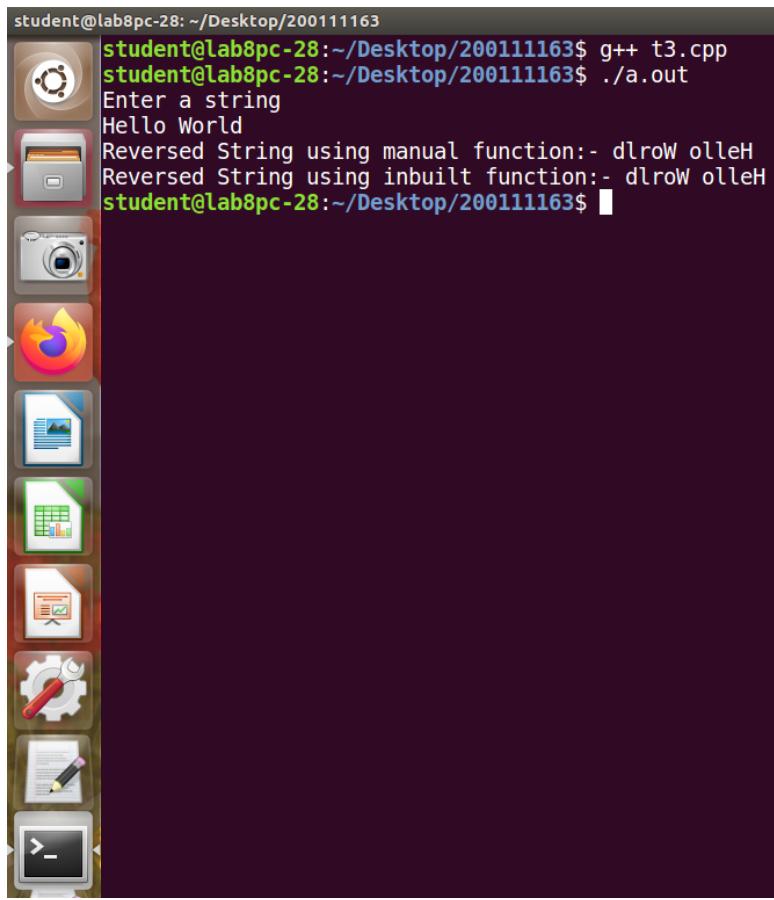
using namespace std;

void reverse(string s)
{
    string temp1;
    int l=0,i;
    l=s.length();
    for(i=l-1;i>=0;i--)
    {
        temp1=temp1+s[i];
    }
    cout<<"Reversed String using manual function:- "<<temp1<<"\n";
}

int main()
{
    string s;
    cout<<"Enter a string\n";
    getline(cin,s);
    reverse(s);
    reverse(s.begin(),s.end());
    cout<<"Reversed String using inbuilt function:- "<<s<<"\n";
    return 0;
}
```

Output

```
student@lab8pc-28: ~/Desktop/200111163
student@lab8pc-28:~/Desktop/200111163$ g++ t3.cpp
student@lab8pc-28:~/Desktop/200111163$ ./a.out
Enter a string
Hello World
Reversed String using manual function:- dlroW olleH
Reversed String using inbuilt function:- dlroW olleH
student@lab8pc-28:~/Desktop/200111163$
```



Practical 6

Task 4

Source Code:

```
#include
<iostream>
#include <bits/stdc++.h>

using namespace std;
int compare(string s1, string s2)
{
    int l1=s1.length();
    int l2=s2.length();
    if(l1==l2)
    {
        for(int i=0;i<l1;i++)
        {
            if(s1[i]!=s2[i])
                return 0;
        }
        return 1;
    }
    else
        return 0;
}
int main()
{
    string s1,s2;
    cout<<"Enter any two strings:- \n";
    getline(cin,s1);
    getline(cin,s2);
    int c=compare(s1,s2);
    if(c==0)
        cout<<"Strings are not equal\n";
    else
        cout<<"Strings are equals\n";
    return 0;
}
```

Output

```

File Actions Edit View Help
File   Actions   Edit   View   Help
( sammei@kali )-[ ~/Desktop/sammei/practical 6 c++ ]
$ g++ t4.cpp
( sammei@kali )-[ ~/Desktop/sammei/practical 6 c++ ]
$ ./a.out
Enter any two strings:-
abc
abc
Strings are equals

( sammei@kali )-[ ~/Desktop/sammei/practical 6 c++ ]
$ ./a.out
Enter any two strings:-
abc
abd
Strings are not equal

( sammei@kali )-[ ~/Desktop/sammei/practical 6 c++ ]
$ ./a.out
Enter any two strings:-
Vaibhav
vaibhav
Strings are not equal

( sammei@kali )-[ ~/Desktop/sammei/practical 6 c++ ]
$ ./a.out
Enter any two strings:-
2001
2001
Strings are equals

( sammei@kali )-[ ~/Desktop/sammei/practical 6 c++ ]
$ 

```

Practical 6

Task 5

Source Code:

```
# include
<iostream>
# include <string>

using namespace std;

int main()
{
    string s1,s2;
    cout<<"Enter any two string:-\n";
    getline(cin,s1);
    getline(cin,s2);
    int x= s1.compare(s2);
    cout<<"Difference in Strings= "<<x<<"\n";
    if(x==0)
        cout<<"Equal Strings\n";
    else
        cout<<"Unequal Strings\n";
    return 0;
}
```

Output

```

File Actions Edit View Help
(sammei㉿kali)-[~/Desktop/sammei/practical 6 c++]
$ g++ t5.cpp
(sammei㉿kali)-[~/Desktop/sammei/practical 6 c++]
$ ./a.out
Enter any two string:-
abc
abc
Difference in Strings= 0
Equal Strings

(sammei㉿kali)-[~/Desktop/sammei/practical 6 c++]
$ ./a.out
Enter any two string:-
abc
abd
Difference in Strings= -1
Unequal Strings

(sammei㉿kali)-[~/Desktop/sammei/practical 6 c++]
$ ./a.out
Enter any two string:-
Abc
abc
Difference in Strings= -2097152
Unequal Strings

(sammei㉿kali)-[~/Desktop/sammei/practical 6 c++]
$ ./a.out
Enter any two string:-
abc
abD
Difference in Strings= 31
Unequal Strings

(sammei㉿kali)-[~/Desktop/sammei/practical 6 c++]
$ 

```

Practical 6

Task 6

Source Code:

```
#include
<iostream>

#include <string>

using namespace std;

int main()
{
    string s;
    char c;
    int i;
    cout<<"Enter a String:-\n";
    getline(cin,s);
    cout<<"Enter a character to replace in string:- \n";
    cin>>c;
    cout<<"Enter the index to repalce in String:-\n";
    cin>>i;
    cout<<"Address of String before change:- "<<&s<<"\n";
    s[i]=c;
    cout<<"String after change:- "<<s<<"\n";
    cout<<"Address of String After change:- "<<&s<<"\n";
    return 0;
}
```

Output

The screenshot shows a terminal window titled 'practical 6 c++' running on a Kali Linux system. The user has compiled a program named 't6.cpp' using g++. The program prompts the user for a string ('Enter a String:-'), a character to replace ('Enter a character to replace in string:-'), and an index ('Enter the index to repalce in String:-'). It then displays the original string address, the modified string, and the new string address. This process is demonstrated twice with different inputs ('Vaibhav', 'h', '3' and 'abc', 'a', '1').

```
~/Desktop/sammei/prac... sammei@kali: ~/Desktop... t5.png - Image Viewer practical 6 c++
sammei@kali: ~/Desktop/sammei/practical 6 c++

File Actions Edit View Help
(sammei@kali)-[~/Desktop/sammei/practical 6 c++]
$ g++ t6.cpp
(sammei@kali)-[~/Desktop/sammei/practical 6 c++]
$ ./a.out
Enter a String:- Vaibhav
Enter a character to replace in string:- h
Enter the index to repalce in String:- 3
Address of String before change:- 0x7ffcb2847450
String after change:- Vaihhav
Address of String After change:- 0x7ffcb2847450

(sammei@kali)-[~/Desktop/sammei/practical 6 c++]
$ ./a.out
Enter a String:- abc
Enter a character to replace in string:- a
Enter the index to repalce in String:- 1
Address of String before change:- 0x7ffc25b7d9b0
String after change:- aac
Address of String After change:- 0x7ffc25b7d9b0

(sammei@kali)-[~/Desktop/sammei/practical 6 c++]
$
```

Practical 7

Task 1

Source Code:

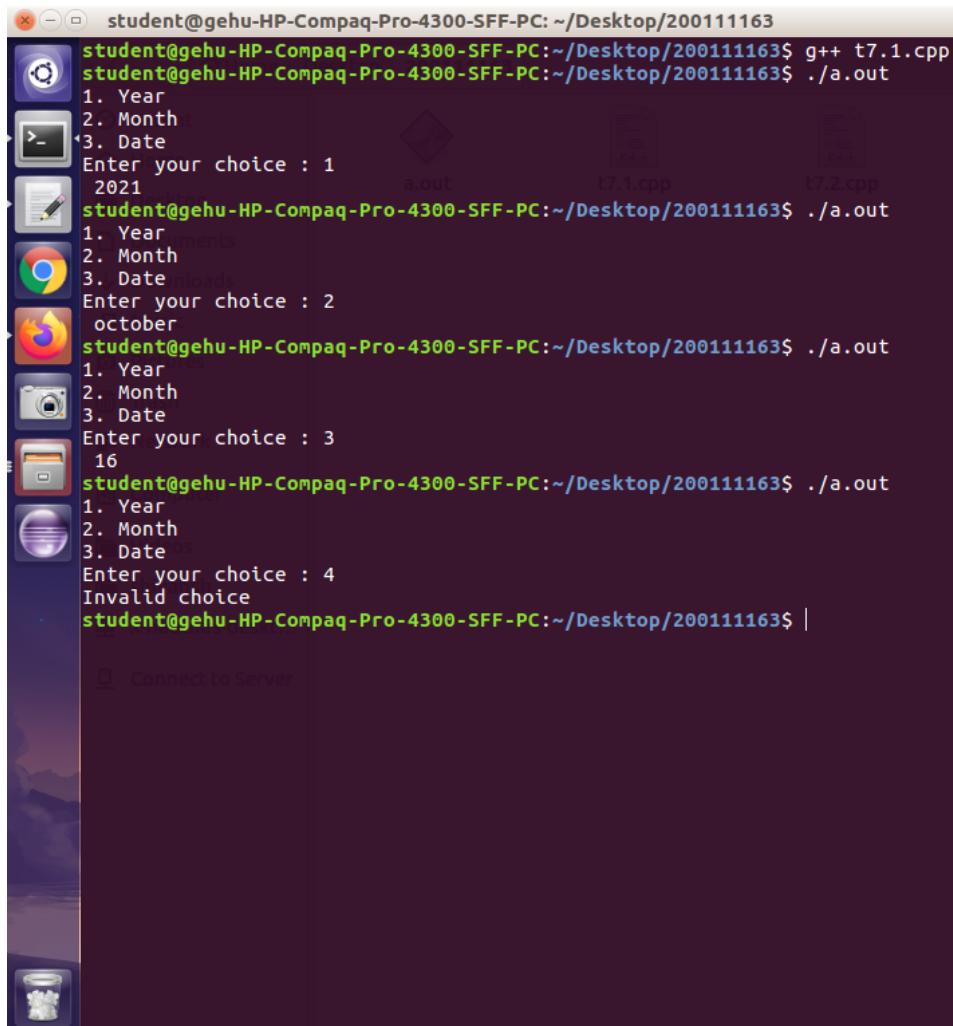
```
#include
<iostream>

#include <string>
using namespace std;
int main()
{
    int yr,ch;
    string month="october";
    int date=16;
    yr=2021;
    cout<<"1. Year\n";
    cout<<"2. Month\n";
    cout<<"3. Date\n";
    cout<<"Enter your choice : ";
    cin>>ch;

    switch(ch)
    {

        case 1:
            cout<<" "<<yr<<"\n";
            break;
        case 2:
            cout<<" "<<month<<"\n";
            break;
        case 3:
            cout<<" "<<date<<"\n";
            break;
        default:
            cout<<"Invalid choice\n";
            break;
    }
    return 0;
}
```

Output



A screenshot of a Linux desktop environment. On the left is a vertical dock containing icons for a terminal, file manager, browser, and other applications. The main window shows a terminal session:

```
student@gehu-HP-Compaq-Pro-4300-SFF-PC: ~/Desktop/200111163
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ g++ t7.1.cpp
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ ./a.out
1. Year
2. Month
3. Date
Enter your choice : 1
2021
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ ./a.out
1. Year
2. Month
3. Date
Enter your choice : 2
october
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ ./a.out
1. Year
2. Month
3. Date
Enter your choice : 3
16
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ ./a.out
1. Year
2. Month
3. Date
Enter your choice : 4
Invalid choice
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ |
```

Practical 7

Task 2

Source Code:

```
#include
<iostream>

#include <ctime>
using namespace std;
int main()
{
    time_t current_time;
    current_time = time(NULL);

    char *tm = ctime(&current_time);
    cout << "Today is : " << tm;

    return 0;
}
```

Output

```
student@gehu-HP-Compaq-Pro-4300-SFF-PC: ~/Desktop/200111163
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ g++ t7.2.cpp
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ ./a.out
Today is : Thu Oct 14 09:33:07 2021
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ |
```

Practical 7

Task 3 V1

Source Code:

```
# include
<iostream>

using namespace std;

int main()
{
    int n,i,j;
    cout<<"Enter size of the array:-\n";
    cin>>n;
    int a[n][n];
    cout<<"Enter the elements of the array\n";
    for(i=0;i<n;i++)
    {
        for(j=0;j<n;j++)
        {
            cin>>a[i][j];
        }
    }
    cout<<"Reversed Array is :-\n";
    for(i=n-1;i>=0;i--)
    {
        for(j=n-1;j>=0;j--)
        {
            cout<<a[i][j]<<" ";
        }
        cout<<"\n";
    }
    return 0;
}
```

Output

The screenshot shows a terminal window titled "student@gehu-HP-Compaq-Pro-4300-SFF-PC: ~/Desktop/200111163". The terminal displays the following command-line session:

```
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ g++ t3.cpp
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ ./a.out
Enter size of the array:-
3
Enter the elements of the array
1 2 3
4 5 6
7 8 9
Reversed Array is :-
9 8 7
6 5 4
3 2 1
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ |
```

The terminal window is located on a desktop environment with a dark purple background. To the right of the terminal, there are several files and folders: "a.out", "t1.png", "t2.png", "t3.cpp", and "t7.1.cpp". On the left side of the terminal, there is a vertical dock containing icons for various applications like a terminal, file manager, and system settings.

Practical 7

Task 3 V2

Source Code:

```
# include
<iostream>

using namespace std;

int main()
{
    int n,i,j;
    cout<<"Enter size of the array:-\n";
    cin>>n;
    int a[n][n];
    cout<<"Enter the elements of the array\n";
    for(i=0;i<n;i++)
    {
        for(j=0;j<n;j++)
        {
            cin>>a[i][j];
        }
    }
    cout<<"Reversed Array is :-\n";
    for(i=0;i<3;i++)
    {
        for(j=0;j<3;j++)
        {
            cout<<10-a[i][j]<<" ";
        }
        cout<<"\n";
    }
    return 0;
}
```

Output

The screenshot shows a terminal window with the following text:

```
student@gehu-HP-Compaq-Pro-4300-SFF-PC: ~/Desktop/200111163$ g++ t3_2.cpp
student@gehu-HP-Compaq-Pro-4300-SFF-PC: ~/Desktop/200111163$ ./a.out
Enter size of the array:-
3
Enter the elements of the array
1 2 3
4 5 6
7 8 9
Reversed Array is :-
9 8 7
6 5 4
3 2 1
student@gehu-HP-Compaq-Pro-4300-SFF-PC: ~/Desktop/200111163$ |
```

The terminal is running on a Linux system with a dark theme. The desktop environment includes icons for various applications like a terminal, file manager, and media players.

Practical 7

Task 3 V3

Source Code:

```
# include
<iostream>

using namespace std;

int main()
{
    int n,i,j;
    cout<<"Enter size of the array:-\n";
    cin>>n;
    int a[n][n],b[n][n];
    cout<<"Enter the elements of the array\n";
    for(i=0;i<n;i++)
    {
        for(j=0;j<n;j++)
        {
            cin>>a[i][j];
        }
    }
    cout<<"Reversed Array is :-\n";
    for(i=n-1;i>=0;i--)
    {
        for(j=n-1;j>=0;j--)
        {
            b[n-i-1][n-j-1]=a[i][j];
        }
    }
    for(i=0;i<n;i++)
    {
        for(j=0;j<n;j++)
        {
            cout<<b[i][j]<<" ";
        }
        cout<<"\n";
    }
    return 0;
}
```

Output

The screenshot shows a terminal window titled "student@gehu-HP-Compaq-Pro-4300-SFF-PC: ~/Desktop/200111163". The user has run the command `g++ t3_3.cpp` to compile a C++ program named `t3_3.cpp`. After compilation, they run the executable `./a.out`. The terminal displays the following interaction:

```
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ g++ t3_3.cpp
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ ./a.out
Enter size of the array:-
3
*Enter the elements of the array
1 2 3
4 5 6
7 8 9
Reversed Array is :-
9 8 7
6 5 4
3 2 1
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ |
```

The terminal also lists several files in the current directory: `a.out`, `t1.png`, `t2.png`, `t3.cpp`, `t3_1.cpp`, `t3_2.png`, `t3_3.cpp`, `t7.1.cpp`, `t7.2.cpp`, and `t7.3.cpp`. The desktop environment visible in the background includes icons for Pictures, Trash, Network, Computer, Videos, shivansh, x-nautilus desktop, and Connect to Server.

Practical 7

Task 3 V4

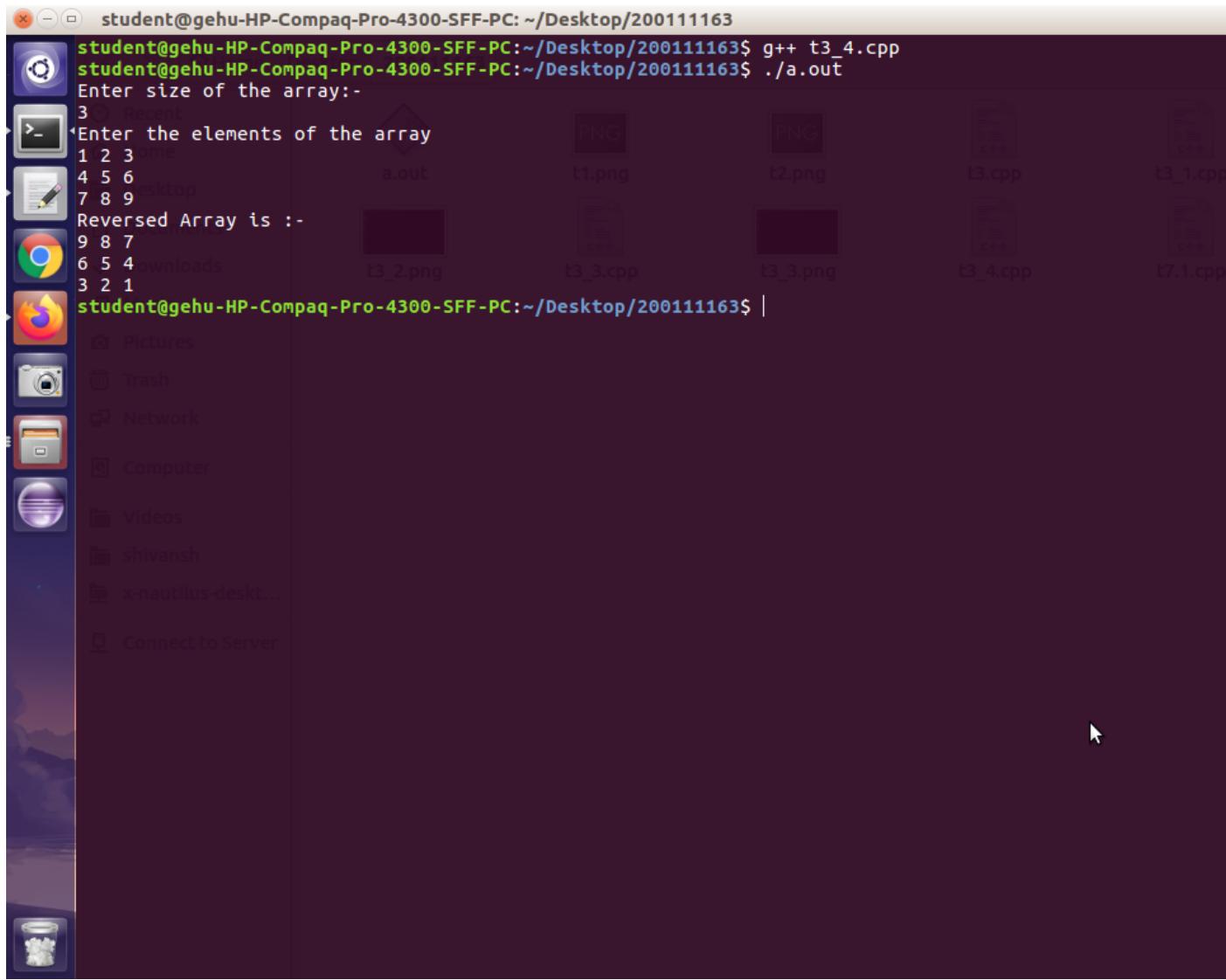
Source Code:

```
# include
<iostream>

using namespace std;

int main()
{
    int n,i,j;
    cout<<"Enter size of the array:-\n";
    cin>>n;
    int a[n][n],b[n][n];
    cout<<"Enter the elements of the array\n";
    for(i=0;i<n;i++)
    {
        for(j=0;j<n;j++)
        {
            cin>>a[i][j];
        }
    }
    cout<<"Reversed Array is :-\n";
    for(i=0;i<3;i++)
    {
        for(j=0;j<3;j++)
        {
            b[i][j]=10-a[i][j];
        }
    }
    for(i=0;i<3;i++)
    {
        for(j=0;j<3;j++)
        {
            cout<<b[i][j]<<" ";
        }
        cout<<"\n";
    }
    return 0;
}
```

Output



A screenshot of a Linux desktop environment. On the left is a vertical dock with icons for Home, Dash, Applications, Computer, and Connect to Server. The main area shows a terminal window with the following content:

```
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ g++ t3_4.cpp
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ ./a.out
Enter size of the array:-
3
Enter the elements of the array
1 2 3
4 5 6
7 8 9
Reversed Array is :-
9 8 7
6 5 4
3 2 1
student@gehu-HP-Compaq-Pro-4300-SFF-PC:~/Desktop/200111163$ |
```

The desktop background is a purple landscape image. A mouse cursor is visible in the bottom right corner.

Practical 7

Task 4 V1

Source Code:

```
# include
<iostream>

using namespace std;

int main()
{
    int n,i,j;
    cout<<"Enter size of the array:-\n";
    cin>>n;
    int a[n][n],b[n][n];
    cout<<"Enter the elements of the array\n";
    for(i=0;i<n;i++)
    {
        for(j=0;j<n;j++)
        {
            cin>>a[i][j];
        }
    }
    cout<<"New matrix is:\n";
    for(i=0;i<n;i++)
    {
        for(j=0;j<n;j++)
        {
            cout<<a[0][i]<<" ";
        }
        cout<<"\n";
    }
    return 0;
}
```

Output

The screenshot shows a terminal window on a Kali Linux desktop environment. The terminal title is '(sammei㉿kali)-[~/Desktop/sammei/opp... practical 7 c++]'. The user has run the command 'g++ t4_1.cpp' to compile the source code. After compilation, they run the executable 'a.out' with the command './a.out'. The program prompts for the size of the array, which is entered as 3. It then asks for the elements of the array, and the user enters three rows of three integers each: 1 2 3, 4 5 6, and 7 8 9. The program outputs the resulting matrix, which is a 3x3 identity matrix:

```
(sammei㉿kali)-[~/Desktop/sammei/opp... practical 7 c++]
$ g++ t4_1.cpp
[sammei㉿kali]-[~/Desktop/sammei/opp... practical 7 c++]
$ ./a.out
Enter size of the array:-
3
Enter the elements of the array
1 2 3
4 5 6
7 8 9
New matrix is:
1 1 1
2 2 2
3 3 3
```

Practical 7

Task 4 V2

Source Code:

```
# include
<iostream>

using namespace std;

int main()
{
    int n,i,j;
    cout<<"Enter size of the array:-\n";
    cin>>n;
    int a[n][n],b[n][n];
    cout<<"Enter the elements of the array\n";
    for(i=0;i<n;i++)
    {
        for(j=0;j<n;j++)
        {
            cin>>a[i][j];
        }
    }
    cout<<"New matrix is:\n";
    for(i=0;i<n;i++)
    {
        for(j=0;j<n;j++)
        {
            cout<<a[i][n-1]/3<<" ";
        }
        cout<<"\n";
    }
    return 0;
}
```

Output

```
(sammei㉿kali)-[~/Desktop/sammei/opp... practical 7 c++]
$ g++ t4_2.cpp
(sammei㉿kali)-[~/Desktop/sammei/opp... practical 7 c++]
$ ./a.out
Enter size of the array:-
3
Enter the elements of the array
1 2 3
4 5 6
7 8 9
New matrix is:
1 1 1
2 2 2
3 3 3
```

Practical 7

Task 4 V3

Source Code:

```
# include
<iostream>

using namespace std;

int main()
{
    int n,i,j;
    cout<<"Enter size of the array:-\n";
    cin>>n;
    int a[n][n],b[n][n];
    cout<<"Enter the elements of the array\n";
    for(i=0;i<n;i++)
    {
        for(j=0;j<n;j++)
        {
            cin>>a[i][j];
        }
    }
    cout<<"New matrix is:\n";
    for(i=0;i<n;i++)
    {
        for(j=0;j<n;j++)
        {
            cout<<a[i][j]-(2*i+j)<<" ";
        }
        cout<<"\n";
    }
    return 0;
}
```

Output

The screenshot shows a terminal window titled "qterminal" with the command line "sammei@kali: ~/Desktop/sammei/oppss c++/practical 7 c++". The terminal displays the following output:

```
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 7 c++]
$ g++ t4_3.cpp

(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 7 c++]
$ ./a.out
Enter size of the array:-
3
Enter the elements of the array
1 2 3
4 5 6
7 8 9
New matrix is:
1 1 1
2 2 2
3 3 3
```

Practical 7

Task 5

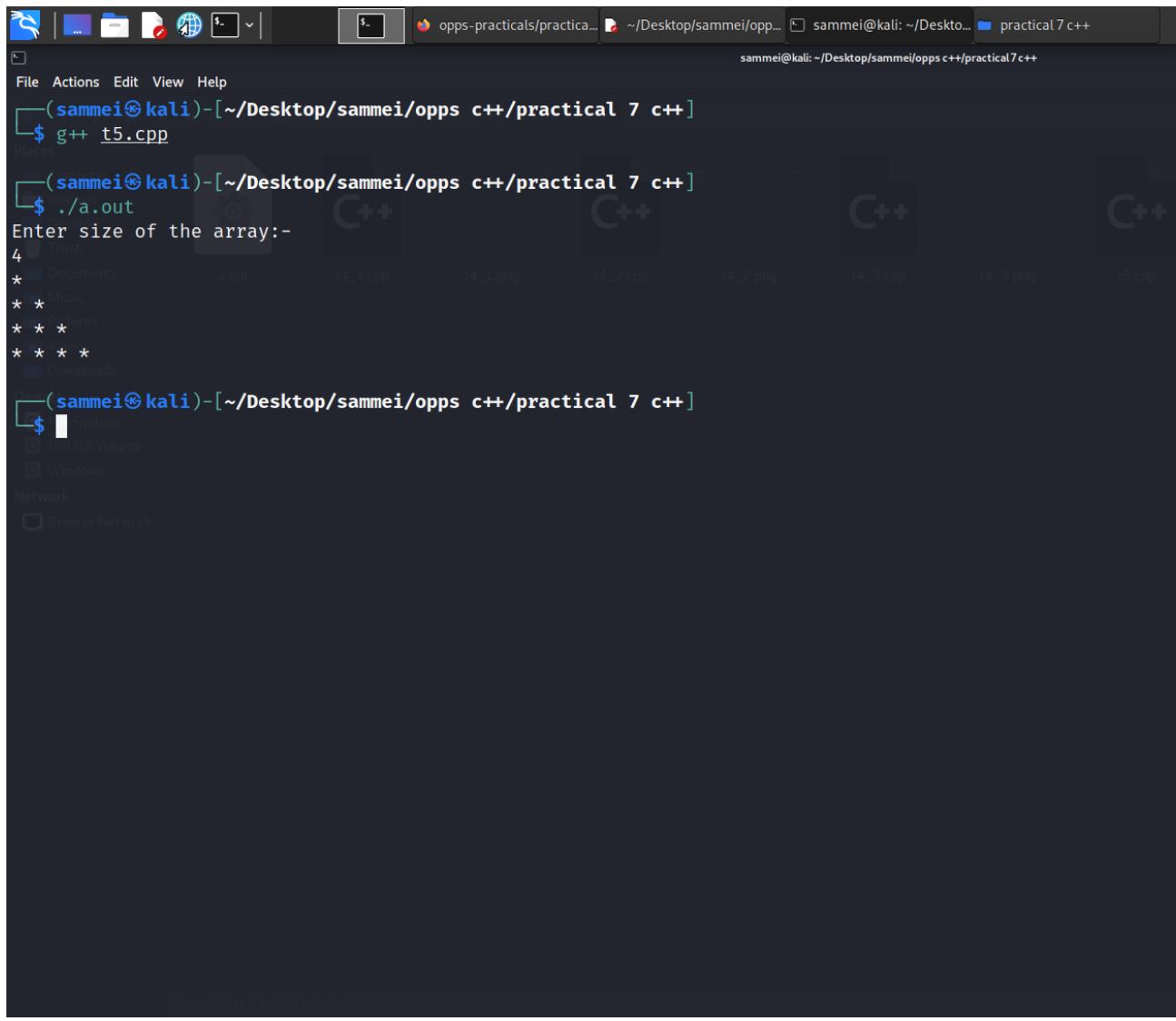
Source Code:

```
# include
<iostream>

using namespace std;

int main()
{
    int n,i,j;
    cout<<"Enter size of the array:-\n";
    cin>>n;
    char a[n][n];
    for(i=0;i<n;i++)
    {
        for(j=0;j<=i;j++)
        {
            a[i][j]='*';
        }
    }
    for(i=0;i<n;i++)
    {
        for(j=0;j<=i;j++)
        {
            cout<<a[i][j]<<" ";
        }
        cout<<'\n';
    }
    return 0;
}
```

Output



The screenshot shows a terminal window with the following content:

```
(sammei㉿kali)-[~/Desktop/sammei/opp... practical 7 c++]
$ g++ t5.cpp
(sammei㉿kali)-[~/Desktop/sammei/opp... practical 7 c++]
$ ./a.out
Enter size of the array:-
4
* * * *
* * * *
* * * *
Downloads
(sammei㉿kali)-[~/Desktop/sammei/opp... practical 7 c++]
$ System
199 GB Volume
Windows
Network
Browse Network
```

The terminal shows the execution of a C++ program named `t5.cpp`. It prompts for the size of an array, which is entered as 4. The output displays four lines of asterisks (*). The terminal is running on a Kali Linux system, as indicated by the prompt and desktop environment.

Practical 7

Task 6

Source Code:

```
# include
<iostream>

using namespace std;

int main()
{
    int n,i,j;
    cout<<"Enter size of the array:-\n";
    cin>>n;
    char a[n][n];
    for(i=0;i<n;i++)
    {
        for(j=0;j<i;j++)
            a[i][j]=' ';
        for(j=i;j<n;j++)
            a[i][j]='*';
    }
    for(i=0;i<n;i++)
    {
        for(j=0;j<n;j++)
        {
            cout<<a[i][j]<<" ";
        }
        cout<<'\n';
    }
    return 0;
}
```

Output

```

Pattern program in c | Tr...
~/Desktop/sammei/opp... sammei@kali: ~/Desktop/sammei/opp... practical 7 c++
sammei@kali: ~/Desktop/sammei/opp... practical 7 c++

File Actions Edit View Help

(sammei㉿kali)-[~/Desktop/sammei/opp... practical 7 c++]
$ g++ t6.cpp
(sammei㉿kali)-[~/Desktop/sammei/opp... practical 7 c++]
$ ./a.out
Enter size of the array:-
4
    cout<<"Enter size of the array:-\n";
* * *
10     char a[n][n];
11     for(i=0;i<n;i++)
12     {
13         for(j=0;j<i;j++)
14             a[i][j]=0;
15         a[i][i]=1;
(sammei㉿kali)-[~/Desktop/sammei/opp... practical 7 c++]
$ []
18     for(i=0;i<n;i++)
19     {
20         for(j=0;j<n;j++)
21         {
22             cout<<a[i][j]<<" ";
23         }
24         cout<<'\n';
25     }
26     return 0;
27 }

```

Practical 7

Task 7

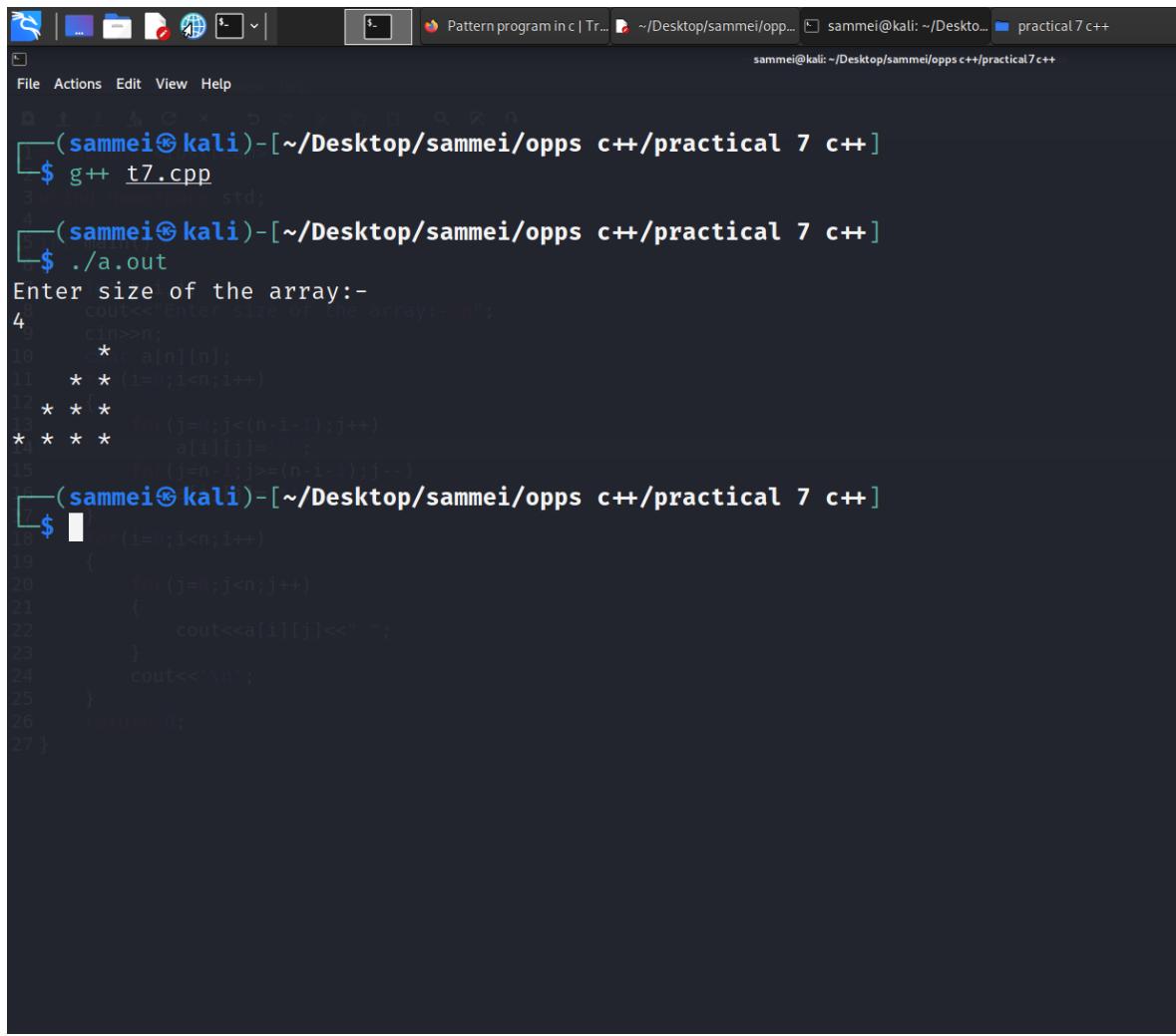
Source Code:

```
# include
<iostream>

using namespace std;

int main()
{
    int n,i,j;
    cout<<"Enter size of the array:-\n";
    cin>>n;
    char a[n][n];
    for(i=0;i<n;i++)
    {
        for(j=0;j<(n-i-1);j++)
            a[i][j]=' ';
        for(j=n-1;j>=(n-i-1);j--)
            a[i][j]='*';
    }
    for(i=0;i<n;i++)
    {
        for(j=0;j<n;j++)
        {
            cout<<a[i][j]<<" ";
        }
        cout<<'\n';
    }
    return 0;
}
```

Output



```

Pattern program in c | Tr... ~/Desktop/sammei/opp... sammei@kali:~/Desktop/practical 7 c++
sammei@kali:~/Desktop/sammei/opp... practical 7 c++

File Actions Edit View Help

1 (sammei㉿kali)-[~/Desktop/sammei/opp... practical 7 c++]
2 $ g++ t7.cpp
3 #include <iostream>
4 using namespace std;
5 (sammei㉿kali)-[~/Desktop/sammei/opp... practical 7 c++]
6 $ ./a.out
7 Enter size of the array:-
8     cout<<"Enter size of the array:- ";
9     cin>>n;
10    * * * a[n][n];
11    * * (j=0; i<n; i++)
12    * * *   * (j=0; j<(n-i-1); j++)
13    * * *   a[i][j]= ' ';
14    * * *   (j=n-1; j>=(n-i-1); j--)
15
16 (sammei㉿kali)-[~/Desktop/sammei/opp... practical 7 c++]
17 $ █
18     (i=0; i<n; i++)
19     {
20         for(j=0; j<n; j++)
21         {
22             cout<<a[i][j]<<" ";
23         }
24         cout<<'\n';
25     }
26     return 0;
27 }

```

Practical 7

Task 8

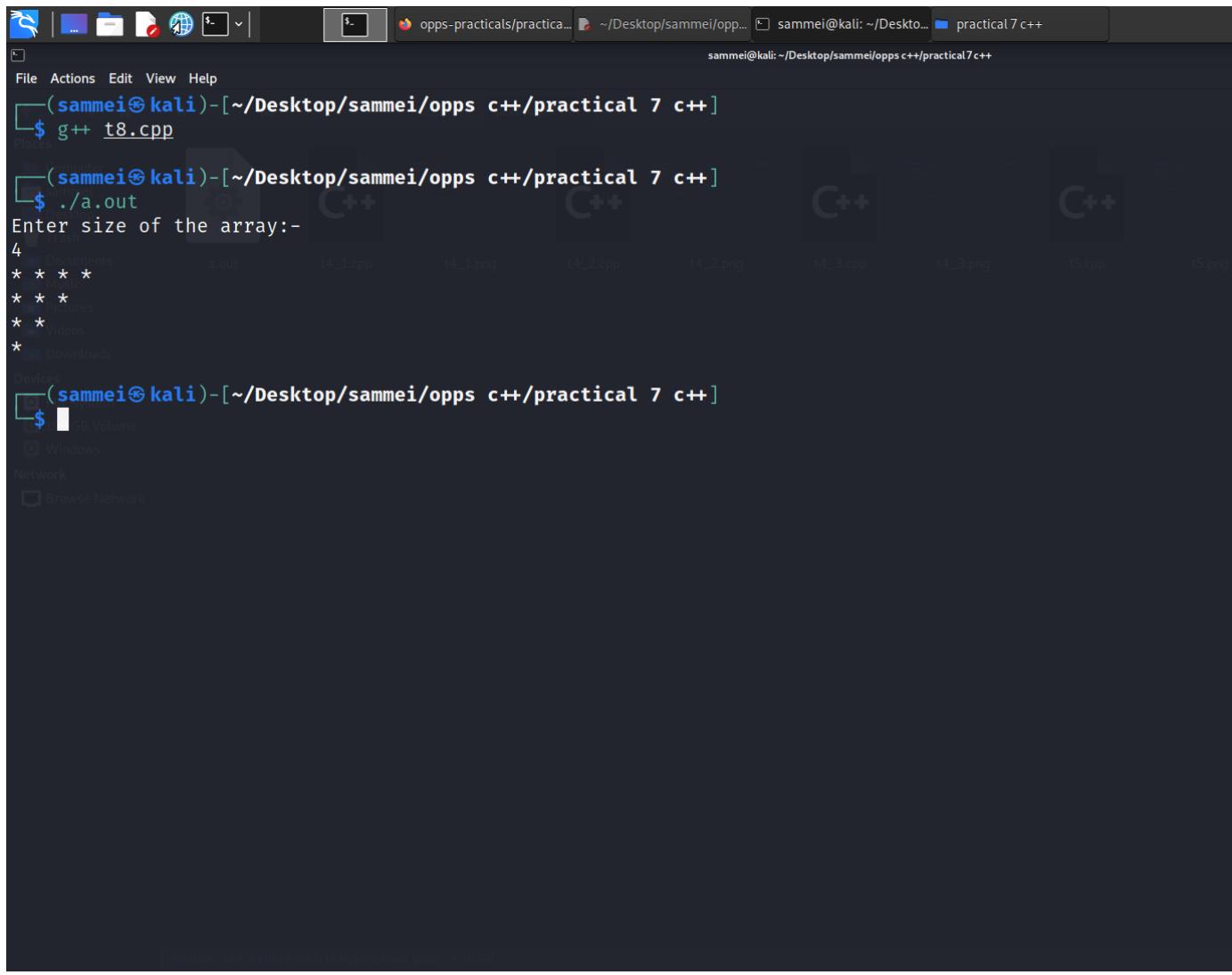
Source Code:

```
# include
<iostream>

using namespace std;

int main()
{
    int n,i,j;
    cout<<"Enter size of the array:-\n";
    cin>>n;
    char a[n][n];
    for(i=n-1;i>=0;i--)
    {
        for(j=i;j>=0;j--)
        {
            a[i][j]='*';
        }
    }
    for(i=n-1;i>=0;i--)
    {
        for(j=i;j>=0;j--)
        {
            cout<<a[i][j]<<" ";
        }
        cout<<'\n';
    }
    return 0;
}
```

Output



```
(sammei㉿kali)-[~/Desktop/sammei/opps c++/practical 7 c++]
$ g++ t8.cpp
(sammei㉿kali)-[~/Desktop/sammei/opps c++/practical 7 c++]
$ ./a.out
Enter size of the array:-
4
* * * *
* * *
* * Pictures
* * Videos
* * Downloads
Devices
$ 1 GB Volume
$ Windows
Network
$ Browse Network
```

Practical 8

Task 1

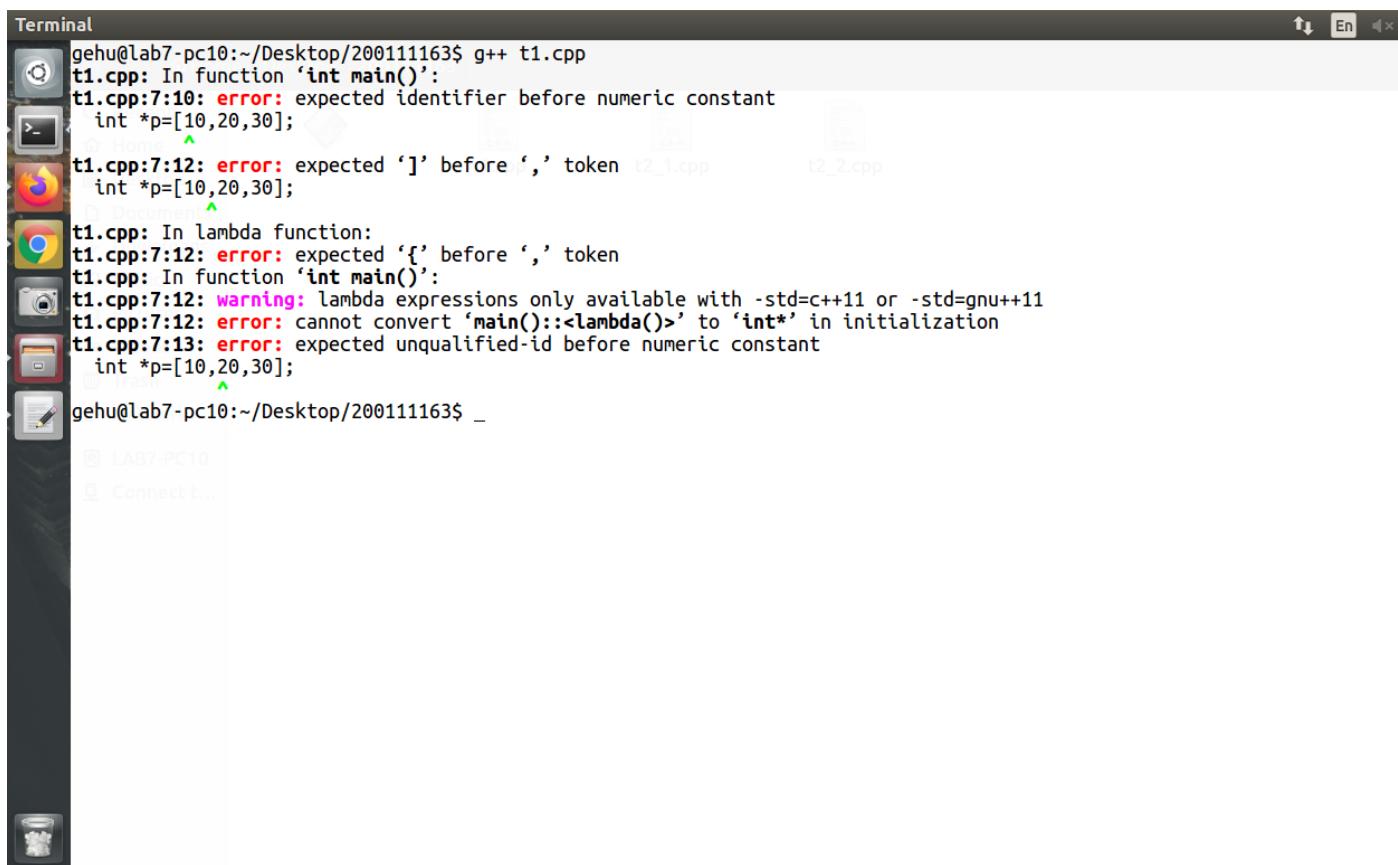
Source Code:

```
#include
<iostream>

using namespace std;

int main()
{
    int *p=[10,20,30];
    cout<<*p;
    p++;
    cout<<(*p);
    return 0;
}
```

Output



The screenshot shows a terminal window with the following output:

```
gehu@lab7-PC10:~/Desktop/200111163$ g++ t1.cpp
t1.cpp: In function 'int main()':
t1.cpp:7:10: error: expected identifier before numeric constant
  int *p=[10,20,30];
               ^
t1.cpp:7:12: error: expected ']' before ',' token
  int *p=[10,20,30];
               ^
t1.cpp: In lambda function:
t1.cpp:7:12: error: expected '{' before ',' token
t1.cpp: In function 'int main()':
t1.cpp:7:12: warning: lambda expressions only available with -std=c++11 or -std=gnu++11
t1.cpp:7:12: error: cannot convert 'main()::<lambda()>' to 'int*' in initialization
t1.cpp:7:13: error: expected unqualified-id before numeric constant
  int *p=[10,20,30];
               ^
gehu@lab7-PC10:~/Desktop/200111163$ _
```

Practical 8

Task 2 V1

Source Code:

```
#include
<iostream>

using namespace std;

int main()
{
    int arr[]={10,20,30};
    int *p;
    p=&arr;
    cout<<*p<<"\n";
    p++;
    cout<<*p<<"\n";
    return 0;
}
```

Output



The screenshot shows a terminal window on a Linux desktop environment. The terminal output is as follows:

```
Terminal
gehu@lab7-PC10:~/Desktop/200111163$ g++ t2_2.cpp
t2_2.cpp: In function 'int main()':
t2_2.cpp:9:3: error: cannot convert 'int (*)[3]' to 'int*' in assignment
  p=&arr;
```

The terminal window has a dark theme with icons for various applications like a file manager, browser, and terminal at the top. The desktop background is visible behind the terminal window.

Practical 8

Task 2 V2

Source Code:

```
#include
<iostream>

using namespace std;

int main()
{
    int arr[]={10,20,30};
    int *p;
    p=arr;
    cout<<*p<<"\n";
    p++;
    cout<<*p<<"\n";
    return 0;
}
```

Output

The screenshot shows a Linux desktop environment with a dark theme. On the left, there is a vertical dock containing icons for a terminal, file manager, browser, and other applications. The main area has two windows open: a terminal window and a file manager window.

Terminal Window Content:

```
gehu@lab7-pc10:~/Desktop/200111163$ g++ t2_1.cpp
gehu@lab7-pc10:~/Desktop/200111163$ ./a.out
10
20
```

File Manager Window Content:

- Desktop folder
- Downloads folder
- Music folder
- Pictures folder
- Videos folder
- Trash folder
- Network folder
- LAB7-PC10 folder
- Connect to... icon
- Files:
 - t1.png
 - t2_1.cpp
 - t2_2.cpp

Practical 8

Task 3 V1

Source Code:

```
#include
<iostream>

using namespace std;

int main()
{
    int a=30;
    int *p;
    p=&a;
    int **q;
    q=&p;
    cout<<*p<<"\n";
    cout<<**q<<"\n";
    return 0;
}
```

Output

```
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 8 c++]
$ g++ t3_1.cpp
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 8 c++]
$ ./a.out
30
30
$
```

Practical 8

Task 3 V2

Source Code:

```
#include
<iostream>

using namespace std;

int main()
{
    int a=30;
    int *p;
    p=&a;
    int **q;
    q=&p;
    cout<<**q<<"\n";
    **q=20;
    cout<<**q<<"\n";
    return 0;
}
```

Output

```
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 8 c++]
$ g++ t3_2.cpp
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 8 c++]
$ ./a.out
30
20
```

Practical 8

Task 4

Source Code:

```
#include
<iostream>

using namespace std;

void fac(int n)
{
    int f=1,i;
    for(i=n;i>0;i--)
        f=f*i;
    cout<<"Factorial of "<<n<<":- "<<f<<"\n";
}
int main()
{
    cout<<"Enter the no. to calculate factorial:\n";
    int n;
    cin>>n;
    fac(n);
    return 0;
}
```

Output

The screenshot shows a Linux desktop environment with a dark theme. On the left is a vertical dock containing icons for a terminal, file manager, browser, camera, and other utilities. The main area features a terminal window titled "Terminal" with the following text:

```
gehu@lab7-PC10:~/Desktop/200111163$ g++ t4.cpp
gehu@lab7-PC10:~/Desktop/200111163$ ./a.out
Enter the no. to calculate factorial:
5
Factorial of 5:-120
gehu@lab7-PC10:~/Desktop/200111163$
```

Below the terminal, there are four small icons labeled t1.png, t2_1.cpp, t3.png, and t4.cpp.

Practical 8

Task 5

Source Code:

```
#include
<iostream>

using namespace std;

int fac(int n)
{
    if(n==0)
        return 1;
    else
        return (n*fac(n-1));
}

int main()
{
    cout<<"Enter the no. to calculate factorial:\n";
    int n,f=0;
    cin>>n;
    f=fac(n);
    cout<<"Factorial of "<<n<<":- "<<f<<"\n";
    return 0;
}
```

Output

The screenshot shows a Linux desktop environment with a dark theme. On the left, there is a vertical dock containing icons for various applications: Dash (Ubuntu logo), Terminal, Dash (Search bar), Home, Dash (File manager), Dash (System settings), Dash (Network), Dash (LXDE-PC10), and Dash (Connect to...).

The main window is a terminal window titled "Terminal". The terminal output is as follows:

```
gehu@lab7-PC10:~/Desktop/200111163$ g++ t5.cpp
gehu@lab7-PC10:~/Desktop/200111163$ ./a.out
Enter the no. to calculate factorial:
5
Factorial of 5:-120
gehu@lab7-PC10:~/Desktop/200111163$
```

To the right of the terminal, there is a file manager window showing files in a directory. The files are:

- t1.cpp
- t1.png
- t2_1.cpp
- t2_1.png
- t3.cpp
- t3.png
- t4.cpp
- t4.png
- t5.cpp

Practical 8

Task 6

Source Code:

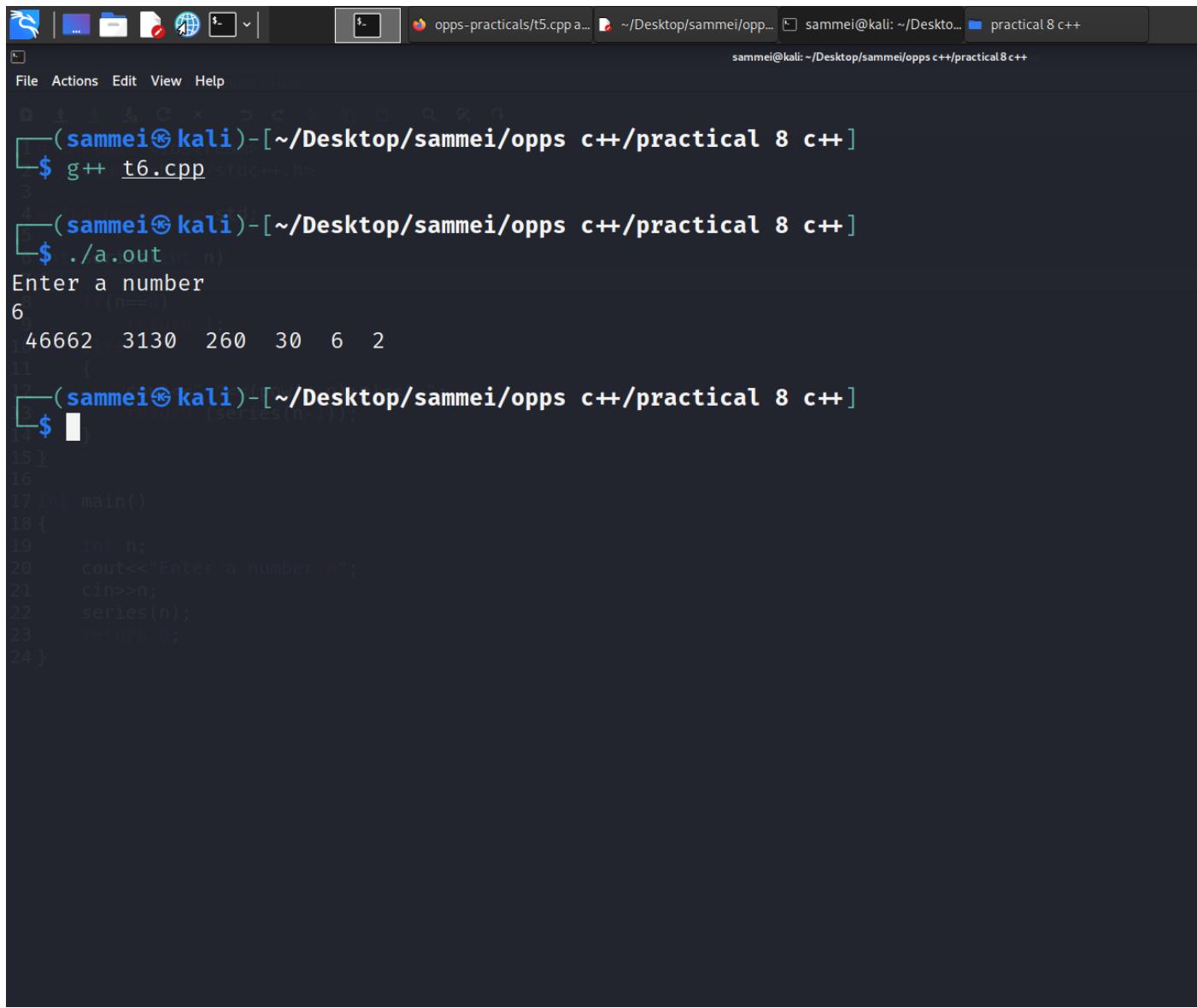
```
# include
<iostream>
# include <bits/stdc++.h>

using namespace std;

int series(int n)
{
    if(n==0)
        return 1;
    else
    {
        cout<<" "<<(pow(n,n)+n)<<" ";
        return (series(n-1));
    }
}

int main()
{
    int n;
    cout<<"Enter a number\n";
    cin>>n;
    series(n);
    return 0;
}
```

Output



The screenshot shows a terminal window with a dark background and light-colored text. At the top, there's a header bar with icons for file operations like copy, paste, and save, followed by a search bar and some status indicators. The main area of the terminal shows the following session:

```
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 8 c++]
$ g++ t6.cpp <stdin>
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 8 c++]
$ ./a.out
Enter a number
6
46662 3130 260 30 6 2
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 8 c++]
$
```

The terminal prompt is \$, and the user has entered the command g++ t6.cpp <stdin>. After compilation, they run the executable ./a.out. They are prompted to enter a number, which they type as 6. The program then outputs the series of numbers: 46662, 3130, 260, 30, 6, 2.

Practical 8

Task 7 V1

Source Code:

```
#include
<iostream>

using namespace std;

void swap(int a,int b)
{
    int t;
    t=a;
    a=b;
    b=t;
}

int main()
{
    int a,b;
    cout<<"Enter the values of a & b\n";
    cin>>a;
    cin>>b;
    cout<<"Value of a & b before calling swap function\n";
    cout<<a<<'\n';
    cout<<b<<'\n';
    swap(a,b);
    cout<<"Value of a & b after calling swap function\n";
    cout<<a<<'\n';
    cout<<b<<'\n';
    return 0;
}
```

Output

```
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 8 c++]
$ g++ t7_1.cpp
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 8 c++]
$ ./a.out
Enter the values of a & b
10
20
Value of a & b before calling swap function
10
20
Value of a & b after calling swap function
10
20
int a,b;
cout<<"Enter the values of a & b:";

(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 8 c++]
$ cin>>a;
cout<<"Value of a & b before calling swap function:";
cout<<a<<\n";
cout<<b<<\n";
swap(a,b);
cout<<"Value of a & b after calling swap function:";
cout<<a<<\n";
cout<<b<<\n";
return 0;
27}
```

Practical 8

Task 7 V2

Source Code:

```
#include
<iostream>

using namespace std;

void swap(int &a,int &b)
{
    int t;
    t=a;
    a=b;
    b=t;
}

int main()
{
    int a,b;
    cout<<"Enter the values of a & b\n";
    cin>>a;
    cin>>b;
    cout<<"Value of a & b before calling swap function\n";
    cout<<a<<'\n';
    cout<<b<<'\n';
    swap(a,b);
    cout<<"Value of a & b after calling swap function\n";
    cout<<a<<'\n';
    cout<<b<<'\n';
    return 0;
}
```

Output

The screenshot shows a terminal window with a dark background and light-colored text. At the top, there are icons for file operations like copy, paste, and save, followed by a search bar and a user status line: "sammei@kali: ~/Desktop/sammei/oppss c++/practical 8 c++". Below this is a menu bar with "File", "Actions", "Edit", "View", and "Help". The main area of the terminal displays the following code and its execution:

```
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 8 c++]
$ g++ t7_2.cpp
3 Using namespace std;
4
5 (sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 8 c++]
$ ./a.out
Enter the values of a & b
10
20
Value of a & b before calling swap function
10
20
int main()
Value of a & b after calling swap function
20
10
cout<<"Enter the values of a & b:\n";
cin>>a;
cin>>b;
cout<<a<<'\n';
cout<<b<<'\n';
swap(a,b);
cout<<"Value of a & b after calling swap Function\n";
cout<<a<<'\n';
cout<<b<<'\n';
return 0;
}
```

Practical 8

Task 7 V2

Source Code:

```
#include
<iostream>

using namespace std;

void swap(int *a,int *b)
{
    int t;
    t=*a;
    *a=*b;
    *b=t;
}

int main()
{
    int a,b;
    cout<<"Enter the values of a & b\n";
    cin>>a;
    cin>>b;
    cout<<"Value of a & b before calling swap function\n";
    cout<<a<<'\n';
    cout<<b<<'\n';
    swap(&a,&b);
    cout<<"Value of a & b after calling swap function\n";
    cout<<a<<'\n';
    cout<<b<<'\n';
    return 0;
}
```

Output

The screenshot shows a terminal window with the following content:

```
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 8 c++]
$ g++ t7_3.cpp
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 8 c++]
$ ./a.out
Enter the values of a & b
30    t=*a;
50    *a=*b;
Value of a & b before calling swap function
30
50 int main()
Value of a & b after calling swap function
50    cout<<"Enter the values of a & b:";
30    cin>>a;
15    cin>>b;
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 8 c++]
$ cout<<a<<'\n';
21 cout<<b<<'\n';
22 swap(&a,&b);
23 cout<<"Value of a & b after calling swap Function:";
24 cout<<a<<'\n';
25 cout<<b<<'\n';
26 return 0;
27 }
```

Practical 9

Task 1 V1

Source Code:

```
#include
<iostream>
#include <string>

using namespace std;

class Student
{
public:
    int rno;
    long int phn;
    string adrs;
    string name;
};

int main()
{
    Student obj1;
    Student obj2;
    obj1.rno=12;
    obj1.phn=9411354282;
    obj1.adrs="Dehradun Uttrakhand";
    obj1.name="Sam";
    obj2.rno=13;
    obj2.phn=9411567855;
    obj2.adrs="Lucknow Uttar Pradesh";
    obj2.name="John";
    cout<<"Details of "<<obj1.name<<" are:\n";
    cout<<"Roll no. :-"<<obj1.rno<<"\n";
    cout<<"Phone no. :-"<<obj1.phn<<"\n";
    cout<<"Address :-"<<obj1.adrs<<"\n";
    cout<<"Details of "<<obj2.name<<" are:\n";
    cout<<"Roll no. :-"<<obj2.rno<<"\n";
    cout<<"Phone no. :-"<<obj2.phn<<"\n";
    cout<<"Address :-"<<obj2.adrs<<"\n";
    return 0;
}
```

Output

The screenshot shows a terminal window with the following content:

```
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 9 c++]
$ g++ t1_1.cpp
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 9 c++]
$ ./a.out
Details of Sam are:
Roll no. :-12
Phone no. :-9411354282
Address :-Dehradun Uttrakhand
Details of John are:
Roll no. :-13
Phone no. :-9411567855
Address :-Lucknow Uttarpardesh
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 9 c++]
$
```

The terminal window has a dark background with light-colored text. It shows the command-line interface of a Linux system, specifically Kali Linux, with the user sammei. The window title is "C++ array of objects : Co...". The working directory is ~/Desktop/sammei/oppss c++/practical 9 c++. The user runs the g++ compiler on a file named t1_1.cpp, then executes the resulting binary ./a.out. The program outputs details for two individuals: Sam and John, including their roll numbers, phone numbers, and addresses.

Practical 9

Task 1 V2

Source Code:

```
#include
<iostream>
#include <string>

using namespace std;

class student
{
public:
    string name;
    int age;
    int year;
    char sec;
    int marks;
};

int main()
{
    student s[4];
    int i,sum=0;
    for(i=0;i<4;i++)
    {
        cout<<"Enter details of student "<<i+1<<"\n";
        cout<<"Enter name\n";
        cin>>s[i].name;
        cout<<"Enter age\n";
        cin>>s[i].age;
        cout<<"Enter year\n";
        cin>>s[i].year;
        cout<<"Enter section\n";
        cin>>s[i].sec;
        cout<<"Enter marks\n";
        cin>>s[i].marks;
        sum=sum+s[i].marks;
    }
    cout<<"Total marks of students in college = "<<sum<<"\n";
    return 0;
}
```

Output

```

(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 9 c++]
$ ./a.out
Enter details of student 1
Enter name
Vaibhav
Enter age
20
Enter year
Enter section
A
Enter marks
93
Enter details of student 2
Enter name
Rama
Enter age
21
Enter year
Enter marks
24
Enter section
E
Enter marks
88
Enter details of student 3
Enter name
Mayank
Enter age
19
for(i=0;i<4;i++)
Enter year
2
Enter section
cout<<"Enter details of student "<<i+1<<"\n";
M
Enter marks
88
cout<<"Enter age\n";
Enter details of student 4
Enter name
Abhishek
Enter age
20
cout<<"Enter year\n";
Enter year
2
Enter section
cout<<"Enter section\n";
K
Enter marks
85
sum=sum+s[i].marks;
Total marks of students in college = 354
36 cout<<"Total marks of students in college = "<<sum<<"\n";
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 9 c++]
$ 

```

Practical 9

Task 2

Source Code:

```

#include
<iostream>

using namespace std;

class Area
{
public:
    int length;
    int breadth;
    Area( int l, int b )
    {
        length = l;
        breadth = b;
    }
    Area( int l )
    {
        length = l;
    }
    int printAreaR()
    {
        return length * breadth;
    }
    int printAreaS()
    {
        return length * length;
    }
};

int main()
{
    Area rt1( 7, 4 );
    Area sq2(25);
    cout << "Area of rectangle " << rt1.printAreaR() << endl;
    cout << "Area of square " << sq2.printAreaS() << endl;
    return 0;
}

```

Output

The screenshot shows a terminal window on a Kali Linux desktop environment. The terminal is running in a window titled 'sammei@kali: ~/Desktop/sammei/opp... practical 9 c++'. The command history shows:

```
(sammei㉿kali)-[~/Desktop/sammei/opp... practical 9 c++]
$ g++ t2.cpp
(sammei㉿kali)-[~/Desktop/sammei/opp... practical 9 c++]
$ ./a.out
Area of rectangle 28
Area of square 625
```

The desktop background features a C++ logo. The file manager sidebar shows documents like 'a.out', 't1.cpp', 't1.png', 't2.cpp', and 't2.png'.

Practical 9

Task 3

Source Code:

```

#include
<iostream>

using namespace std;

class item
{
    static int count;
    int number;
public:
    void getdata(int a)
    {
        number=a;
        count++;
    }

    void getcount(void)
    {
        cout<<"Count :"<<count<<"\n";
    }
};

int item::count;

int main()
{
    item a,b,c;
    cout<<'\n'<<"Before reading data"<<'\n';
    a.getcount();
    b.getcount();
    c.getcount();

    cout<<'\n'<<"After while data"<<'\n';
    a.getdata(123);
    a.getcount();
    b.getdata(456);
    b.getcount();
    c.getdata(789);
    c.getcount();
}

```

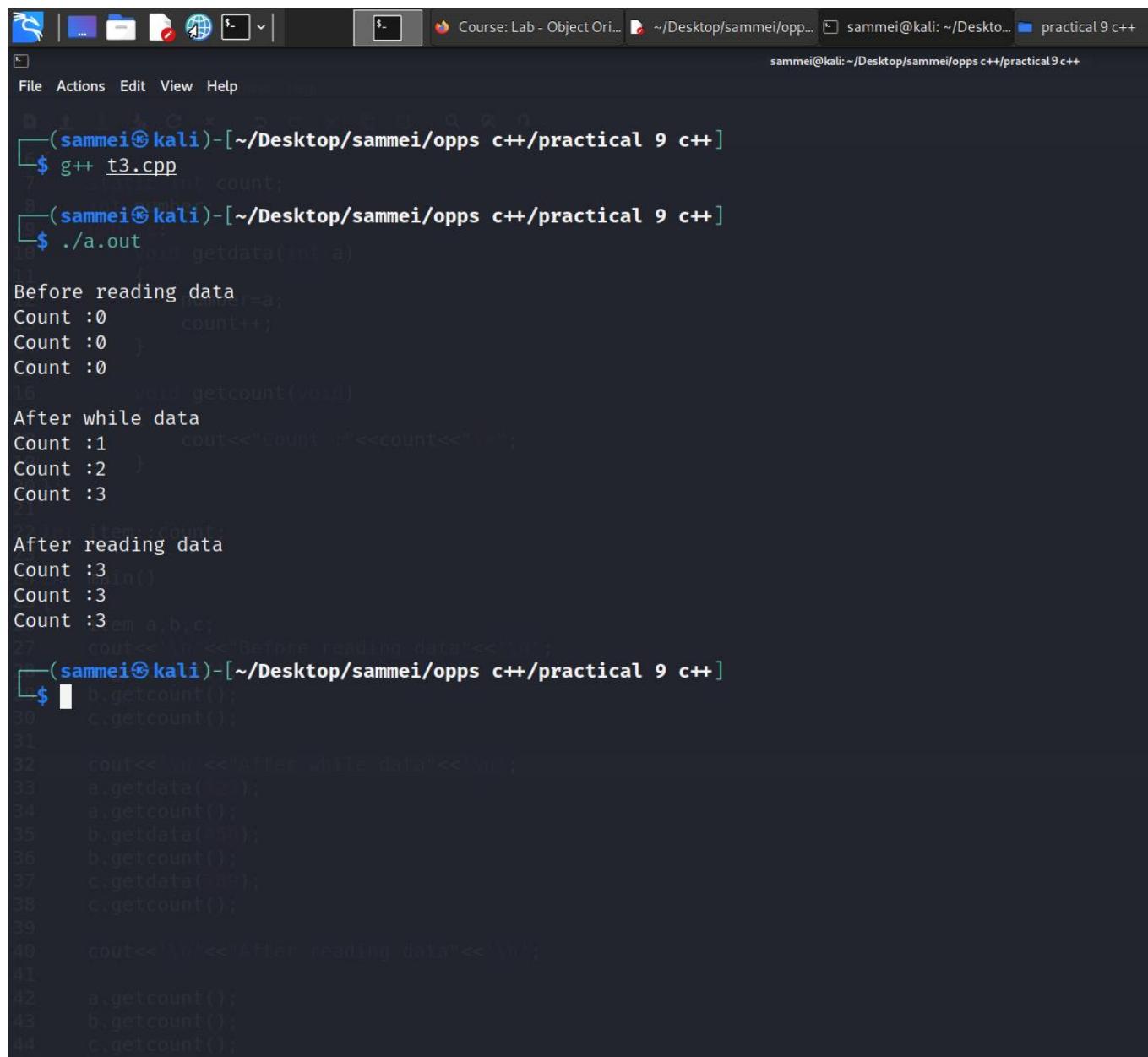
```

cout<<'\n'<<"After reading data"<<'\n';

a.getcount();
b.getcount();
c.getcount();
return 0;
}

```

Output



```

(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 9 c++]
$ g++ t3.cpp
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 9 c++]
$ ./a.out
Before reading data
Count :0
Count :0
Count :0
After while data
Count :1
Count :2
Count :3

After reading data
Count :3
Count :3
Count :3
main()
Count :3
em a,b,c;
cout<<'\n'<<"Before reading data"<<'\n';
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 9 c++]
$ b.getcount();
c.getcount();
31
32 cout<<'\n'<<"After while data"<<'\n';
33 a.getdata(10);
34 a.getcount();
35 b.getdata(10);
36 b.getcount();
37 c.getdata(10);
38 c.getcount();
39
40 cout<<'\n'<<"After reading data"<<'\n';
41
42 a.getcount();
43 b.getcount();
44 c.getcount();

```

Practical 9

Task 4

Source Code:

```

#include
<iostream>
#include <string>

using namespace std;

class student
{
public:
    string name;
    int age;
    int marks;
    friend int add(student s1,student s2,student s3);
};

int add(student s1,student s2,student s3)
{
    int sum=0;
    sum=sum+s1.marks+s2.marks+s3.marks;
    cout<<"Total marks of students in college = "<<sum<<"\n";
    return 0;
}

int main()
{
    student s1,s2,s3;
    s1.name="Sammei";
    s1.age=20;
    s1.marks=93;
    s2.name="Rama";
    s2.age=20;
    s2.marks=88;
    s3.name="Masky";
    s3.age=20;
    s3.marks=85;
    int i,sum=0;
    sum=add(s1,s2,s3);
    return 0;
}

```

Output

```
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 9 c++]
$ g++ t4.cpp
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 9 c++]
$ ./a.out
Total marks of students in college = 266
```

```
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
```

```
string name;
int age;
int marks;
void add(int add(student s1,student s2,student s3));
int add(student s1,student s2,student s3)
{
    int sum=0;
    sum=sum+s1.marks+s2.marks+s3.marks;
    cout<<"Total marks of students in college = "<<sum<<endl;
}
int main()
{
    student s1,s2,s3;
    s1.name="Sammei";
    s1.age=20;
    s1.marks=33;
    s2.name="Raine";
    s2.age=20;
    s2.marks=89;
    s3.name="Masky";
    s3.age=20;
    s3.marks=89;
    int i,sum=0;
    sum=add(s1,s2,s3);
    cout<<endl;
}
```

Practical 9

Task 5

Source Code:

```
#include
<iostream>
#include <string>

using namespace std;

class College
{
public:
    string name;
    string address;
    long int phn;
};

typedef struct student
{
    string name;
    int age;
    long int phn;
}student;

int main()
{
    College obj;
    obj.name="Graphic Era Hill University";
    obj.address="Dehradun Uttrakhand";
    obj.phn=9445245637;

    student s1;
    s1.name="Vaibhav Kumar";
    s1.age=20;
    s1.phn=9411354282;

    cout<<"\nCollege Details :\n";
    cout<<obj.name<<'\n';
    cout<<obj.address<<'\n';
    cout<<obj.phn<<'\n';

    cout<<"\nStudent Details :\n";
}
```

```

cout<<s1.name<<'\n';
cout<<s1.age<<'\n';
cout<<s1.phn<<'\n';
return 0;
}

```

Output

```

File Actions Edit View Help
└──(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 9 c++]
$ g++ t5.cpp
└──(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 9 c++]
$ ./a.out
College Details :
Graphic Era Hill University
Dehradun Uttrakhand
9445245637
Student Details :
Vaibhav Kumar
20
9411354282
└──(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 9 c++]
$ █
27
28     student s1;
29     s1.name="Vaibhav Kumar";
30     s1.age=20;
31     s1.phn=9411354282;
32
33     cout<<"College Details : ";
34     cout<<obj.name<<'\n';
35     cout<<obj.address<<'\n';
36     cout<<obj.phn<<'\n';
37
38     cout<<"Student Details : ";
39     cout<<s1.name<<'\n';
40     cout<<s1.age<<'\n';
41     cout<<s1.phn<<'\n';
42
43 }

```

Practical 9

Task 6

Source Code:

```
#include
<iostream>
#include <iomanip>

using namespace std;

int main ()
{
    cout<<"Vaibhav Kumar Kapriyal"=>endl;

    cout<<setw(15)<<200111163<<endl;

    cout<<setfill('*')<<setw(15)<<200111163<<endl;
    return 0;
}
```

Output

```
(sammei㉿kali)-[~/Desktop/sammei/opps c++/practical 9 c++]
$ g++ t6.cpp
(sammei㉿kali)-[~/Desktop/sammei/opps c++/practical 9 c++]
$ ./a.out
Vaibhav Kumar Kapriyal
*****200111163
```

Practical 10

Task 1

Source Code:

```
#include
<iostream>
#include <string>

using namespace std;

class Directory
{
public:
    string name;
    string address;
    long int telephn;
    long int mobilephn;
    string head;
};

int main()
{
    cout<<"\nEnter the objects to created: \n";
    int n,i,sum=0;
    cin>>n;
    Directory d[n];
    for(i=0;i<n;i++)
    {
        cout<<"\nEnter details of "<<i+1<<" person\n";
        cout<<"Enter name :\n";
        cin>>d[i].name;
        cout<<"Enter address :\n";
        cin>>d[i].address;
        cout<<"Enter tele-phone no. :\n";
        cin>>d[i].telephn;
        cout<<"Enter mobile no. :\n";
        cin>>d[i].mobilephn;
        cout<<"Enter name of the Head of the Family :\n";
        cin>>d[i].head;
    }
    for(i=0;i<n;i++)
    {
```

```

        cout<<"\nDetails of "<<i+1<<" person\n";
        cout<<"Name :"<<d[i].name<<'\n';
        cout<<"Address :"<<d[i].address<<'\n';
        cout<<"Tele-phone no. :"<<d[i].telephn<<'\n';
        cout<<"Mobile no. :"<<d[i].mobilephn<<'\n';
        cout<<"Head of the family :"<<d[i].head<<'\n';
    }
}

return 0;
}

```

Output

```

File Actions Edit View Help
(vaibhavk@kali)-[~/Desktop/sammei/opp...]
$ g++ t1.cpp
(vaibhavk@kali)-[~/Desktop/sammei/opp...]
$ ./a.out
Enter the objects to created:
2
Enter details of 1 person
Enter name :
Vaibhav
Enter address :
Dehradun
Enter tele-phone no. :
0135277894
Enter mobile no. :
9411354282
Enter name of the Head of the Family :
Jitendra

Enter details of 2 person
Enter name :
Rohan
Enter address :
Rishikesh
Enter tele-phone no. :
0135295683
Enter mobile no. :
9385285943
Enter name of the Head of the Family :
Ramesh

Details of 1 person
Name :Vaibhav
Address :Dehradun
Tele-phone no. :135277894
Mobile no. :9411354282
Head of the family :Jitendra

Details of 2 person
Name :Rohan
Address :Rishikesh
Tele-phone no. :135295683
Mobile no. :9385285943
Head of the family :Ramesh

```

Practical 10

Task 2

Source Code:

```

#include
<iostream>
#include <string>

using namespace std;

class Student
{
public:
    int rno;
    long int phn;
    string adrs;
    string name;
    void display()
    {
        cout<<"Details of "<<name<<" are:\n";
        cout<<"Roll no. :-"<<rno<<"\n";
        cout<<"Phone no. :-"<<phn<<"\n";
        cout<<"Address :-"<<adrs<<"\n";
    }
};

int main()
{
    Student *s=new Student;
    s->rno=12;
    s->phn=9411354282;
    s->adrs="Dehradun Uttrakhand";
    s->name="Sam";
    s->display();
    return 0;
}

```

Output

The screenshot shows a terminal window with a dark background and light-colored text. At the top, there's a toolbar with icons for file operations like copy, paste, and save. The title bar displays the path: 'opp-practicals/practica...' and the command: 'sammei@kali: ~/Desktop/sammei/opp... practical10 c++'. Below the title bar is a menu bar with 'File', 'Actions', 'Edit', 'View', and 'Help'. The main area of the terminal shows the following session:

```
(sammei㉿kali)-[~/Desktop/sammei/opp-practicals/practical 10 c++]
$ g++ t2.cpp

(sammei㉿kali)-[~/Desktop/sammei/opp-practicals/practical 10 c++]
$ ./a.out
Details of Sam are:
Roll no. :-12
Phone no. :-9411354282
Address :-Dehradun Uttrakhand

(sammei㉿kali)-[~/Desktop/sammei/opp-practicals/practical 10 c++]
$
```

On the left side of the terminal window, there's a sidebar with sections for 'System' (showing '199 GB Volume'), 'Network' (with 'Browse Network' option), and other system-related links.

Practical 10

Task 3

Source Code:

```
#include
<iostream>

using namespace std;

class Abc
{
public:
    int a;
    int b;
    Abc(int a,int b)
    {
        this->a=a;
        this->b=b;
    }
    void compute()
    {
        float r;
        r=a%b;
        cout<<"Remainder of "<<a<<' '<<b<<" = "<<r<<'\n';
    }
};

int main()
{
    int a,b;
    cout<<"Enter any two numbers :\n";
    cin>>a;
    cin>>b;
    Abc obj(a,b);
    obj.compute();
    return 0;
}
```

Output

```
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 10 c++]
$ g++ t3.cpp
$ ./a.out
Enter any two numbers :
15
7
Remainder of 15 7 = 1
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 10 c++]
$ void compute()
{
    float r;
    r=a%b;
    cout<<"Remainder of "<<a<<" "<<b<<" = "<<r<<\n";
}
int main()
{
    int a,b;
    cout<<"Enter any two numbers :\n";
    cin>>a;
    cin>>b;
    Abc obj(a,b);
    obj.compute();
    return 0;
}
```

Practical 10

Task 4 V1

Source Code:

```
#include
<iostream>
using namespace std;

class Complex {
public:
    int a;

    void input() {
        cout << "Enter a number:\n ";
        cin >> a;
    }

    friend Complex operator < (const Complex& obj);

    void output() {
        cout<<"Smaller number is "<<a<<"\n";
    }
};

Complex operator < (Complex& obj1,Complex& obj2) {
    if(obj1.a<obj2.a)
        return (obj1.a);
    else
        return (obj2.a);
}

int main() {
    Complex complex1, complex2, result;

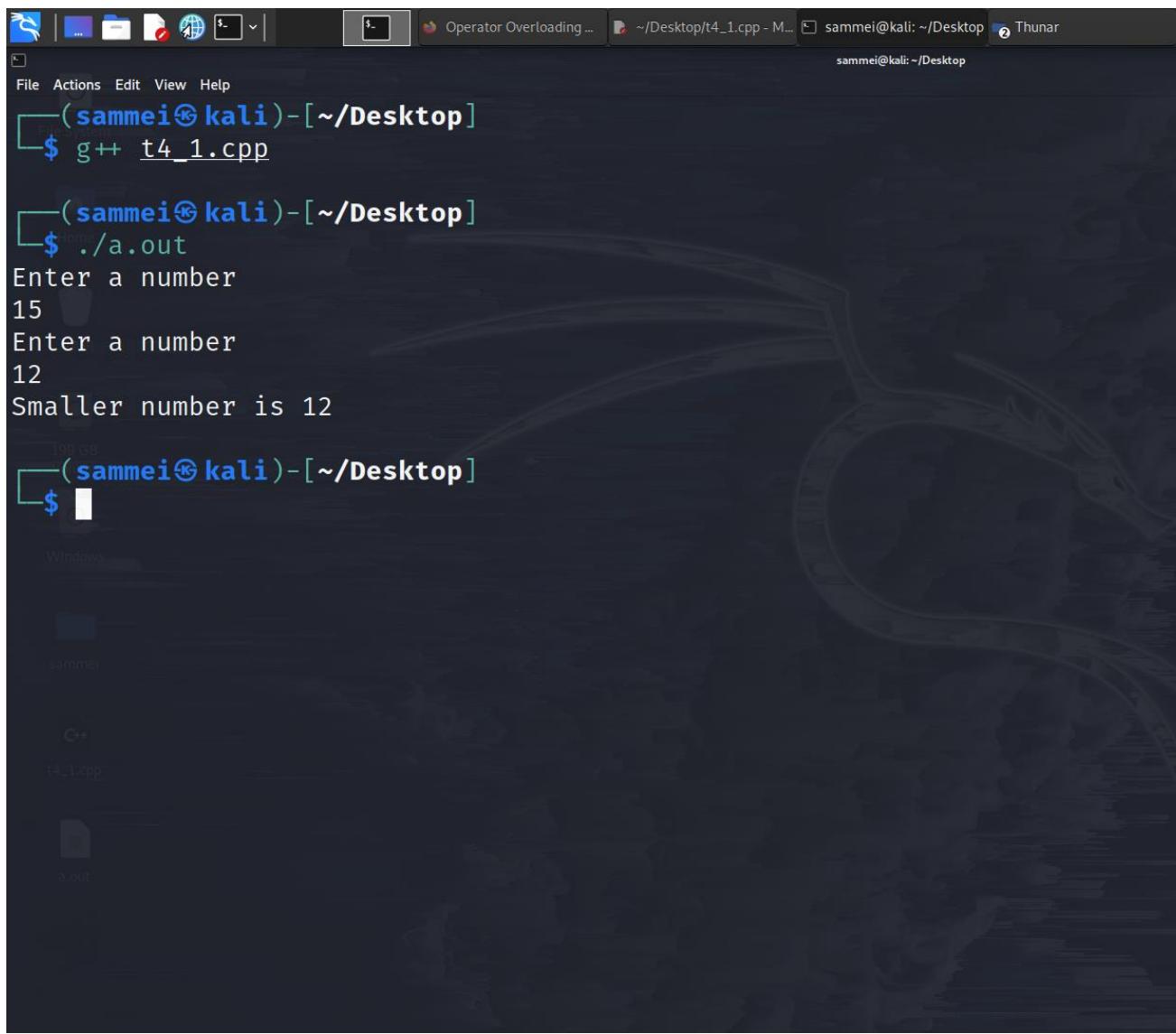
    complex1.input();

    complex2.input();

    result = complex1 < complex2;
    result.output();
```

```
    return 0;  
}
```

Output



```
(sammei㉿kali)-[~/Desktop]$ g++ t4_1.cpp  
(sammei㉿kali)-[~/Desktop]$ ./a.out  
Enter a number  
15  
Enter a number  
12  
Smaller number is 12  
(sammei㉿kali)-[~/Desktop]$
```

Practical 10

Task 4 V2

Source Code:

```
#include
<iostream>

using namespace std;

class Complex {
private:
    int real;
    int imag;

public:
    Complex() : real(0), imag(0) {}

    void input() {
        cout << "Enter real and imaginary parts respectively: ";
        cin >> real;
        cin >> imag;
    }

    Complex operator + (const Complex& obj) {
        Complex temp;
        temp.real = real + obj.real;
        temp.imag = imag + obj.imag;
        return temp;
    }

    void output() {
        if (imag < 0)
            cout << "Output Complex number: " << real << imag << "i";
        else
            cout << "Output Complex number: " << real << "+" << imag <<
        "i";
    }
};

int main() {
    Complex complex1, complex2, result;
```

```

        cout << "Enter first complex number:\n";
        complex1.input();

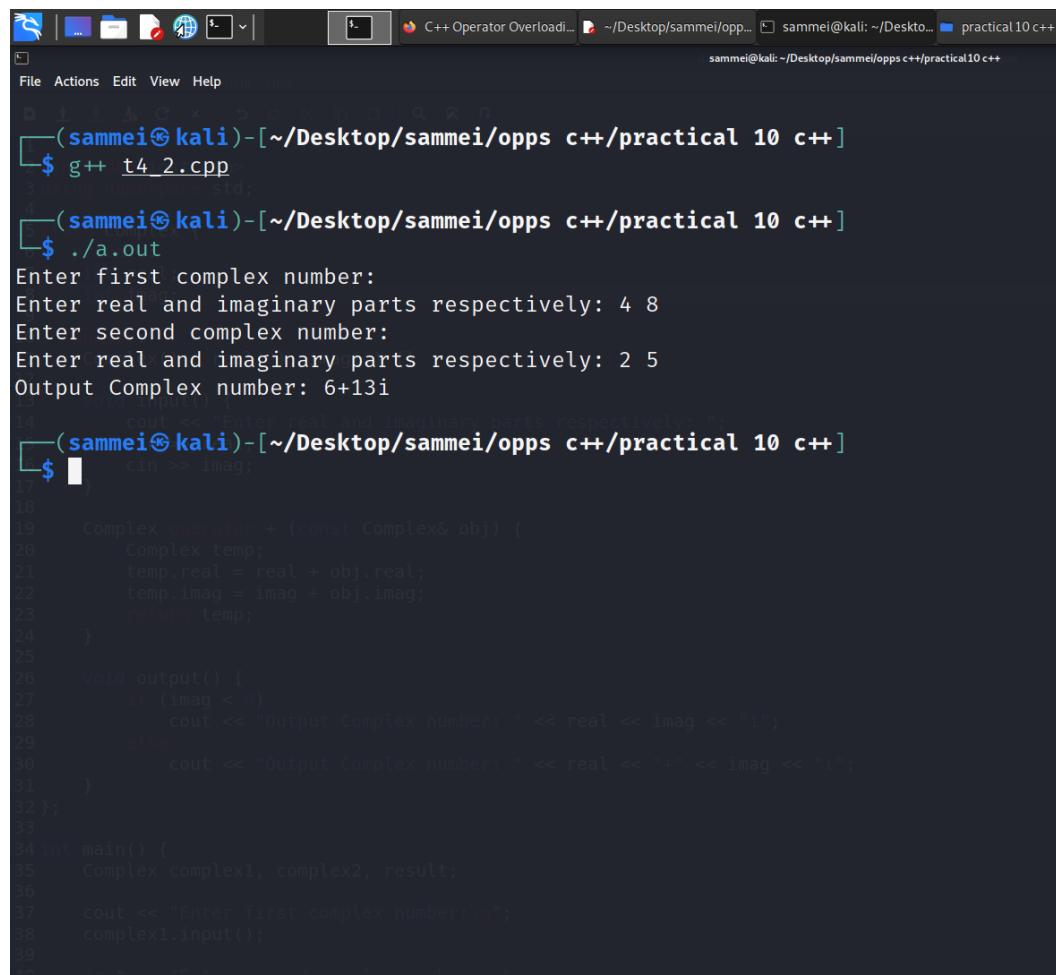
        cout << "Enter second complex number:\n";
        complex2.input();

        result = complex1 + complex2;
        result.output();

        return 0;
    }
}

```

Output



```

(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 10 c++]
$ g++ t4_2.cpp
(sammei㉿kali)-[~/Desktop/sammei/oppss c++/practical 10 c++]
$ ./a.out
Enter first complex number:
Enter real and imaginary parts respectively: 4 8
Enter second complex number:
Enter real and imaginary parts respectively: 2 5
Output Complex number: 6+13i

```

```

1. cout << "Enter first complex number:\n";
2. complex1.input();
3. cout << "Enter second complex number:\n";
4. complex2.input();
5. result = complex1 + complex2;
6. result.output();
7. return 0;
8. }

9. Complex operator + (const Complex& obj) {
10.     Complex temp;
11.     temp.real = real + obj.real;
12.     temp.imag = imag + obj.imag;
13.     return temp;
14. }

15. void output() {
16.     if (imag < 0)
17.         cout << "Output Complex number: " << real << imag << "i";
18.     else
19.         cout << "Output Complex number: " << real << "+" << imag << "i";
20. }
21. }

22. int main() {
23.     Complex complex1, complex2, result;
24.     cout << "Enter first complex number:\n";
25.     complex1.input();
26.     cout << "Enter second complex number:\n";
27.     complex2.input();
28.     result = complex1 + complex2;
29.     result.output();
30.     return 0;
31. }

```

Practical 11

Task 1 V1

Source Code:

```
#include
<iostream>

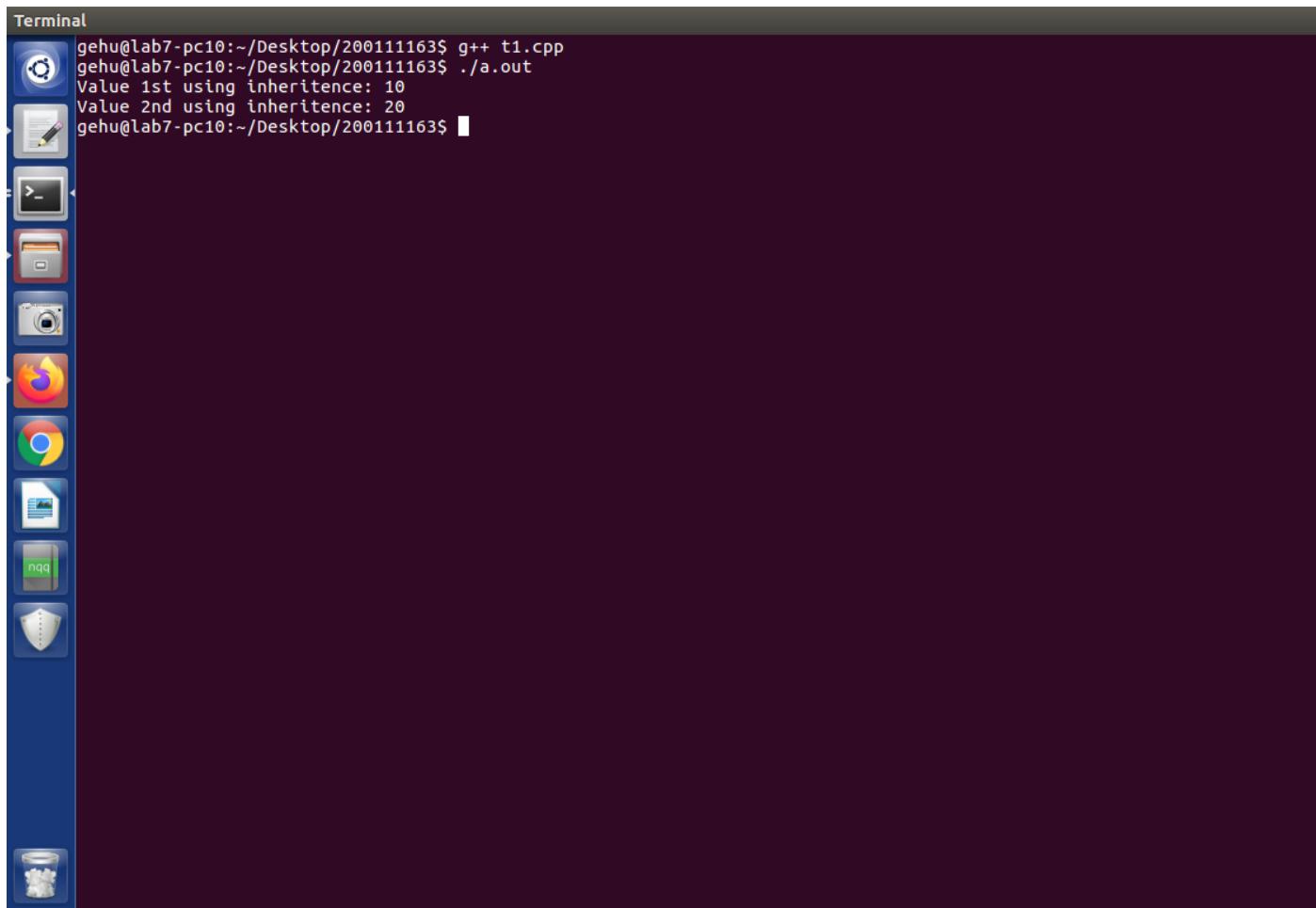
using namespace std;

class A
{
public:
    int x;
    int y;
};

class B:public A
{
public:
    void display()
    {
        x=10;
        y=20;
        cout<<"Value 1st using inheritance: "<<x<<"\n";
        cout<<"Value 2nd using inheritance: "<<y<<"\n";
    }
};

int main()
{
    B obj;
    //obj.x=30;
    //obj.y=40;
    obj.display();
    return 0;
}
```

Output



The screenshot shows a Linux desktop environment with a dark blue background. On the left side, there is a vertical dock containing icons for various applications: Terminal, Nautilus (file manager), Dash (application launcher), Home, Camera, Firefox, Google Chrome, LibreOffice Writer, LibreOffice Calc, LibreOffice Impress, and a trash can.

The main window is a terminal window titled "Terminal". It displays the following command-line session:

```
gehu@lab7-pc10:~/Desktop/200111163$ g++ t1.cpp
gehu@lab7-pc10:~/Desktop/200111163$ ./a.out
Value 1st using inheritance: 10
Value 2nd using inheritance: 20
gehu@lab7-pc10:~/Desktop/200111163$ █
```

Task 1 V2

Source Code:

```
#include
<iostream>

using namespace std;

class A
{
public:
    int x;
    int y;
};

class B:public A
{
public:
    void display()
    {
        //x=10;
        //y=20;
        cout<<"Value 1st using inheritance: "<<x<<"\n";
        cout<<"Value 2nd using inheritance: "<<y<<"\n";
    }
};

int main()
{
    B obj;
    obj.x=30;
    obj.y=40;
    obj.display();
    return 0;
}
```

Output

Terminal

```
gehu@lab7-PC10:~/Desktop/200111163$ g++ t1.cpp
gehu@lab7-PC10:~/Desktop/200111163$ ./a.out
Value 1st using inheritance: 30
Value 2nd using inheritance: 40
gehu@lab7-PC10:~/Desktop/200111163$
```



Task 2

Source Code:

```
#include<iostream>
using namespace std;
class Mammals{
public:
    void print1(){
        cout<<"I am Mammal\n";
    }
};
class MarineAnimal{
public:
    void print2(){
        cout<<"I am Marine animal\n";
    }
};
class BlueWhale:public Mammals,public MarineAnimal{      //Multiple Inheritance
public:
    void print(){
        cout<<"I am BlueWhale\n";
    }
};
int main(){
    Mammals M;
    MarineAnimal MA;
    BlueWhale BW;
    M.print1();
    MA.print2();
    BW.print1();
    BW.print2();
    BW.print();
    return 0;
}
```

Output

```
[1] "D:\programs\opps c++\sammei\bin\Debug\sammei.exe"
I am Mammal
I am Marine animal
I am Mammal
I am Marine animal
I am BlueWhale

Process returned 0 (0x0)  execution time : 20.172 s
Press any key to continue.
```

Task 3 v1

Source Code:

```
#include<iostream>

using namespace std;

class A
{
public:
    int k;
};

class B : public A
{

};

class C : public A
{

};

class D : public B , public C
{

};

int main(){
    D obj;
    obj.k=10;           //ERROR k is ambiguous i.e more than one existence
of k
    cout<<"K = "<<obj.k<<endl;
    return 0;
}
```

Output

```
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 11]
$ g++ t3.cpp
t3.cpp: In function 'int main()':
t3.cpp:24:7: error: request for member 'k' is ambiguous
  24 |     obj.k=10;           //ERROR k is ambiguous i.e more than one existence of k
      |     ^
t3.cpp:8:9: note: candidates are: 'int A::k'
   8 |     int k;
      |
t3.cpp:8:9: note:                 'int A::k'
t3.cpp:25:21: error: request for member 'k' is ambiguous
  25 |     cout<<"K = "<<obj.k<<endl;
      |     ^
t3.cpp:8:9: note: candidates are: 'int A::k'
   8 |     int k;
      |
t3.cpp:8:9: note:                 'int A::k'

(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 11]
$
```

File System
229 GB Volume
Windows
Network
Browse Network

Task 3 v1

Source Code:

```
#include<iostream>

using namespace std;

class A
{
public:
    int k;
};

class B : virtual public A // virtual keyword makes memory
shareable of any of the class to overcome diamond problem
{

};

class C : virtual public A
{

};

class D : public B , public C
{

};

int main(){
    D obj;
    obj.k=10;      //ERROR k is ambiguous i.e more than one existence
of k
    cout<<"K = "<<obj.k<<endl;
    return 0;
}
```

Output

The screenshot shows a terminal window with a dark background and light-colored text. At the top, there are several icons and the text "cplusplus/t11.3.B.cpp at ... ~/Desktop/sammei/OO... sammei@kali: ~/Desktop/practical 11". Below the title bar, the terminal menu bar includes "File", "Actions", "Edit", "View", and "Help". The main area of the terminal displays the following command-line session:

```
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 11]
$ g++ t3_2.cpp
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 11]
$ ./a.out
K = 10

(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 11]
$
```

On the left side of the terminal window, there is a sidebar with sections for "Devices" (File system, 320 GB Volume, Windows) and "Network" (Browse Network).

Practical 12

Task 1 V1

Source Code:

```
#include
<iostream>

using namespace std;

class A
{
public:
    int x;

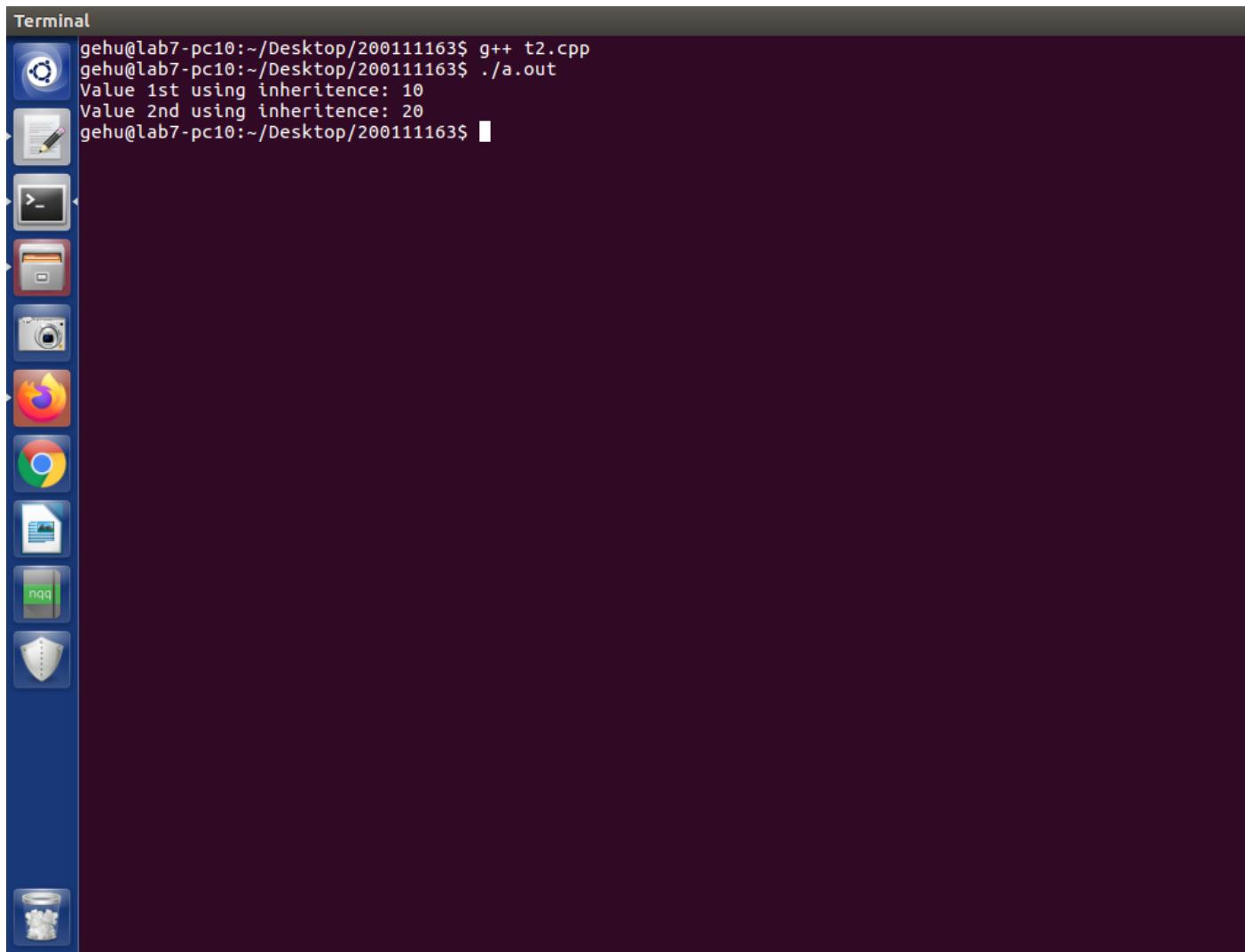
protected:
    int y;

private:
    int z;
};

class B:public A
{
public:
    void display()
    {
        x=10;
        y=20;
        //z=30; #error will occur during execution
        cout<<"Value 1st using inheritance: "<<x<<"\n";
        cout<<"Value 2nd using inheritance: "<<y<<"\n";
        //cout<<"Value 3rd using inheritance: "<<z<<"\n";
    }
};

int main()
{
    B obj;
    obj.display();
    return 0;
}
```

Output



The screenshot shows a Linux desktop environment with a dark blue background. On the left, there is a vertical dock containing icons for various applications: Terminal, Nautilus (file manager), Dash (application menu), Home, Camera, Firefox, Chrome, LibreOffice Writer, LibreOffice Calc, LibreOffice Impress, and a trash can. The main window is a terminal window titled "Terminal" with the following text displayed:

```
gehu@lab7-PC10:~/Desktop/200111163$ g++ t2.cpp
gehu@lab7-PC10:~/Desktop/200111163$ ./a.out
Value 1st using inheritance: 10
Value 2nd using inheritance: 20
gehu@lab7-PC10:~/Desktop/200111163$ █
```

Task 1 V2

Source Code:

```

#include
<iostream>

using namespace std;

class A
{
public:
    int x;

protected:
    int y;

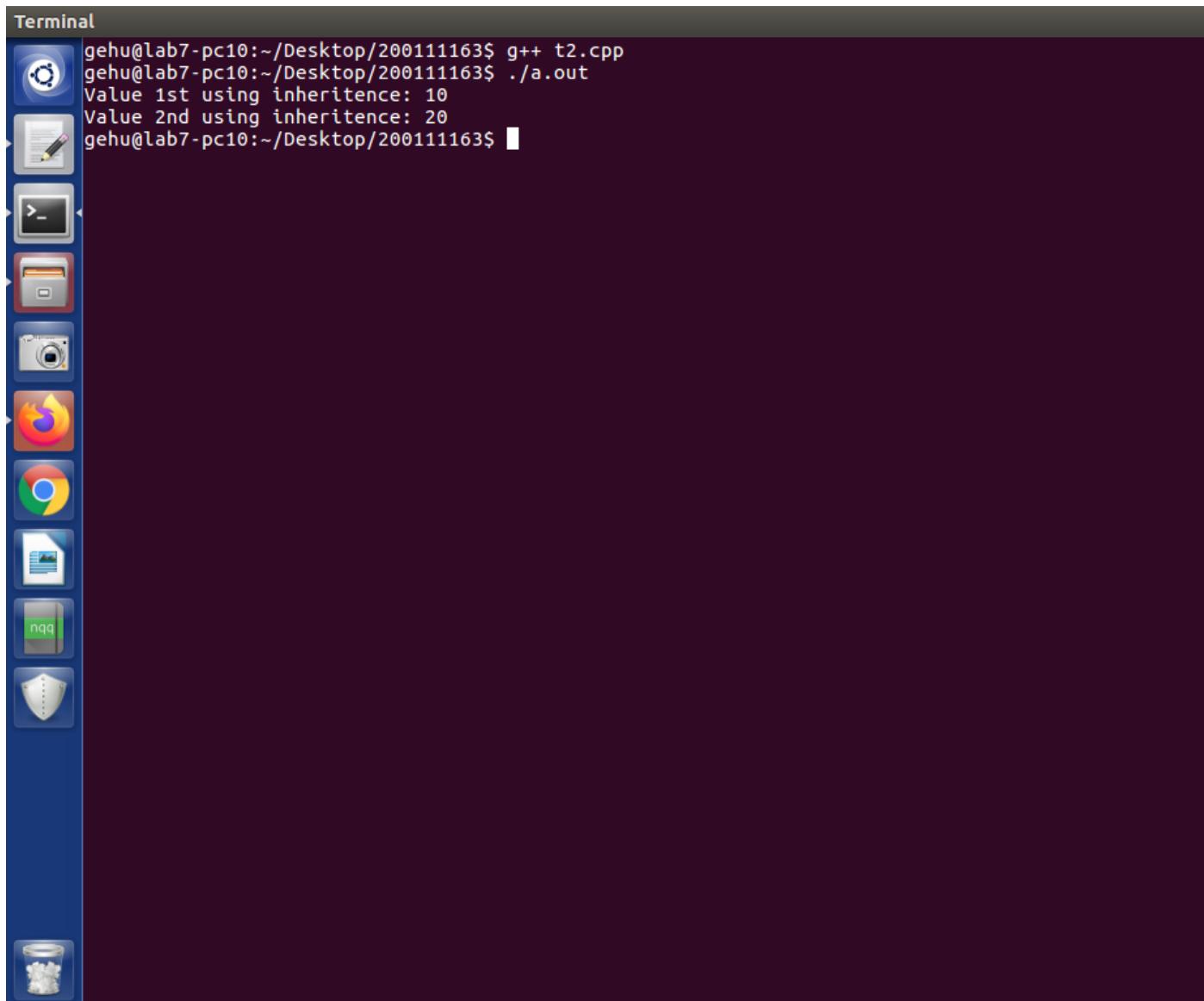
private:
    int z;
};

class B:private A
{
public:
    void display()
    {
        x=10;
        y=20;
        //z=30; #error will occur during execution
        cout<<"Value 1st using inheritance: "<<x<<"\n";
        cout<<"Value 2nd using inheritance: "<<y<<"\n";
        //cout<<"Value 3rd using inheritance: "<<z<<"\n";
    }
};

int main()
{
    B obj;
    //obj.x=10 #will throw an error since class B is private
    //obj.y=20 #will throw an error since class B is private
    //obj.z=30 #will throw an error since class B is private
    obj.display();
    return 0;
}

```

Output



The screenshot shows a Linux desktop environment with a dark blue theme. On the left, there is a vertical dock containing icons for various applications: a terminal, a text editor, a file manager, a camera, Firefox, Google Chrome, a file viewer, a file manager, a shield, and a trash can. The main window is a terminal window titled "Terminal" with the following text displayed:

```
gehu@lab7-PC10:~/Desktop/200111163$ g++ t2.cpp
gehu@lab7-PC10:~/Desktop/200111163$ ./a.out
Value 1st using inheritance: 10
Value 2nd using inheritance: 20
gehu@lab7-PC10:~/Desktop/200111163$ █
```

Task 1 V3

Source Code:

```

#include
<iostream>

using namespace std;

class A
{
public:
    int x;

protected:
    int y;

private:
    int z;
};

class B:protected A
{
public:
    void display()
    {
        x=10;
        //y=20; #error will occur since y is protected and
        //class B is also protected
        //z=30; #error will occur during execution
        cout<<"Value 1st using inheritance: "<<x<<"\n";
        //cout<<"Value 2nd using inheritance: "<<y<<"\n";
        //cout<<"Value 3rd using inheritance: "<<z<<"\n";
    }
};

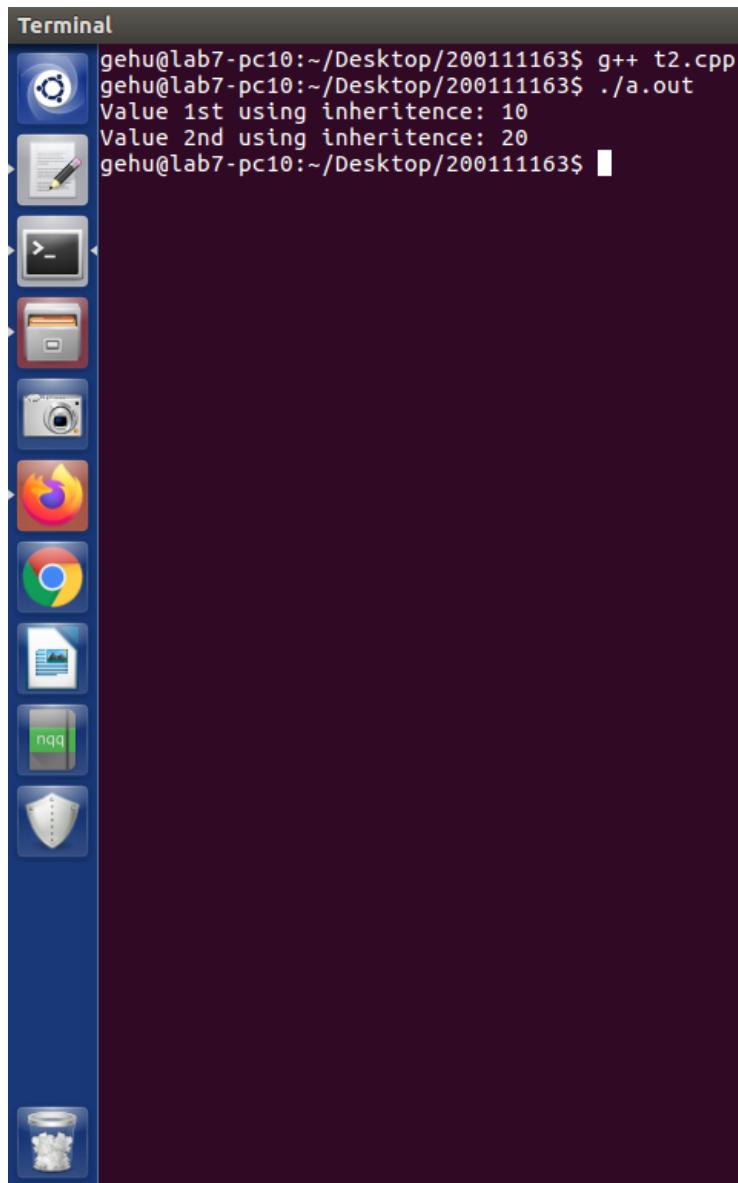
class C:public B
{
public:
    void display()
    {
        y=20;
        cout<<"Value 2nd using inheritance: "<<y<<"\n";
    }
};

```

```
};

int main()
{
    B obj;
    C obj1;
    //obj.x=10 #will throw an error since class B is private
    //obj.y=20 #will throw an error since class B is private
    //obj.y=30 #will throw an error since class B is private
    obj.display();
    obj1.display();
    return 0;
}
```

Output



The screenshot shows a Linux desktop environment with a dark blue theme. On the left, there is a vertical dock containing icons for various applications: a terminal, a text editor, a file manager, a camera, a web browser (Firefox), a file viewer, a file manager, a file manager, a file manager, and a trash can at the bottom.

The terminal window is titled "Terminal" and contains the following text:

```
Terminal
gehu@lab7-pc10:~/Desktop/200111163$ g++ t2.cpp
gehu@lab7-pc10:~/Desktop/200111163$ ./a.out
Value 1st using inheritance: 10
Value 2nd using inheritance: 20
gehu@lab7-pc10:~/Desktop/200111163$
```

Task 2 V1

Source Code:

```
#include<iostream>

using namespace std;

class A{
    int a;
public :
A(){
    a=0;
    cout<<"default A's constructor\n";
}
A(int x){
    a=x;
    cout<<"parameterized A's constructor\n";
}
void displayA(){
    cout<<"A :"<<a<<endl;
}
};

class B{
    int b;
public :
B(){
    b=0;
    cout<<"default B's constructor\n";
}
B(int x){
    b=x;
    cout<<"parameterized B's constructor\n";
}
void displayB(){
    cout<<"B :"<<b<<endl;
}
};

class C : public B , public A{
    int c;
public :
C(){
}
```

```
c=0;
cout<<"default C's constructor\n";
}
C(int a, int b,int c):B(b),A(a){
    C::c=c;
    cout<<"parameterized C's constructor\n";
}
void displayC(){
    displayA();
    displayB();
    cout<<"C :"<<c<<endl;
}
};

int main(){
C Cobj;
    Cobj.displayC();
C Cobj2(100,200,300);
    Cobj2.displayC();
    return 0;
}
```

Output

```
cplusplus/t12.2.cpp at m... ~/Desktop/sammei/OO... sammei@kali: ~/Desktop/Thunar
sammei@kali: ~/Desktop/sammei/OOP WITH C++/practical12

File Actions Edit View Help

( sammei@kali )-[~/Desktop/sammei/OOP WITH C++/practical 12]
$ g++ t12_1.cpp
( sammei@kali )-[~/Desktop/sammei/OOP WITH C++/practical 12]
$ ./a.out
default B's constructor
default A's constructor
default C's constructor
A :0
B :0
C :0
parameterized B's constructor
parameterized A's constructor
parameterized C's constructor
A :100
B :200
C :300

( sammei@kali )-[~/Desktop/sammei/OOP WITH C++/practical 12]
$ 
```

Task 2 V2

Source Code:

```
#include<iostream>

using namespace std;

class A{
    int a;
public :
    A(){
        a=0;
        cout<<"default A's constructor\n";
    }
    A(int x){
        a=x;
        cout<<"parameterized A's constructor\n";
    }
    ~A(){
        cout<<"A's Desturctor\n";
    }
    void displayA(){
        cout<<"A :"<<a<<endl;
    }
};

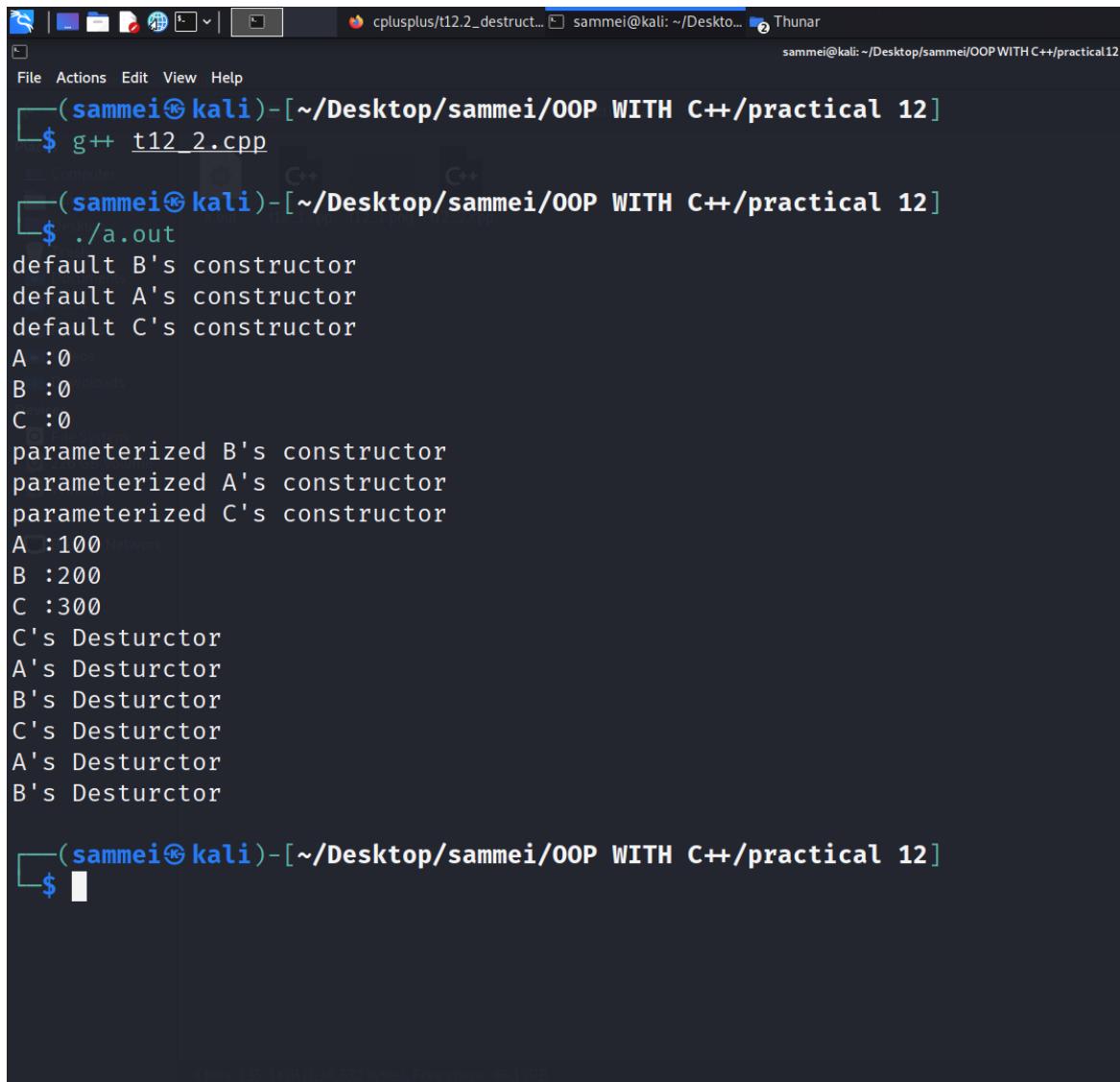
class B{
    int b;
public :
    B(){
        b=0;
        cout<<"default B's constructor\n";
    }
    B(int x){
        b=x;
        cout<<"parameterized B's constructor\n";
    }
    ~B(){
        cout<<"B's Desturctor\n";
    }
    void displayB(){
        cout<<"B :"<<b<<endl;
    }
};
```

```
};

class C : public B , public A{
    int c;
public :
    C(){
        c=0;
        cout<<"default C's constructor\n";
    }
    C(int a, int b,int c):B(b),A(a){
        C::c=c;
        cout<<"parameterized C's constructor\n";
    }
    ~C(){
        cout<<"C's Desturctor\n";
    }
    void displayC(){
        displayA();
        displayB();
        cout<<"C :"<<c<<endl;
    }
};

int main(){
    C Cobj;
    Cobj.displayC();
    C Cobj2(100,200,300);
    Cobj2.displayC();
    return 0;
}
```

Output



```

sammei@kali:~/Desktop/sammei/OOP WITH C++/practical12]$ g++ t12_2.cpp
sammei@kali:~/Desktop/sammei/OOP WITH C++/practical12]$ ./a.out
default B's constructor
default A's constructor
default C's constructor
A :0
B :0
C :0
parameterized B's constructor
parameterized A's constructor
parameterized C's constructor
A :100
B :200
C :300
C's Desturctor
A's Desturctor
B's Desturctor
C's Desturctor
A's Desturctor
B's Desturctor

sammei@kali:~/Desktop/sammei/OOP WITH C++/practical12]$ 

```

Practical 13

Task 1 V1

Source Code:

```

# include
<iostream>

using namespace std;

class Base
{
public:
    int add(int x,int y)
    {
        return(x+y+1);
    }
    float add(float x,float y)
    {
        return(x+y);
    }
};

class Child:public Base
{
public:
    using Base::add;
    int add(int x,int y)
    {
        return(x+y+2);
    }
};

int main()
{
    Base ob1,ob2;
    cout<<"using object of Base class"<<endl;
    cout<<ob1.add(40,30)<<endl;
    cout<<ob2.add(12.6f,15.2f)<<endl;
    Child ob3;
    cout<<"using object of Child class"<<endl;
    cout<<ob3.add(5,8)<<endl;
    cout<<ob3.add(3.4f,5.3f)<<endl;
    return 0;
}

```

Output

```
[1] "D:\programs\opps c++\polymorphism\ques 1\bin\Debug\ques 1.exe"
using object of Base class
71
27.8
using object of Child class
15
10

Process returned 0 (0x0)  execution time : 6.419 s
Press any key to continue.
```

Task 1 V2

Source Code:

```
# include
<iostream>

using namespace std;

class Base
{
public:
    int add(int x,int y)
    {
        return(x+y+1);
    }
    float add(float x,float y)
    {
        return(x+y);
    }
};

class Child:public Base
{
public:
    using Base::add;
    int add(int x,int y)
    {
        return(x+y+2);
    }
};

int main()
{
    Base ob1,ob2;
    cout<<"using object of Base class"<<endl;
    cout<<ob1.add(40,30)<<endl;
    cout<<ob2.add(12.6f,15.2f)<<endl;
    Child ob3;
    cout<<"using object of Child class"<<endl;
    cout<<ob3.add(5,8)<<endl;
    cout<<ob3.add(3.4f,5.3f)<<endl;
    return 0;
}
```

Output

```
[1] "D:\programs\opps c++\polymorphism\ques 1 v2\bin\Debug\ques 1 v2.exe"
using object of Base class
71
27.8
using object of Child class
15
8.7

Process returned 0 (0x0)  execution time : 1.230 s
Press any key to continue.
```

Task 2 V1

Source Code:

```
#include
<iostream>

using namespace std;

class Base
{
public:
    virtual int add(int x,int y)
    {
        return(x+y);
    }

    virtual void display()=0;
};

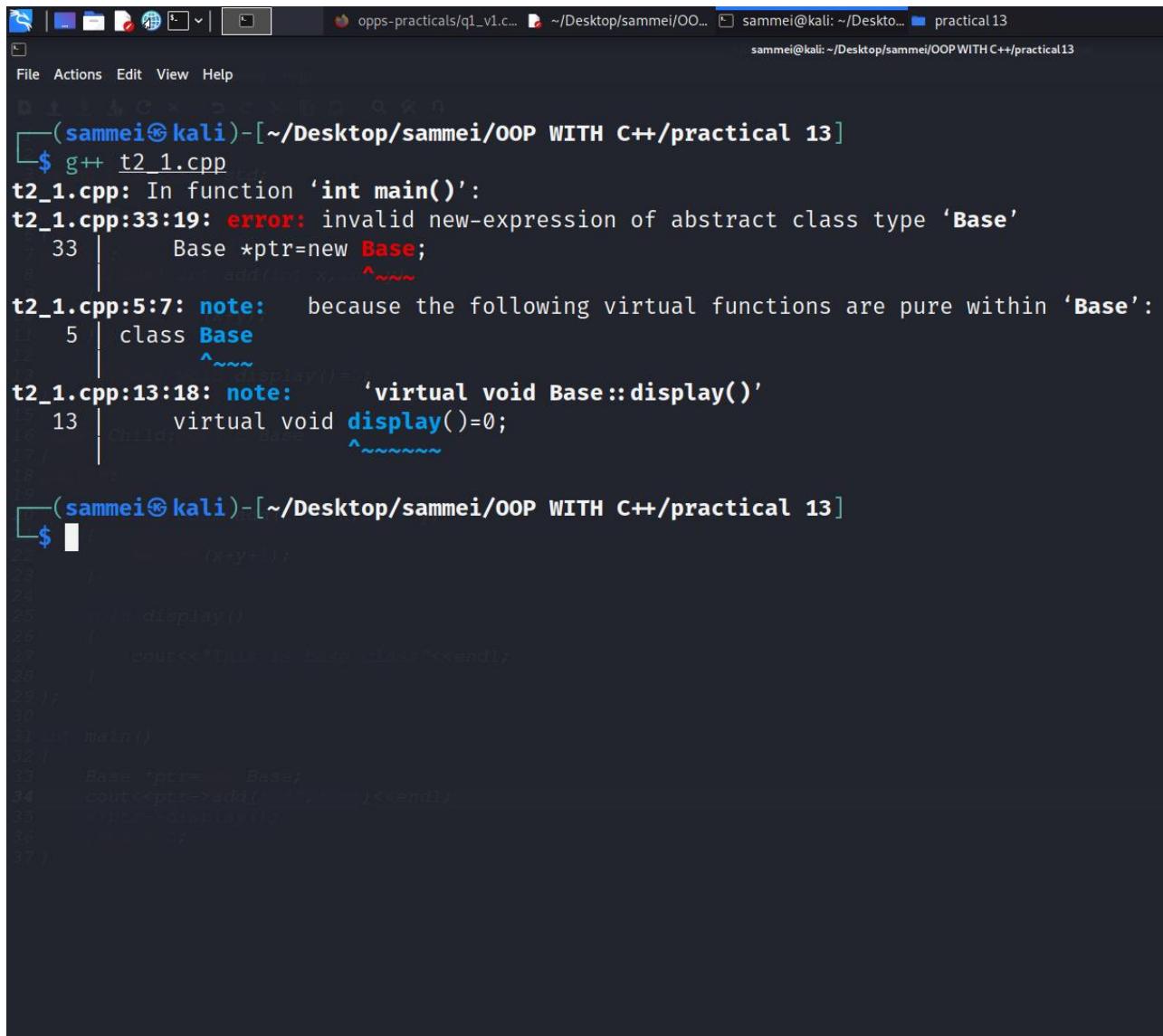
class Child:public Base
{
public:

    virtual float add(float x,float y)
    {
        return(x+y+1);
    }

    void display()
    {
        cout<<"This is base class"<<endl;
    }
};

int main()
{
    Base *ptr=new Base;
    cout<<ptr->add(1.3f,2.7f)<<endl;
    return 0;
}
```

Output



```
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 13]
$ g++ t2_1.cpp
t2_1.cpp: In function 'int main()':
t2_1.cpp:33:19: error: invalid new-expression of abstract class type 'Base'
  33 |     Base *ptr=new Base;
                 ^~~~
t2_1.cpp:5:7: note:   because the following virtual functions are pure within 'Base':
  5 | class Base
      ^~~~
t2_1.cpp:13:18: note:     'virtual void Base::display()'
 13 |     virtual void display()=0;
      ^~~~~~
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 13]
$ [REDACTED]
```

The terminal window shows the compilation of a C++ program named t2_1.cpp. The compilation fails due to an invalid new-expression of an abstract class type 'Base'. The error occurs at line 33, where a pointer 'ptr' is dynamically allocated to a 'Base' object. A note from the compiler indicates that the 'display()' function within 'Base' is pure virtual, which prevents it from being instantiated.

Task 2 V1

Source Code:

```
#include
<iostream>

using namespace std;

class Base
{
public:
    virtual int add(int x,int y)
    {
        return(x+y);
    }

    virtual void display()=0;
};

class Child:public Base
{
public:

    virtual float add(float x,float y)
    {
        return(x+y+1);
    }

    void display()
    {
        cout<<"This is base class"<<endl;
    }
};

int main()
{
    Base *ptr=new Base;
    ptr->display();
    return 0;
}
```

Output

The screenshot shows a terminal window on a Kali Linux desktop environment. The terminal is running a g++ compiler on a file named t2_1.cpp. The code defines an abstract class Base with a pure virtual function display(). A derived class Dev13 inherits from Base and overrides the display() function. The error message indicates that it is invalid to new an object of an abstract class type 'Base'. The terminal window also shows the desktop environment's taskbar at the top and various icons for files, folders, and network drives.

```
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 13]
$ g++ t2_1.cpp
t2_1.cpp: In function 'int main()':
t2_1.cpp:33:19: error: invalid new-expression of abstract class type 'Base'
  33 |     Base *ptr=new Base;
          ^~~~
t2_1.cpp:5:7: note: because the following virtual functions are pure within 'Base':
  5 | class Base
    ^~~~
t2_1.cpp:13:18: note:   'virtual void Base::display()'
Dev13 |     virtual void display()=0;
          ^~~~~~
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 13]
$
```

Practical 14

Task 1

Source Code:

```

#include
<iostream>

using namespace std;

class Base
{
public:
    virtual void show()
    {
        cout<<"In Base\n";
    }
    void display()
    {
        cout<<"In Base\n";
    }
};

class Derived: public Base
{
public:
    void show()
    {
        cout<<"In Derived\n";
    }
    void display()
    {
        cout<<"In Derived\n";
    }
};

int main(void)
{
    Base *bp = new Derived;
    bp->show(); // RUN-TIME POLYMORPHISM late binding()
    Base *dp = new Derived;
    dp->display(); //Any normal function call (without virtual) is binded
early.
    return 0;
}

```

```
}
```

Output

```

Early binding and Late bi... ~/Desktop/sammei/OO... sammei@kali: ~/Desktop/... practical14
File Actions Edit View Help
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 14]
$ g++ t1.cpp
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 14]
$ ./a.out
In Derived void show()
In Base cout<<"In Base ";
16/2
17
18// In Derived: cout<<"In Base "
19/
20// In Base:
21 void show()
22 {
23     cout<<"In Derived ";
24 }
25 void display()
26 {
27     cout<<"In Derived ";
28 }
29// 
30
31 int main(int)
32 {
33     Base *bp = new Derived;
34     bp->show(); // RUN-TIME POLYMORPHISM IS WORKING!
35     Base *dp = new Derived;
36     dp->display(); // (MUCH) LATER: FUNCTION CALL (WHICH WAS ALREADY ASSIGNED PREVIOUSLY)
37 }

```

Task 2

Source Code:

```
#include<iostream>

using namespace std;

class A{
    int a;
public :
    A()
    {
        a=0;
        cout<<"default A's constructor\n";
    }

    ~A()
    {
        cout<<"A's Desturctor\n";
    }
};

class B : public A{
    int c;
public :
    B()
    {
        c=0;
        cout<<"default B's constructor\n";
    }

    ~B()
    {
        cout<<"B's Desturctor\n";
    }
};

int main()
{
    A *ptr=new B;
    ptr->~A(); //Call base class destructor from base class
pointer which is holding thechild class object.
```

```

ptr->~B(); //Call child class destructor from base class
pointer which is holding the child class object.

        return 0;
    }
}

```

Output

```

(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 14]
$ g++ t2_1.cpp
t2_1.cpp: In function 'int main()':
t2_1.cpp:40:8: error: the type being destroyed is 'A', but the destructor refers to 'B'
  40 |     ptr->~B();
     |     ^
10:11: a=?

(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 14]
$ ./a.out
default A's constructor
default B's constructor
A's Desturctor
B's Desturctor

(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 14]
$ 
23  B()
24  {
25      cout<<"default B's constructor()\n";
26  }
27
28 ~B()
29  {
30      cout<<"B's Desturctor()\n";
31  }
32
33 }//
34 */
35
36 int main()
37 {
38     A *ptr=new B;
39     ptr->~A();
40     ptr->~B();
41     cout<<"\n";
42 }

```

Practical 15

Task 1

Source Code:

```
#include
<iostream>

#include <string.h>
#include <fstream>
#include <cstdlib>
using namespace std;

int main()
{
    ofstream write;
    ifstream read;
    write.open("s1.txt");
    string str;
    getline(cin,str);
    write<<str;
    write.close();

    write.open("s2.txt");
    read.open("s1.txt");
    char ch;
    while(read)
    {
        read>>ch;
        if(read.eof())
        {
            break;
        }
        write<<ch;
    }
    write.close();
    read.close();
    return 0;
}
```

Output

The screenshot shows a Linux desktop environment with a dark theme. At the top, there is a horizontal bar with icons for file, folder, and other applications. The taskbar shows several open windows: Microsoft Word, Mousepad, and two terminal windows. The left terminal window has the title 'sammei@kali: ~/Desktop...' and shows the command '\$ g++ t1.cpp' followed by the output 'hello world'. The right terminal window has the title 'sammei@kali: ~/Desktop/sammei/OOP WITH C++/practical15/' and shows the command '\$./a.out' followed by the output 'hello world'. Below the terminals is a code editor window titled 'Mousepad' which contains the code '1 hello world'.

```
File Edit Search View Document Help
File Edit Search View Document Help
File Edit Search View Document Help
File Actions Edit View Help
sammei@kali: ~/Desktop/sammei/OOP WITH C++/practical 15]
$ g++ t1.cpp
sammei@kali: ~/Desktop/sammei/OOP WITH C++/practical 15]
$ ./a.out
hello world
sammei@kali: ~/Desktop/sammei/OOP WITH C++/practical 15]
$ 
```

Task 2 V1, V2, V3

Source Code:

```
#include<iostream>
#include<string>
#include<fstream>
using namespace std;

int main()
{
    ofstream write;
    ifstream read;
    write.open("s1.txt");
    string str;
    getline(cin,str);
    write<<str;
    write.close();

    write.open("s2.txt");
    read.open("s1.txt");
    char ch;
    while(read)
    {
        read>>ch;
        if(read.eof())
        {
            break;
        }
        write<<ch;
    }
    write.close();
    read.close();

    read.open("s1.txt");
    write.open ("s1.txt",ios::app); // Append mode
    if(read.is_open())
        write<< "\n Writing to a file opened from program.\n"; //
Writing data to file
    cout<<"\n Data has been appended to file";
    read.close();
    write.close(); // Closing the file
    return 0;
}
```

Output

The screenshot shows a Linux desktop environment with several windows open:

- Top Bar:** Shows icons for file, folder, recycle bin, and network. A Microsoft Word document titled "Mousepad" is also visible.
- Terminal Window 1:** Titled "sammei@kali: ~/Desktop/...". It contains the command "g++ t2.cpp" followed by the output of the program execution: "This is C++" and "Data has been appended to file".
- Terminal Window 2:** Titled "sammei@kali: ~/Desktop/sammei/OOP WITH C++/practical 15". It shows the command ".a.out" being run, resulting in the output "This is C++".
- File Viewer:** Titled "Mousepad" and "~/Desktop/sammei/OOP WITH C++/practical15/s1.txt". It displays the contents of the file: "1 This is C++" and "2 Writing to a file opened from program."
- Bottom Bar:** Shows icons for file, actions, edit, view, and help. The path "sammei@kali: ~/Desktop/sammei/OOP WITH C++/" is displayed.

```

1 This is C++
2 Writing to a file opened from program.

1|This is C++|
```

```

( sammei@kali )-[ ~/Desktop/sammei/OOP WITH C++/practical 15 ]
$ g++ t2.cpp
( sammei@kali )-[ ~/Desktop/sammei/OOP WITH C++/practical 15 ]
$ ./a.out
This is C++

Data has been appended to file

( sammei@kali )-[ ~/Desktop/sammei/OOP WITH C++/practical 15 ]
$ 
```

Task 3

Source Code:

```
#include
<bits/stdc++.h>

using namespace std;

int main()
{
    cout<<"Hello World"=><endl;//using endl
    cout<<"this is a test"=><flush;//using flush
    cout<<endl<<"abc"=><ends;//using ends--->null character will be
added at the last
    cout<<setw(30)<<"this is C++"=><endl;//using setw
    double f =3.14159;
    cout<<setprecision(5)<<f=><endl;
    cout<<setprecision(9)<<f=><endl;//using setprecision
    cout<<hex<<11=><endl;//using hex
    cout<<dec<<f=><endl;//using dec
    char a,b,c;
    stringstream s(" 123");
    s>>skipws>>a>>b>>c;
    cout <<a <<b<< c=><endl;
    stringstream p(" 123");
    p>>noskipws>>a>>b>>c;
    cout <<a <<b<< c=><endl;
    return 0;
}
```

Output

The screenshot shows a terminal window with a dark background and light-colored text. At the top, there are icons for file operations like copy, paste, and delete, followed by the text "Microsoft Word - shivan... sammei@kali: ~/Desktop... practical15". Below the title bar, the terminal menu bar includes "File", "Actions", "Edit", "View", and "Help". The main area of the terminal shows the following command-line session:

```
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 15]
$ g++ t3.cpp
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 15]
$ ./a.out
Hello World
this is a test
abc           this is C++
3.1416
3.14159
b
3.14159
123
1
$
```

At the bottom of the terminal window, there is a status bar with the text "Screenshot 1.5 KB (0.584 bytes) Freespace (3.0 GB)".

Practical 16

Task 1 V1

Source Code:

```
#include<iostream>

using namespace std;

template <typename A, typename B, typename R>

R add(A num1, B num2)
{
    R ans = num1 + num2;
    return ans;
}
int main()
{
    cout << add<int, int, int>(2, 3) << endl;
    return 0;
}
```

Output

The screenshot shows a terminal window with the following session:

```
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 16]
$ g++ t1_1.cpp
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 16]
$ ./a.out
```

The terminal is running on a Kali Linux system, as indicated by the prompt and desktop environment. The user has navigated to the directory `~/Desktop/sammei/OOP WITH C++/practical 16`. They compiled a file named `t1_1.cpp` using `g++` and then executed the resulting binary `./a.out`.

Task 1 V2**Source Code:**

```
#include<iostream>

using namespace std;

template <typename A, typename B, typename R>

R add(A num1, B num2)
{
    R ans = num1 + num2;
    return ans;
}
int main()
{
    cout << add<int, float, double>(2, 3.5f) << endl;
    return 0;
}
```

Output

The screenshot shows a terminal window with a dark background and light-colored text. The terminal is running on a Kali Linux system, as indicated by the prompt `(sammei㉿kali)`. The user is in the directory `~/Desktop/sammei/OOP WITH C++/practical 16`. The terminal history shows:

- `$ g++ t1_2.cpp`
- `$./a.out`
- `5.5`
- `$`

At the bottom of the terminal, there is a message: `4 files, 1084 KB (0.10774 bytes). Free space: 4316 KB`.

The desktop environment visible in the background includes icons for Microsoft Word, a file browser, and a terminal window titled "practical 16". The taskbar also shows the current terminal window.

Task 2 V1**Source Code:**

```
#include
<iostream>

using namespace std;
int main()
{
    int a, b;
    cout << "Enter two numbers for division \n";
    cin >> a >> b;
    try
    {
        if (b == 0)
        {
            throw runtime_error("Denominator cannot be 0\nTry something
else...!!\n");
        }
        else
        {
            cout << "Result is " << a / b << "\n";
        }
    }
    catch (runtime_error &e)
    {
        cout << e.what() << "\n";
    }
    return 0;
}
```

Output

```

Microsoft Word - shivan... sammei@kali: ~/Desktop... practical 16
sammei@kali: ~/Desktop/sammei/OOP WITH C++/practical 16

File Actions Edit View Help
( sammei@kali )-[ ~/Desktop/sammei/OOP WITH C++/practical 16 ]
$ g++ t2_1.cpp
( sammei@kali )-[ ~/Desktop/sammei/OOP WITH C++/practical 16 ]
$ ./a.out
Enter two numbers for division
6
2
Result is 3
Device( sammei@kali )-[ ~/Desktop/sammei/OOP WITH C++/practical 16 ]
$ ./a.out
Enter two numbers for division
6
0
Denominator cannot be 0
Try something else ... !!

( sammei@kali )-[ ~/Desktop/sammei/OOP WITH C++/practical 16 ]
$ 

```

Task 2 V2

Source Code:

```
#include
<iostream>

using namespace std;

int main()
{
    try
    {
        throw 'a';
    }
    catch (int x)
    {
        cout << "Caught " << x;
    }
    catch (...)
    {
        cout << "Default Exception\n";
    }
    return 0;
}
//The block catch(...) is used for catch all, when a data type of a thrown
exception doesn't
//match with any other catch block, the code inside catch(...) is executed.
Note that the implicit type conversion doesn't happen
//when exceptions are caught. The character 'a' is not automatically
converted to int.
```

Output

The screenshot shows a terminal window on a Kali Linux desktop environment. The terminal history is as follows:

```
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 16]
$ g++ t2_2.cpp
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 16]
$ ./a.out
Default Exception
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 16]
$
```

The terminal window has a dark background with light-colored text. It includes a standard Linux desktop menu bar at the top and a sidebar on the left containing icons for Computer, Downloads, Devices (File System, 226 GB Volume), and Network.

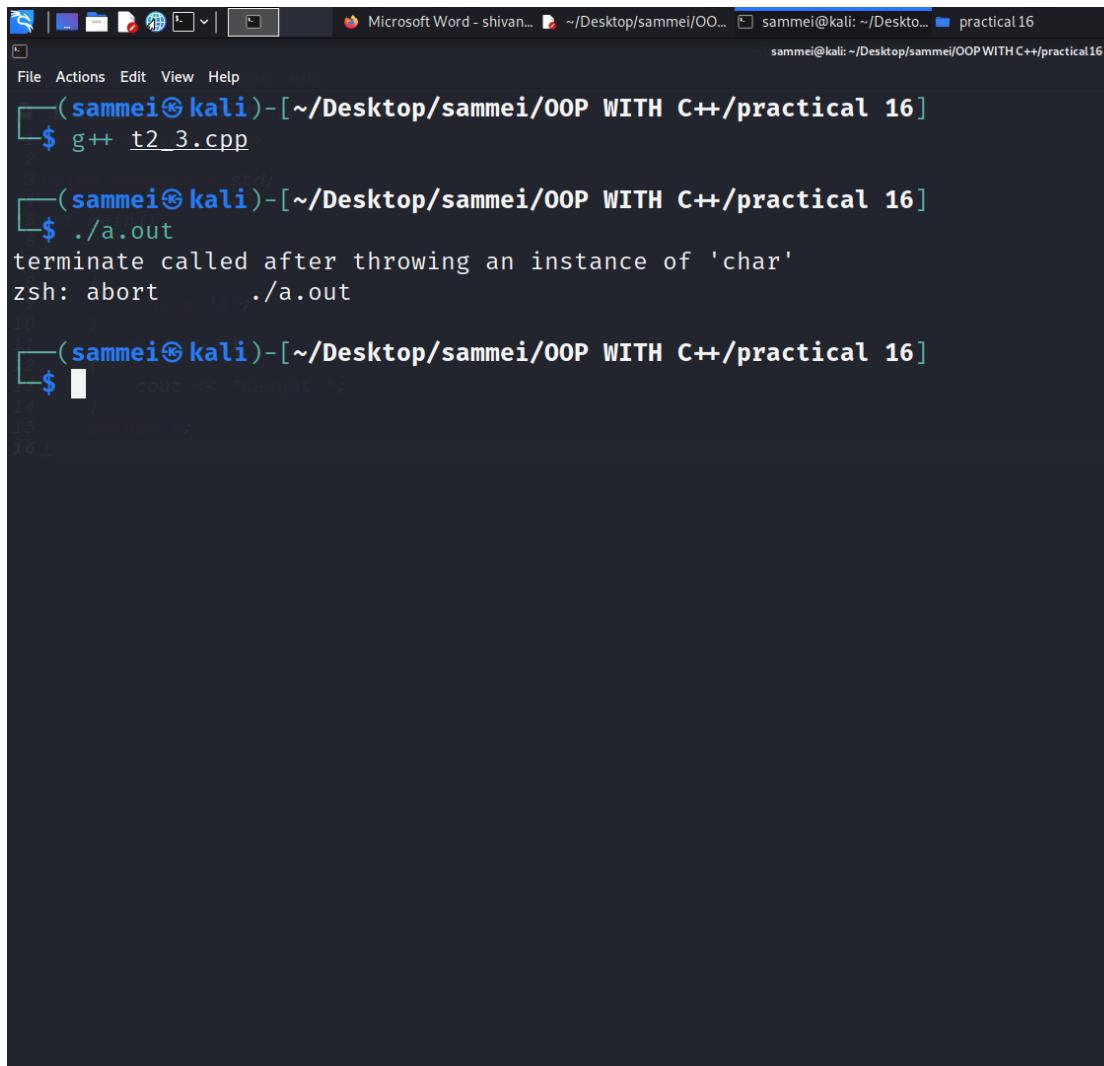
Task 2 V3**Source Code:**

```
#include
<iostream>

using namespace std;

int main()
{
    try
    {
        throw 'a';
    }
    catch (int x)
    {
        cout << "Caught ";
    }
    return 0;
}
```

Output



The screenshot shows a terminal window on a Kali Linux desktop environment. The terminal title is '(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 16]'. The user has run the command 'g++ t2_3.cpp' to compile a C++ program. When they run './a.out', the program terminates with an error message: 'terminate called after throwing an instance of 'char' zsh: abort ./a.out'. Finally, the user runs 'cout << "Caught it";' which outputs 'Caught it' to the terminal.

```
Microsoft Word - shivan... ~/Desktop/sammei/OO... sammei@kali: ~/Deskt... practical16
sammei@kali: ~/Desktop/sammei/OOP WITH C++/practical16

(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 16]
$ g++ t2_3.cpp

(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 16]
$ ./a.out
terminate called after throwing an instance of 'char'
zsh: abort ./a.out

(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 16]
$ cout << "Caught it";
Caught it
```

Task 2 V4

Source Code:

```
#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 Numbers to Divide" << endl;
    cin >> numerator;
    cin >> denominator;
    try
    {
        result = Division(numerator, denominator);
        cout << "The quotient is "
            << result << endl;
    }
    catch (runtime_error& e)
    {
        cout << "Exception occurred" << endl
            << e.what();
    }
}
```

Output

```

Handling the Divide by Z... ~/Desktop/sammei/OOP... sammei@kali:~/Desktop/sammei/OOP WITH C++/practical16
File Actions Edit View Help
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 16]
$ g++ t2_1.cpp
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 16]
$ ./a.out
Enter Numbers to Divide
12
3
The quotient is 4

(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 16]
$ ./a.out
Enter Numbers to Divide
12
0
Exception occurred
Math error: Attempted to divide by Zero
The quotient is 4
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 16]
$ [runtime_error & e)
29 {
30     cout << "Exception occurred" << endl
31     << e.what();
32 }
33

```

Practical 17

Task 1

Source Code:

```
#include
<iostream>

#include <list>
#include <iterator>

using namespace std;

// function for printing the elements in a list

void printList(list<int> g)
{
    list<int>::iterator it;
    for (it = g.begin(); it != g.end(); ++it)
        cout << *it << " ";
    cout << '\n';
}

int main()
{
    list<int> l;
    int n;
    cout << "\nEnter the size of the List \n";
    cin >> n;
    cout<<"\nEnter elemets in the list\n";
    for (int i = 0; i < n; i++)
    {
        int ele;
        cin >> ele;
        l.push_back(ele);
    }
    // Task 1
    cout<<"\nElements in the list are:- \n";
    printList(l);
    // Task 2
    cout << "\nSize of the list is : " << l.size() << "\n";
    // Task 3
    l.sort();
    cout << "\nPrinting list after sorting\n";
    printList(l);
    // Task 4
```

```

    l.reverse();
    cout << "\nPrinting list after Reversing\n";
    printList(l);
    return 0;
}

```

Output

```

Microsoft Word - shivan... ~/Desktop/sammei/OO... sammei@kali: ~/Desktop/practical 17
sammei@kali: ~/Desktop/sammei/OOP WITH C++/practical 17

File Actions Edit View Help

(sammei@kali)-[~/Desktop/sammei/OOP WITH C++/practical 17]
$ g++ t1.cpp
(sammei@kali)-[~/Desktop/sammei/OOP WITH C++/practical 17]
$ ./a.out
Enter the size of the List
8
Elements in the list are:- 1 3 5 7 2 4 6 8
Size of the list is : 8
Printing list after sorting
1 2 3 4 5 6 7 8
Enter elements in the list
Printing list after Reversing
8 7 6 5 4 3 2 1
(sammei@kali)-[~/Desktop/sammei/OOP WITH C++/practical 17]
$ 

```

29 // Task 1
30 cout << "Elements in the list are:- \n";
31 printList(l);
32 // Task 2
33 cout << "Size of the list is : " << l.size() << "\n";
34 // Task 3
35 l.sort();
36 cout << "Printing list after sorting :\n";
37 printList(l);
38 // Task 4
39 l.reverse();
40 cout << "Printing list after Reversing :\n";
41 printList(l);
42 return 0;
43 }

Task 2

Source Code:

```

#include
<iostream>
#include <vector>
#include <algorithm>
#include <iterator>

using namespace std;

// function for printing the elements in a vector

void printvector(vector<int> v)
{
    vector<int>::iterator it;
    for (it = v.begin(); it != v.end(); ++it)
        cout << *it << " ";
    cout << '\n';
}

int main()
{
    vector<int> v;
    int n;
    cout << "\nEnter the size of the vector \n";
    cin >> n;
    // Task 1
    cout<<"\nEnter the elements in the vector\n";
    for (int i = 0; i < n; i++)
    {
        int ele;
        cin >> ele;
        v.push_back(ele);
    }
    cout<<"\nElements in the list are:-\n";
    // Task 2
    printvector(v);
    // Task 3
    cout << "\nSize of the vector is : " << v.size() << "\t Capacity of
vector is : " << v.capacity() << "\n";
    // Task 4
    v.resize(2 * n, 0);
}

```

```

        cout << "\nPrinting vector after resizing and intialising after
0\n";
        printvector(v);
        // Task 5
        cout << "\nChecking vector is empty or not after :\n";
        if (v.empty())
            cout << "\nVector is empty\t";
        else
            cout << "\nVector is not empty";
        return 0;
    }
}

```

Output

```

Unit-05 Practical Questi... ~/Desktop/sammei/OO... sammei@kali: ~/Deskt... practical17
File Actions Edit View Help
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 17]
$ g++ t2.cpp
[sudo] password:
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 17]
$ ./a.out
Enter the size of the vector
8
Enter the elemets in the vector
1 3 5 7 2 4 6 8

Elements in the list are:-
1 3 5 7 2 4 6 8
Size of the vector is : 8 Capacity of vector is : 8
Printing vector after resizing and intialising after 0
1 3 5 7 2 4 6 8 0 0 0 0 0 0 0 0
Checking vector is empty or not after :
Vector is not empty

```

Task 3

Source Code:

```

#include
<bits/stdc++.h>

#include <map>
#include <algorithm>
#include <iterator>

using namespace std;
// function for printing the elements in a map

void printmap(map<int, string> v)
{
    map<int, string>::iterator it;
    for (it = v.begin(); it != v.end(); ++it)
        cout << it->first << " " << it->second << "\n";
    cout << '\n';
}

int main()
{   // Task 1
    map<int, string> m;
    // Task 2
    m.insert(pair<int, string>(4, "Hello"));
    m.insert(pair<int, string>(6, "World"));
    m.insert(pair<int, string>(8, "This"));
    m.insert(pair<int, string>(1, "is"));
    m.insert(pair<int, string>(7, "OOPS"));
    m.insert(pair<int, string>(2, "C++"));
    m.insert(pair<int, string>(5, "program"));
    // Task 3
    cout<<"\nElements in the map are:-\n";
    printmap(m);
    // Task 4
    auto itr = m.find(4);
    cout << "\nitr is pointing to \n" << itr->first << " " << itr-
>second << " \n";
    // Task 5
    map<int, string> copyMap = m;
    cout << "\nPrinting copyMap :\n";
    printmap(copyMap);
    // Task 6
}

```

```
cout << "\nDeleting a key-value from copyMap : 9 algorithm\n";
copyMap.erase(5);
cout << "\nPrinting map After deleting key = 9 from it\n";
printmap(copyMap);
// Task 7
cout << "\nSize of the map is : " << copyMap.size() << "\t maxSize
of map is : " << copyMap.max_size() << "\n";
// Task 8
cout << "\nChecking map is empty or not :\n";
if (copyMap.empty())
cout << "\nMap is empty\n";
else cout << "\nMap is not empty\n";
// Task 9
copyMap.clear();
cout << "\nPrinting a Map after Clearing it :\n";
printmap(copyMap);
return 0;
}
```

Output

```
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 17]
$ g++ t3.cpp
^[[A
$ ./a.out
Elements in the map are:-
1 is      main()
2 C++      Task 1
4 Hello   map<int, string> m;
5 program  Task 2
6 World   m.insert(pair<int, string> (1, "Hello"));
7 OOPS    m.insert(pair<int, string> (2, "OOPS"));
8 This    m.insert(pair<int, string> (3, "This"));
9 C       m.insert(pair<int, string> (4, "C"));
itr is pointing to pair<int, string> (4, "C");
4 Hello  m.insert(pair<int, string> (5, "Hello"));
5 program  m.insert(pair<int, string> (6, "program"));
Printing copyMap :
1 is      cout<<"Elements in the map are:-";
2 C++      printmap(m);
3 Hello
4 program
5 World
6 OOPS
7 This
8 This
map<int, string> copyMap = m;
cout << "Printing copyMap:-";
Deleting a key-value from copyMap : 9 algorithm

Printing map After deleting key = 9 from its value from copyMap : 9 algorithm
1 is      copyMap.erase(9);
2 C++      cout << "Printing map After deleting key = 9 from it:-";
3 Hello
4 World
5 printmap(copyMap);
6 OOPS
7 This
8 cout << "Size of the map is : " << copyMap.size() << " maxSize of map is : " << copyMap.m
9 cout << "Checking map is empty or not :-";
Size of the map is : 6  maxSize of map is : 128102389400760775
Checking map is empty or not :
Map is not empty
copyMap.clear();
Printing a Map after Clearing it :
cout << "Map after Clearing it :-";
copyMap.printmap(copyMap);

(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 17]
```

Task 4

Source Code:

```
#include
<bits/stdc++.h>

using namespace std;

void printvector(vector<int> v)
{
    vector<int>::iterator it;
    for (it = v.begin(); it != v.end(); ++it)
        cout << *it << " ";
    cout << '\n';
}

void printArray(int a[], int n)
{
    for (int i = 0; i < n; i++)
        cout << a[i] << " ";
    cout << '\n';
}

int main()
{
    int arr[] = {2, 7, 3, 1, 8, 3, 3, 4};
    // Task 1
    int n = sizeof(arr) / sizeof(arr[0]);
    vector<int> vec(arr, arr + n);
    // Task 2
    cout << "\nPrinting vector before sorting : \n";
    printvector(vec);
    sort(vec.begin(), vec.end());
    cout << "\nPrinting vector after sorting : \n";
    printvector(vec);
    // Task 3
    reverse(vec.begin(), vec.end());
    cout << "\nPrinting vector after Reversing : \n";
    printvector(vec);
    // Task 4
    cout << "\nMax element of vector is : " <<
        *(max_element(vec.begin(), vec.end())) << endl;
    // Task 5
```

```
        cout<< " \nMin Element of vector is : " <<
*(min_element(vec.begin(), vec.end())) << endl;
// Task 6
cout << "\noccurrence of an 3 in vector :" <<
count(vec.begin(), vec.end(), 3) << endl;
// Task 7
sort(arr, arr + n);
cout << "\nPrinting array after sorting :\n";
printArray(arr, n);
//Task 8
cout << "\nUsing Binary Search for finding 7 in an Array : \n
";
if (binary_search(arr, arr + n, 7))
{
    cout << "\n7 Exist in the Array \n";
}
else
{
    cout << "\n7 Doesn't Exist in the Array\n";
}
return 0;
}
```

Output

```

Unit-05 Practical Questi... ~/Desktop/sammei/OO... sammei@kali:~/Desktop/sammei/OOP WITH C++/practical17
sammei@kali:~/Desktop/sammei/OOP WITH C++/practical17

File Actions Edit View Help
(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 17]
$ g++ t4.cpp

(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 17]
$ ./a.out
a.out 11.cpp 11.png 12.cpp 12.png 13.cpp 13.png 14.cpp

Printing vector before sorting :
2 7 3 1 8 3 3 4

Printing vector after sorting :
1 2 3 3 3 4 7 8

Printing vector after Reversing :
8 7 4 3 3 3 2 1

Max element of vector is : 8
Min Element of vector is : 1

occurrence of an 3 in vector :3

Printing array after sorting :
1 2 3 3 3 4 7 8

Using Binary Search for finding 7 in an Array :

7 Exist in the Array

(sammei㉿kali)-[~/Desktop/sammei/OOP WITH C++/practical 17]
$ 

```