Term work

of

**OOPs With C++ Lab (PCS-307)**

Submitted in partial fulfillment of the requirement for the III semester

**Bachelor of Technology**

By

**Name of the Student**

**University Roll No**

**12345678**

**Under the Guidance of**

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**Assistant Professor**

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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**GRAPHIC ERA HILL UNIVERSITY, BHIMTAL CAMPUS**

**SATTAL ROAD, P.O. BHOWALI**

**DISTRICT- NAINITAL-263132**

**2022-2023**

**CERTIFICATE**

**The term work of OOPs with C++ Lab (PCS-307), being submitted by……………………………. d/o s/o…………. , Enrollment no………… , Roll no……….  
to Graphic Era Hill University Bhimtal Campus for the award of bona fide work   
carried out by him/her. He/She has worked under my guidance and supervision and   
fulfilled the requirement for the submission of this work report.**

**(…………………) (……………………)**

**Subject Professor HOD, CSE Dept.**

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**STUDENT’S DECLARATION**

I, ……………., hereby declare the work, which is being presented in the report, entitled **Term work of OOPs with C++ Lab (PCS-307)**  in partial fulfillment of the requirement for the award of the degree **Bachelor of Technology (Computer Science)**  in the session **2022-2023** for semester III, is an authentic record of my own work carried out under the supervision of **Mr. Ravindra Koranga**  
(Graphic Era Hill University, Bhimtal)

The matter embodied in this project has not been submitted by me for the award of any other degree.

Date: ………… ……………….

(Full signature of student)



**Computer Science and Engineering Department**

**OOPS LAB (PCS-307)**

**Requirements:**

* Unix/Linux based Computer System

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**1. WAP in C++ to calculate factorial of a number**

#include<iostream>

using namespace std;

int main()

{

int n;

cout<<"Enter a number"<<endl;

cin>>n;

int fact=1,i;

for(i=1;i<=n;i++)

{

fact=fact\*i;

}

cout<<"The factorial is "<<fact<<endl;

}

**Output:**

Enter a number

5

The factorial is 120

**2.WAP in C++ to show the use of function**

#include<iostream>

using namespace std;

int add(int x, int y)

{

int sum=x+y;

return sum;

}

int main()

{

int a,b;

cout<<"Enter two numbers "<<endl;

cin>>a>>b;

cout<<"The sum is "<<add(a,b)<<endl;

}

**OUTPUT:**

Enter two numbers

5

10

The sum is 15

**3.WAP in C++ to show the use of inline function**

#include<iostream>

using namespace std;

inline int mul(int x, int y)

{

int prod;

prod=x\*y;

return prod;

}

int main()

{

int a,b;

cout<<"Enter two numbers "<<endl;

cin>>a>>b;

cout<<"The product is "<<mul(a,b)<<endl;

}

**OUTPUT:**

Enter two numbers

5

10

The product is 50

**4.WAP in C++ to demonstrate Function Overloading**

#include<iostream>

using namespace std;

int add(int x, int y)

{

int sum=x+y;

return sum;

}

int add(int x, int y, int z)

{

int sum=x+y+z;

return sum;

}

int main()

{

int a,b,c;

cout<<"Enter two numbers "<<endl;

cin>>a>>b;

cout<<"The sum is "<<add(a,b)<<endl;

cout<<"Enter three numbers "<<endl;

cin>>a>>b>>c;

cout<<"The sum is "<<add(a,b,c)<<endl;

}

**OUTPUT:**

Enter two numbers

10

20

The sum is 30

Enter three numbers

10

20

30

The sum is 60

**5.WAP in C++ in which a member function can be called inside another member function of same class.**

#include<iostream>

using namespace std;

class student

{

private:

int roll, marks1, marks2;

public:

void set(int x, int y, int z);

void get();

void add();

};

void student::set(int x, int y, int z)

{

roll=x;

marks1=y;

marks2=z;

}

void student::get()

{

cout<<"Roll no.: "<<roll<<" Marks1: "<<marks1<<" Marks2: "<<marks2<<endl;

add();

}

void student::add()

{

cout<<"Total marks is "<<marks1+marks2<<endl;

}

int main()

{

student obj1;

obj1.set(1,90,90);

obj1.get();

}

**OUTPUT:**

Roll no.: 1 Marks1: 90 Marks2: 90

Total marks is 180

**6.WAP in C++ to demonstrate the concept of arrays within a class**

#include<iostream>

using namespace std;

class student

{

private:

int roll, marks[5];

public:

void set(int x, int arr[]);

void get();

void add();

};

void student::set(int x, int arr[])

{

roll=x;

int i;

for(i=0;i<5;i++)

{

marks[i]=arr[i];

}

}

void student::get()

{

cout<<"Printing Studentd Details: "<<endl;

cout<<"Roll no. "<<roll<<endl;

cout<<"Marks in five subjects are "<<endl;

int i;

for(i=0;i<5;i++)

{

cout<<marks[i]<<endl;

}

}

void student::add()

{

int i, sum=0;

for(i=0;i<5;i++)

{

sum=sum+marks[i];

}

cout<<"Total marks are : "<<sum<<endl;

}

int main()

{

int a, arr[5];

cout<<"Enter roll no "<<endl;

cin>>a;

cout<<"Enter marks in five subjects "<<endl;

int i;

for(i=0;i<5;i++)

{

cin>>arr[i];

}

student obj;

obj.set(a,arr);

obj.get();

obj.add();

}

**OUTPUT:**

Enter roll no

1

Enter marks in five subject

10

10

10

10

10

Printing Student Details:

Roll no. 1

Marks in five subjects are

10

10

10

10

10

Total marks are : 50

**7.WAP in C++ in which static data member maintain values common to the entire class.**

#include<iostream>

using namespace std;

class student

{

private:

int roll, marks1, marks2;

static int count;

public:

void set(int x, int y, int z);

void get();

void add();

student();

~student();

};

int student::count=0;

void student::set(int x, int y, int z)

{

roll=x;

marks1=y;

marks2=z;

}

void student::get()

{

cout<<endl<<"Printing Student Details : "<<endl;

cout<<"Roll no.: "<<roll<<" Marks1: "<<marks1<<" Marks2: "<<marks2<<endl;

}

void student::add()

{

cout<<"Total marks is "<<marks1+marks2<<endl<<endl;

}

student::student()

{

count++;

cout<<"Object is created "<<endl;

cout<<"No. of objects = "<<count<<endl;

}

student::~student()

{

count--;

cout<<"Object is destroyed "<<endl;

cout<<"No. of objects = "<<count<<endl;

}

int main()

{

student obj1;

obj1.set(1,10,20);

obj1.get();

obj1.add();

student obj2;

obj2.set(2,40,40);

obj2.get();

obj2.add();

}

**OUTPUT:**

Object is created

No. of objects = 1

Printing Student Details :

Roll no.: 1 Marks1: 10 Marks2: 20

Total marks is 30

Object is created

No. of objects = 2

Printing Student Details :

Roll no.: 2 Marks1: 40 Marks2: 40

Total marks is 80

Object is destroyed

No. of objects = 1

Object is destroyed

No. of objects = 0

**8.WAP in C++ to demonstrate the concept of friend function**

#include<iostream>

using namespace std;

class student

{

private:

int roll, marks1, marks2;

public:

void set(int x, int y, int z);

void get();

friend void add(student po);

};

void student::set(int x, int y, int z)

{

roll=x;

marks1=y;

marks2=z;

}

void student::get( )

{

cout<<"Printing student details : "<<endl;

cout<<"Roll no.: "<<roll<<" Marks1: "<<marks1<<" Marks2: "<<marks2<<endl;

}

void add(student po)

{

cout<<"Total marks is "<<po.marks1+po.marks2<<endl;

}

int main()

{

student obj1;

obj1.set(1,90,90);

obj1.get();

add(obj1);

}

**OUTPUT:**

Printing student details :

Roll no.: 1 Marks1: 90 Marks2: 90

Total marks is 180

**9.WAP in C++ to demonstrate the concept of parameterized constructor**

#include<iostream>

using namespace std;

class student

{

private:

int roll, marks1, marks2;

public:

void set(int x, int y, int z);

void get();

void add();

student(int x, int y, int z);

};

void student::set(int x, int y, int z)

{

roll=x;

marks1=y;

marks2=z;

}

void student::get()

{

cout<<"Printing Student Details: "<<endl;

cout<<"Roll no.: "<<roll<<" Marks1: "<<marks1<<" Marks2: "<<marks2<<endl;

}

void student::add()

{

cout<<"Total marks is "<<marks1+marks2<<endl;

}

student::student(int x, int y, int z)

{

cout<<"Parameterized Constructor is called "<<endl;

roll=x;

marks1=y;

marks2=z;

}

int main()

{

student obj1(1,50,60);

obj1.get();

obj1.add();

}

**OUTPUT:**

Parameterized Constructor is called

Printing Student Details:

Roll no.: 1 Marks1: 50 Marks2: 60

Total marks is 110

**10.WAP in C++ that contains one constructor and one destructor**

#include<iostream>

using namespace std;

class student

{

private:

int roll, marks1, marks2;

public:

void set(int x, int y, int z);

void get();

void add();

student(int x, int y, int z);

~student();

};

void student::set(int x, int y, int z)

{

roll=x;

marks1=y;

marks2=z;

}

void student::get()

{

cout<<"Printing Student Details: "<<endl;

cout<<"Roll no.: "<<roll<<" Marks1: "<<marks1<<" Marks2: "<<marks2<<endl;

}

void student::add()

{

cout<<"Total marks is "<<marks1+marks2<<endl;

}

student::student(int x, int y, int z)

{

cout<<"Constructor is called "<<endl;

roll=x;

marks1=y;

marks2=z;

}

student::~student()

{

cout<<"Destructor is Called"<<endl;

}

int main()

{

student obj1(1,50,60);

obj1.get();

obj1.add();

}

**OUTPUT:**

Constructor is called

Printing Student Details:

Roll no.: 1 Marks1: 50 Marks2: 60

Total marks is 110

Destructor is Called

**11.WAP in C++ to show how unary minus operator is overloaded**

#include<iostream>

using namespace std;

class student

{

private:

int roll, marks1, marks2;

public:

void set(int x, int y, int z);

void get();

void add();

student operator-(student po);

};

void student::set(int x, int y, int z)

{

roll=x;

marks1=y;

marks2=z;

}

void student::get()

{

cout<<"Printing Student Details: "<<endl;

cout<<"Roll no.: "<<roll<<" Marks1: "<<marks1<<" Marks2: "<<marks2<<endl;

}

void student::add()

{

cout<<"Total marks is "<<marks1+marks2<<endl;

}

student student::operator-(student po)

{

student temp;

temp.roll=3;

temp.marks1 = marks1-po.marks1;

temp.marks2 = marks2-po.marks2;

return temp;

}

int main()

{

student obj1, obj2;

obj1.set(1,50,60);

obj1.get();

obj1.add();

obj2.set(2,40,50);

obj2.get();

obj2.add();

student obj3;

cout<<"Create obj3. It will contain difference of obj1 and obj2 "<<endl;

obj3=obj1-obj2;

obj3.get();

}

**OUTPUT:**

Printing Student Details:

Roll no.: 1 Marks1: 50 Marks2: 60

Total marks is 110

Printing Student Details:

Roll no.: 2 Marks1: 40 Marks2: 50

Total marks is 90

Create obj3. It will contain difference of obj1 and obj2

Printing Student Details:

Roll no.: 3 Marks1: 10 Marks2: 10

**12.WAP in C++ to demonstrate the concept of Multiple Inheritance**

#include<iostream>

using namespace std;

class A

{

protected:

int i,j;

public:

void add()

{

cout<<i+j;

}

};

class B

{

protected:

int k,l;

public:

void mul()

{

cout<<k\*l;

}

};

class C:public A, public B

{

public:

void set(int w, int x, int y, int z)

{

i=w;

j=x;

k=y;

l=z;

}

void get()

{

cout<<"The values of four variables are :"<<endl;

cout<<i<<" "<<j<<" "<<k<<" "<<l<<" "<<endl;

}

void add()

{

cout<<"The sum of four variables is "<<i+j+k+l<<endl;

}

void mul()

{

cout<<"The product of four variables is "<<i\*j\*k\*l<<endl;

}

};

int main()

{

C obj;

obj.set(10,20,30,40);

obj.get();

obj.add();

obj.mul();

}

**OUTPUT:**

The values of four variables are :

10 20 30 40

The sum of four variables is 100

The product of four variables is 240000

**13.WAP in C++ that shows the ambiguity resolution in inheritance through virtual base class**

#include<iostream>

using namespace std;

class A

{

protected:

int i,j;

public:

void add()

{

cout<<"The sum is ";

cout<<i+j<<endl;

}

};

class B: virtual public A

{

protected:

public:

void mul()

{

cout<<"The product is ";

cout<<i\*j<<endl;

}

};

class C: virtual public A

{

protected:

public:

void div()

{

cout<<i/j;

}

};

class D:public B, public C

{

public:

void set(int x, int y)

{

i=x;

j=y;

}

void get()

{

cout<<"The values of two variables are :"<<endl;

cout<<i<<" "<<j<<" "<<endl;

}

};

int main()

{

D obj;

obj.set(10,20);

obj.get();

obj.add();

obj.mul();

}

**OUTPUT:**

The values of two variables are :

10 20

The sum is 30

The product is 200

**14.WAP in C++ to demonstrate the use of virtual function**

#include<iostream>

using namespace std;

class A

{

protected:

int i,j;

public:

virtual void add()

{

cout<<"Sum of two numbers is "<<i+j<<endl;

}

void set(int x , int y)

{

i=x;

j=y;

}

};

class B:public A

{

protected:

int k;

public:

void add()

{

cout<<"Sum of three numbers is "<<i+j+k<<endl;

}

void set(int x , int y, int z)

{

i=x;

j=y;

k=z;

}

};

class C: public B

{

protected:

int l;

public:

void add()

{

cout<<"Sum of four numbers is "<<i+j+k+l<<endl;

}

void set(int w, int x , int y, int z)

{

i=w;

j=x;

k=y;

l=z;

}

};

int main()

{

A obja;

B objb;

C objc;

obja.set(10,20);

objb.set(10,20,30);

objc.set(10,20,30,40);

A &ref1 = obja;

cout<<"Calling virtual function through Base Class Reference to object of Class A"<<endl;

ref1.add();

A &ref2=objb;

cout<<"Calling virtual function through Base Class Reference to object of Class B"<<endl;

ref2.add();

A &ref3=objc;

cout<<"Calling virtual function through Base Class Reference to object of Class C"<<endl;

ref3.add();

}

**OUTPUT:**

Calling virtual function through Base Class Reference to object of Class A

Sum of two numbers is 30

Calling virtual function through Base Class Reference to object of Class B

Sum of three numbers is 60

Calling virtual function through Base Class Reference to object of Class C

Sum of four numbers is 100

**15.WAP in C++ to demonstrate the use of pointers to objects**

#include<iostream>

using namespace std;

class student

{

private:

int roll, marks1, marks2;

public:

void set(int x, int y, int z)

{

roll=x;

marks1=y;

marks2=z;

}

void get()

{

cout<<"Roll: "<<roll<<" Marks1 : "<<marks1<<" Marks2 : "<<marks2<<endl;

}

void add()

{

cout<<"Totals marks are "<<marks1+marks2<<endl;

}

};

int main()

{

student obj;

student \* ptr;

ptr=&obj;

ptr->set(1,40,45);

cout<<"Printing student details "<<endl;

ptr->get();

ptr->add();

}

**OUTPUT:**

Printing student details

Roll: 1 Marks1 : 40 Marks2 : 45

Totals marks are 85

**16.WAP in C++ to create a file and perform write , read and update operation on file**

#include<iostream>

#include<fstream>

#include<string>

using namespace std;

int main()

{

ofstream myout("file.txt", ios::app);

if(!myout)

{

cout<<"Can't open file "<<endl;

return 0;

}

char text[255];

cout<<"Enter text to write to file"<<endl;

cin.getline(text, sizeof(text));

cout<<"Writing text to file"<<endl;

char \*c;

c=text;

myout<<endl;

while(\*c != NULL)

{

myout.put(\*c);

c++;

}

myout.close();

ifstream myin("file.txt");

cout<<"Reading text from file "<<endl;

myin.read(text, sizeof(text));

cout<<text<<endl;

myin.close();

cout<<endl<<endl<<"Updating the file"<<endl;

cout<<"Secify the position at which you want to updat the character in file"<<endl;

int pos;

cin>>pos;

cout<<"Secify the new character at this position"<<endl;

char ch;

cin>>ch;

myout.open("file.txt",ios::in|ios::out);

myout.seekp(pos, ios::beg);

myout.put(ch);

myout.close();

myin.open("file.txt");

cout<<"Reading text from file "<<endl;

myin.read(text, sizeof(text));

cout<<text<<endl;

myin.close();

}

**OUTPUT:**

Enter text to write to file

Happi New Year

Writing text to file

Reading text from file

Happi New Year

Updating the file

Secify the position at which you want to updat the character in file

6

Secify the new character at this position

Y

Reading text from file

HappY New Year

**17.WAP in C++ to demonstrate Exception Handling by using try and catch block**

#include<iostream>

using namespace std;

int main()

{

int a;

cout<<"Enter a number"<<endl;

cin>>a;

try

{

if(a==0)

throw 100;

cout<<"5000 divided by a is "<<5000/a<<endl;

}

catch(int x)

{

cout<<"Can't Divide by zero"<<endl;

cout<<"Error code is "<<x<<endl;

}

}

**OUTPUT:**

Enter a number

50

5000 divided by a is 100

**18.WAP in C++ to create a Linked List using STL. Sort this list using sort algorithm in STL.**

#include<iostream>

#include<list>

#include<algorithm>

#include<iterator>

using namespace std;

int main()

{

list<int> l;

cout<<"How many elements do you want in the list"<<endl;

int n;

cin>>n;

cout<<"Enter the elements"<<endl;

int i,x;

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

{

cin>>x;

l.push\_back(x);

}

cout<<"Printing the list"<<endl;

list<int>::iterator itr;

itr=l.begin();

while(itr!=l.end())

{

cout<<\*itr<<"-> ";

itr++;

}

cout<<endl<<"Sorting the list"<<endl;

l.sort();

cout<<"The sorted list is"<<endl;

itr=l.begin();

while(itr!=l.end())

{

cout<<\*itr<<"-> ";

itr++;

}

}

**OUTPUT:**

How many elements do you want in the list

5

Enter the elements

1

2

3

4

5

Printing the list

1-> 2-> 3-> 4-> 5->

Sorting the list

The sorted list is

1-> 2-> 3-> 4-> 5->