



Basic Object Oriented Programming

LAB MANUAL

Department
Of
Computer Engineering

Neotech Faculty of Diploma Engineering

Name: - _____

Branch: - _____ Division: - _____

Roll No: - _____ Year: - _____

NEOTECH FACULTY OF DIPLOMA ENGINEERING
Basic Object Oriented Programming(4311603)



Neotech Faculty Of
Diploma Engineering

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CERTIFICATE

This is to certify that

Mr./Ms. Enrollment No. _____ of 2nd Semester Diploma course in
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Place:

Date:

Subject Teacher

Head of Department

Subject: Basic Object Oriented Programming

Subject Code : 4311603

LIST OF EXPERIMENTS

Sr. NO.	TITLE OF EXPERIMENT	Date	Sign
1.	Create your account on github and save simple C++ Program in github		
2.	Develop minimum 5 program cin and cout		
3.	Develop program using scope resolution operator, simple manipulators , and enumeration		
4.	Develop programs using call by reference and return by reference, default arguments, constant arguments, inline and function overloading.		
5.	Develop programs using structures.		
6.	Define minimum 5 different classes such as student, distance, shape, employee, account, inventory, vector, movie-ticket booking, time, point, etc. with data member & member functions. Also Develop programs to test those classes functionality.		
7.	Develop Programs using array of objects and static member function		
8.	Develop programs to pass object as an argument and Returning object.		
9.	Develop programs using friend function and Friend class.		
10.	Apply the concepts of constructors and destructors in the Programs developed in unit-2 and test those programs.		
11.	Develop programs using single, multilevel, multiple Inheritance		

12.	Develop programs using Constructors in base and derive classes			
13.	Develop a program to show use of this pointer			
14.	Develop a program using runtime polymorphism			
15.	Develop at least 2 programs using file operations			

Q.2) Develop minimum 5 program using cin and cout.

Program1

→ Addition of two number

```
#include<iostream.h>

#include<conio.h>

int main()
{
    int num1,num2,num3;

    cout<<"Enter the number 1 : ";

    cin>>num1;

    cout<<"Enter the number 2 : ";

    cin>>num2;

    num3=num1+num2;

    cout<<"sum = "<<num3<<endl;

    return 0;
}
```

Output

```
Windows PowerShell
Copyright (C) 2009 Microsoft Corporation. All rights reserved.

PS C:\Users\Admin\Documents\html> cd "c:\Users\Admin\Documents\html\BOOP lab manual\" ; if ($?) {
g++ practical21.cpp -o practical21 } ; if ($?) { .\practical21 }
Enter the number 1 : 5
Enter the number 2 : 5
sum = 10
PS C:\Users\Admin\Documents\html\BOOP lab manual> 
```

Program2

→Subtraction of two number

```
#include<iostream.h>

#include<conio.h>

int main()
{
    int num1,num2,num3;

    cout<<"Enter the number 1 : ";

    cin>>num1;

    cout<<"Enter the number 2 : ";

    cin>>num2;

    num3=num1-num2;

    cout<<"subtraction = "<<num3<<endl;

    return 0;
}
```

Output

```
PS C:\Users\Admin\Documents\html\BOOP lab manual> cd "c:\Users\Admin\Documents\html\BOOP lab manual" ; if ($?) { g++ practical22.cpp -o practical22 } ; if ($?) { .\practical22 }
Enter the number 1 : 10
Enter the number 2 : 5
subtraction = 5
PS C:\Users\Admin\Documents\html\BOOP lab manual> 
```

Program 3

→ Multiplication of two number

```
#include<iostream>

#include<conio.h>

using namespace std;

int main()
{
    int num1,num2,num3;

    cout<<"Enter the number 1 : ";

    cin>>num1;

    cout<<"Enter the number 2 : ";

    cin>>num2;

    num3=num1*num2;

    cout<<"multiplication = "<<num3<<endl;

    return 0;
}
```

Output

```
PS C:\Users\Admin\Documents\html\BOOP lab manual> cd "c:\Users\Admin\Documents\html\BOOP lab manual" ; if ($?) { g++ practical23.cpp -o practical23 } ; if ($?) { .\practical23 }
Enter the number 1 : 2
Enter the number 2 : 5
multiplication = 10
PS C:\Users\Admin\Documents\html\BOOP lab manual> |
```

Program 4

→ Division of two number

```
#include<iostream>

#include<conio.h>

using namespace std;

int main()
{
    int num1,num2,num3;

    cout<<"Enter the number 1 : ";

    cin>>num1;
    cout<<"Enter the number 2 : ";

    cin>>num2;

    num3=num1/num2;

    cout<<"division = "<<num3<<endl;

    return 0;
}
```

Output

```
PS C:\Users\Admin\Documents\html\BOOP lab manual> cd "c:\Users\Admin\Documents\html\BOOP lab manual" ; if ($?) { g++ practical24.cpp -o practical24 } ; if ($?) { .\practical24 }
Enter the number 1 : 16
Enter the number 2 : 2
division = 8
PS C:\Users\Admin\Documents\html\BOOP lab manual> |
```


Program 5

→ Program to print the number

```
#include<iostream>

#include<conio.h>

using namespace std;

int main()

{
    int number;

    cout<<"Enter the number : ";

    cin>>number;

    cout<<"Enter number is "<<number<<endl;

    return 0;
}
```

Output

```
PS C:\Users\Admin\Documents\html\BOOP lab manual> cd "c:\Users\Admin\Documents\html\BOOP lab manual" ; if ($?) { g++ practical25.cpp -o practical25 } ; if ($?) { .\practical25 }
Enter the number : 10
Enter number is 10
PS C:\Users\Admin\Documents\html\BOOP lab manual>
```

Q.3)Develop program using scope resolution operator ,simple manipulators ,and enumeration.

Program 1

→ scope resolution operator

```
#include<iostream>

#include<conio.h>

using namespace std;

int num = 100;

int main()
{
    int num = 50;

    cout<<"The value of local variable is "<<num<<endl;

    cout<<"The value of Global variable is "<<::num<<endl;

    return 0;
}
```

Output

```
PS C:\Users\Admin\Documents\html\BOOP lab manual> cd "c:\Users\Admin\Documents\html\BOOP lab manual" ; if ($?) { g++ practical31.cpp -o practical31 } ; if ($?) { .\practical31 }
The value of local variable is 50
The value of Global variable is 100
PS C:\Users\Admin\Documents\html\BOOP lab manual> █
```

Program 2

→ Enumeration operator

```
#include<iostream>
```

```
using namespace std;
```

```
enum weak{sunday,monday,tuesday,wednesday,thursday,friday,saturday};
```

```
int main()
```

```
{
```

```
    weak today;
```

```
    today = wednesday;
```

```
    cout<<"Day"<<today<<endl;
```

```
    return 0;
```

```
}
```

Output

```
PS C:\Users\Admin\Documents\html\BOOP lab manual> cd "c:\Users\Admin\Documents\html\BOOP lab manual" ; if ($?) { g++ practical32.cpp -o practical32 } ; if ($?) { .\practical32 }  
Day4  
PS C:\Users\Admin\Documents\html\BOOP lab manual> 
```

Program 3

→ Manipulator

```
#include<iostream>

#include<conio.h>

#include<iomanip>

using namespace std;

int main()
{
    int num1=1,num2=20,num3=300;

    cout<<"The value of number 1 is"<<setw(4)<<num1<<endl;

    cout<<"The value of number 2 is"<<setw(4)<<num2<<endl;

    cout<<"The value of number 3 is"<<setw(4)<<num3<<endl;
}
```

Output

```
PS C:\Users\Admin\Documents\html> cd "c:\Users\Admin\Documents\html\BOOP lab manual\" ; if ($?) { g++ practical33.
cpp -o practical33 } ; if ($?) { .\practical33 }
The value of number 1 is   1
The value of number 2 is  20
The value of number 3 is 300
PS C:\Users\Admin\Documents\html\BOOP lab manual>
```

Q.4)Develop program using call by reference and return by reference ,default arguments ,constant arguments, inline and function overloading.

→Call reference

```
#include<iostream>
#include<conio.h>
using namespace std;
void swap(int &,int &);
int main()
{
    int num1,num2;
    cout<<"Enter the number 1"<<endl;
    cin>>num1;
    cout<<"Enter the number 2"<<endl;
    cin>>num2;
    swap(num1,num2);
    cout<<"The swap number 1 is "<<num1<<endl;
    cout<<"The swap number 2 is "<<num2<<endl;
    return 0;
}

void swap (int &var1,int &var2)
{
    int temp;
    temp=var1;
    var1=var2;
    var2=temp;
}
```

Output

```
PS C:\Users\Admin\Documents\html\BOOP lab manual> cd "c:\Users\Admin\Documents\html\BOOP lab manual\" ; if ($?) {
g++ practical41.cpp -o practical41 } ; if ($?) { .\practical41 }
Enter the number 1
2
Enter the number 2
4
The swap number 1 is 4
The swap number 2 is 2
PS C:\Users\Admin\Documents\html\BOOP lab manual> █
```

→ Return by reference

```
#include<iostream>
using namespace std;
int num;
int& test();
int main()
{
    test()=5;
    cout<<num<<endl;
    return 0;
}
int& test()
{
    return num;
}
```

Output:

```
PS C:\Users\Admin\Documents\html\BOOP lab manual> cd "c:\Users\Admin\Documents\html\BOOP lab manual\" ; if ($?) {
g++ practical42.cpp -o practical42 } ; if ($?) { .\practical42 }
5
PS C:\Users\Admin\Documents\html\BOOP lab manual> 
```

→ Default argument

```
#include<iostream>
using namespace std;
int fun(int a, int b = 7)
{
    cout<<a<<endl;
    cout<<b<<endl;
}
int main()
{
    cout<<"function call with two argument"<<endl;
    fun(14,15);
    cout<<"function call with only one argument"<<endl;
    fun(14);
    return 0;
}
```

Output:

```
PS C:\Users\Admin\Documents\html\BOOP lab manual> cd "c:\Users\Admin\Documents\html\BOOP lab manual\" ; if ($?) {
g++ practical43.cpp -o practical43 } ; if ($?) { .\practical43 }
function call with two argument
14
15
function call with only one argument
14
7
PS C:\Users\Admin\Documents\html\BOOP lab manual> 
```

→ constant argument

```
#include<iostream>

using namespace std;

const int PI = 3.14;

int function(int x, int y)
{
    return y*x*x;
}

int main()
{
    int r, area;

    cout<<"Enter the radius : ";

    cin>>r;

    area = function(r,PI);

    cout<<"Area = "<<area<<endl;

    return 0;
}
```

Output:

```
PS C:\Users\Admin\Documents\html\BOOP lab manual> cd "c:\Users\Admin\Documents\html\BOOP lab manual\" ; if ($?) {
g++ practical44.cpp -o practical44 } ; if ($?) { .\practical44 }
Enter the radius : 2
Area = 12
PS C:\Users\Admin\Documents\html\BOOP lab manual> 
```


→ inline function

```
#include<iostream>
using namespace std;
inline int fun(int x, int y)
{
    return x + y;
}
int main()
{
    int a ,b,c;
    cout<<"Enter the two number:"<<endl;
    cin>>a>>b;
    c=fun(a,b);
    cout<<"sum = "<<c<<endl;
    return 0;
}
```

Output:

```
PS C:\Users\Admin\Documents\html\BOOP lab manual> cd "c:\Users\Admin\Documents\html\BOOP lab manual\" ; if ($?) {
g++ practical45.cpp -o practical45 } ; if ($?) { .\practical45 }
Enter the two number:
5
5
sum = 10
PS C:\Users\Admin\Documents\html\BOOP lab manual> 
```

→function overloading

```
#include<iostream>
using namespace std;
int function1(int x ,int y)
{
    return x+y;
}
float function1(float x ,float y)
{
    return x*y;
}
int main()
{
    int a,b;
    cout<<"Enter the numbers : "<<endl;
    cin>>a>>b;
    cout<<"Sum = "<<function1(a,b)<<endl;

    float i,j;
    cout<<"Enter the numbers : "<<endl;
    cin>>i>>j;
    cout<<"Multiplication = "<<function1(i,j)<<endl;

    return 0;
}
```

Output:

```
PS C:\Users\Admin\Documents\html\BOOP lab manual> cd "c:\Users\Admin\Documents\html\BOOP lab manual\" ; if ($?) {
g++ practical46.cpp -o practical46 } ; if ($?) { .\practical46 }
Enter the numbers :
5
5
Sum = 10
Enter the numbers :
5.5
2.5
Multiplication = 13.75
PS C:\Users\Admin\Documents\html\BOOP lab manual> |
```

Q.5) Develop program using structure.

→Structure

```
#include<iostream>
#include<string.h>
using namespace std;
struct student
{
    int Enroll;
    char name[20];
    int age;
    int sem;
};
int main()
{
    struct student a1;
    cout<<"Enter the Enrollement number : ";
    cin>>a1.Enroll;
    cout<<"Enter the name of the student : ";
    cin>>a1.name;
    cout<<"Enter the age : ";
    cin>>a1.age;
    cout<<"Enter the semester of the student : ";
    cin>>a1.sem;
    cout<<endl;
    cout<<"-----The entered information are-----"
    cout<<"The name of the student is : "<<a1.name<<endl;
    cout<<"The Enrollement number of the student is : "<<a1.Enroll<<endl;
    cout<<"The age of the student is : "<<a1.age<<endl;
    cout<<"The semester of the student is : "<<a1.sem<<endl;

    return 0;
}
```

Output

```
PS C:\Users\Admin\Documents\html\BOOP lab manual> cd "c:\Users\Admin\Documents\html\BOOP lab manual\" ; if ($?) { g
++ practical51.cpp -o practical51 } ; if ($?) { .\practical51 }
Enter the Enrollement number : 10
Enter the name of the student : veer
Enter the age : 17
Enter the semester of the student : 2

-----The entered information are-----
The name of the student is : veer
The Enrollement number of the student is : 10
The age of the student is : 17
The semester of the student is : 2
PS C:\Users\Admin\Documents\html\BOOP lab manual> |
```

Q.6) Define minimum 5 different classes such as student, distance, shape, employee, account, inventory, vector, movie-ticket booking, time, point, etc. with data member & member functions. Also Develop programs to test those classes functionality

→ program 1

→

```
#include<iostream>
#include<conio.h>
using namespace std;
class student
{
private:
    int enrollement_number;
    char name[20];
    char field[10];
    int phone_number;
    int student_number;
    char student_email[40];
public:

    void getinfo(void)
    {
        cout<<"-----Enter the student details-----";
        cout<<endl;
        cout<<endl;
        cout<<"Enter the student name"<<endl;
        cin>>name;
        cout<<"Enter the student enrollement number"<<endl;
        cin>>enrollement_number;
        cout<<"Enter the student Field"<<endl;
        cin>>field;
        cout<<"Enter the parents phone number"<<endl;
        cin>>phone_number;
        cout<<"Enter the student phone number"<<endl;
        cin>>student_number;
        cout<<"Enter the student Email "<<endl;
        cin>> student_email;
    }
}
```

```
void printinfo(void)
{
    cout<<"Informations of the student"<<name;
    cout<<endl;
    cout<<endl;
    cout<<"student full name : "<<name<<endl;
    cout<<"student enrollement : "<<enrollement_number<<endl;
    cout<<"student Filed : "<<field <<endl;
    cout<<"phone number : "<< phone_number <<endl;
    cout<<"student phone number : "<< student_number <<endl;
    cout<<"student Email : "<< student_email <<endl;
}
};

int main()
{
    student veer;
    veer.getinfo();
    cout<<endl;
    veer.printinfo();
    return 0;
}
```

Output

```
PS C:\Users\Admin\Documents\html\c++\c++> cd "c:\Users\Admin\Documents\html\c++\c++\" ; if ($?) { g++ practical
12.cpp -o practical12 } ; if ($?) { .\practical12 }
-----Enter the student details-----

Enter the student name
veer
Enter the student enrollement number
10
Enter the student Field
computer
Enter the parents phone number
114477884
Enter the student phone number
112241512
Enter the student Email
veer123@gmail.com

Informations of the studentveer

student full name :veer
student enrollement :10
student Field :computer
phone number :114477884
student phone number :112241512
student Email :veer123@gmail.com
PS C:\Users\Admin\Documents\html\c++\c++> |
```

→program 2

```
#include<iostream>
#include<conio.h>
using namespace std;
class employ
{
private:
    int id;
    char employName[20];
    int number;
    char address[40];
    int salary;
public:
    void getinfo(void);
    void printinfo(void);
};

void employ :: getinfo(void)
{
    cout<<"Enter the employ information"<<endl;
    cout<<" Enter the Employ ID : ";
    cin>>id;
    cout<<" Enter the Employ Name: ";
    cin>>employName;
    cout<<" Enter the employ phone number: ";
    cin>>number;
    cout<<" Enter the Address of the employ: ";
    cin>>address;
    cout<<" Enter the salary of the employ: ";
    cin>>salary;
}

void employ :: printinfo(void)
{
    cout<<"The information of the Employ are "<<endl;
    cout<<"The Employ ID is : "<<id<<endl;
    cout<<"The Employ name is : "<<employName<<endl;
    cout<<"The Employ phone number is : "<<number<<endl;
    cout<<"The Employ Address is : "<<address<<endl;
    cout<<"The Employ salary is : "<<salary<<endl;
}
```

```
int main()
{
    employ veer;
    veer.getinfo();
    veer.printinfo();

    return 0;
}
```

Output

```
PS C:\Users\Admin\Documents\html\c++\c++> cd "c:\Users\Admin\Documents\html\c++\c++\" ; if ($?) { g++ practical
13.cpp -o practical13 } ; if ($?) { .\practical13 }
Enter the employ information
Enter the Employ ID : 1
Enter the Employ Name : veer
Enter the employ phone number : 1234578
Enter the Address of the employ : sama
Enter the salary of the employ : 3000000
The information of the Employ are
The Employ ID is : 1
The Employ name is : veer
The Employ phone number is : 1234578
The Employ Address is : sama
The Employ salary is : 3000000
PS C:\Users\Admin\Documents\html\c++\c++> 
```


→program 3

```
#include<iostream>
using namespace std;
class shape
{
private:
    int side;
    int height;
    int width;
    char sh_name[20];
public:
    void getInfo(void)
    {
        cout<<"Shape name : ";
        cin>>sh_name;
        cout << "Enter the number of sides : ";
        cin >> side;
        cout << "Enter the height of shape : ";
        cin >> height;
        cout << "Enter the width of shape : ";
        cin >> width;
    }
    void printInfo(void)
    {
        cout << "___Entered information are___ " << endl;
        cout<<"Shape name : "<<sh_name<<endl;
        cout << "The number of sides of the shape are : " << side<< endl;
        cout << "The height of the shape are : " << height<<"cm" << endl;
        cout << "The width of the shape are : " << width <<"cm"<< endl;
    }
};
int main()
{
    shape a;
    a.getInfo();
    a.printInfo();
    return 0;
}
```

Output

```
PS C:\Users\Admin\Documents\html\BOOP lab manual> cd "c:\Users\Admin\Documents\html\c++\c++\" ; if ($?) { g++ practical1000.cpp -o practical1000 } ; if ($?) { .\practical1000 }
Shape name : rectangle
Enter the number of sides : 4
Enter the height of shape : 20
Enter the width of shape : 40
_____Entered information are_____
Shape name : rectangle
The number of sides of the shape are : 4
The height of the shape are : 20cm
The width of the shape are : 40cm
PS C:\Users\Admin\Documents\html\c++\c++> |
```

→program 4

```
#include<iostream>
using namespace std;
class movie
{
    private:
        int num_tic;
        char movie[20];
        char name[20];
        int row;
        char email[30];
        int startseatnu;
        int endseatnum;
    public:
        void getInfo(void)
        {
            cout<<"Enter the information";
            cout<<"Enter your name : ";
            cin>>name;
            cout<<"Enter the name of the movie : ";
            cin>>movie;
            cout<<"Enter the number of ticket: ";
            cin>>num_tic;
            cout<<"Enter the row of seat : ";
            cin>>row;
            cout<<"Enter the starting and ending seat"<<endl;
            cin>>startseatnu;
            cin>>endseatnum;
            cout<<"Enter the Email number";
            cin>>email;
        }
        void Printinfo(void)
        {
            cout<<endl;
            cout<<"The enter inforamtion are "<<endl;
            cout<<"Name : "<<name<<endl;
            cout<<"Movie name : "<<movie<<endl;
            cout<<"Number of ticket : "<<num_tic<<endl;
            cout<<"Seat row : "<<row<<endl;
            cout<<"The seats are from "<<startseatnu<<"to"<<endseatnum<<endl;
            cout<<"Email : "<<email<<endl;

        }
}
```

```
};  
int main()  
{  
    movie a1;  
    a1.getInfo();  
    a1.Printinfo();  
    return 0;  
}
```

Output

```
PS C:\Users\Admin\Documents\html\c++\college> cd "c:\Users\Admin\Documents\html\c++\college\" ; if ($?) { g++ m  
ovie.cpp -o movie } ; if ($?) { .\movie }  
Enter the information  
Enter your name : veer  
Enter the name of the movie : endgame  
Enter the number of ticket: 5  
Enter the row of seat : 9  
Enter the starting and ending seat  
2  
6  
Enter the Email number veerpatel1122@gmail.com  
  
The enter inforamtion are  
Name : veer  
Movie name : endgame  
Number of ticket : 5  
Seat row : 9  
The seats are from 2to6  
Email : veerpatel1122@gmail.com  
PS C:\Users\Admin\Documents\html\c++\college> |
```

→program 5

```
#include<iostream>
using namespace std;
class account
{
    private:
        int ac_number;
        char ac_owner[30];
        int ifsc_code;
        int ac_balance = 100000;
        int pin;
    public:
        void getInfo(void)
        {
            cout<<"Enter the account information"<<endl;
            cout<<"Enter the account number : ";
            cin>>ac_number;
            cout<<"Enter the account owner name : ";
            cin>>ac_owner;
            cout<<"Enter the IFSC code : ";
            cin>>ifsc_code;
            cout<<"Enter the four digit pin : ";
            cin>>pin;
            cout<<endl;
        }
        void printInfo(void)
        {
            cout<<"The information you enter is as follows "<<endl;
            cout<<"Account number : "<<ac_number <<endl;
            cout<<"Account owner : "<<ac_owner <<endl;
            cout<<"Account IFSC code : "<<ifsc_code <<endl;
            cout<<"Account balance : "<<ac_balance <<endl;
        }
};
int main()
{
    account a1;
    a1.getInfo();
    a1.printInfo();
    return 0;
}
```

Output:

```
PS C:\Users\Admin\Documents\html\c++\college> cd "c:\Users\Admin\Documents\html\c++\college\" ; if ($?) { g++ a
ccount.cpp -o account } ; if ($?) { .\account }
Enter the account information
Enter the account number : 2211314
Enter the account owner name : veer
Enter the IFSC code : 11221122
Enter the four digit pin : 1234

The information you enter is as follows
Account number :2211314
Account owner :veer
Account IFSC code :11221122
Account balance :100000
PS C:\Users\Admin\Documents\html\c++\college> |
```

Q.7) Develop a program using array of objects and static member function

→

```
#include<iostream>
using namespace std;
class student
{
private:
    static int count;
    char name[20];
    int enroll_num;
    int sem;

public:
    void getInfo(void)
    {
        count++;
        cout << endl << "-----Enter the information of student count" << count << "----
---" << endl << endl;
        cout << "Enter the student Name : ";
        cin>>name;
        cout << "Enter the student Enrollement number : ";
        cin >> enroll_num;
        cout << "Enter the student semester : ";
        cin >> sem;
    }
};

int student::count = 0;

int main()
{
    student a[3];
    int i;
    for ( i = 0; i < 3; i++)
    {
        a[i].getInfo();
        cout<<endl;
    }
    return 0;
}
```

Output:

```
PS C:\Users\Admin\Documents\html\Boop lab manula practical programs> cd "c:\Users\Admin\Documents\html\Boop lab manula practical programs\" ; if ($?) { g++ practical7.cpp -o practical7 } ; if ($?) { .\practical7 }

-----Enter the information of student count1-----

Enter the student Name : Rahul
Enter the student Enrollement number : 101
Enter the student semester : 2

-----Enter the information of student count2-----

Enter the student Name : karan
Enter the student Enrollement number : 102
Enter the student semester : 3

-----Enter the information of student count3-----

Enter the student Name : salman
Enter the student Enrollement number : 104
Enter the student semester : 1

PS C:\Users\Admin\Documents\html\Boop lab manula practical programs> 
```


Q.8/9)

→

```
#include<iostream>
using namespace std;
class s2;
class s1
{
    int a;
    public:
    int setinfo(int x)
    {
        a=x;
    }
    void printinfo(void)
    {
        cout<<"The value of a is "<<a<<endl;
    }
    friend void swap(s1 &s1,s2 &s2);
};

class s2
{
    int b;
    public:
    int setinfo(int x)
    {
        b=x;
    }
    void printinfo(void)
    {
        cout<<"The value of b is "<<b<<endl;
    }
    friend void swap(s1 &s1,s2 &s2);
};

void swap(s1 &o1, s2 &o2)
{
    int temp;
    temp = o1.a;
    o1.a = o2.b;
    o2.b = temp;
}
```

```
int main()
{
    s1 a1;
    s2 a2;
    a1.setinfo(3);
    a1.printinfo();
    a2.setinfo(5);
    a2.printinfo();
    swap(a1,a2);
    cout<<"Values after swaping"<<endl;
    a1.printinfo();
    a2.printinfo();
    return 0;
}
```

Output:

```
PS C:\Users\Admin\Documents\html\c++\c++> cd "c:\Users\Admin\Documents\html\c++\c++\" ; if ($?) { g++ practical
16.cpp -o practical16 } ; if ($?) { .\practical16 }
The value of a is 3
The value of b is 5
Values after swaping
The value of a is 5
The value of b is 3
PS C:\Users\Admin\Documents\html\c++\c++> □
```

Q10) Apply the concepts of constructors and destructors in the Programs developed in unit-2 and test those programs.

→

```
#include<iostream>
```

```
using namespace std;
```

```
class base
```

```
{
```

```
    public:
```

```
    base()
```

```
    {
```

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

```
    }
```

```
    ~base()
```

```
    {
```

```
        cout<<"-----destructor is called-----"<<endl;
```

```
    }
```

```
};
```

```
int main()
```

```
{
```

```
    base a;
```

```
    return 0;
```

```
}
```

Output:

```
PS C:\Users\Admin\Documents\html> cd "c:\Users\Admin\Documents\html\BOOP lab manual\" ; if ($?) { g++ practical10_1.cpp -o practical10_1 } ; if ($?) { .\practical10_1 }  
-----Constructor is called-----  
-----destructor is called-----  
PS C:\Users\Admin\Documents\html\BOOP lab manual>
```

Q11) Develop programs using single, multilevel, multiple Inheritance

→ single level

#include<iostream>

using namespace std;

class base

```
{  
    int num1;  
public:  
    int num2;  
    void setdata()  
    {  
        num1 = 10;  
        num2 = 30;  
    }  
    void getn()  
    {  
        cout<<"enter";  
        cin>>num1;  
    }  
    int getnum()  
    {  
        return num1;  
    }  
};
```

class derived : public base

```
{  
    int num3;  
public:  
    void process()  
    {  
        num3 = num2 + getnum();  
    }  
    void display()  
    {  
        cout << "-----The numbers are----- "<<endl;  
        cout << "the num1 is " << getnum() << endl;  
        cout << "the num2 is " << num2 << endl;  
        cout << "the num3 is " << num3 << endl;  
    }  
};
```

```
int main()
{
    derived a;
    a.setdata();
    a.getn();
    a.process();
    a.display();
    return 0;
}
```

Output:

```
PS C:\Users\Admin\Documents\html\c++\c++\constructor\inheritance> cd "c:\Users\Admin\Documents\html\c++\c++\constructor\inheritance\" ; if ($?) { g++ practical1.cpp -o practical1 } ; if ($?) { . \practical1 }
enter12
-----The numbers are-----
the num1 is 12
the num2 is 30
the num3 is 42
PS C:\Users\Admin\Documents\html\c++\c++\constructor\inheritance> █
```

→Multi level

```
#include<iostream>
using namespace std;
class num1
{
    int num_1;
public:
    void getNum1()
    {
        cout << "enter the number 1 : ";
        cin >> num_1;
    }
    int setNum1()
    {
        return num_1;
    }
};
class num2 :public num1
{
    int num_2;
public:
    void getNum2()
    {
        cout << "enter the number 2 : ";
        cin >> num_2;
    }
    int setNum2()
    {
        return num_2;
    }
};
class sum : public num2
{
    int sum_num;
public:
    void sum_number()
    {
        cout << "sum = " << setNum1()+setNum2()<<endl;
    }
};
int main()
{
    sum a1;
    a1.getNum1();
}
```

```
a1.getNum2();  
a1.sum_number();  
return 0;  
}
```

Output:

```
PS C:\Users\Admin\Documents\html\BOOP lab manual> cd "c:\Users\Admin\Documents\html\BOOP lab manual\" ; if ($?) {  
g++ practical11_2.cpp -o practical11_2 } ; if ($?) { .\practical11_2 }  
enter the number 1 : 5  
enter the number 2 : 5  
sum = 10  
PS C:\Users\Admin\Documents\html\BOOP lab manual> |
```

```
→multiple
#include<iostream>
using namespace std;
class num1
{
public:
    int num_1;
    void getNum1()
    {
        cout << "enter the number 1 : ";
        cin >> num_1;
    }
};
class num2
{
public:
    int num_2;
    void getNum2()
    {
        cout << "enter the number 2 : ";
        cin >> num_2;
    }
};
class sum : public num1, public num2
{
public:
    int sum_num;
    void sum_number()
    {
        cout << "sum = " << num_1 + num_2 << endl;
    }
};
int main()
{
    sum a1;
    a1.getNum1();
    a1.getNum2();
    a1.sum_number();
    return 0;
}
```

Output:

```
PS C:\Users\Admin\Documents\html\B00P lab manual> cd "c:\Users\Admin\Documents\html\B00P lab manual\" ; if ($?) {
g++ practical11_3.cpp -o practical11_3 } ; if ($?) { .\practical11_3 }
enter the number 1 : 5
enter the number 2 : 5
sum = 10
PS C:\Users\Admin\Documents\html\B00P lab manual> █
```


Q12) Develop programs using Constructors in base and derive classes

→

```
#include<iostream>
using namespace std;
class base
{
    public:
    base()
    {
        cout<<"-----base class constructor is called-----"<<endl;
    }
};
class derive : public base
{
    public:
    derive()
    {
        cout<<"-----derived class constructor is called-----"<<endl;
    }
};
int main()
{
    derive a1;
    return 0;
}
```

Output:

```
PS C:\Users\Admin\Documents\html\BOOP lab manual> cd "c:\Users\Admin\Documents\html\BOOP lab manual\" ; if ($?) {
g++ practical12_1.cpp -o practical12_1 } ; if ($?) { .\practical12_1 }
-----base class constructor is called-----
-----derived class constructor is called-----
PS C:\Users\Admin\Documents\html\BOOP lab manual> 
```

Q13) Develop a program to show use of this pointer

→

```
#include<iostream>
using namespace std;
void test(int*, int*);
```

```
int main() {
int a = 5, b = 5;
cout << "Before changing:" << endl;
cout << "a = " << a << endl;
cout << "b = " << b << endl;
test(&a, &b);
cout << "\nAfter changing" << endl;
cout << "a = " << a << endl;
cout << "b = " << b << endl;
return 0;
}
```

```
void test(int* n1, int* n2)
{
*n1 = 10;
*n2 = 11;
}
```

Output:

```
PS C:\Users\Admin\Documents\html> cd "c:\Users\Admin\Documents\html\BOOP lab manual\" ; if ($?) { g++ practical13_1.cpp -o practical13_1 } ; if ($?) { .\practical13_1 }
Before changing:
a = 5
b = 5

After changing
a = 10
b = 11
PS C:\Users\Admin\Documents\html\BOOP lab manual> 
```

Q14) Develop a program using runtime polymorphism

→

```
#include <iostream>
using namespace std;
class Polygon {
public:
    virtual void show() {
        cout<<"It is a polygon"<<endl;
    }
};
class Hexagon : public Polygon {
public:
    void show() {
        cout<<"Hexagon is a 6 sided polygon"<<endl;
    }
};
class Pentagon : public Polygon {
public:

    void show() {
        cout<<"Pentagon is a 5 sided polygon"<<endl;
    }
};

int main() {
    Polygon *P;
    Hexagon h;
    Pentagon p;
    P = &h;
    P->show();
    P = &p;
    P->show();
    return 0;
}
```

Output:

```
PS C:\Users\Admin\Documents\html\BOOP lab manual> cd "c:\Users\Admin\Documents\html\BOOP lab manual\" ; if ($?) { g
++ practical14_1.cpp -o practical14_1 } ; if ($?) { .\practical14_1 }
Hexagon is a 6 sided polygon
Pentagon is a 5 sided polygon
PS C:\Users\Admin\Documents\html\BOOP lab manual> □
```

Q15) Develop at least 2 programs using file operations

Program 1

→

```
#include<iostream>
```

```
#include <fstream>
```

```
using namespace std;
```

```
int main()
```

```
{
```

```
    fstream new_file;
```

```
    new_file.open("new_file", ios::out);
```

```
    if (!new_file)
```

```
    {
```

```
        cout << "File creation failed";
```

```
    }
```

```
    else
```

```
    {
```

```
        cout << "New file created"<<endl;
```

```
        new_file.close(); // Step 4: Closing file
```

```
    }
```

```
    return 0;
```

```
}
```

Output:

```
PS C:\Users\Admin\Documents\html\BOOP lab manual> cd "c:\Users\Admin\Documents\html\BOOP lab manual\" ; if ($?) { g
++ practical15_1.cpp -o practical15_1 } ; if ($?) { .\practical15_1 }
New file created
PS C:\Users\Admin\Documents\html\BOOP lab manual> 
```

Program 2

→

```
#include <iostream>
#include <fstream>
using namespace std;
int main()

{
    fstream new_file;
    new_file.open("new_file_write.txt", ios::out);
    if (!new_file)
    {
        cout << "File creation failed";
    }
    else
    {
        cout << "New file created"<<endl;
        new_file << "Learning File handling"<<endl; //Writing to file
        new_file.close();
    }
    return 0;
}
```

Output:

```
PS C:\Users\Admin\Documents\html\BOOP lab manual> cd "c:\Users\Admin\Documents\html\BOOP lab manual\" ; if ($?) { g
++ practical15_2.cpp -o practical15_2 } ; if ($?) { .\practical15_2 }
New file created
PS C:\Users\Admin\Documents\html\BOOP lab manual> 
```