# PRACTICAL FILE

# OF

# Object Oriented Programming

# (OOPS)

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# 1. Program to find area of circle and cuboid.

Program Body:

circle.cpp

```cpp
#include<iostream>
using namespace std;
int main() {
int r,c;
cout<<"Enter the radius of the circle"<<endl;
cin>>r;
cout<<"Enter the vlaue of edge of cube"<<endl;
cin>>c;
double a,ar;
a=(22/7)*r*r;
ar=6*r*r;
cout<<"Area of circle = "<<a<<endl;
cout<<"Area of cube = "<<ar<<endl;
return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Notebook$ g++ circle.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Notebook$ ./a.out
Enter the radius of the circle
12
Enter the vlaue of edge of cube
8
Area of circle = 432
Area of cube = 864
```

## 2. Program to find whether a number is prime or not and if its even or odd.

Program Body:

even.cpp

```cpp
#include<iostream>
using namespace std;
int main() {
int n;
cout<<"Enter the number"<<endl;
cin>>n;
int c=2;
for(int i=2;i<n;i++){
if(n%i==0)
c++;
}
if(c==2)
cout<<"Number is prime"<<endl;
else
cout<<"Number is not prime"<<endl;
if(n%2==0)
cout<<"Number is even"<<endl;
else
cout<<"Number is odd"<<endl;
}
```

Output

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Notebook$ g++ even.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Notebook$ ./a.out
Enter the number
34
Number is not prime
Number is even
```

## 3. Program to find factorial of a number.

Program Body:

fact.cpp

```cpp
#include<iostream>
using namespace std;
int main(){
int n,f;
f=1;
cout<<"Enter the number"<<endl;
cin>>n;
for(int i=1;i<=n;i++)
f=f*i;
cout<<"Factorial of "<<n<<" = "<<f<<endl;
return 0;

}
```

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Notebook$ g++ fact.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Notebook$ ./a.out
Enter the number
5
Factorial of 5 = 120
```

# 4. Program to find roots of a quadratic equations.

Program Body:

quad.cpp

```cpp
#include<iostream>
#include<cmath>
using namespace std;
int main() {
float a,b,c,x1,x2,d,real,img;
cout<<"Enter the value of a, b and c"<<endl;
cin>>a>>b>>c;
d=b*b-(4*a*c);
if(d>0){
x1=(-b+sqrt(d))/(2*a);
x2=(-b-sqrt(d))/(2*a);
cout<<"Roots are real and different "<<endl;
cout<<"x1 = "<<x1<<endl;
cout<<"x2 = "<<x2<<endl;
}
else if(d==0){
cout<<"Roots are real and same "<<endl;
x1=(-b+sqrt(d))/(2*a);
}
else cout<<"Roots are complex"<<endl;

return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Notebook$ g++ quad.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Notebook$ ./a.out
Enter the value of a, b and c
12
23
4
Roots are real and different
x1 = -0.193435
x2 = -1.72323
```

## 5. Program to swap two numbers using third variable.

Program Body:

swap.cpp

```cpp
#include<iostream>
using namespace std;
int  main(){
int a,b,c;
cout<<"Enter the value of a and b"<<endl;
cin>>a>>b;
cout<<"a= "<<a<<"b= "<<b<<endl;

cout<<"Swapping using third variable"<<endl;
c=a;
a=b;
b=c;
cout<<"Swapped values of a and b are: "<<endl;
cout<<"a="<<a<<"  b= "<<b<<endl;
return 0;

}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Notebook$ g++ swap.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Notebook$ ./a.out
Enter the value of a and b
24
43
a= 24b= 43
Swapping using third variable
Swapped values of a and b are:
a=43  b= 24
```

## 6. Program to swap two numbers by using only 2 variables.

Program Body:

swap2.cpp

```cpp
#include<iostream>
using namespace std;
int main() {
int a,b;
cout<<"Enter the values of a and b"<<endl;
cin>>a>>b;
cout<<"a= "<<a<<" b= "<<b<<endl;

a=a+b;
b=a-b;
a=a-b;
cout<<"Swapped values"<<endl;
cout<<"a= "<<a<<" b= "<<b<<endl;
return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Notebook$ g++ swap2.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Notebook$ ./a.out
Enter the values of a and b
12
32
a= 12 b= 32
Swapped values
a= 32 b= 12
```

## 7. Program to find values of an array using pointer.

Program Body:

pointer.cpp

```cpp
#include<iostream>
using namespace std;
int main() {
int a[]={1,2,3,4,5};

int *p=&a[0];
int n;
cout<<"Total number of elements =5"<<endl;
for (int j=0;j<5;j++){
cout<<a[j]<<" "<<endl;
}
cout<<"Enter the index no. you want to print"<<endl;
cin>>n;
if(n<4){
for(int i=0;i<n;i++)
*p++;
cout<<"The required value at the entered index = "<<*p<<endl;
}
else
cout<<"Value out of index";
return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Notebook$ g++ pointer.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Notebook$ ./a.out
Total number of elements =5
1
2
3
4
5
Enter the index no. you want to print
2
The required value at the entered index = 3
```

# 8. Program to use static variable by use of class.

Program Body:

counter.cpp

```cpp
#include<iostream>
using namespace std;
class counter
{
  int n;
  static int count;
public: void getdata(int number)
{
  n=number;
  count++;
}
public: void showcount(){
  cout<<"Count :"<<count<<endl;
}
};

int counter:: count;
int main() {
  counter count[4];
  for(int i=0;i<4;i++)
  {
    count[i].showcount();
    count[i].getdata(i+10);
  }
  cout<<"Values after calling get function: "<<endl;
  for(int j=0;j<4;j++)
  count[j].showcount();
  return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Notebook$ g++ counter.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Notebook$ ./a.out
Count :0
Count :1
Count :2
Count :3
Values after calling get function:
Count :4
Count :4
Count :4
Count :4
```

# 9. Program to find sum of two complex numbers using class and functions.

Program Body:

complex.cpp

```cpp
#include<iostream>
using namespace std;
class complex {
float realp;
float imagp;
public : void getdata();
public : void sum(complex c1, complex c2);
public : void output();
};

void complex:: getdata() {
cout<<"Enter the real part \n";
cin>>realp;
cout<<"Enter the img part \n";
cin>>imagp;
}

void complex:: sum(complex c1, complex c2)
{
realp= c1.realp+ c2.realp;
imagp= c1.imagp + c2.imagp;
}

void complex:: output() {
cout<<realp<<" + i"<<imagp<<"\n";
}

int main() {
complex x,y,z;
cout<<"Enter first complex number \n";
x.getdata();
cout<<"Enter second complex number \n";
y.getdata();
z.sum(x,y);

cout<<"First number \n";
x.output();
cout<<"Second nuber \n";
y.output();

cout<<"Sum of the two numbers = ";
z.output();

return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/31.01.2020$ g++ complex.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/31.01.2020$ ./a.out
Enter first complex number
Enter the real part
23
Enter the img part
4
Enter second complex number
Enter the real part
21
Enter the img part
4
First number
23 + i4
Second nuber
21 + i4
Sum of the two numbers = 44 + i8
```

## 10. Program to find factorial by using class and function outside the class.

Program Body:

factorial.cpp

```cpp
#include<iostream>
using namespace std;
class factorial {
public : int a;
public : void  getdata();

};

void factorial:: getdata() {
cout<<"Enter the number";
cin>>a;
int i,p;
p=1;
for(i=1;i<=a;i++)
p=p*i;
cout<<"Factorial is: "<<p<<endl;
}
int main() {
factorial obj;

obj.getdata();

return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/31.01.2020$ g++ factorial.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/31.01.2020$ ./a.out
Enter the number5
Factorial is: 120
```

# 11. Program to calculate simple interest on an amount, Rate=5%.

Program Body:

interest.cpp

```
#include <iostream>
using namespace std;
class interest {
double r=5.0; double t=10.0;
double i,a,ta;
public : void getdata()
{
cout<<"Enter the amount \n";
cin>>a;
cout<<"\n";
}
public : double cal();
public : void  display();
};

double interest:: cal(){
i=a*r*t/100;
ta=a+i;
return(ta);
}

void interest :: display() {
double d=cal();
cout<<"The interest = \n"<<i<<" \n";
cout<<"The amount after adding interest for 10 years = \n"<<d;
cout<<"\n";
}

int main() {
interest obj;
obj.getdata();
obj.cal();
obj.display();
return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/31.01.2020$ ./a.out
Enter the amount
5000

The interest =
2500
The amount after adding interest for 10 years =
7500
```

## 12. Program to find area of square and rectangle by use of class and function.

Program Body:

area.cpp

```
#include<iostream>
using namespace std;
class cal {
public :int s,l,b;
void getdata();
void area();
};
class sol: cal{
public: void  getdata();
public: void  area();
};

void cal::getdata() {
cout<<"Enter value of side of square"<<endl;
cin>>s;
cout<<"Length of rectangle"<<endl;
cin>>l;
cout<<"Breadth of rectangle"<<endl;
cin>>b;
}
void cal::area() {
int as= s*s;
int ar=l*b;
cout<<"Area of square=  "<<as<<endl;
cout<<"Area of rectangle= "<<ar<<endl;
}


int main() {
cal d1;
d1.getdata();
d1.area();
return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/07.02.2020$ g++ area.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/07.02.2020$ ./a.out
Enter value of side of square
4
Length of rectangle
7
Breadth of rectangle
6
Area of square=  16
Area of rectangle= 42
```

# 13. Program to find bonus of an employee.

Program Body:

bonus.cpp

```cpp
#include<iostream>
using namespace std;
int main() {
cout<<"A for company 1, B for company 2, D for both"<<endl;
char co;
cout<<"Enter the company"<<endl;
cin>>co;
double s1,s2,s3,b;
if(co=='B'){
cout<<"Enter monthly salary of employee of comapny 1"<<endl;
cin>>s1;
b=(s1*10)/100;
cout<<"Bonus = Rs."<<b<<endl;
s1=s1+b;
cout<<"Salary wtih 10% bonus = Rs."<<s1<<endl;
}
else if(co=='A'){
cout<<"Enter monthly salary of employee of comapny 2"<<endl;
cin>>s2;
b=(s2*7)/100;
cout<<"Bonus =Rs."<<b<<endl;
s2=s2+b;
cout<<"Salary wtih 7% bonus = Rs. "<<s1<<endl;
}
else if(co=='D'){
cout<<"Enter monthly salary of employee of comapny 1"<<endl;
cin>>s1;
cout<<"Enter monthly salary of employee of comapny 2"<<endl;
cin>>s2;
s3=s1+s2;
b=(s3*5)/100;
cout<<"Bonus =Rs."<<b<<endl;
s3=s3+b;
cout<<"Salary after a bonus of 5% on both the salaries = Rs."<<s3<<endl;
}
else cout<<"WRONG CHOICE";
return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/07.02.2020$ g++ bonus.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/07.02.2020$ ./a.out
A for company 1, B for company 2, D for both
Enter the company
D
Enter monthly salary of employee of comapny 1
10000
Enter monthly salary of employee of comapny 2
5000
Bonus =Rs.750
Salary after a bonus of 5% on both the salaries = Rs.15750
```

# 14. Program to use of access specifiers and class inheritance.

Program Body:

access_specifier.cpp

```
#include<iostream>
using namespace std;
class B
{
private : int x;
protected: int y;
public: int z;
void getdata();
void showdata();
};

class D: public B
{
private :int k;
public : void getk();
void output();
};

void B:: getdata() {
cout<<"Enter first no :";
cin>>x;
cout<<"Enter second no :";
cin>>y;
cout<<"Enter third no :";
cin>>z;
}

void B:: showdata() {
cout<<"x= "<<x<<endl;
cout<<"y= "<<y<<endl;
cout<<"z= "<<z<<endl;
}

void D :: getk() {
cout<<"Enter k :"; cin>>k;
}

void D:: output() {
int s=y+z+k;
cout<<"y+z+k = " <<s<<endl;
}

int  main() {
D d1;
d1.getdata();
d1.getk();
d1.showdata();
d1.output();
return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/07.02.2020$ g++ access_specifier.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/07.02.2020$ ./a.out
Enter first no :34
Enter second no :55
Enter third no :667
Enter k :4
x= 34
y= 55
z= 667
y+z+k = 726
```

## 15. Program to find area and use parameterized constructors.

Program Body:

area.cpp

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

class area {
int s,l,b,l1,b1,h;
public: area(int side){
s=side;
int a=s*s;
cout<<"Area os square = "<<a<<endl;
}
public: area (int length,int breadth){
  l=length;
  b=breadth;
  int a1=l*b;
  cout<<"Area of rectangle = " <<a1<<endl;
}
public: area(int length,int breadth,int height){
  l1=length; b1=breadth; h= height;
  int a2= 2*(l1*b1 + b1*h+h*l1);
  cout<<"Area of cuboid= "<<a2<<endl;
}
};
int main() {
  int s,l,b,l1,b1,h;
  cout<<"Enter the side of square"<<endl;
  cin>>s;
  cout<<"Enter the length and breadth of rectangle"<<endl;
  cin>>l>>b;
  cout<<"Enter the length, breadth and height of cuboid "<<endl;
  cin>>l1>>b1>>h;
  area a1(s);
  area a2(l,b);
  area a3(l1,b1,h);
  return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/14.02.2020$ g++ area.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/14.02.2020$ ./a.out
Enter the side of square
4
Enter the length and breadth of rectangle
32
21
Enter the length, breadth and height of cuboid
4
2
5
Area os square = 16
Area of rectangle = 672
Area of cuboid= 76
```

## 16. Program to show the use of constructor in a class.

Program Body:

xyz.cpp

```cpp
#include<iostream>
using namespace std;
class xyz {
int a,b;
public:xyz(int a1,int b1){
a=a1;
b=b1;
}
int mul() {return(a*b);}
};

int  main() {
int i,j;
cout<<"First number"<<endl;
cin>>i;
cout<<"Second number"<<endl;
cin>>j;

xyz c1(i,j);
cout<<"Product of two numbers = "<<c1.mul()<<endl;
return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/14.02.2020$ g++ xyz.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/14.02.2020$ ./a.out
First number
12
Second number
324
Product of two numbers = 3888
```

## 17. Program to pass array as an argument to a function.

Program Body:

```cpp
#include<iostream>
using namespace std;
class array {
public: void print(int a[]){
  for(int i=0;i<5;i++)
  cout<<a[i]<<" ";
  cout<<endl;
}
};
int main(){
  cout<<"The length of array = 5"<<endl;
  int a[5];
  for(int i=0;i<5;i++)
  {
    cout<<"Enter the "<<i<<" element of array"<<endl;
    cin>>a[i];
  }
  array obj;
  obj.print(a);
  return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Remaining$ g++ arraypass.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Remaining$ ./a.out
The length of array = 5
Enter the 0 element of array
12
Enter the 1 element of array
13
Enter the 2 element of array
14
Enter the 3 element of array
15
Enter the 4 element of array
16
12 13 14 15 16
```

## 18. Program to print biodata and percentage of the students.

Program Body:

```
#include<iostream>
using namespace std;
class biodata{
public: int p,n;
public: string na;
public: int t=0;
public: int m[];
public: void get();
public: void cal();
public: void dis();
};
void biodata :: get(){
  cout<<"Enter the name of the student"<<endl;
  cin>>na;
  cout<<"Enter the roll number"<<endl;
  cin>>n;
  for(int i=0;i<5;i++){
    cout<<"Enter the marks of "<<i+1<<" subject"<<endl;
    cin>>m[i];
  }
}
void biodata:: cal(){
  for(int i=0;i<5;i++){
    t=t+m[i];
  }
  p=t/5;
}
void biodata:: dis(){
  cout<<"Name: "<<na<<endl;
  cout<<"Roll Number: "<<n<<endl;
  cout<<"Total Marks: "<<t<<"/500"<<endl;
  cout<<"Percentage: "<<p<<endl;
}
int main(){
  cout<<"Enter the number of students "<<endl;
  int ne;
  cin>>ne;
  biodata obj[ne];
  for(int i=0;i<ne;i++){
    obj[i].get();
    obj[i].cal();
  }
  for(int i=0;i<ne;i++){
    obj[i].dis();
  }
  return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Remaining$ g++ biodata.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Remaining$ ./a.out
Enter the number of students
1
Enter the name of the student
bhs
Enter the roll number
1
Enter the marks of 1 subject
78
Enter the marks of 2 subject
98
Enter the marks of 3 subject
99
Enter the marks of 4 subject
100
Enter the marks of 5 subject
67
Name: bhs
Roll Number: 1
Total Marks: 442/500
Percentage: 88
```

# 19. Program to implement function overloading.

Program Body:

```cpp
#include<iostream>
using namespace std;
class fnoverload{
public: void hello(){
  cout<<"Hello world"<<endl;
}
public: void hello(int n){
  cout<<"Ten times of the numnber = "<<n*10<<endl;
}
public: void hello(string name){
  cout<<"Have a good day "<<name<<endl;
}};
int main() {
  fnoverload obj;
  cout<<"Enter your name and a numnber"<<endl;
  string n; int a;
  cin>>n>>a;
  obj.hello();
  obj.hello(a);
  obj.hello(n);
  return 0;
}
```

Output:

```
lbhupesh@lbhupesh-Inspiron-5579:~/Desktop/c++lab/Remaining$ g++ fnoverload.cpp
lbhupesh@lbhupesh-Inspiron-5579:~/Desktop/c++lab/Remaining$ ./a.out
Enter your name and a numnber
Bhupesh 12
Hello world
Ten times of the numnber = 120
Have a good day Bhupesh
```

## 20. Program to implement unary operator overloading.

Program Body:

```cpp
#include<iostream>
using namespace std;
class Complex {
private: int real, img;
public:
  Complex() {
  real=0;
  img=0;
}
 Complex(int r, int i){
  real=r;
  img =i;
}
 void Display(){
  cout<<"Complex number: "<<real<<" + "<<img<<"i"<<endl;
}
Complex operator +(){
  real++;
  img++;
  return Complex(real,img);
}
};
int main(){
  Complex C(3,4);
  C.Display();
  cout<<"After unary operator"<<endl;
  +C;
  C.Display();
}
```

Output:

```
lbhupesh@lbhupesh-Inspiron-5579:~/Desktop/c++lab/Remaining$ g++ opeartor.cpp
lbhupesh@lbhupesh-Inspiron-5579:~/Desktop/c++lab/Remaining$ ./a.out
Complex number: 3 + 4i
After unary operator
Complex number: 4 + 5i
```

## 21. Program to check whether a given number is palindrome or not.

Program Body:

```cpp
#include<iostream>
using namespace std;
int main() {
cout<<"Enter any number"<<endl;
int n,k,p=0;
cin>>n;
k=n;
while(n!=0){
  p=p*10+(n%10);
  n=n/10;
}
if(k==p)
cout<<"The number is palindrome"<<endl;
else
cout<<"The number is not palindrome"<<endl;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Remaining$ g++ palindrome.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Remaining$ ./a.out
Enter any number
123
The number is not palindrome
```

## 22. Program to pass object as a parameter to a function.

Program Body:

```cpp
#include <iostream>
using namespace std;
class A {
public:
   int n=100;
   char ch='A';
   void disp(A a){
      cout<<a.n<<endl;
      cout<<a.ch<<endl;
   }
};
int main() {
   A obj;
   obj.disp(obj);
   return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Remaining$ g++ passobj.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Remaining$ ./a.out
100
A
```

## 23. Program to return object from a function.

Program Body:

```cpp
#include <iostream>
using namespace std;
class Student {
public:
   int stuId;
   int stuAge;
   string stuName;
   /* In this function we are returning the
    * student object.
    */
   Student input(int n, int a, string s){
      Student obj;
      obj.stuId = n;
      obj.stuAge = a;
      obj.stuName = s;
      return obj;
   }
   /* In this function we are passing object
    * as an argument.
    */
   void disp(Student obj){
      cout<<"Name: "<<obj.stuName<<endl;
      cout<<"Id: "<<obj.stuId<<endl;
      cout<<"Age: "<<obj.stuAge<<endl;
   }
};
int main() {
   Student s;
   s = s.input(1001, 29, "Negan");
   s.disp(s);
   return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Remaining$ g++ returnobj.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Remaining$ ./a.out
Name: Negan
Id: 1001
Age: 29
```

# 24. Program to show implementation of switch case.

Program Body:

```cpp
#include<iostream>
using namespace std;
int main() {
cout<<"Enter any two numbers"<<endl;
int a,b,n;
cin>>a>>b;
cout<<"Enter 1 To find sum."<<endl;
cout<<"Enter 2 To find difference."<<endl;
cout<<"Enter 3 To find product."<<endl;
cin>>n;
switch(n) {
  case 1:
  cout<<"Sum ="<<a+b<<endl;
  break;
  case 2:
  cout<<"Difference ="<<a-b<<endl;
  break;
  case 3:
  cout<<"Product ="<<a*b<<endl;
  break;
  default:
  cout<<"WRONG CHOICE!!"<<endl;
}
return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Remaining$ g++ switch.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Remaining$ ./a.out
Enter any two numbers
12
13
Enter 1 To find sum.
Enter 2 To find difference.
Enter 3 To find product.
3
Product =156
```

## 25. Program to convert the temperature from Celsius Scale into Fahrenheit Scale.

Program Body:

```cpp
#include<iostream>
using namespace std;
int main()
{
    float fahrenheit, celsius;
    cout << "Enter the temperature in Celsius : ";
    cin >> celsius;
    fahrenheit = (celsius * 9.0) / 5.0 + 32;
    cout << "The temperature in Celsius    : " << celsius << endl;
    cout << "The temperature in Fahrenheit : " << fahrenheit << endl;
    return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Remaining$ g++ temp.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Remaining$ ./a.out
Enter the temperature in Celsius : 35
The temperature in Celsius    : 35
The temperature in Fahrenheit : 95
```

# 26. Program to show single inheritance.

Program Body:

```cpp
#include <iostream>
using namespace std;
class base    //single base class
{
   public:
     int x;
    void getdata()
    {
      cout << "Enter the value of x = "; cin >> x;
    }
 };
class derive : public base    //single derived class
{
   private:
    int y;
   public:
    void readdata()
    {
      cout << "Enter the value of y = "; cin >> y;
    }
    void product()
    {
      cout << "Product = " << x * y<<endl;
    }};
int main()
{
    derive a;     //object of derived class
    a.getdata();
    a.readdata();
    a.product();
    return 0;
 }
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Inheritance$ g++ single.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Inheritance$ ./a.out
Enter the value of x = 12
Enter the value of y = 32
Product = 384
```

## 27. Program to show multi-level inheritance.

Program Body:

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

class A
{
    public:
      void display()
      {
          cout<<"Base class content."<<endl;
      }
};

class B : public A
{

};

class C : public B
{

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

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Inheritance$ g++ multi.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Inheritance$ ./a.out
Base class content.
```

# 28. Program to show multiple inheritance.

Program Body:

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

class Mammal {
  public:
    Mammal()
    {
      cout << "Mammals can give direct birth." << endl;
    }
};

class WingedAnimal {
  public:
    WingedAnimal()
    {
      cout << "Winged animal can flap." << endl;
    }
};

class Bat: public Mammal, public WingedAnimal {

};

int main()
{
    Bat b1;
    return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Inheritance$ g++ multiple.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Inheritance$ ./a.out
Mammals can give direct birth.
Winged animal can flap.
```

## 29. Program to show hierarchal inheritance .

Program Body:

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

class A //single base class
{
    public:
  int x, y;
  void getdata()
  {
        cout << "\nEnter value of x and y:\n"; cin >> x >> y;
  }
};
class B : public A //B is derived from class base
{
    public:
  void product()
  {
      cout << "\nProduct= " << x * y;
  }
};
class C : public A //C is also derived from class base
{
    public:
  void sum()
  {
        cout << "\nSum= " << x + y<<endl;
  }
};
int main()
{
    B obj1;          //object of derived class B
    C obj2;          //object of derived class C
    obj1.getdata();
    obj1.product();
    obj2.getdata();
    obj2.sum();
    return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Inheritance$ g++ hierarchal.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Inheritance$ ./a.out

Enter value of x and y:
12
32

Product= 384
Enter value of x and y:
12
32

Sum= 44
```

# 30. Program to show hybrid inheritance.

Program Body:

```
#include<iostream>
using namespace std;
int a,b,c,d,e;
class A
{
protected:
public:
 void getab()
 {
 cout<<"\nEnter a and b value:"<<endl;
 cin>>a>>b;
 }
};

class B:public A    {
protected:
public:
void getc()
 {
 cout<<"Enter c value:"<<endl;
 cin>>c;
 }
};

class C
{
protected:
public:
 void getd()
 {
 cout<<"Enter d value:";
 cin>>d;
 }
};

class D:public B,public C
{
protected:
public:
 void result()
 {
 getab();    getc();
 getd();    e=a+b+c+d;
 cout<<"\n Addition is :"<<e<<endl;
 }
};

int main()
{
 D d1;
 d1.result();

 return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Inheritance$ g++ hybrid.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Inheritance$ ./a.out

Enter a and b value:
12
34
Enter c value:
35
Enter d value:56

 Addition is :137
```

# 31. Program to show the implementation of friend function .

Program Body:

```cpp
#include <iostream>
using namespace std;
class B;
class A {
    private:
      int numA;
    public:
      A(): numA(12) { }
      friend int add(A, B);
};

class B {
    private:
       int numB;
    public:
       B(): numB(1) { }
       friend int add(A , B);
};
int add(A objectA, B objectB)
{
   return (objectA.numA + objectB.numB);
}
int main()
{
    A objectA;
    B objectB;
    cout<<"Sum: "<< add(objectA, objectB)<<endl;
    return 0;
}
```

Output:

```
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Inheritance$ g++ friend.cpp
ibhupesh@ibhupesh-Inspiron-5579:~/Desktop/c++lab/Inheritance$ ./a.out
Sum: 13
```

## 31. Program to .

Program Body:

Output: