Experiment 1

a Write a C++ program to declare class student & accept & display the data for one object

```
#include<iostream>
using namespace std;
class student ()
{     string name, clg;
      int roll_no;
   public:
      void accept()
      {   cout<<" enter name : ";
          getline (cin, name);
          cout<<"enter roll no. ";
          cin >> roll_no ;
          cout <<" enter class : ";
          getline (cin, clg);
      }
      void display ()
      {   student S1;
          s1.accept() ;
          c1. display ();
          return 0;
      }
```

Output :

```
Enter Name: Rohan
Enter Roll No: 90
Enter class : SY
Enter Name: Rohan
Enter Roll No: 90
Enter class : Sy
```

b Write a C++ program to declare a class book having data members as id, name & price. Accept data for 2 books & display data of book having greater price

```
#include <iostream>
#include <string>
using namespace std;
class book ()
{
   public:
     string book_name;
     int price, no_of_pages;

       void accept()
       { cout<<"\n enter book name : ";
         cin. ignore();
         getline (cin, book_name);
         cout<<"\n book price";
         cin>>price;
         cout<<"\n enter number of pages : ";
       }
};
int main()
{
   book b1, b2;
   b1. accept();
   b2. accept();
```

```
if (b1.price == b2.price)
{
    cout<<" "endl<<"Price of both books equals";
}
else if (b1.price > b2.price)
{
    cout<<" "endl"<<b1.book_name<<" has greater price";
}
 else
{
    cout<<endl<<b2.book_name<<"has greater price";
}

return 0;

}
```

Output:

Enter book name : Ikigai
Enter book price : 60
Enter number of pages : 200

Enter book name : Sapiens
Enter book price : 70
Enter number of pages : 400

Sapiens has a greater price

c) Write a C++ program to accept time in hours, minutes & seconds for one member & display total time in seconds.

```
#include<iostream>
using namespace std;
class Time
{
  public:
   int hr, min, sec;

     void accept()
    { cout << " Enter time (HH:MM:SS)
       cin >> hr >> min >> sec;
    }
   int convert()
    {
      int secs = (hr*3600)+(min*60)+secs;
       return secs;
    }
};
int main()
{
     Time t;
     t.accept();
     cout << endl << "The time in seconds : " << t.convert() <<
     "seconds";

     return 0;
}
```

15/7

Output

enter time in (HH:MM:SS) : 12
12
12

total time in seconds is : 43932 :

Practical 2

a) WAP to delare a class city having data member as name & population. Accept this data for 5 cities and display name of city having higest population.

```
#include<iostream>
#include<string.h>
using namespace std;
class City
{       public:
          int p;
          string name;

        void accept()
        {  cout<<"enter city name : ";
           cin >> ws;
           getline (cin, name);
           cout <<"enter population : ";
           cin>> p;
         }
};
int main()
{    City c[5];
   for (int i=0; i<5; i++)
    {
        cout <<" City " << i+1 << ":\n";
         c[i]. accept ();
    }
```

```
int max = 0;
for (int i=1; i<5; i++)
 {
    if(c[i].p > c[max].p)
    {
        max = i;
    }
 }

cout << "In city with higest population : " << c[max].name;
cout << "Bhavesh Kanjwani";
cout << "PRN No. S1262240267";

 return 0;

}
```

b WAP to declare class 'Account' having data members as Account No. & balance. Accept data for 10 students accounts & give interest of 10% where balance is equal or greater than 5000 and display them.

```
#include <iostream>
using namespace std;
iclass Account
{     int acc_no;
      float b;
      void accept()
   {     cout<<"enter account number :";
         cin >> acc_no;
         cout<<"enter balance";
         cin>>b;
    }
      void display()
   {
   cout<<" account number :"<<accno.<<"Balance : "<<b;
   }
};
int main()
{     Account a[10];
   for (int i=0; i<10; i++)
    {
         a[i]. accept();
    }
```

```
for (int i=0 ; i<10 ; i++)
{
    if(a[i].balance >= 5000)
    { a[i].balance += a[i].balance * 0.10;
    }
}
int max =0;
for (int i =1 ; i<10 ; i++)
{
    if(a[i].balance > a[max].balance)
    { max = i;
    }
}
cout << "\n Accounts with Balance >= 5000 ;
for (i=0; i<10 ; i++)
{
    if (a[i].balance >=5000)
    {
        a[i].display();
    }
}

return 0;

}.
```

3 Write a C++ program class "staff" having data members as name & post.

```
#include<iostream>
using namespace std;
class staff:
{
    public:
    string p, n;
     void getdata()
      {
          cout<<" enter name and post : ";
          cin >> n>>p;
      }
      void display()
       {
           cout<<"Name : "<<n<<" Post : "<<p;
       }
};
int main()
{    int i;
     staff s[5];
    cout<<" enter data for 5 people : ";
    for (i=0; i<5; i++)
     {
          cout<<" Name"<<i+1 <<" Post : ";i+1 )n;)
          s[i].getdata();
     }
```

```
int m=0;
for(i=i-0; i<5; i++)
 {
    if (s[i].p == 'Hod')
    {
        m=i;
    }
cout<<" People who are HOD : "\n;
 s[m].display();
 return 0;

 }
}.
```

9/7/25

Assignment - 13

1. Write a program to declare class book containing data book title, author name & price.

```
#include <iostream>
#include <string>
using namespace;
int class book
{
    string btitle, bauthor;
    float price;

    public:
     void accept()
    { cout << "enter author of book: "; cin>> bauthor;
      cout<<" enter title of book: "; cin>> btitle;
      cout <<" enter price of book: "; cin >> price;
    }
     void display()
     { cout<<" Name of author is: " << bauthor;
       cout <<"\n title of book is: " <<btitle;
       cout<<"\n price of book is: " <<price;
     }
};
 int main()
{   book b1;  p1=&b1;
    p1. accept();
    p2. display();
     return 0;
 }
```

2 WAP to declare class student having data members roll no & percentage by using this pointer

```
#include<iostream>
using namespace std;
class student
{    float per;
     int rno;
     public:
        void accept()
        {  cout<<" enter roll number : "; cin>>rno;
           cout<<" enter percentage : "; cin>>per;
        }
         void display()
        {
          cout<<" roll number : "<< this->rno;
          cout<<"\n percentage is : "<< this->per;
        }
 };
int main()
{    student s;
     s.accept();
     s.display();

     return 0;
}
```

e WAP to demonstrate the use of nested class.

```
#include<iostream>
using namespace std;
class student
{
    private:
     string name;
     int rno;
     public:
      void inputStudentDetails()
     {
       cout<<" enter students name :";
       getline (cin, name);
       cout<<" enter roll number :";
        cin>> rno;
     }
      void display Student Details ()
     {
       cout<<" student name :"<<name;
       cout<<" roll no.  :"<< rno;
     }
};
class Marks
{    int sci, eng;
      public:
     void inputmarks()
     {
         cout<<"enter marks in science :"; cin>>sci;
         cout<<"enter english marks :"; cin>>eng;
     }
```

```
void displaymarks()
{
   cout << " marks in science are: " << sci;
   cout << " marks in english are: " << eng;
}
};
};
};

int main()
{
    student s1;
    student ::Marks m1;
    s1. input student details();
    M1. input Marks();
    s1. display student details();
    M1. display Marks();
    return 0;
}
```

28/8

Practical - 4.

a WAP to create two class result1 & result2 which stores marks of the student. Read the values of marks for both class objects & compute the average of two results.

```
#include<iostream>
using namespace std;
class result1
{
   float marks;
   public:
      void accept()
      {
         cout<<"\nenter marks: ";
         cin>>marks;
      }
      void display()
      {
         cout<<"marks are: "<<marks;
      }
      float getmarks()
      {
         return marks;
      }
};
class result2
{
   float marks;
   public:
```

```
void accept ()
{
    cout<<"enter marks : ";
    cin>> marks;
}
void display ()
{
    cout<<" marks are : "<< marks;
}
float calaverage (result1 &a )
{
    float average;
    average=(a.getmarks()+marks)/2;
    return average;
}
};
int main ()
{   result1 r1;
    result2 r2;
    r1.accept();
    r2.accept();
    r1.display();
    r2.display();
    float ans = r2.calaverage(r1);
    cout<<"\n average of two results of two marks are :"<<ans;
    return 0;
}
```

6 WAP to find greatest number among two numbers from two different classes using friend function.

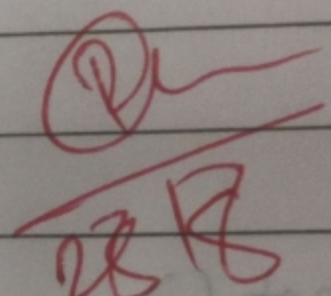
```
#include<iostream>
using namespace std;
class number2;
class number1
{
    int n;
    public:
        void accept()
        {
            cout<<"enter a number : ";
            cin>>n;
        }
        void display()
        {
            cout<<"number is: "<<n;
        }
        friend int max(number1 &, number2 &);
};
class number2
{
    int n;
    public:
        void accept()
        {
            cout<<"enter a number : ";
            cin>>n;
        }
        void display()
        {
            cout<<"number is : "<<n;
        }
```

```
friend int max (number1 &, number2 &);
};
int max (number1 &a, number2 &b)
{
    if (a.n>b.n)
    {
        return a.n;
    }
    else
    {
        return b.n;
    }
},
int main()
{  number1 n1;
   number2 n2;
   n1.accept();
   n2.accept();
   n1.display();
   n2.display();
 int ans = max(n1,n2);
 cout<<"\n greater number is : "<<ans;
  return 0;
}
```

c WAP for swaping contents of two variables of same class using friend function.

```
#include<iostream>
using namespace std;
class number
{
    int a;
    public:
        void accept()
        {
            cout<<"enter a number:";
            cin>>a;
        }
        void display()
        {
            cout<<"number is:"n;
        }
    friend int void swapNumbers(number &, number &);
};
void swapNumbers(number &n1, number &n2)
{
    int temp = n1.a;
    n1.a = n2.a;
    n2.a = temp;
}
int main()
{   number n1, n2;
    n1.accept();
    n2.accept();
```

```
cout<<" original numbers are :";
n1.display ();
n2.display ();
cout<<" In numbers after swaping are :";
n1.display ();
n2.display();
return 0;
}.
```



d Create two classes ClassA & class B each with private integer. Write a friend function sum that can access private data of both classes & return sum

```
#include<iostream>
using namespace std;
class ClassB;
class ClassA;
{   int A;
    public:
     void accept()
     {   cout<<" enter value of A";
         cin>>A;
     }
  friend int sum(ClassA oA, classB oB);
}na;
class ClassB
{       int B;
        public:
         void accept()
         {  cout<<"enter value of B";
            cin>>B;
          }
   friend int sum(classA oA, classB oB);
{ nb;
int sum (ClassA oA, classB oB)
{
       return oA.A + oB.B;
}
int main()
{
```

```
    na.accept();
    nb.accept();
    cout << "sum of two values is: " << sum(na,nb);
    return 0;
}
```

e WAP that contains a private integer in class Number. Use friend function swapNumbers (Number &, Number &) to swap private values of two Numbers objects.

```
#include <iostream>
using namespace std;
class Number
{       int num;
        public :
         void accept()
         {  cout<<"enter a number : ";
            cin >>num;
         }
       friend swapNumbers (Number &, Number &);
}n1, n2;
void swapNumbers (Number &, Number &)
{    int temp = n1.num;
      n1.num = n2.num;
      n2.num = temp;
}
int main()
{     n1.accept(); n2.accept();
    cout <<"\n numbers before swaping are: ";
      n1.display(); n2.display();
    swapNumbers (n1, n2);
    cout <<"\n numbers after swaping are :";
      n1.display();
      n2.display();
    return 0;
}
```

1. Define two classes Box & cube each having private volume. Using friend function findGreater(Box, Cube) determines which object has larger volume.

```
#include<iostream>
using namespace std;
class Cube;
class Box;
{       double v;
        public:
          void accept()
          {  double l,w,h;
          cout<<"enter value of l & w & h";
           cin>>l>>w>>h;
          } v= l*w*h;
          } friend void greaterVolume(Box,Cube);
};
Class Cube;
{ double v;
   public:
   void accept()
   {   double s;
       cout<<"enter side length for the cube :";
       cin>>s;
       v= s* s* s;
   } friend void findGreater(Box, Cube);
};
void findGreater(Box, Cube)
{
    cout<<" Greater volume :"<<res<<endl;
}
```

```
int main()
{   b.accept();
    c.accept();
    find greater(b,c);
    return 0;
}
```

9 Create a class complex with real & imaginary parts as private members. Use a friend function to add two numbers & return result as a new complex no.

```
#include<iostream>
using namespace std;
class Complex
{    int r,i;
     public:
     void accept()
    { cout<<"enter real & imaginary parts :";
      cin>>r>>i;
    }
      void display()
    { cout<<r<<"+"<<i<<"i"<<endl;
     } friend Complex add (Complex c1, Complex c2);
} c1,c2;
Complex add (Complex, Complex)
{    Complex sum;
     sum.r = c1.r +c2.r;
     sum.i = c1.i +c2.i;
      return sum;
}
int main()
{
     c1.accept();
     c2.accept();
    Complex sum = add(c1,c2);
    cout<<" Sum is :"<<sum;
     sum.display();
     return 0;
}
```

h to create a class with private data members: name & three subject marks. Write a friend function calculateAverage() that calculates & displays average marks.

```
#include<iostream>
using namespace std;
class Student
{     string N; int m[3];
        public:
      void accept()
    {
      cout<<"enter name of students : "; cin>>n;
      cout<<"enter three subject marks : "; cin>>m[0]>>m[1]>>m[2];
    }friend void calculateAverage(Student s);
}s;
void calculateAverage(Student)
{  double avg=(s.m[0]+s.[1]+s.m[2])/3;
    cout<<" Student : "<<s.n;
    cout<<"\n Average marks : "<<avg;
}
int main()
{
   s.accept();
   calculate average(s);
    return 0;
}
```

1 Create a class point with private members x & y. Write a friend function that calculates & returns distance between them.

```
#include<iostream>
using namespace std;
class Point
{  double x, y;
   public:
    void accept()
   {  cout<<"enter x & y coordinates :";
      cin>>x>>y;
   } friend double dist (Point p1, Point p2);
} p1, p2;
double dist (Point , Point)
{     double dx = p1.x - p2.x;
      double dy = p1.y - p2.y;
   return sqrt ((dx*dx) + (dy*dy));
}
int main ()
{  p1.accept();
   p2.accept();
   cout<<" distance : "<< dist(p1,p2);
   return 0;
}.
```

5 Create two classes BankAccount & Audit. Bank account holds private balance information. Write a friend function in Audit that access & prints balance information for auditing

```
#include<iostream>
using namespace std;
class BankAccount;
class Audit
{   public:
      void pBal(BankAccount);
} aud;
class BankAccount
{ double b; public:
    void accept()
   { cout<<"enter bank account balance : ";
     cin>>b;
   } friend void Audit :: pBal (BankAccount);
} ba;
Void audit :: pBal (BankAcount)
{
  cout << " Auditing --- Bank account balance : " << ba.b <<;
}
int main()
{
   ba.accept();
   aud.pBal(ba);
   return 0;
}
```

28/8

Practical - 5

a WAP to find the sum of numbers from 1 to n using default constructor

```
#include<iostream>
using namespace std;
class sum
{   int num;
    public:
      sum()
      {  num=4;
      }
      int calsum()
     {  int i, add=0;
      for(i=1; i<=num; i++)
      {
          add= add+i;
      }cout<<"\n sum of numbers is : "<<add;
      }
};
int main()
{   sum s1;
   s1.calsum();
   return 0;
}
```

- WAP to find sum of numbers from 1 to n using parameterized constructor

```
#include <iostream>
using namespace std;
class sum
{       int num;
        public:
          sum(int a)
        {   num = a;
        }
          int calsum()
        {  int i, add=0;
          for(i=1; i<=num ; i++)
           {
                add = add + i;
           }
          cout<<" sum of numbers is : ",<< add;
        }
};
int main()
{   sum s1(7);
    s1.calsum();
    return 0;
}
```

- WAP to find sum of numbers from 1 to n using copy constructor.

```
#include<iostream>
using namespace std;
class sum
{    int num;
     public:
          sum (int a)
          {   num=a;
          }
          sum (int sum&s)
          {    num=s.num;
          }
          int calsum()
          {  int i,add=0;
             for(i=1;i<=num;itt)
             {
                  add=add+i;
             }
          cout<<"\n sum of numbers is "<<add;
          }
};
int main()
{   sum s1(5);
    s1.calsum();
    return 0;
}
```

b WAP to declare class 'student' having data members as name & percentage. Accept & display data for one object using default constructor.

```
#include<iostream>
using namespace std;
class student
{    int p; string name;
     public:
       student()
     {   name ="will";
         p = 98;
     }
      void display()
     {  cout<<"\n name of student is: "<<name;
        cout<<"\n percentage of student is: "<<p;
     }
};
int main()
{    student s1;
     s1.display();
     return 0;
}
```

- WAP to declare a class 'student' having data members as name & percentage. Accept & display data for one object using parameterized constructor

```
#include<iostream>
using namespace std;
class student
{    int p; string n;
     public:
       student (int a, string b)
       {    p=a;
            n=b;
       }
       void display()
       {
          cout<<"\nname of student is: "<<n;
          cout<<"\n percentage of student is: "<<p;
       }
};
int main()
{  student s1(99,'jill');
   s1.display();
   return 0;
}
```

- WAP to declare a class 'student' having data members as name & percentage. Accept & display data for one object using copy constructor.

```
#include<iostream>
using namespace std;
class student
{    float p, string n;
     public:
      student (float a, string b)
      {    p=a;
           n=b;
      }
      student (  student &s)
      {    p=s.p;
           n=s.n;
      }
      void display ()
      {  cout<<"\nname of student is: "<<n
         cout<<"\npercentage of student is: "<<p;
      }
};
int main()
{    student s1(98.6, "jack");
     student s2(s1);
     s2.display();
     return 0;
}
```

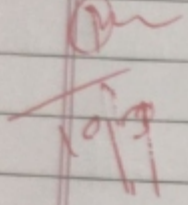
c Define a class 'college' having data members as rno, name, course. WAP using constructor with default value as "computer Engineering" for course. Accept this data for two objects of class & display the data.

```
#include<iostream>
using namespace std
class college
{       int rno;
        string name, course;
        public :
          college ()
          {   name = "joe";
              rno  =19;
              course = "computer engineering";
          }
          college ( string a, int b, string c = "computer engineering")
          {   name = a;
              rno = b;
              course = c;
          }
          void display ()
          {
              cout<<"\n name of is : "<<name;
              cout<<"\n roll no is : "<<rno;
              cout<<"\n course is : "<< course;
          }
};
int main()
{   college c1("jos", 39), c2("ben", 40);
    c1. display ();   c2. display ();
    return 0;
}
```

d WAP to demonstrate constructor overloading.

```
#include<iostream>
using namespace std;
class department
{   int nof, nos;
    string n;
    public:
      department()
      {     n="it";
            nof = 20;
            nos = 80;
      }
      department(string a, int b, int c)
      {     n= a;
            nof =b;
            nos =c;
      }
      department(int x, int y)
      {   name ="rahul";
          nof = x;
          nos = y;
      }
      void display()
      {
          cout<<"\n name is: "<<na;
          cout<<"\n number of faculty is: "<<nof;
          cout<<"\n number of student is: "<<nos;
      }
};
int main()
{
```

```
department d1(), d2("william", 80, 60), d3(80, 75);
 d1.display();
 d2.display();
 d3.display();
 return 0;
}
```



Practical -6

a WAP to implement single inheritance

```
#include <iostream>
using namespace std;
class person
{       protected:
          string name ; int age;
};
class student : public person
{       protected:
           int arno;
        public:
          void accept()
        { cout <<" enter name of person : ";
          cin >> name;
          cout <<" enter age of person : ";
          cin >> age;
          cout <<" enter roll no. : ";
          cin >> arno;
        }
          void display()
        {
          cout <<" name of person is : "<<name;
          cout <<"\n age of person is : "<<age
          cout <<"\n roll no is : "<< arno;
        }
};
```

```
int main()
{   student s1;
    s1.accept();
    s1.display();
    return 0;
}
```

b WAP to implement multiple inheritance

```
#include<iostream>
using namespace std;
class academic
{    protected:
        float marks;
};
class sports
{    protected:
        float score;
};
class result: public academic, sports
{    protected:
        float total=0;
     public:
        void accept()
        {
            cout<<"enter marks:";
            cin>>marks;
            cout<<"enter sports score:";
            cin>>score;
            total=(marks+score);
        }
```

```
    void display()
    {
        cout <<" Academic marks are : " << marks;
        cout <<"\n sports score is : " << score;
        cout <<"\n result is : " << total;
    }
};
int main()
{
    result r1
    r1. accept();
    r1. display();

    return 0;
}
```

c WAP to implement multilevel inheritance

```
#include <iostream>
using namespace std;
class vehicle
{   protected:
        string brand; char model[20];
};
class car: public vehicle
{   protected:
        char vtype[40];
}
class electric_car:public car
{   protected:
        float battcap;
    public:
        void accept()
        {
            cout<<"enter car brand:";
            in>>brand;
            cout<<"enter car model:";
            in>>model;
            cout<<"enter vehicle type:";
            in>>vtype;
            cout<<"enter battery capacity:"
            in>>battcap;
        {
            void display()
        { cout<<"\n car brand is:"<<brand;
          cout<<"\n car model is:"<<model;
          cout<<"\n vehicle type:"<<vtype;
          cout<<"\n battery capacity:"battcap;
};      };
```

```
int main()
{   electric_car el;
    el.accept();
    el.display();

};
```

d) WAP to implement Hierarical Inheritance

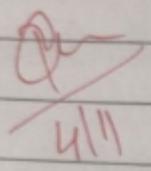
```
#include<iostream>
using namespace std;
class employee
{  protected:
     int eid; string name;
};
class manager: public employee
{  protected:
     string dept;
   public:
     manager()
     {  cout<<"enter employee id: ";
        cin>>eid;
        cout<<"enter name:";
        cin>>name;
        cout<<"Dept";
        cin.ignore();
        getline(cin,dept);
     }
      void display()
     {  cout<<"eid:"<<eid;
        cout<<"name:"<<name;
        cout<<"Dept:"<<dept
     }
};
```

```
class developer :public employee
{ protected:
    string pl;
  public:
    void accept()
    { cout << " enter programing language :";
      cin >>pl;
    }
    void display()
    {
      cout << " language :" <<pl;
    }
};
int main()
{   manager m;
    developer d;
    m.display();
    d.accept();
    d.display();
    return 0;
}
```

e WAP to implement following inheritance

```
#include <iostream>
using namespace std;
class student
{   protected:
        long ccode;
};
class test : public virtual student
{   protected:
        float per;
}
class sports : public virtual student
{   protected:
        string grade;
}
class result :: public virtual student, public virtual test
{   public:
    void accept()
    {
        cout<<" enter college code : ";
        cin >> ccode;
        cout<<" enter percentage : ";
        cin>> per ;
        cout<<" enter grade : ";
        cin >> grade;
    }
    void display()
    {   cout<<" college code : "<<ccode;
        cout<<" percentage : "<< per;
        cout<<" grade : "<<grade;
    }
};
```

```
int main()
{
    result r1;
    r1.accept();
    r1.display();
    return 0;
}
```



Experiment 7

a WAP to calculate area of labrotary and classroom using function overloading

```
#include <iostream>
using namespace std;
int calarea(int l, int b)
{       int area;
        area = l*b;
        return area;
}
int calarea(int a)
{       int area;
        area = a*a;
        return area;
}
int main()
{       int l,b,a;
    cout<<" enter length of rectangle : ";
    cin>>l;
    cout<<"enter breadth of rectangle: ";
    cin>>b;
    cout<<" enter side of square : ";
    cin>>a;

  cout<<" area of labrotary is: "<< calarea(3,4);
  cout<<"\n area of classroom is : "<< calarea(6);

    return 0;

}
```

b WAP to calculate sum of 5 float values and 10 int values

```
#include <iostream>
using namespace std;
class addition
{   public:
      int sum (int num[5])
      {  int sum=0,i;
         for (i=0; i<=5 ;i++)
         {    sum = sum + num[i];
         }
        return sum;
      }
        float sum(float nam[10])
        {   int i; float sum=0;
           for(i=0; i<5 ;i++)
           {   sum = sum+num[i];
           }
          return sum;
        }
};
int main()
{   addition a[];
    int i,n[5],j;
    float m[10];
    cout<<" enter 5 numbers: ";
    for(i=0;i<5;i++)
    {
        cin >> n[i];
    }
    int total = a1.sum(n);
```

```
cout<<" enter 10 numbers :";
for (j=0;j<10 ;j++)
{
        cin>>m[j];
}
float totall= al.sum(m);

cout<<"\n sum of 10 float numbers is: "<< totall;
cout<<"\n sum of 5 integers is: "<< total;

return 0;
}
```

c WAP to implement Unary '-' operator when used with Object so that numeric data member of class is negated

```
#include <iostream>
using namespace std;
int main()
{ class number
{   int num;
    public:
      number()
      {   num=0;
      }
      number (int n)
      {   num=n;
      }
      void display ()
      {  cout<<"\n number is: "<<num;
      }
      void operator -()
      {                num=-num;
      }
};
int main()
{   number n1(2);
    n1.display();
    -n1;
    cout<<" number after negation is: ";
    n1.display;
    return 0;
}
```

Experiment 8

a WAP to overload the '+' operator so the two strings can be concatenated:

```
#include<iostream>
#include<string.h>
using namespace std;
class mystring
{   char str[20];
    public:
     mystring (char a[20])
    {   strcpy(str,a);
    }
     void display()
    {  cout<<" string is : "<<str<<"\n";
    }
     my string operator +(mystring);
};
mystring mystring:: operator +(mystring s2)
{     mystring s3;
     strcpy (s3.str, str);
     strcat (s3.str, s2.str);
     return s3;
}
int main()
{   mystring s1("abc"); mystring s2("xyz");
     s3= s1+s2;
    cout<<"\n concatenated ";
    s3.display();
    return 0;
}
```

b WAP to create base class Ilogin ---:-

```
#include <iostream>
using name space ;std;
class ilogin
{   protected :
        char n[20], p[20];
    public :
        virtual void accept()
        {   cout<<" enter name :";
            cin>>n ;
            cout<<" enter password: ";
            cin>>p;
        }
        virtual void public ()
        {   cout<<"\n name is: "<<n;
            cout<<"\n password is : "<<p ;
        }
};
class email_login : public ilogin
{   public :
        void accept()
        {   cout<<" enter email id : ";
            cin>>n;
            cout<<" enter email-id password :";
            cin>>p;
        }
        void display()
        {   cout<<"\n email id is: "<<n;
            cout<<"\n email id password is: "<<p;
        }
};
```

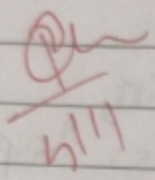
```
class membership_login : public ilogin
{   public:
      void accept()
      {   cout<<"enter membership name: ";
          cin>>n;
          cout<<"enter membership password: ";
          cin>>p;
      }

      void display()
      {  cout<<"\n membership name is: "<<n;
         cout<<"\n membership password is: "<<p;
      }
};
int main()
{     ilogin *ill, ill;
      email_login el;
      membership_login ml;

      int type;
     cout<<"\n1:- for email login \n2:- for membership login \n3:-
          normal login :";
     cin>>type;

     if(type==1)
     {    ill=&el;
          ill->accept();
          ill->display();
      }
     else if( type==2)
     {     ill=&ml;
          ill->accept();
          ill->display();
     }
```

```
else if (type==3)
{   il=&ill;
    il -> accept();
    il -> display();
}
return 0;
}
```



Experiment 9

1. WAP to copy the contents of one file to another

```
#include <iostream>
#include <fstream>
using namespace std;
int main()
{
    ifstream f1;
    ofstream f2;
    char ch;
    f1.open((ch=figet())!=EOF);
    f2.open(("abc.

    f1.open("myfile.txt", ios::in);
    f2.open("abc.txt", ios::out);

    while((ch=fi.get())!=EOF)
    {
        f2.put(ch);
    }
    f1.close();
    f2.close();
    cout<<"contents copied:";
    return 0;
}
```

b WAP to count digits and spaces using file handling

```
#include <iostream>
#include <fstream>  #include <ctype.h>
using namespace std;
int main()
{
    ifstream fl("myfile.txt");
    char ch;
    int d=0, s=0;

    while((ch=fl.get())!=EOF)
    {
        if(isdigit(ch))
        {
            d++;
        }
        else if(isspace(ch))
        {
            s++;
        }
    }
cout<<"\n number of digits in file are: "<<d;
cout<<"\n number of spaces in file are: "<<s;

return 0;

}.
```

c WAP to count words using file handling.

```
#include<iostream>
#include<fstream>
#include<ctype.h>
using namespace std;
int main()
{
    ifstream fl("myfile.txt");
    char ch;
    int w=0;
    while ((ch=fl.get())!=EOF)
    { if(isspace(ch))
      { w++;
    } }
    }
    cout<<" total words are : "<<w;
    return 0;

}
```

d WAP to count occurance of a given word using file handling

```
#include<iostream>
#include<fstream> #include<ctype.h>
using namespace std;
int main()
{
    ifstream fl("myfilee.txt");
     string ch;
     int w=0;
    cout<<" entera word:");
     cin>>ch;
    string word;
    while(fl >>word)
    {
        cout<<"\n"<<word;
         if(ch=word)
        {   w++;
        }
    }
    fl.close();
    cout<<" \n occurance of a word in file is: "<<w;
    return 0;

}.
```

Experiment 10

i WAP to find sum of array using funtion template

```
#include <iostream>
using namespace std;
template <class t>
t sum (t arr [10])
{   int i;
    t add=0;
   for(i=0; i<10; i++)
   {
       add = add+ arr[i];
   }
   return add;
}
int main()
{ float arr[] = {12,1,3,5,6,3,4,9,10,14,15};
   cout << "\nsum of array elements is: " << sum(arr);
    return 0;

}
```

ii Write a C++ program of square function using template specialization

```
#include <iostream>
using namespace std;
template <class t> t square (t num)
{
    return num* num;
}
template < > string square (string str)
{
    return str* str
}
int main()
{   int n=5;
   string t= "hello";

cout <<" square of no. is: " << square (n);
cout <<" square of string is: " << square (t);

return 0;

}
```

iii WAP to build simple calculator using class Template

```
#include <iostream>
#include <math.h>
using namespace std;
template <class t> class Cal
{     t a,b;
    public:
      Cal (tc, td)
      {  a = c;
         b = d;
      }
      t add()
      { return a+b;
      }
      t subt()
      { return a-b;
      }
      t div()
      { return a/b;
      }
      t mult()
      { return a*b;
      }
      t Sqrt()
      { return sqrt(a);
      }
      t Cbrt()
      { return cbrt(a);
      }
```

```
    t Pow()
    { return pow(a);
    }
    t Sin()
    { return sin(a);
    }
    t Cos()
    { return cos(a);
    }
    t Tan()
    { return tan(a)
    }
};
int main()
{   int a,b,ch;
    cout<<" enter two numbers ";
    cin>>a>>b;
    Cal<float>cl(a,b);
do{
    printf("\n1: to add \n2: subtract \n3: divide \n4: multiply \n5: Square
        \n6: Cuberoot \n7: Power \n8: Sin \n9: Cos \n10: Tan
        \n11: exit \n" enter your choice : ");
    scanf("%d",&ch);
    switch(ch)
    { case 1:
      cout<<" addition is: "<<cl.add();
       break;
       case 2:
      cout<<" subtraction is: "<<cl.subt();
       break;
      case 3:
      coat<<" division is: "<<cl.div();
      break;
```

```
case 4:
cout<<" multiplication is: "<<cl.mult();
break;
case 5:
cout<<" square root is: "<<cl.sqrt();
break;
case 6:
cout<<" cube root is: "<<cl.Cbrt();
break;
case 7:
cout<<" sin is: "<<cl.Sin();
break;
case 8:
cout<<" cos is: "<<cl.Cos();
break;
case 9:
cout<<" tan is: "<<cl.Tan();
break;
case 10:
cout<<" Power is: "<<cl.Pow();
break;
}
}while(ch!=11);
return 0;
}
```

4/11

Experiment 11

a WAP to modify the value of given element

```
#include<iostream>
using namespace std;
template <typename T> class vec
{
    T*v;
  int size;
  public:
    vec (int n):: size(n)
    {
        v=new T [size];
    }
    void set (int idx, T val)
    {
        v[idx] = val;
    }
    void mult()
  {
      for(int i=0; i<size ;i++)
      {     v[i]*=2;
      }
  }
    void display()
    {
          cout<<"(";
      for(int i= 0; i<size ;++i)
      {     cout<<v[i];
          if( i!=size-1)
          {  cout<<",";
          }
    }
```

```
};
int main()
{   int n;
    cout<<"enter no of elements: ";
    cin>>n;
    vec<int> v(n);
    for(int i=0; i<n; i++)
    {  cout<<"enter value for element "<<i+1<<":";
       int val;
       cin>>val;
       v.set(i,val);
    }
    v.display();
    int idx, newval;
    cout<<"enter index to modify: "<<n-1<<")": ";
    cin>>idx;
    cout<<"enter new value: "<<idx;
    cin>>newVal;
    v.set(idx, newVal);
    cout<<"vector after multiply: ";
    v.display;
    return 0;

}
```

```
case 3:
if(v.empty())
{ cout<<"stack underflow:";
}
else
{ cout<<"\n stack is: ";
  stack<int>temp=v;
  while(!temp.empty())
  { cout<<temp.top()<<" ";
    temp.pop();
  }
  break;
}
case 4:
  cout<<"bbyee";
  break;
}
}while(ch!=4);
return 0;
}.
```

Experiment 12

i WAP using STL to implement stack.

```
#include <iostream>
#include <stack>
using namespace std;
int main()
{  stack<int> v;
   int ch, n, data, i;
  do
   { cout<<"\n1: to push \n2: to pop \n3: to display \n4: to exit
          \n Enter your choice";
     cin>>ch;
     switch (ch);
     {  case 1:
          cout<<"enter data to push ";
          cin>> data;
          v.push (data);
          break;
        case 2:
          if (v.empty())
          {
             cout<<"queue overflow";
          }
          else
          {  v.pop();
             cout<<" data popped : ";
          }  break;
```

```
case 3:
if(v.empty())
{ cout<<"stack underflow:";
}
else
{ cout<<"In stack is: ";
  stack<int>temp=v;
  while(!temp.empty())
  { cout<<*temp.top()<<" ";
    temp.pop();
  }
  break;
}
case 4:
  cout<<"bbyee";
  break;
}
}while(ch!=4);
return 0;
}
```