Sarthak Kale

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experiment — 1

1) write a c++ code to declare a class student having data members as roll no and name accept and display data for single student

ans)
```
#include<iostream.h>
using namespace std;
class student
{   int roll-no,
    string name;
    public:
    void accept()
    { cout<<"enter the student name & roll no:";
      cin>>"name">>"roll-no"; }
    void disp()
    { cout <<"student name:"<<name;
      cout <<"\n student roll-no:"<<roll-no; } };
int main()
{ student s1;
  s1.accept();
  s1.disp();
  return 0; }
```

2) write a c++ code to create a class book having data members as book_name, book_price, & book_id. Accept the data for 2 books & display the name of the book having greater prices.

ans)
```
#include <iostream>
using namespace std;
class class_book
{ string book_name,
  int book_id;
  public:
  int book_price;
```

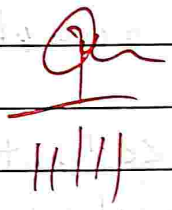
```
void accept()
{
  cout<<"enter the book name,price & id:";
  cin>>book_name>>book_price>>book_id;}
void disp()
{ cout<<"\n book name:"<<book_name;
  cout<<"\n book price:"<<book_price;
  cout<<"\n book ID:"<<book_id;}};
int main()
{ class_book B1,B2;
  B1.accept();
  B2.accept();
  if(B1.book_price > BB2.book_price)
  { B1.disp()
  else
  { B2.disp();}
  return 0;}
```

3) write a C++ program to declare a class time having data members as H, M and S. Accept data for one object and display total time in seconds

ans)

```
#include<iostream>
using namespace std;
class time
{ int H,M,S;
  public:
  void accept()
  {cout<<"enter the time in hours,minutes & seconds:";
    cin>>H>>M>>S;}
  void calculate()
  { H = H*3600;
    M = M*60;
```

```
S = S + H + M; }
void disp()
{ cout << " total time in seconds = " << S; }}
int main()
{ Time T1;
  T1.accept(); T1.calculate();
  T1.disp();
  return 0; }
```



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experiment -2

1) WAP to declare a class 'city' having data members as name & population. Accept this data for 5 cities & display name of city having highest population.

ans)
```
#include<iostream>
using namespace std;
class city
{ public:
  string name;
  int population;
  void accept()
  {
  cout<<"enter city name:";
  cin>>city;
  cout<<"enter city population:";
  cin>>population; }
  void disp()
  { cout<<"city having highest population:"<<name;}};
  int main()
  { city c[5];
   int i, max;
   for(i=0; i<5; i++)
   { c[i].accept(); }
   max = c[0].population;
   for = (i=0; i<5; i++)
   { if( c[i] population>max)
     { max=i }}
     c[max].disp();
   return 0; }
```

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2) WAP to declare a class 'account' having data members as account & balance. Accept this is data for 10 accounts & give interest of 10% where balance is equal or greater than 5000 & display them.

ans)
```
#include <iostream>
class account
{ public:
  int acc_no;
  float balance;
  void accept()
  { cout<<"enter account number:";
    cin>>"acc_no";
    cout<<"enter account balance:";
    cin>>"balance";}
  void disp()
  { cout<<"\n account number:"<<acc_no;
    cout<<"\n account balance:"<<balance;}};
int main()
{ account A[10];
  int i;
  for (i=0;i<10;i++)
  { A[i].accept();}
  for (i=0;i<10;i++)
  { if (A[i].balance>=50000)
  { A[i].balance =A[i] balance + (0.1*A[i]);
    A[i].balance();
    A[i].disp();}}
  return 0;}
```

3) WAP to declare a class 'staff' having data members as name & post. Accept this data for 5 staff and display name of staff who have "HOD"

ans)
```
#include <iostream>
using namespace std;
class staff
{ string name;
  public:
  string post;
  void accept()
  { cout<<"enter the staff name : ";
    getline(cin,name);
    cout<<"enter the staff post:";
    getline(cin,post);}
    void disp()
  { cout<<"\n staff name:"<<name;
    cout<<"\n staff post:"<<post;}};
int main()
{staff s[5];
  int i;
  for(i=0; i<5; i++)
  { s[i].accept();}
  for(i=0; i<5; i++)
  { if (s[i].post =="HOD")
  { s[i].disp();}}
  return 0;}
```

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experiment 3

1) WAP to declare a class 'book' containing data members as book_title, author name & price. Accept & display the information for one object using a pointer to that object.

ans)
```
#include<iostream>
using namespace std;
class book
{ string book title;
  string author name;
  int price;
  public:
  void accept()
  { cout<<"enter book title:";
    getline(cin, booktitle);
    cout<<"enter author name:";
    getline(cin, authorname);
    cout<<"enter book price:";
    cin>>price;}
  void disp()
  { cout<<"Book title:"<<book title;
    cout<<"\nauthor name:"<<authorname;
    cout<<"\n book price:"<<price;}};
  int main()
  { book B1;
    book *p;
    p=&B1
    p->accept();
    p->disp();
    return 0;
```

2) WAP to declare a class 'student' having

ans)
```
#include<iostream>
using namespace std;
class student
{ int roll_no;
  float percentage;
  public:
  void accept()
  { cout<<"enter the student roll no:";
    cin>>roll_no;
    cout<<"enter student percentage:";
    cin>>percentage;}
  void disp()
  { this->accept();
    cout<<"\n roll no. of the student:"<<roll_no;
    cout<<"\n percentage of the student:"<<percentage;
  }};
int main()
{ student s1;
  s1.disp()
  return 0;
```

3) WAP to demonstrate the use of nested class?

ans)
```
#include<iostream>
using namespace std;
class student
{ private:
    string name;
    int roll_no;
  public:
```

```
void input student details()
{ cout<<"enter student's name:";
  getline(cin,nam);
  cout<<"enter student's roll number:";
  cin>>roll-no;
}
void display student details()
{ cout<<"\n student name:"<<name<<endl;
  cout<<"\n student roll-no:"<<roll-no<<endl;
}
class marks
{ private:
  int science;
  int english;
  public:
  void input marks()
  { cout<<"enter marks in science:";
    cin>>science;
    cout<<"enter marks in english:";
    cin>>english;
  }
  void display marks()
  { cout<<"Marks in science:"<<science<<endl;
    cout<<"marks in english:"<<english<<endl;
  }
};
int main()
{ student s1;
  student :: marks M1;
  s1.input student details();
  M1.input marks();
```

```
S1.display student details();
M1.display marks();
return 0;
}
```

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expt - 4

Q) write a c++ program to solve the following problem statement & show output:

1) swap 2 numbers from same class using object as functions & write swap functions as member functions.

ans) code:

```
#include <iostream>
using namespace std;
class num{
class public:
    int n1,n2;
    void accept(){
        cout<<"enter first number:"<<endl;
        cin>>n1;
        cout<<"enter second number:"<<endl;
        cin>>n2;
    }
    void display(){
        cout<<"Num1."<<n1<<endl;
        cout<<"Num 2."<<n2<<endl;
    }
    void swap(num&){
        int temp=n1; n1=n2; n2=temp;
        cout<<"swapped:\n first number:"<<n1<<"\n
            second number:"<<n2;
    }
};num nu;
int main(){
    nu.accept();
    nu.display();
    nu.swap(nu);
    return 0;
}
```

O/P

```
enter first number:
5
enter second number:
9
num1 : 5
num 2 : 9
swapped
first number : 9
second number : 5
```

2) Swap 2 number from same class using concept of friend function.

ans)
```
#include<iostream>
using namespace std;
class num{
public: int n1, n2;
    void accept(){
        cout<<"enter first number:"<<endl;
        cin>>n1;
        cout<<"enter second number:"<<endl;
        cin>>n2;
    }
    void display(){
        cout<<"num1:"<<n1<<endl<<"num2:"<<n2<<
    }
}nu;
void swap(num){
    int temp = nu.n1;
    nu.n1 = nu.n2;
    nu.n2 = temp;
    cout<<"swapped:\n first:"<<nu.n1<<"second:"<<nu.
        <<endl;
}
int main(){
    nu.accept();
    nu.display();
    swap(nu);
    return 0;
}
```

O/P

```
enter first number
5
enter second number
9
num 1: 5
num 2: 9
swapped
first: 9
second: 5
```

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3) swap 2 number from different class using friend function.

ans)
```
#include<iostream>
using namespace std;
class num1 {
public: int n1;
   void accept(){
        cout<<" enter first number: "<<endl;
        cin >> n1;}
   void display(){ cout << "num1: " <<n1<<endl;}
}nu1;
class num2 {
public: int n2;
   void accept(){
      cout <<" enter second number: "<<endl;
      cin>>n2;}
   void display(){cout<<"num2: "<<n2 <<endl;
}nu2;
void swap (num1, num2){
        int temp = nu1.n1;
        nu1.n1 = nu2.n2;
        nu2.n2 = temp;
        cout<<"swapped: \n first: "<<nu1.n1<<\n second:"
            <<nu2.n2<<endl;
}
int main(){
    nu1.accept();
    nu2.accept();
    nu1.display();
    nu2.&display();
    swap(nu1, nu2);
    return 0;
}
```

```
O/P: enter first number
     5
     enter second number
     9
     num1 = 5
     num2 = 9
     swapped:
     first: 9
     second: 5
```

4) create 2 classes result1 & result2 which stores the marks of students read the value of final for the class objects & ~~avg~~ compute avg.

ans)
```
#include<iostream>
using namespace std;
class result1{
public:
    int r1;
    void accept(){
        cout<<"enter first result:"<<endl;
        cin>>r1;}
}res1;
class result2{
public:
    int r2;
    void accept(){
        cout<<"enter second result:"<<endl;
        cin>>r2;}
}res2;
float avg(result1, result2){
    return (res1.r1+res2.r2)/2;
}
int main(){
    res1.accept();
    res2.accept();
    float avg = avg(res1, res2);
    cout<<"average:"<<avg;
    return 0;
}
```

o/p

```
enter first result:
95
```

enter second result:
99
average : 97

5) Find the greatest number among 2 numbers from 2 different classes using friend function.

ans)
```
#includ<iostream>
using namespace std;
class num1{
public: int n1;
    void accept(){
        cout<<"enter first number:"<<endl;
        cin>>n1;}
};nu1;
class num2{
public: int n2;
    void accept(){
        cout<<"enter second number:"<<endl;
        cin>>n2;}
};nu2;
int gnum(int n1, int n2){return (n1>n2?n1:n2);}
int main(){
    nu1.accept();
    nu2.accept();
    int gr=gnum(nu1.n1, nu2.n2);
    cout<<"greatest:"<<g<<endl;
    return 0;
}
```

O/P

enter first number:
5
enter second number:
9
greatest: 9

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Expt - 5

Q.1) WAP to find the sum of numbers between 1 to n using a constructor where the value of n will be passed to the constructo

ans) code:

```
#include <stdio.iostream>
using namespace std;
class sum{
    int n, sum;
    int total;
    public:
    sum(){          // 1. Default constructor
      n=0;
    total=0;
    cout<<"default constructor called"<<endl;
    }
    sum(int num){
        n=num;
        total=(n*(n+1))/2;
        cout<<"parameterized constructor called"<<
            endl;
    }
sum(const sum &S){
        n=S.n;
        total = S.total;
        cout<<"copy constructor called"<<endl;
    }
void display(){
    public:
        sum(int num)
        {
            n = num;
            sum = 0
```

```
        for (int i=0; i<n; i++)
        {
            sum+=i
        }
        cout << "sum=" << sum;
    }
};
int main ()
{
  sum s(10);
  return 0;
}
```

2) WAP to declare a class 'student' having data members as name & percentage write a constructor to initialize the data members. Accept & display data for one student

ans)

```
#include <iostream>
#include <string>
using namespace std;
class student
{
    private:
    string name;
    float percentage;
    public:
        student (string n, float p)
        {
            name = n;
            percentage = p;
            cout << "Name:";
            getline (cin, name);
            cout << "percentage:";
            cin >> percentage;
        }
```

```
void display()
{
    cout << "student name: " << name << endl;
    cout << "student percentage: " << percentage << endl;
}
};
int main(){
    student si("sarthak", 92.0)
    si.display()
    return 0;
}
```

3) Define a class 'college' members variables as roll_no, name, course, WAP using constructor with default value as "computer engineering" for course Accept this data for two object of class & display the data.

ans)
```
#include <string>
#include <iostream>
using namespace std;
class college
{
    private:
    string course_name, stud_name;
    int roll_no;
    public:
    college()
    {
        roll_no = 73;
        stud_name = "sarthak";
        course_name = "CSE";
    }
```

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```
void display()
{
    cout<<"Roll.no:"<<roll_no<<endl;
    cout<<"student name:"<<stud.name<<endl;
    cout<<"course name:"<<course_name<<endl;
}
};
int main()
{
  college c1;
  c1.display();
  return 0;
```

4) WAP to demonstrate constructor overloading

ans)
```
#include<iostream>
using name space std;
class rectangle
{
   int l,b;
   public:
   rectangle()
   {
       l=2;
       b=5;
   }
   rectangle(int x)
   {
       l=x;
       b=x;
   }
   rectangle(int x, int y)
   {
```

```
        l = x;
        b = y;
    }
    rectangle (rectangle &r3)
    {
        l = r3.l;
        b = r3.b;
    }
    void calculate ()
    {
        cout << " the area is : " << (l * b) << endl
    }
};
int main()
{
    rectangle r1
    r1.calculate();
    rectangle r2 (3);
    r2.calculate();
    rectangle r3 (6,6);
    r3.calculate();
    rectangle r4 (r3);
    r4.calculate();
    return 0;
}
```

Q4

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expt - 6

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1)a WAP to implement multilevel inheritance assume suitable data.

ans)
```
#include <iostream>
#include < string>
using namespace std;
class person
{
    protected;
    int age;
    string name;
};
class student: public person
{
    private:
    int roll_no;
    public:
    void accept()
    {
        cout <<" enter your name: ";
        cin >> name;
        cout <<" enter your age: ";
        cin >> age;
        cout <<"enter your roll no:";
        cin >> roll_no;
    }
    void display ()
    {
        cout <<" name: \n" << name;
        cout <<" Age: \n" << age;
        cout <<" Roll no: \n" << Roll_no;
    }
};
```

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

2) write a program to implement multiple classes assume suitable data

ans)

```
#include <iostream>
using namespace std;
class academic
{
    protected:
    int marks;
};
class sports
{
    protected:
    int score;
};
class result : protected academic, protected sports.
{
    int total_score = 0;
    public:
    void accept()
    {
        cout<<"enter the marks of the students:";
        cin >> marks;
        cout<<"enter the sports score of the students:";
        cin>> score;
    }
```

```
void calculate()
{
    total score = marks + score;
    cout<<"the marks of student: "<<marks<<endl;
    cout<<"The sports score of the student: "<<score<<endl;
    cout<<"the total score of the student: "<<total_score<<endl;
    }
};
int main()
{
    result r;
    r.accept();
    r.calculate();
    return 0;
}
```

2) WAP to implement hierarchial inheritance assume suitable ~~table~~ data.

ans)

```
#include<iostream>
using namespace std;
class vehicle
{
    protected
    string brand;
    int model;
};
class car: protected vehicle
{
    protected:
        string type;
};
class electric car: protected car
{
```

```
int battery capacity;
public:
void accept()
{
    cout<<"enter the brand of car:";
    cin>>brand;
    cout<<"enter the model of car:";
    cin>>model;
    cout<<"enter the type of car:";
    cin>>tyre;
    cout<<"enter the battery capacity of the
          car:";
    cin>>battery capacity;
}
void display()
{
    cout<<"\n The brand of the car:"<<brand<<endl;
    cout<<"\n The model of the car:"<<model<<endl;
    cout<<"\n The tyre of the car:"<<tyre<<endl;
    cout<<"\n The battery capacity of the car:"<<
        battery capacity<<endl;
    }
};
int main()
{
    electric car e;
    e.accept();
    e.display()
    return 0;
}
```

4) WAP to implement hybrid inheritance

```
#include <string>
#include <iostream>
using namespace std;
class person
{
    public:
    string name;
    int age;
    void get personal details()
    {
        cout<<"enter name:";
        cin>>name;
        cout<<"enter age:";
        cin>>age;
    }
    void show details()
    {
        cout<<"name:"<<name<<"age:"<<age<<endl;
    }
};
class student: public person
{
    public
    string course
    void get details()
    {
        cout<<"enter course:";
        cin>>course;
    }
    void show details()
    {
        cout<<"course:"<<course<<endl;
    }
```

```
};
class employee : public person
{
    public:
    string company;
    void get employee details ()
    {
        cout<<" enter company : ";
        cin>>company;
    }
    void show employee details ()
    {
        cout<<" company : "<<company <<endl;
    }
};
class intern : public student, public employee
{
    public:
    void show intern details ()
    {
        cout <<"\n ---- intern details ---- \n";
        student :: show person details ();
        show employee details ();
    }
};
int main ()
{
    intern it;
    it.student :: get personal details ();
    it.get details ();
    it.get employee details ();
    it.show intern details ();
    return 0;
}
```

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expt. 7

1) WAP using function overloading to calculate the area of a laboratory (rectangular in shape) & area of classroom(square)

ans)
```
#include<iostream>
using namespace std;
class area;
{
    private:
    float l,b;
     public:
    void area (float l);
    {
        float area;
        area = l*b;
        cout <<" area of classroom: " <<area <<endl;
    }
    void area (float l, float b)
    {
        float area;
        area = l*b;
        cout<<" area of laboratory: " <<area;
    }
};
int main()
{
    area a1;
    a1. area (8);
    a1. area (4,12);
    return 0;
}
```

2) WAP using function overloading to calculate the sum of 5 float values & 10 integer values

ans)
```
#include<iostream>
using namespace std;
class sum
{
    private:
    int a,b,c,d,e,f,g,h,i,j;
    float k,l,m,n,o;
    public:
    void sum(float k, float l, float m, float n, float
    {
        float sum;
        sum = k+l+m+n+o;
        cout<<" sum of 5 floating numbers:"<<sum
            <<endl;
    }
    void sum(int a, int b, int c, ind d, int e, int f
            int g, int h, int i, int j)
    {
        int sum;
        sum = a+b+c+d+e+f+g+h+i+j;
        cout<<"sum of 10 integers:"<<sum;
    }
};
int main()
{
    sum s1;
    s1.sum(1.2, 3.5, 5.6, 8.4, 1.5);
    s1.sum(1,2,3,4,5,6,7,8,9,10);
    return 0;
}
```

3) WAP to implement unary operators when used with the object so that the numeric data member of the class is negated

ans)
```
#include<iostream>
using namespace std;
class number
{
    private: int x;
    public void accept()
    {
        cout<<"enter a number:";
        cin>>x;
    void operator -()
    {
        x = -x;
    }
    void display()
    {
        cout<<"negated number:"<<x<<endl;
};
int main()
{
    number n1;
    n1.accept();
    -n1;
    n1.display();
    return 0;
}
```

4) WAP to implement the unary ++ operator (for pre~~fi~~ increment & post increment) when used with the object so that the numeric data member of the class is incremented.

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

```
class number
{
    private: int x; int accept;
    public:
    void accept
    {
        cout<<"enter a number";
        cin>>x; temp=x;
    }
    void operator ++()
    {
        x = ++x;
    }
    void reset()
    {
        x=temp;
    }
    void operator ++(int)
    {
        x=x++;
    }
    void display()
    {
        cout<<"(prve) the number is:"<<x<<endl;
    }
    void display2()
    {
        cout<<"(post) the number is:"<<x;
    }
};
int main()
{
```

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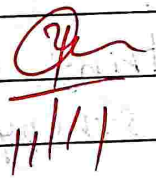
```
Number n1;
n1.accept();
++n1;
n1.display();
n1.reset();
n1++;
n1.display2();
return 0;
```



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expt-8

Q) WAP to overload the '+' operator so the two string can be concatinated.

ans)
```
#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 + (my string);
};
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 concatinated ";
    s3. display ();
}
```

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2) WAP to create base class I login --:

ans)
```
#include <iostream>
using name space std;
class ilogin
{   protected: string name password;
    public: virtual void accept (){
    cout<<" enter name:"; cin>>name;
    cout<<"password"; cin>>password;
  }
};
class emailogin : public login{
    string email;
    public: void accept () override{
        login :: accept()
        cout<<"enter email:"; cin>>email;
      }
      void display (){
        cout<<"name:" <<name<<"password"
         <<password <<"email" << email<<endl;
       }
};
class membership login: public login {
        string membership;
    public: void accept () override {
    login : accept ();
    cout <<"enter membership ID:";
    cin>>membership ID;
  }
  void display() {
    cout<<In ---membership details---\n";
    cout << name:" name<<"\n password:"<<password
    <<"membership:"<<membership Id <<endl;
  }
```

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};
int main() { email login e; membership login m;
e.accept(); m.accept(); e.display();
m.display();
return 0;
}

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expt- 9

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

ans)
```
#include <iostream>
#include <fstream>
Using namespace std;
int main(){ fstream first_file;
            fstream second_file;
            first_file.open("first.text",ios::in);
            if(!first_file){
              cout<<"error"<<endl;
              return 1;
            }
           second_file.open("second.text",ios::out);
           if(!second_file){
             cout<<"error"<<endl;
             return 1;
           }
    cout<<"file copied successfully!"<<endl;
    return 0;
}
```

2)

→
```
#include <iostream>
#include <fstream>
#include <cctype>
Using namespace std;
int main(){ fstream new_file;
            new_file.open("first_text",ios::in);
            if(!new_file){
              cout<<"error"<<endl;
              return 1;}
```

```
int digits_count = 0;
int =paces_count=0.
char ch; while (new_file.get(ch)){
    if (isdigit (ch)) {
        digits_count++;
    }
    if(isspace (ch)) {
        space_count++;
    }
new_file.close();
cout<<"No. of digits :"<< digits_count<<
                                    endl
cout<<" No. of spaces :"<<space_count<<
                                    end
    return 0;
}.
```

Q)

→
```
#include <iostream>
#include <fstream>
#include <cctype>
Using namespace std;
fstream new_file
new_file.open ("first.text", ios::in);
(!new_file) {
    cout <<" unter occured !"<< endl;
    return 1;
}
char ch {
    int words_count = 0;
```

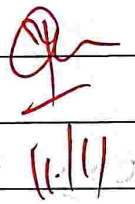
```
bool inWord = false;
while (new_files.get(ch)){
    if (isspace(ch)) {
        inWord = false }
    else if (! inWord)
    {
        words_count++;
        int word = true;
    }
}
};
new_file.close();
cout << "No. of words: " << words_count << endl;
return 0;
}.
```

d)

→

```
#include <iostream>
#include <fstream>
using namespace std;
int main()
{
    ifstream f1("myfile e.txt");
    string ch;
    int w = 0;
    cout << "enter a word:");
    cin >> ch;
    string word;
    while (f1 >> word).
    }
```

```
cout<<"\n"<<word;
if(ch=word)
{ w++
}
}
fl.close()
cout<<"\n occurrance of a word in file i
   <<w; return 0;
}
```



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Experiment. 10

1) WAP to find sum of array using function template

ans)
```
#include<iostream>
using namespace std;
template <class t>
t sum <class t>
t sum (t arr [10])
{     int i;
      t add=0;
      for (i=0; i<10; i++)
      {
          add = add + a[i];
      }
      return add;
}
int main()
{ float arr[] = {12,1,2,5,6,3,4,9,10,14,15};
  cout<<"\n sum of array elements is:"<<sum
  return 0;
}
```

→
```
# include <iostream>
using namespaces 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. : " << square(n).
    cout << " Square of string : " << square(t);
    return 0;
  }

};
```

→

```
#include <iostream>
Using namespace std;
template <class T> class c
{
  public: T num1=0; T num2=0;
  void accept (){
      cout << " Enter nos :";
      cin>> num1 >> num2;
    }
  void add (){ cout << " sum: " << num1+num2;}
  void sub() { cout << " sub : " << num1-num2; }
  void mult(){ cout << " mult : " << num1 * num2; }
  void div() { cout << " div : " << num1/num2; }
};
int main (){ c <int> obj;
  obj. acc(); obj.add(); obj. sub(); obj. mult();
  obj. div();
  return 0;
}
```

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Experiment No. 11

Q)

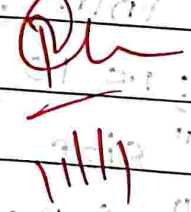
→
```
#include <iostream>
#include <vector>
using namespace std;
int main (){
    vector <char> v(10); unsigned int i;
    cout<<" Size=" <<v.size ()<<endl;
    for(i=0;i<10;i++) { v[i]= i+'a'; }
    cout<<" current content : \n";
    for(i=0;i<10;i++){ v.push_back(i+10+'a'); }
    cout<<" Size
```

again →
```
#include <iostream>
#include <vector>
using namespace std;
int main (){
    vector <char> v(10); unsigned int i;
    cout<<"size="<<v.size ()<<"  "<<endl;
    for(i=0;i<10;i++){ v[i]=i+'a'; }
    cout<<" current content : \n";
    for(i=0;i<v.size ();i++){ cout<<v[i]<<"  "; }
    cout<<" \n\n"; cout<<" expanding vector : \n";
    for(i=0;i<10;i++){ v.push_back (i+10+'a'); }
    cout<<" size now =" <<v.size ()<<endl;
    cout<<" current content : \n";
    for (i=0;i<v.size();i++) { cout<<v[i]<<"  "; }
    cout<<"\n\n";
    for(i=0;i<v.size ();i++){ v[i]=toupper(v[i]); }
    cout<<" modified contents : \n";
    for(i=0;i<v.size();i++) { cout<<v[i]<<"  "; }
```

```
    cout << endl;
    return 0;
}
```

Q)

→
```
#include <iostream>
using namespace std;
int main(){
    vector<char> v(10); vector<char>::iterator p;
    int i; p=v.begin(); i=0;
    while(p != v.end()){
        *p=i+'a'; p++; i++;
    }
    cout<<" original content : \n";
    p=v.begin();
    while( p != v.end()) {
        cout<< *p << " "; p++;
    }
}
```



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Experiment No. 12

Q1)

→
```
#include <bits/stdc++.h>
using namespace std;
int main() {
    stack <char> cars;
    cars.push("BMW"); cars.push("Audi");
    cars.push("Mercedes"); cars.push("Ferrari");
    cout<<"Top element is:" << cars.top()<<endl;
    cout<<"Size of stack is:"<<cars.size()<<endl;
    cars.pop(); cars.pop();
    while(!cars.empty()) {
    cout<<"elements in stack are:"<< cars.top()
                                  <<endl;
    cars.pop();
    }
    return 0;
}
```

→ o/p →
```
Top element : Ferrari
Size of stack is : 4
Elements in stack are : Audi
"  "  "  "  : BMW
```

Q2)

→
```
#include <bits/stdc++.h>
using namespace std;
int main() {
    queue<int> age;
    age.push(21); age.push(22); age.push(23);
    age.push(24);
    cout<<" front is :"<< age.front()<< endl;
    cout<<" Back is :"<< age.back()<< endl;
    age.pop(); age.pop();
    while(!age.empty())
    {
        cout<<" element in queue :"<< age.front()
        <<endl;
        age.pop(); }
    return 0;
}
```

→ O/P → Front element is : 21
Back : 24
Element in queue : 23
Element in queue : 24.