Algorithm: Eigenvalues of 2x2 matrix

Include predefined class libraries / header files in the program using preprocessor directive #include <iostream> , <cmath>

using namespace std;

Class declaration: declare a class “eigenvalue”

Private member declaration:

Data variables:
declare float type data variables “a,b,c,d,deter,dis,t,l1,l2,real,imag”

Public member declaration:
Declare member function (1) getdata (2) calculate of type void

Member function definitions:
Define member functions getdata using scope resolution operator

“void eigenvalue::getdata()”

Get input from user:

"Enter matrix elements a11,a12,a21,a22"

The input is written in allocated memory space using
cin>>a>>b>>c>>d;

Member function definition:
Define member functions calculate using scope resolution operator
“void eigenvalue::calculate()”

Perform the calculations

```
deter=(a*d)-(b*c);                                          //calculate determinant
 cout<<"Determinant of the given matrix is "<<deter<<endl;
 t=a+d;                                                     //calculate trace
 cout<<"Trace is "<<t<<endl;
 dis=(t*t)-(4*deter);                                       //calculate discriminant
 cout<<"Discriminant is "<<dis<<endl;

 if(dis>0)                                                  //if loop condition
 {
    cout<<"eigen values are real and different"<<endl;
    l1=(t/2)+sqrt(dis)/2;                                   //calculate eigenvalues
    l2=(t/2)-sqrt(dis)/2;
    cout<<"eigen value of given matrix are "<<l1<<" and "<<l2<<endl;
 }

 else if(dis==0)                                            //if loop condition
 {
```

```
    cout<<"eigen values are real and equal"<<endl;
    l1=t/2;                                                    //calculate eigenvalues
    l2= t/2;
    cout<<"eigen value of given matrix are "<<l1<<" and "<<l2<<endl;
  }

  else if(dis<0)                                               //if loop condition
  {
    cout<<"eigen values are complex no"<<endl;
    real=(t/2);                                                //calculate eigenvalues
    imag= (sqrt(-dis))/2;
    cout<<"First eigen value of given matrix are "<<real<<"+i"<<imag<<endl;
    cout<<"Second eigen value of given matrix are "<<real<<"-i"<<imag<<endl;
  }
```

Inside the main function of type integer , create an object of class eigenvalue and named e. Use this object to call public member functions and terminate the program using return 0 statement

```
int main()
{
eigenvalue e;                                                  //create object
e.getdata();                                                   //member function calling
e.calculate();
return 0;                                                      //program termination
}
```