1. Define a class 'product' with data members pcode, pname and price. Create 3 objects of the class and find the product having the lowest price.

Program:

```java
import java.util.Scanner;

class Product {
    String pcode;
    String pname;
    double price;

    public Product(String pcode, String pname, double price) {
        this.pcode = pcode;
        this.pname = pname;
        this.price = price;
    }
}

class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);


        Product[] products = new Product[3];
        System.out.println(" Abhirami Vinod \n 23MCA002 \n 13-FEB-2024");
        for (int i = 0; i < products.length; i++) {
            System.out.println("Enter details for product " + (i + 1) + ":");
            System.out.print("Product code: ");
            String pcode = scanner.nextLine();
            System.out.print("Product name: ");
            String pname = scanner.nextLine();
            System.out.print("Price: ");
            double price = scanner.nextDouble();
            scanner.nextLine();
            products[i] = new Product(pcode, pname, price);
        }


        Product lowestPriceProduct = products[0];
```
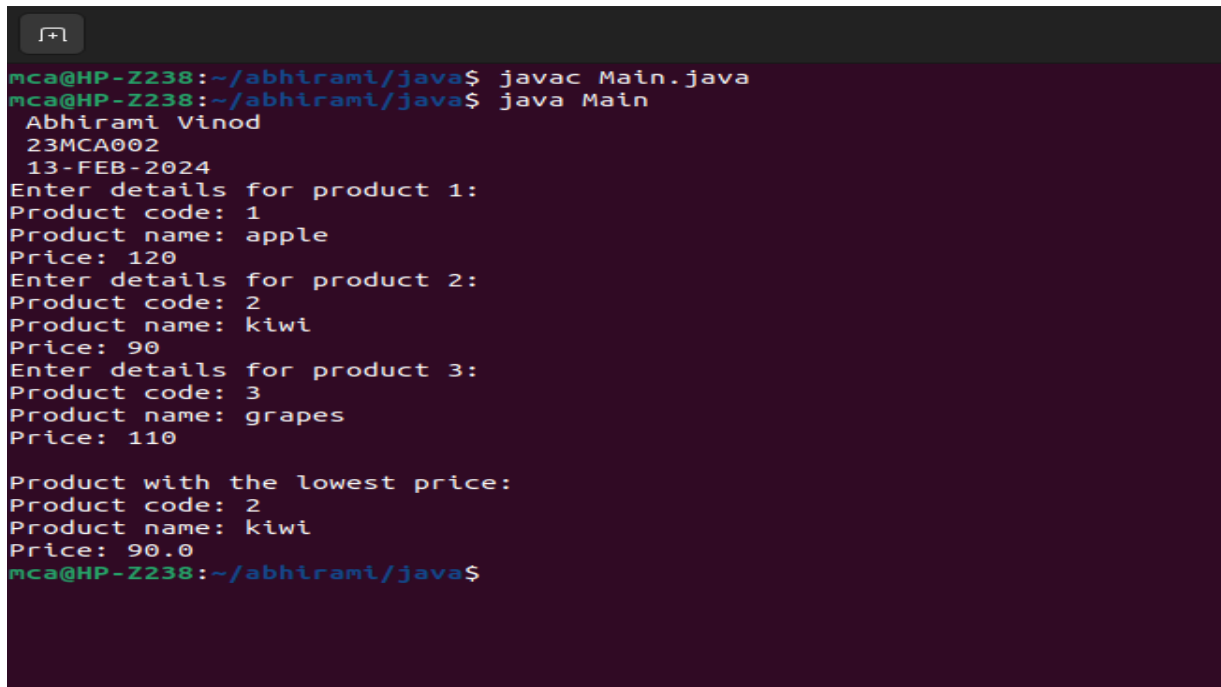
```java
        for (int i = 1; i < products.length; i++) {
           if (products[i].price < lowestPriceProduct.price) {
              lowestPriceProduct = products[i];
           }
        }



        System.out.println("\nProduct with the lowest price:");
        System.out.println("Product code: " + lowestPriceProduct.pcode);
        System.out.println("Product name: " + lowestPriceProduct.pname);
        System.out.println("Price: " + lowestPriceProduct.price);

        scanner.close();
     }
  }
```
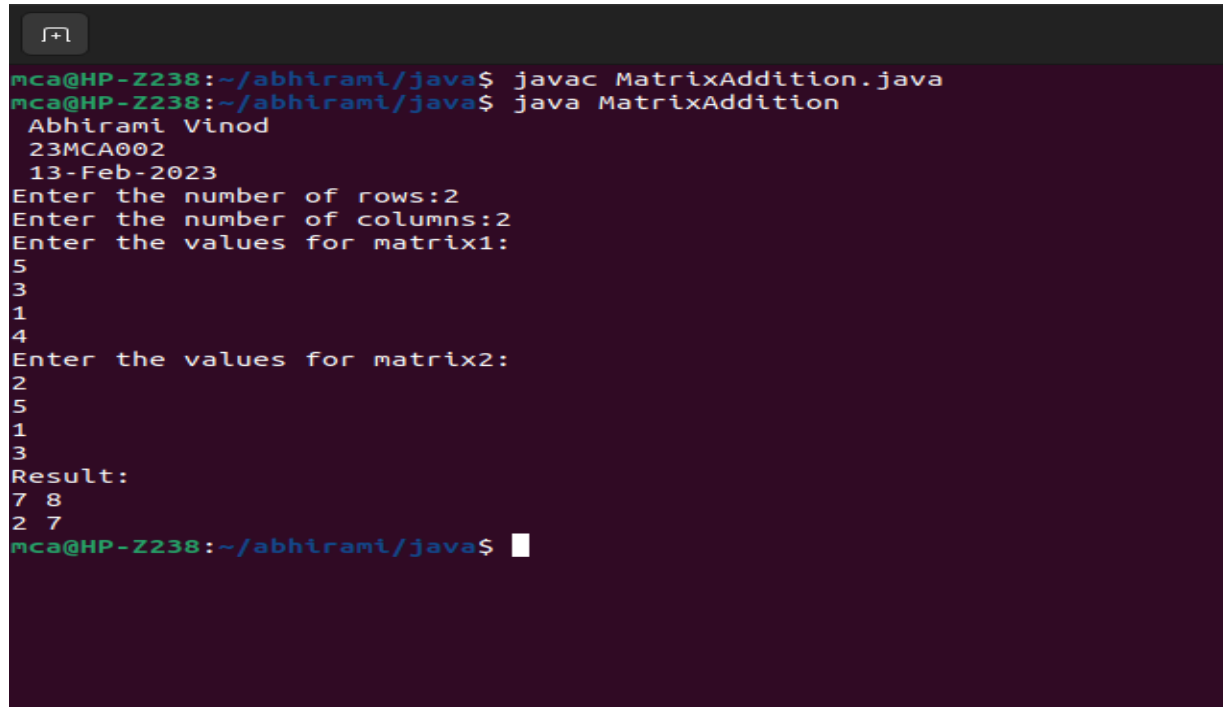
Output:

```
mca@HP-Z238:~/abhirami/java$ javac Main.java
mca@HP-Z238:~/abhirami/java$ java Main
 Abhirami Vinod
 23MCA002
 13-FEB-2024
Enter details for product 1:
Product code: 1
Product name: apple
Price: 120
Enter details for product 2:
Product code: 2
Product name: kiwi
Price: 90
Enter details for product 3:
Product code: 3
Product name: grapes
Price: 110

Product with the lowest price:
Product code: 2
Product name: kiwi
Price: 90.0
mca@HP-Z238:~/abhirami/java$
```

2. Read 2 matrices from the console and perform matrix addition.

Program:

```java
import java.util.Scanner;
public class MatrixAddition{
public static void main(String[]args)
{
System.out.println(" Abhirami Vinod\n 23MCA002\n 13-Feb-2023");
Scanner scanner=new Scanner(System.in);
System.out.print("Enter the number of rows:");
int rows=scanner.nextInt();
System.out.print("Enter the number of columns:");
int cols=scanner.nextInt();
int[][] matrix1=new int[rows][cols];
System.out.println("Enter the values for matrix1:");
for(int i=0;i<rows;i++){
for(int j=0;j<cols;j++){
matrix1[i][j]=scanner.nextInt();
}
}
int[][] matrix2=new int[rows][cols];
System.out.println("Enter the values for matrix2:");
for(int i=0;i<rows;i++){
for(int j=0;j<cols;j++){
matrix2[i][j]=scanner.nextInt();
}
}
int[][] result=new int[rows][cols];
for(int i=0;i<rows;i++){
for(int j=0;j<cols;j++){
result[i][j]=matrix1[i][j]+matrix2[i][j];
}
}
System.out.println("Result:");
for(int i=0;i<rows;i++){
for(int j=0;j<cols;j++){
System.out.print(result[i][j]+" ");
}
System.out.println();
```

```
    }

    scanner.close();
    }
}
```

Output:

```
mca@HP-Z238:~/abhirami/java$ javac MatrixAddition.java
mca@HP-Z238:~/abhirami/java$ java MatrixAddition
 Abhirami Vinod
 23MCA002
 13-Feb-2023
Enter the number of rows:2
Enter the number of columns:2
Enter the values for matrix1:
5
3
1
4
Enter the values for matrix2:
2
5
1
3
Result:
7 8
2 7
mca@HP-Z238:~/abhirami/java$
```

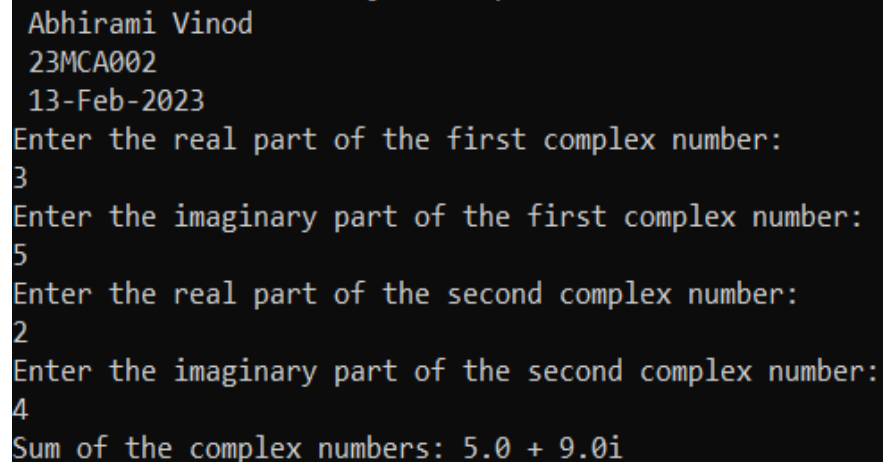## 3. Add complex numbers

Program:

```java
import java.util.Scanner;

public class Complex {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
            System.out.println(" Abhirami Vinod\n 23MCA002\n 13-Feb-2023");

        System.out.println("Enter the real part of the first complex number:");
        double real1 = scanner.nextDouble();
        System.out.println("Enter the imaginary part of the first complex number:");
        double imaginary1 = scanner.nextDouble();

        System.out.println("Enter the real part of the second complex number:");
        double real2 = scanner.nextDouble();
        System.out.println("Enter the imaginary part of the second complex number:");
        double imaginary2 = scanner.nextDouble();
        double sumReal = real1 + real2;
        double sumImaginary = imaginary1 + imaginary2;
        System.out.println("Sum of the complex numbers: " + sumReal + " + " +     sumImaginary
    + "i");
        scanner.close();
    }
}
```
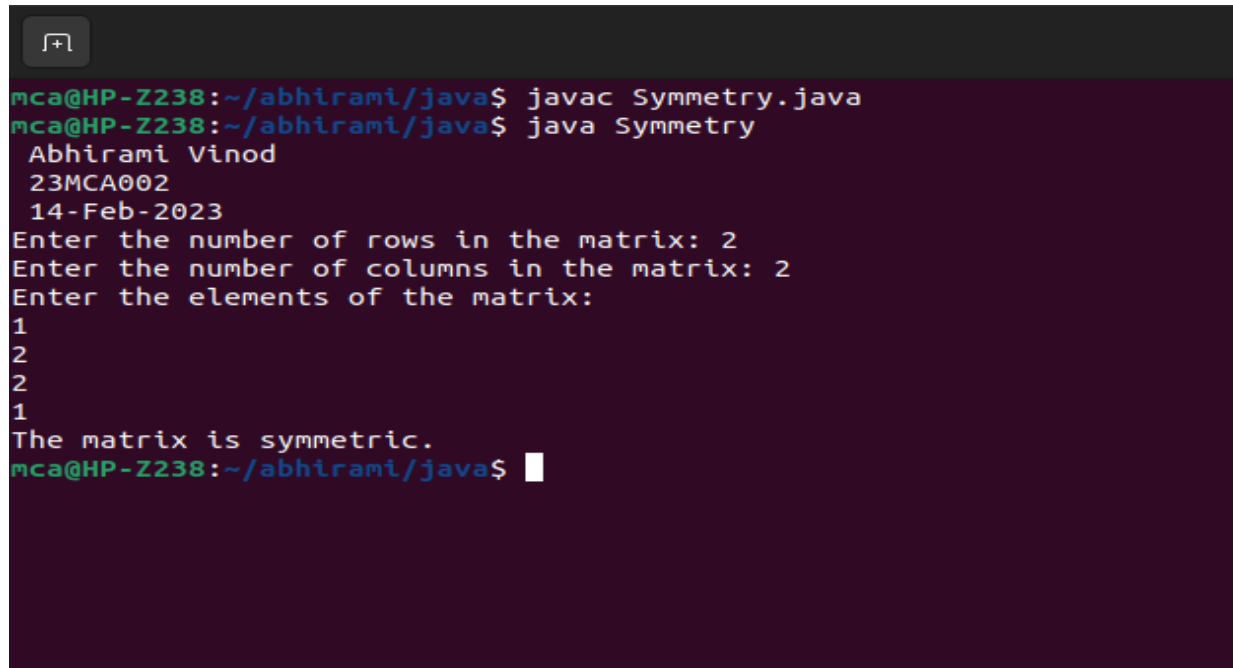
Output:

```
 Abhirami Vinod
 23MCA002
 13-Feb-2023
Enter the real part of the first complex number:
3
Enter the imaginary part of the first complex number:
5
Enter the real part of the second complex number:
2
Enter the imaginary part of the second complex number:
4
Sum of the complex numbers: 5.0 + 9.0i
```

4. Read a matrix from the console and check whether it is symmetric or not.

Program:

```java
import java.util.Scanner;
public class Symmetry{
public static void main(String[] args)
{
System.out.println(" Abhirami Vinod\n 23MCA002\n 14-Feb-2023");
Scanner input=new Scanner(System.in);
System.out.print("Enter the number of rows in the matrix: ");
int rows = input.nextInt();
System.out.print("Enter the number of columns in the matrix: ");
int cols = input.nextInt();
int[][] matrix = new int[rows][cols];
System.out.println("Enter the elements of the matrix:");
for (int i = 0; i < rows; i++) {
for (int j = 0; j < cols; j++) {
matrix[i][j] = input.nextInt();
}
}
boolean isSymmetric = true;
for (int i = 0; i < rows; i++) {
for (int j = 0; j < cols; j++) {
if (matrix[i][j] != matrix[j][i]) {
isSymmetric = false;
break;
}
}
if (!isSymmetric) {
break;
}
}
if (isSymmetric) {
System.out.println("The matrix is symmetric.");
} else {
System.out.println("The matrix is not symmetric.");
}
}
}
```

Output:

```
mca@HP-Z238:~/abhirami/java$ javac Symmetry.java
mca@HP-Z238:~/abhirami/java$ java Symmetry
 Abhirami Vinod
 23MCA002
 14-Feb-2023
Enter the number of rows in the matrix: 2
Enter the number of columns in the matrix: 2
Enter the elements of the matrix:
1
2
2
1
The matrix is symmetric.
mca@HP-Z238:~/abhirami/java$
```

5. Create CPU with attribute price. Create inner class Processor (no. of cores, manufacturer)

and static nested class RAM (memory, manufacturer). Create an object of CPU and print information of Processor and RAM.
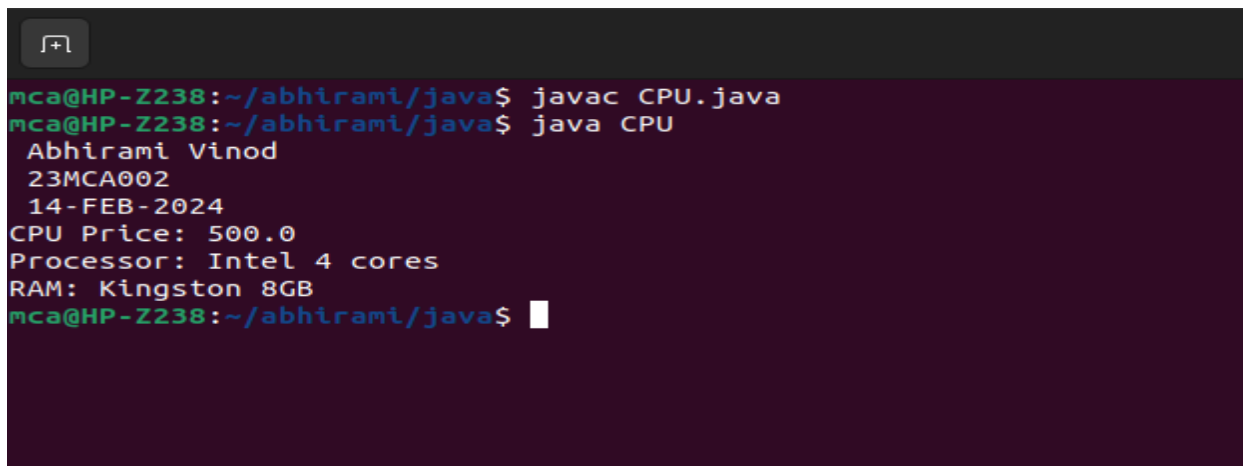
Program:

```
public class CPU {
private double price;
private Processor processor;
private RAM ram;
public CPU(double price, Processor processor, RAM ram) {
this.price = price;
this.processor = processor;
this.ram = ram;
}
public double getPrice() {
return price;
}
public Processor getProcessor() {
return processor;
}
public RAM getRam() {
return ram;
}
public static class Processor {
private int numberOfCores;
private String manufacturer;
public Processor(int numberOfCores, String manufacturer) {
this.numberOfCores = numberOfCores;
this.manufacturer = manufacturer;
}
public int getNumberOfCores() {
return numberOfCores;
}
public String getManufacturer() {
return manufacturer;
}
}
public static class RAM {
```

```java
private int memory;
private String manufacturer;
public RAM(int memory, String manufacturer) {
this.memory = memory;
this.manufacturer = manufacturer;
}
public int getMemory() {
return memory;
}
public String getManufacturer() {
return manufacturer;
}
}
public static void main(String[] args) {
System.out.println(" Abhirami Vinod \n 23MCA002 \n 14-FEB-2024");
Processor processor = new Processor(4, "Intel");
RAM ram = new RAM(8, "Kingston");
CPU cpu = new CPU(500.0, processor, ram);
System.out.println("CPU Price: " + cpu.getPrice());
System.out.println("Processor: " + cpu.getProcessor().getManufacturer() + " " +
cpu.getProcessor().getNumberOfCores() + " cores");
System.out.println("RAM: " + cpu.getRam().getManufacturer() + " " +
cpu.getRam().getMemory() + "GB");
}
}
```

Output:

```
mca@HP-Z238:~/abhirami/java$ javac CPU.java
mca@HP-Z238:~/abhirami/java$ java CPU
 Abhirami Vinod
 23MCA002
 14-FEB-2024
CPU Price: 500.0
Processor: Intel 4 cores
RAM: Kingston 8GB
mca@HP-Z238:~/abhirami/java$
```