Program :1

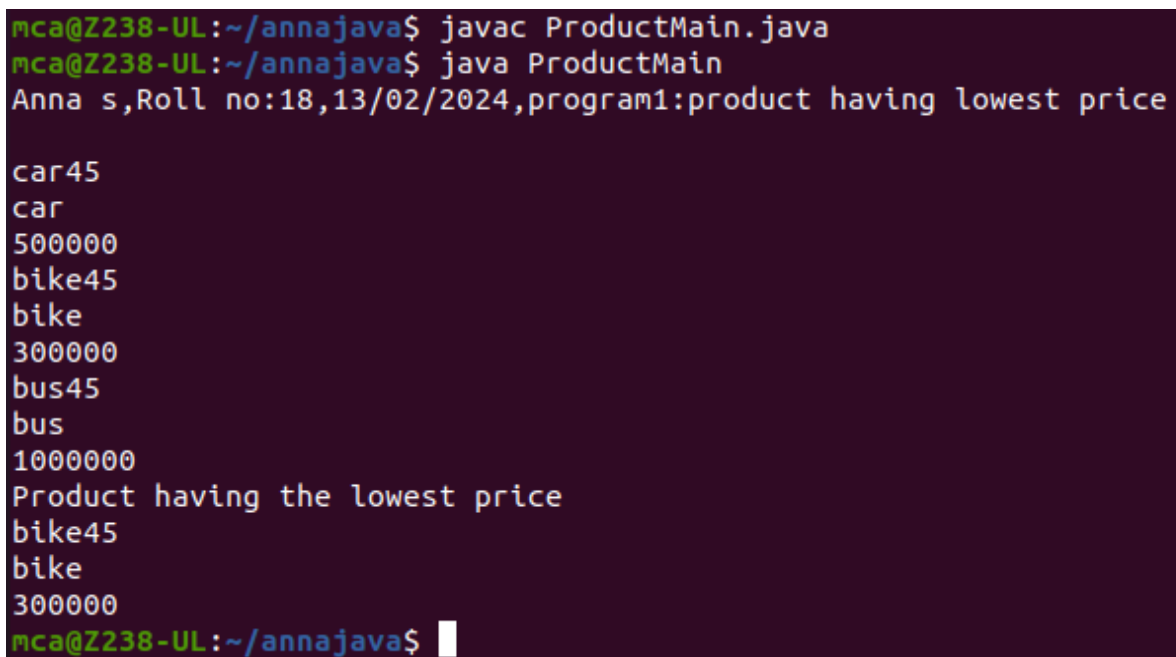**Aim:**Define a class 'product' with data members pcode, pname and price. Create 3 objects of the class and find the product having the lowest price.

Source Code:
```java
import java.io.*;
class Product{
int price;
String pcode,pname;
public Product(String pcode,String pname,int price){
this.pcode=pcode;
this.pname=pname;
this.price=price;
}
String getPcode(){
return pcode;
}
String getPname(){

return pname;
}
int price(){
return price;
}
void display(){
System.out.println(this.pcode);
System.out.println(this.pname);
System.out.println(this.price);
}
}
class ProductMain{
public static void main(String args[]){
System.out.println("Anna s,Roll no:18,13/02/2024,program1:product having lowest price \n");
Product p1=new Product("car45","car",500000 );
p1.display();
Product p2=new Product("bike45","bike",300000);
p2.display();
Product p3=new Product("bus45","bus",1000000);
p3.display();
Product p;
System.out.println("Product having the lowest price");
if(p1.price<p2.price){
if(p1.price<p3.price){
p=p1;
}
else{
p=p3;
}
}
```

```
else{
if(p2.price<p3.price){
p=p2;
}
else{
p=p3;
}
}
p.display();
}
}
```

Output:

```
mca@Z238-UL:~/annajava$ javac ProductMain.java
mca@Z238-UL:~/annajava$ java ProductMain
Anna s,Roll no:18,13/02/2024,program1:product having lowest price

car45
car
500000
bike45
bike
300000
bus45
bus
1000000
Product having the lowest price
bike45
bike
300000
mca@Z238-UL:~/annajava$
```

Program :2

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

Source Code:
```java
import java.io.*;
import java.util.*;
class MatrixMain{
public static void main(String[] args){
Scanner in=new Scanner(System.in);
System.out.println("Anna s,Roll no:18,13/2/2024,program2: matrix addition");
System.out.println("enter the order of matrix");
int m=in.nextInt();
int n=in.nextInt();
int matrix1[][]=new int[m][n];
int matrix2[][]=new int[m][n];
int matrix3[][]=new int[m][n];
System.out.println("enter the elements of matrix1");
for(int i=0;i<m;i++)
{
for(int j=0;j<n;j++)
{
matrix1[i][j]=in.nextInt();
}
}
System.out.println("enter the elements of matrix2");
for(int i=0;i<m;i++)
{
for(int j=0;j<n;j++)
{
matrix2[i][j]=in.nextInt();
}
}
for(int i=0;i<m;i++)
{
for(int j=0;j<n;j++)
{
matrix3[i][j]=matrix1[i][j]+matrix2[i][j];
}
}
System.out.println("The sum of two matrix:");
for(int i=0;i<m;i++)
{
for(int j=0;j<n;j++)
{
System.out.print(matrix3[i][j]+" ");
}
System.out.println();
}
}
}
```

Output:

4

```
mca@Z238-UL:~/annajava$ javac MatrixMain.java
mca@Z238-UL:~/annajava$ java MatrixMain
Anna s,Roll no:18,13/2/2024,program2: matrix addition
enter the order of matrix
2
2
enter the elements of matrix1
1
2
3
4
enter the elements of matrix2
5
4
3
2
The sum of two matrix:
6 6
6 6
mca@Z238-UL:~/annajava$
```

Program :3

Aim: Add complex numbers

Source Code:
```java
import java.io.*;
import java.util.*;
class Complex
{
int r,img;
public Complex()
{
}
public Complex(int real,int image)
{
r=real;
img=image;
}
void display(int real,int image)
{
System.out.println(real+" +i"+image);
}
}
class ComplexMain
{
public static void main(String[] args)
{
Scanner in=new Scanner(System.in);
System.out.println("Anna s Rollno:18,14/2/2024,program3:Add complex numbers ");
System.out.println("enter real part of first complex number");
int r1=in.nextInt();
System.out.println("enter image part of first complex number");
int i1=in.nextInt();
System.out.println("enter real part of second complex number");
int r2=in.nextInt();
System.out.println("enter image part of second complex number");
int i2=in.nextInt();
Complex c1=new Complex(r1,i1);
System.out.println("first complex number is:");
c1.display(r1,i1);
Complex c2=new Complex(r2,i2);
c2.display(r2,i2);
int creal=c1.r+c2.r;
int cimage=c1.img+c2.img;
System.out.print("sum of two complex number=");
Complex c=new Complex();
c.display(creal,cimage);
}
}
```

Output:

```
mca@Z238-UL:~/annajava$ javac ComplexMain.java
mca@Z238-UL:~/annajava$ java ComplexMain
Anna s Rollno:18,14/2/2024,program3:Add complex numbers
enter real part of first complex number
2
enter image part of first complex number
3
enter real part of second complex number
4
enter image part of second complex number
5
first complex number is:
2 +i3
4 +i5
sum of two complex number=6 +i8
mca@Z238-UL:~/annajava$
```
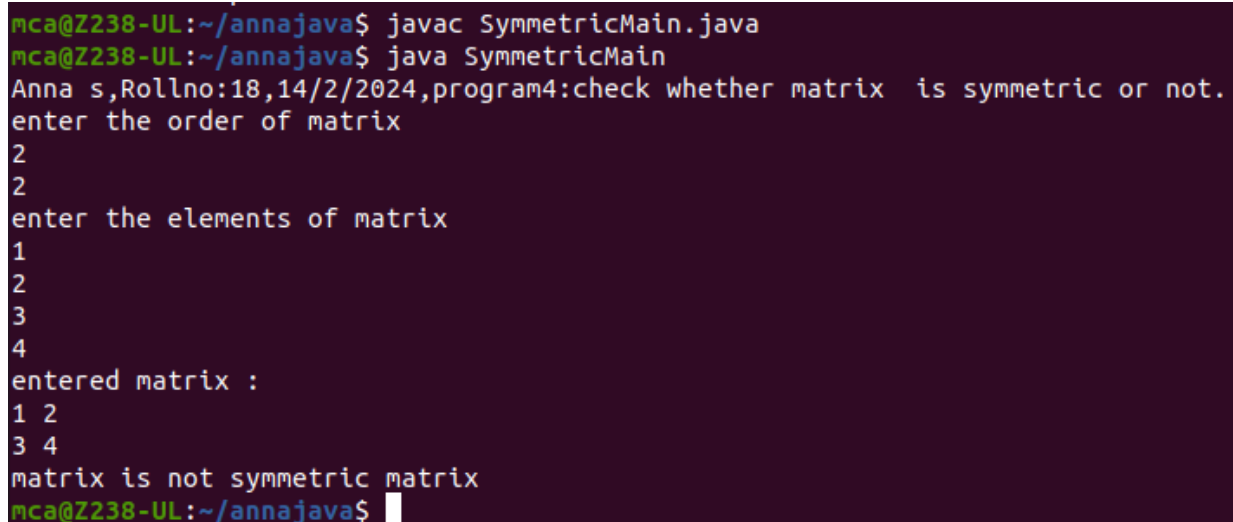
Program :4

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

Source Code:
```java
import java.io.*;
import java.util.*;
class SymmetricMain
{
public static void main(String[] args)
{
Scanner in=new Scanner(System.in);
System.out.println("Anna s,Rollno:18,14/2/2024,program4:check whether matrix  is symmetric or not. ");
System.out.println("enter the order of matrix");
int m=in.nextInt();
int n=in.nextInt();
int matrix1[][]=new int[m][n];
int matrix2[][]=new int[m][n];
System.out.println("enter the elements of matrix");
for(int i=0;i<m;i++)
{
for(int j=0;j<n;j++)
{
matrix1[i][j]=in.nextInt();
}
}
System.out.println("entered matrix :");

for(int i=0;i<m;i++)
{
for(int j=0;j<n;j++)
{
System.out.print(matrix1[i][j]+" ");
}
System.out.println();
}
if(m != n)
{
System.out.println("cannot find symmetric");
}
else
{
 boolean sym=true;
 for(int i=0;i<m;i++)
 {
 for(int j=0;j<n;j++)
 {
```

```
 if(matrix1[i][j]!=matrix1[j][i])
 sym=false;
}
}
if(sym)
{
System.out.println("matrix is symmetric matrix");
}
else
{
System.out.println("matrix is not symmetric matrix");
}
}
}
}
```

Output:

```
mca@Z238-UL:~/annajava$ javac SymmetricMain.java
mca@Z238-UL:~/annajava$ java SymmetricMain
Anna s,Rollno:18,14/2/2024,program4:check whether matrix  is symmetric or not.
enter the order of matrix
2
2
enter the elements of matrix
1
2
3
4
entered matrix :
1 2
3 4
matrix is not symmetric matrix
mca@Z238-UL:~/annajava$
```

Program :5

Aim: 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.

Source Code:

```
class CPU{
double price;
class Processor{
double cores;
String manufacturer;
double getCache(){
return 2.3;
}
}
protected class RAM{
double memory;
String manufacturer;
double getClockSpeed(){
return 4.5;
}
}
}
public class CPUMain{
public static void main(String[] args){
System.out.println("Anna s,Rollno:18,14/2/2024,program5:cpu and its details using inner classes");

CPU cpu = new CPU();
CPU.Processor processor=cpu.new  Processor();

CPU.RAM ram=cpu.new RAM();
System.out.println("Processor Cache:"+processor.getCache());
System.out.println("Ram Clock speed:"+ram.getClockSpeed());
}
}
```

Output:

```
mca@Z238-UL:~/annajava$ javac CPU.java
mca@Z238-UL:~/annajava$ java CPUMain
Anna s,Roll no:18,14/2/2024,program5:cpu and its details using inner classes
Processor Cache = 2.3
Ram Clock speed = 4.5
mca@Z238-UL:~/annajava$
```