Experiment No: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.

CO1: Understand object-oriented concepts and design classes and objects to solve problems

Program:

```java
import java.util.*;

public class prod
{
        int pcode;
        String pname;
        int price;
        public void get()   //get is just a variable
        {
                Scanner sc=new Scanner(System.in);
                System.out.println("Enter your product code");
                pcode=sc.nextInt();
                System.out.println("Enter your Product Name:");
                pname=sc.next();
                System.out.println("Enter your Price:");
                price=sc.nextInt();
        }
        public void view() //view is just a variable
        {
        System.out.println("******* PRODUCT INFO ***********");
        System.out.println("Product Code:"+pcode);
        System.out.println("Product Name:"+pname);
        System.out.println("Price:"+price);
        }


        public static void  main(String[] args)
        {
                prod p1=new prod();
```

```java
prod p2=new prod();

prod p3=new prod();

p1.get();

p2.get();

p3.get();

p1.view();

p2.view();

p3.view();

if(p1.price < p2.price && p1.price < p3.price)

{

        System.out.println("Product #1  has the lowest price :"+p1.price);

}

else if(p2.price < p1.price && p2.price < p3.price)

{

        System.out.println("Product #2 has the lowest price :"+p2.price);

}

else if(p3.price < p2.price && p3.price < p1.price)

{

        System.out.println("Product #3 has the lowest price :"+p3.price);

}


        }

}
```

Output Screenshot:

```
C:\Users\ajcemca\Desktop\Shyam>java prod
Enter your product code
100
Enter your Product Name:
A
Enter your Price:
300
Enter your product code
102
Enter your Product Name:
B
Enter your Price:
200
Enter your product code
103
Enter your Product Name:
C
Enter your Price:
330
******* PRODUCT INFO ************
Product Code:100
Product Name:A
Price:300
******* PRODUCT INFO ************
Product Code:102
Product Name:B
Price:200
******* PRODUCT INFO ************
Product Code:103
Product Name:C
Price:330
Product #2 has the lowest price :200
```

Result:

The program has been executed successfully and the result is obtained. Thus CO1 is attained.

Experiment No:2

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

CO1: Understand object-oriented concepts and design classes and objects to solve problems

Program:

```java
import java.util.*;


class MatrixClass {

        Scanner sc = new Scanner(System.in);


        public int[][] setfn(int r, int c) {

                int[][] arr = new int[r][c];

                for (int i = 0; i < r; i++) {

                        for (int j = 0; j < c; j++) {

                                System.out.print("element: ");

                                arr[i][j] = sc.nextInt();

                        }

                }

                return arr;

        }

}


public class Matrix {

        public static void main(String[] args) {

                Scanner sc = new Scanner(System.in);

                System.out.print("Enter the number of rows: ");

                int r1 = sc.nextInt();

                System.out.print("Enter the number of columns: ");

                int c1 = sc.nextInt();

                System.out.print("Enter the number of rows: ");
```

```java
        int r2 = sc.nextInt();

        System.out.print("Enter the number of columns: ");

        int c2 = sc.nextInt();


        // ADDITION

        if ((r1 != r2) || (c1 != c2)) {

                System.out.println("Addition is not Possible");

        } else {

                System.out.println("Enter Matrix 1:");

                MatrixClass m1 = new MatrixClass();

                int[][] arr1 = m1.setfn(r1, c1);


                System.out.println("Enter Matrix 2:");

                MatrixClass m2 = new MatrixClass();

                int[][] arr2 = m2.setfn(r2, c2);


                int[][] res_arr = new int[r1][c1];

                for (int i = 0; i < r1; i++) {

                        for (int j = 0; j < c1; j++) {

                                res_arr[i][j] = arr1[i][j] + arr2[i][j];

                        }

                }


                System.out.println("Resultant Matrix:");

                for (int i = 0; i < r1; i++) {

                        for (int j = 0; j < c1; j++) {

                                System.out.print(res_arr[i][j] + " ");

                        }

                        System.out.println();

                }

        }

    }

}
```

Output:

```
C:\Users\ajcemca\Desktop\Shyam>javac Matrix.java

C:\Users\ajcemca\Desktop\Shyam>java Matrix
Enter the number of rows: 2
Enter the number of columns: 2
Enter the number of rows: 3
Enter the number of columns: 3
Addition is not Possible

C:\Users\ajcemca\Desktop\Shyam>
```

Result:

The program has been executed successfully and the result is obtained. Thus CO1 is attained.

Experiment No:3

Aim: Add complex numbers

CO1: Understand object-oriented concepts and design classes and objects to solve problems

Program:

```java
import java.util.Scanner;
public class Addcomplex
{
        public static void main(String[] args)
        {
                Scanner obj=new Scanner(System.in);
                System.out.println("Enter real and imaginary part of first");
                Integer fr=obj.nextInt();
                Integer fi=obj.nextInt();
                System.out.println("Enter real and imaginary part of second");
                Integer sr=obj.nextInt();
                Integer si=obj.nextInt();
                Integer res=fr+sr;
                Integer res2=fi+si;
                System.out.println("Sum of complex nos is is "+res+ "+" +res2+"i");
        }
}
```

Output:

```
C:\Users\ajcemca\Desktop\Shyam>javac Addcomplex.java

C:\Users\ajcemca\Desktop\Shyam>java Addcomplex
Enter real and imaginary part of first
1
2
Enter real and imaginary part of second
3
4
Sum of complex nos is is 4+6i

C:\Users\ajcemca\Desktop\Shyam>
```

Result:

The program has been executed successfully and the result is obtained. Thus CO1 is attained.

Experiment No:4

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

CO1: Understand object-oriented concepts and design classes and objects to solve problems

Program:

```java
import java.util.*;

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

        System.out.print("Enter the number of rows of Matrix :");
        int r = sc.nextInt();
        System.out.print("Enter the number of columns of Matrix :");
        int c = sc.nextInt();
        int flag = 1;

        int arr1[][] = new int[r][c];
        System.out.println("Enter the Elements");
        for (int i = 0; i < r; i++) {
            for (int j = 0; j < c; j++) {
                arr1[i][j] = sc.nextInt();
            }
        }

        System.out.print("\nMatrix Entered");
        for (int i = 0; i < r; i++) {
```

```java
                System.out.print("\n");

                for (int j = 0; j < c; j++) {

                        System.out.print(arr1[i][j] + " ");

                }

        }


        // PRINTING TRANSPOSE

        System.out.print("\nMatrix Transpose");

        for (int i = 0; i < r; i++) {

                System.out.print("\n");

                for (int j = 0; j < c; j++) {

                        System.out.print(arr1[j][i] + " ");

                }

        }


        // CHECKING

        for (int i = 0; i < r; i++) {

                System.out.print("\n");

                for (int j = 0; j < c; j++) {

                        if ((arr1[i][j]) != (arr1[j][i])) {

                                flag = 0;

                        }

                }

        }

        if (flag == 0) {

                System.out.println("MATRIX IS NOT SYMMETRIC");

        } else {

                System.out.println("MATRIX IS SYMMETRIC ");

        }

    }

}
```

Output:

```
C:\Users\ajcemca\Desktop\Shyam>javac matsym1.java

C:\Users\ajcemca\Desktop\Shyam>java matsym1
Enter the number of rows of Matrix :2
Enter the number of columns of Matrix :2
Enter the Elements
3
5
3
1

Matrix Entered
3 5
3 1
Matrix Transpose
3 3
5 1

MATRIX IS NOT SYMMETRIC

C:\Users\ajcemca\Desktop\Shyam>
```

Result:

The program has been executed successfully and the result is obtained. Thus CO1 is attained.

Experiment No: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.

CO1: Understand object-oriented concepts and design classes and objects to solve problems

Program:

```
import java.util.*;
class CPU
{
        int price;
        CPU()
        {
                Scanner obj=new Scanner(System.in);
                System.out.println("Enter the price:");
                price=obj.nextInt();
        }
        public void display()
        {
                System.out.println("Price :"+price);
        }
        class Processor
        {
                int core;
                String Manufacture;
                Processor()
                {
```

```java
                Scanner obj1=new Scanner(System.in);

                System.out.println("Enter the core:");

                core=obj1.nextInt();

                System.out.println("Enter the Manufacture:");

                Manufacture=obj1.next();

        }

        public void display1()

        {

                System.out.println("Core :"+core);

                System.out.println("Manufacture :"+Manufacture);

        }

    }

    static class r

    {

        int mem;

        String Manufacture1;

        r()

        {

            Scanner obj2=new Scanner(System.in);

            System.out.println("Enter the mem:");

            mem=obj2.nextInt();

            System.out.println("Enter the Manufacture:");

            Manufacture1=obj2.next();

        }

        public void display2()

        {

            System.out.println("mem :"+mem);

            System.out.println("Manufacture :"+Manufacture1);

        }

    }

}

public class CpuDetails

{
```
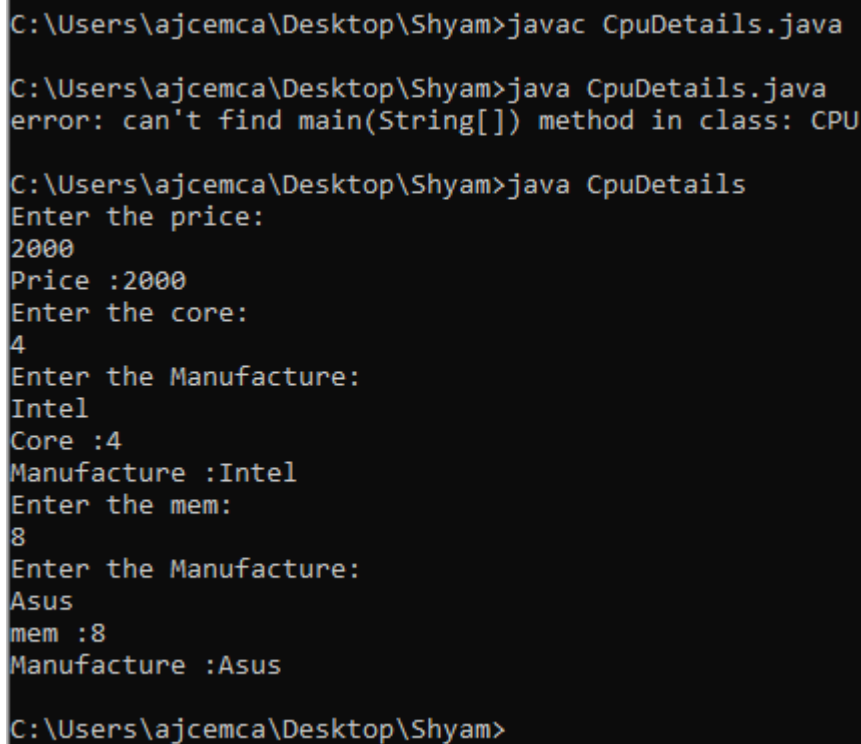
```java
public static void main(String args[])

{

        CPU c=new CPU();

        c.display();

        CPU.Processor s= c.new Processor();

        s.display1();

        CPU.r p=new CPU.r();

        p.display2();

}

}
```

Output:

```
C:\Users\ajcemca\Desktop\Shyam>javac CpuDetails.java

C:\Users\ajcemca\Desktop\Shyam>java CpuDetails.java
error: can't find main(String[]) method in class: CPU

C:\Users\ajcemca\Desktop\Shyam>java CpuDetails
Enter the price:
2000
Price :2000
Enter the core:
4
Enter the Manufacture:
Intel
Core :4
Manufacture :Intel
Enter the mem:
8
Enter the Manufacture:
Asus
mem :8
Manufacture :Asus

C:\Users\ajcemca\Desktop\Shyam>
```

Result:

The program has been executed successfully and the result is obtained. Thus CO1 is attained.