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.

Code :

```
import java.util.Scanner;

class ProductClass{
	String pname;
	int pcode;
	int price;
	public ProductClass(String name,int code,int price){
		this.pname = name;
		this.pcode = code;
		this.price = price;
	}
}
class Product {

	public static void main(String[] arguments){
		System.out.println("\nName : Sreyas Satheesh\nRoll.no : 53\nTitle :
Product Class\nDate : 13/02/2024\n");

		Scanner scan = new Scanner(System.in);
		System.out.print("\nEnter the code of the first product : ");
		int code1 = scan.nextInt();
		System.out.print("Enter the name of the first product : ");
		scan.nextLine();
		String name1 = scan.nextLine();
		System.out.print("Enter the price of the first product : ");
		int price1 = scan.nextInt();

		System.out.print("\nEnter the code of the second product : ");
		int code2 = scan.nextInt();
		System.out.print("Enter the name of the second product : ");
		scan.nextLine();
		String name2 = scan.nextLine();
		System.out.print("Enter the price of the second product : ");
		int price2 = scan.nextInt();

		System.out.print("\nEnter the code of the third product : ");
		int code3 = scan.nextInt();
		System.out.print("Enter the name of the third product : ");
		scan.nextLine();
```

```
            String name3 = scan.nextLine();
            System.out.print("Enter the price of the third product : ");
            int price3 = scan.nextInt();

            ProductClass obj1 = new ProductClass(name1, code1, price1);
            ProductClass obj2 = new ProductClass(name2, code2, price2);
            ProductClass obj3 = new ProductClass(name3, code3, price3);

            ProductClass minimum = obj1.price < obj2.price ? obj1 : obj2;
            minimum = minimum.price < obj3.price ? minimum : obj3;
            System.out.println("\nThe product with the smallest price is " +
minimum.pname + " with a price of " + minimum.price + "\n");
        }
}
```

Output :

```
sreyas@sreyas-hp-pavilion-gaming /m/c/c/L/s/O/cycle1> javac Product.java
sreyas@sreyas-hp-pavilion-gaming /m/c/c/L/s/O/cycle1> java Product

Name : Sreyas Satheesh
Roll.no : 53
Title : Product Class
Date : 13/02/2024


Enter the code of the first product : 100
Enter the name of the first product : Apple
Enter the price of the first product : 200

Enter the code of the second product : 101
Enter the name of the second product : Mango
Enter the price of the second product : 180

Enter the code of the third product : 102
Enter the name of the third product : Pineapple
Enter the price of the third product : 225

The product with the smallest price is Mango with a price of 180

sreyas@sreyas-hp-pavilion-gaming /m/c/c/L/s/O/cycle1>
```

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

Code :

```
import java.util.Scanner;

public class Matrix{
   public static void main(String[] args){
                System.out.println("\nName : Sreyas Satheesh\nRoll.no : 53\nTitle :
Matrix addition\nDate : 13/02/2024\n");

      Scanner read = new Scanner(System.in);
      System.out.println("Enter the rows and cols in the first matrix : ");
      int row1 = read.nextInt();
      int col1 = read.nextInt();
      int[][] mat1 = new int[row1][col1];
      System.out.println("Enter the first matrix");
      for(int i=0; i<row1; i++){
         for(int j=0;j<col1;j++){
            mat1[i][j] = read.nextInt();
         }
      }
      System.out.println("Enter the rows and cols in the second matrix : ");
      int row2 = read.nextInt();
      int col2 = read.nextInt();
      int[][] mat2 = new int[row2][col2];
      System.out.println("Enter the second matrix");
      for(int i=0; i<row1; i++){
         for(int j=0;j<col1;j++){
            mat2[i][j] = read.nextInt();
         }
      }
      System.out.println("first matrix is \n");
      for(int i=0; i<row1; i++){
         for(int j=0;j<col1;j++){
            System.out.print(mat1[i][j] + "\t");
         }
         System.out.print("\n");
      }
      System.out.println("second matrix is \n");
      for(int i=0; i<row2; i++){
         for(int j=0;j<col2;j++){
            System.out.print(mat2[i][j] + "\t");
         }
```

```
            System.out.print("\n");
        }
        // Adding matrices
        int add[][] = new int[row1][col1];
        if(row1 == row2 && col1 == col2){
            for(int i=0; i<row1; i++){
                for(int j=0; j<col1; j++){
                    add[i][j] = mat1[i][j] + mat2[i][j];
                }
            }
            System.out.println("added matrix is \n");
            for(int i=0; i<row1; i++){
                for(int j=0;j<col1;j++){
                    System.out.print(add[i][j] + "\t");
                }
                System.out.print("\n");
            }
        } else {
            System.out.println("Addition not possible.");
        }

        read.close();
    }
}
```

Output :

```
sreyas@sreyas-hp-pavilion-gaming /m/c/c/L/s/O/cycle1> javac Matrix.java
sreyas@sreyas-hp-pavilion-gaming /m/c/c/L/s/O/cycle1 (master)> java Matrix

Name : Sreyas Satheesh
Roll.no : 53
Title : Matrix addition
Date : 13/02/2024

Enter the rows and cols in the first matrix :
3 3
Enter the first matrix
1 2 3
4 5 6
7 8 9
Enter the rows and cols in the second matrix :
3 3
Enter the second matrix
9 8 7
6 5 4
3 2 1
first matrix is

1       2       3
4       5       6
7       8       9
second matrix is

9       8       7
6       5       4
3       2       1
added matrix is

10      10      10
10      10      10
10      10      10
sreyas@sreyas-hp-pavilion-gaming /m/c/c/L/s/O/cycle1 (master)>
```

3. Add complex numbers

Code :

```
import java.util.Scanner;

public class ComplexNumber{
   public static void main(String[] arg){
                System.out.println("\nName : Sreyas Satheesh\nRoll.no : 53\nTitle :
Addition of complex numbers numbers\nDate : 13/02/2024\n");
      class ComplexNumberClass{
         int real;
         int img;
         public ComplexNumberClass(int r, int i) {
            this.real = r;
            this.img = i;
         }
      }
      int a, b;
      Scanner scan = new Scanner(System.in);
      System.out.println("Enter the first complex number");
      System.out.print("Real part : ");
      a=scan.nextInt();
      System.out.print("Imaginary part : ");
      b=scan.nextInt();
      ComplexNumberClass first = new ComplexNumberClass(a, b);

      System.out.println("Enter the second complex number");
      System.out.print("Real part : ");
      a=scan.nextInt();
      System.out.print("Imaginary part : ");
      b=scan.nextInt();
      ComplexNumberClass second = new ComplexNumberClass(a, b);

      int real = first.real + second.real;
      int img = first.img + second.img;
      System.out.println("Sum of the complex number is : " + real + " + " + img + "i");

      scan.close();
   }
}
```

Output :

```
sreyas@sreyas-hp-pavilion-gaming /m/c/c/L/s/O/cycle1 (master)> javac ComplexNumber.java
sreyas@sreyas-hp-pavilion-gaming /m/c/c/L/s/O/cycle1 (master)> java ComplexNumber

Name : Sreyas Satheesh
Roll.no : 53
Title : Addition of complex numbers numbers
Date : 13/02/2024

Enter the first complex number
Real part : 5
Imaginary part : 3
Enter the second complex number
Real part : 6
Imaginary part : 2
Sum of the complex number is : 11 + 5i
sreyas@sreyas-hp-pavilion-gaming /m/c/c/L/s/O/cycle1 (master)>
```

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

Code :

```
import java.util.Scanner;

public class SymmetricMatrix{
   public static void main(String[] arg){
                System.out.println("Name : Sreyas Satheesh\nRoll.no : 53\nTitle :
Check for symmetric matrices\nDate : 13/02/2024\n");

      Scanner read = new Scanner(System.in);
      System.out.println("Enter the rows and cols of the matrix : ");
      int rows = read.nextInt();
      int columns = read.nextInt();
      int[][] matrix = new int[rows][columns];
      System.out.println("Enter the matrix elements : ");
      for(int i=0; i<rows; i++){
         for(int j=0;j<columns;j++){
            matrix[i][j] = read.nextInt();
         }
      }
      System.out.println("\nMatrix is");
      for(int i=0; i<rows; i++){
         for(int j=0;j<columns;j++){
            System.out.print(matrix[i][j] + "\t");
         }
         System.out.print("\n");
      }
      if(rows == columns){
         int flag=0;
         for(int i=0; i<rows; i++){
            for(int j=0;j<columns;j++){
               if(matrix[i][j] != matrix[j][i]){
                  flag=1;
                  break;
               }
            }
            if(flag == 1) break;
         }
         if(flag == 0){
            System.out.println("\nThe matrix is a Symmetric matrix.");
         } else {
            System.out.println("\nThe matrix is not a Symmetric matrix.");
```

```
            }
        } else {
            System.out.println("\nThe matrix is not a Symmetric matrix.");
        }

        read.close();
    }
}
```

Output :

```
sreyas@sreyas-hp-pavilion-gaming /m/c/c/L/s/O/cycle1 (master)> javac SymmetricMatrix.java
sreyas@sreyas-hp-pavilion-gaming /m/c/c/L/s/O/cycle1 (master)> java SymmetricMatrix
Name : Sreyas Satheesh
Roll.no : 53
Title : Check for symmetric matrices
Date : 13/02/2024

Enter the rows and cols of the matrix :
3 3
Enter the matrix elements :
1 5 6
5 9 3
6 3 4

Matrix is
1       5       6
5       9       3
6       3       4

The matrix is a Symmetric matrix.
sreyas@sreyas-hp-pavilion-gaming /m/c/c/L/s/O/cycle1 (master)>
```

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.

Code :

```
import java.util.Scanner;

class Cpu {
   private int price;

   public Cpu(int price) {
      this.price = price;
   }

   public void printCPUInfo() {
      Scanner scanner = new Scanner(System.in);
      System.out.println("Processor information");
      System.out.print("Number of cores : ");
      int noOfCores = scanner.nextInt();
      System.out.print("Manufacturer : ");
      scanner.nextLine();
      String ProcessorManufacturer = scanner.nextLine();
      System.out.println("RAM information");
      System.out.print("Memory size : ");
      int size = scanner.nextInt();
      System.out.print("Manufacturer : ");
      scanner.nextLine();
      String manufacturer = scanner.nextLine();
      scanner.close();

      System.out.println("\nCPU Price: " + price);
      System.out.println("Processor and RAM information:");

      Processor processor = new Processor(noOfCores, ProcessorManufacturer);
      RAM ram = RAM.getRAM(size, manufacturer);
      processor.printProcessorInfo();
      ram.printRAMInfo();
   }

   public static class Processor {
      private int numberOfCores;
      private String manufacturer;
```

```
        public Processor(int numberOfCores, String manufacturer) {
            this.numberOfCores = numberOfCores;
            this.manufacturer = manufacturer;
        }

        public void printProcessorInfo() {
            System.out.println("  Number of Cores: " + numberOfCores);
            System.out.println("  Manufacturer: " + manufacturer);
        }
    }

    public static class RAM {
        private int memory;
        private String manufacturer;

        private RAM(int memory, String manufacturer) {
            this.memory = memory;
            this.manufacturer = manufacturer;
        }

        public static RAM getRAM(int memory, String manufacturer) {
            return new RAM(memory, manufacturer); // Creates and returns a new RAM
object
        }

        public void printRAMInfo() {
            System.out.println("  RAM Size: " + memory + " GB");
            System.out.println("  Manufacturer: " + manufacturer);
        }
    }

    public static void main(String[] args) {
                    System.out.println("Name : Sreyas Satheesh\nRoll.no : 53\nTitle :
Display CPU specs\nDate : 13/02/2024\n");

        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the price of the cpu : ");
        Cpu cpu = new Cpu(scanner.nextInt());
        cpu.printCPUInfo();
        scanner.close();
    }
}
```

Output :

```
sreyas@sreyas-hp-pavilion-gaming /m/c/c/L/s/O/cycle1 (master)> javac Cpu.java
sreyas@sreyas-hp-pavilion-gaming /m/c/c/L/s/O/cycle1 (master)> java Cpu
Name : Sreyas Satheesh
Roll.no : 53
Title : Display CPU specs
Date : 13/02/2024

Enter the price of the cpu : 4000
Processor information
Number of cores : 12
Manufacturer : Intel
RAM information
Memory size : 16
Manufacturer : Samsung

CPU Price: 4000
Processor and RAM information:
  Number of Cores: 12
  Manufacturer: Intel
  RAM Size: 16 GB
  Manufacturer: Samsung
sreyas@sreyas-hp-pavilion-gaming /m/c/c/L/s/O/cycle1 (master)>
```