CYCLE - 1

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:

```
public class product{
	int pcode;
	int price;
	String pname;

	void getdata(int p1,String p2,int p3){
		pcode=p1;
		pname=p2;
		price=p3;
	}

	public static void main(String[] args){
		System.out.println("Name : Anjala Michael");
		System.out.println("Reg No : SJC22MCA-2007 ");
		System.out.println("Course : OOPS Lab ");
		System.out.println("Course code : 20MCA132 ");
		System.out.println("Date : 24/03/2023");

		int smallest;
		product ob1 = new product();
		product ob2 = new product();
		product ob3 = new product();

		ob1.getdata(1234,"Smart TV",55000);
		ob2.getdata(1235,"Smart Watch",15000);
		ob3.getdata(1236,"Smart Phone",25000);

		if(ob1.price<ob2.price){
			if(ob3.price<ob1.price){
				smallest = ob3.price;
			}
			else{
				smallest = ob1.price;
```

```
                }
            }
            else{
                if(ob2.price<ob3.price){
                    smallest = ob2.price;
                }
                else{
                    smallest = ob3.price;
                }
            }

            System.out.println("The lowest price is "+smallest);
        }
}
```

OUTPUT

```
j(base) sjcet@Z238-UL:~/anjala007/java$ javac product.java
(base) sjcet@Z238-UL:~/anjala007/java$ java product
Name : Anjala Michael
Reg No : SJC22MCA-2007
Course : OOPS Lab
Course code : 20MCA132
Date : 24/03/2023
The lowest price is 15000
```

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

CODE

```
import java.util.Scanner;
public class matrixAddition{
        public static void main(String[] args){
        System.out.println("Name : Anjala Michael");
        System.out.println("Reg No : SJC22MCA-2007 ");
        System.out.println("Course : OOPS Lab ");
        System.out.println("Course code : 20MCA132 ");
        System.out.println("Date : 28/03/2023");
                int p, q, m, n,choice,d;
                Scanner s = new Scanner(System.in);
                System.out.print("Enter number of rows and columns in first matrix : ");
                p = s.nextInt();
```

```
q = s.nextInt();
System.out.print("Enter number of rows and columns in second matrix : ");
m = s.nextInt();
n = s.nextInt();
int a[][] = new int[p][q];
int b[][] = new int[m][n];
int c[][] = new int[m][n];
System.out.println("Enter all the elements of first matrix : ");

for (int i = 0; i < p; i++){
        for (int j = 0; j < q; j++){
                a[i][j] = s.nextInt();
        }
}
System.out.println("Enter all the elements of second matrix : ");
for (int i = 0; i < m; i++){
        for (int j = 0; j < n; j++){
                b[i][j] = s.nextInt();
        }
}
System.out.println("First Matrix : ");
for (int i = 0; i < p; i++){
        for (int j = 0; j < q; j++){
                System.out.print(a[i][j]+" ");
        }
        System.out.println("");
}
System.out.println("Second Matrix : ");
for (int i = 0; i < m; i++){
        for (int j = 0; j < n; j++){
                System.out.print(b[i][j]+" ");
        }
        System.out.println("");
}
        if( p == m && q == n){
                for (int k = 0; k < p; k++){
                        for (int l = 0; l < q; l++){
                                c[k][l] = a[k][l] + b[k][l];
                        }
                }
```

```
                        System.out.println("Matrix after addition : ");
                        for (int k = 0; k < p; k++){
                                for (int l = 0; l < q; l++){
                                        System.out.print(c[k][l]+" ");
                                }
                                System.out.println("");
                        }
                }
                else{
                        System.out.println("Addition would not be possible");
                }
        }
}
```

OUTPUT

```
(base) sjcet@Z238-UL:~/anjala007/java$ javac matrixAddition.java
(base) sjcet@Z238-UL:~/anjala007/java$ java matrixAddition
Name : Anjala Michael
Reg No : SJC22MCA-2007
Course : OOPS Lab
Course code : 20MCA132
Date : 28/03/2023
Enter number of rows and columns in first matrix : 3
2
Enter number of rows and columns in second matrix : 3
2
Enter all the elements of first matrix :
1 2 3 4 5 6
Enter all the elements of second matrix :
1 2 3 4 5 6
First Matrix :
1 2
3 4
5 6
Second Matrix :
1 2
3 4
5 6
Matrix after addition :
2 4
6 8
10 12
```

3. Add complex numbers

CODE

```
import java.util.Scanner;

public class ComplexAddition {
   public static void main(String[] args) {
      Scanner input = new Scanner(System.in);
      System.out.print("Enter the real part of the first complex number: ");
      double real1 = input.nextDouble();
      System.out.print("Enter the imaginary part of the first complex number: ");
      double imaginary1 = input.nextDouble();
      System.out.print("Enter the real part of the second complex number: ");
      double real2 = input.nextDouble();
      System.out.print("Enter the imaginary part of the second complex number: ");
      double imaginary2 = input.nextDouble();

      double realResult = real1 + real2;
      double imaginaryResult = imaginary1 + imaginary2;
         System.out.println("Anjala Michael\n22mca007\nOOPS
LAB\n20MCA132\nDate:26-03-2023");
      System.out.println("The sum of the two complex numbers is: " + realResult + " + " +
imaginaryResult + "i");
   }
}
```

OUTPUT

```
(base) sjcet@Z238-UL:~/anjala007/sem 2/java/cycle 1$ javac ComplexAddition.java
(base) sjcet@Z238-UL:~/anjala007/sem 2/java/cycle 1$ java ComplexAddition
Enter the real part of the first complex number: 4
Enter the imaginary part of the first complex number: 5
Enter the real part of the second complex number: 3
Enter the imaginary part of the second complex number: 6
Anjala Michael
22mca007
OOPS LAB
20MCA132
Date:26-03-2023
The sum of the two complex numbers is: 7.0 + 11.0i
```

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[] args){
		System.out.println("Name : Anjala Michael");
		System.out.println("Reg No : SJC22MCA-2007 ");
		System.out.println("Course : OOPS Lab ");
		System.out.println("Course code : 20MCA132 ");
		System.out.println("Date : 28/03/2023");
		int p,q,m,n,flag=0;
		Scanner s = new Scanner(System.in);
		System.out.print("Enter number of rows and columns in the matrix : ");
		p = s.nextInt();
		q = s.nextInt();

		int a[][] = new int[p][q];
		//int b[][] = new int[m][n];

		System.out.println("Enter all the elements of the matrix : ");

		for (int i = 0; i < p; i++){
			for (int j = 0; j < q; j++){
				a[i][j] = s.nextInt();
			}
		}

		System.out.println("The given  Matrix is : ");
		for (int i = 0; i < p; i++){
			for (int j = 0; j < q; j++){
				System.out.print(a[i][j]+" ");
			}
			System.out.println("");
		}

		if(p!=q){
			System.out.println("The given matrix is not square matrix...so we can't check the symmetry of the matrix!!!");
```

```
            }
            else{
                for(int i=0;i<p;i++){
                    for(int j=0;j<q;j++){
                        if(a[i][j]==a[j][i]){
                            flag=1;
                        }
                    }
                }

                if(flag==1){
                    System.out.println("The given matrix is a symmetric matrix");
                }
                else{
                    System.out.println("The given matrix is not a symmetric matrix ");
                }

            }
        }
}
```

OUTPUT

```
(base) sjcet@Z238-UL:~/anjala007/java$ javac SymmetricMatrix.java
(base) sjcet@Z238-UL:~/anjala007/java$ java SymmetricMatrix
Name : Anjala Michael
Reg No : SJC22MCA-2007
Course : OOPS Lab
Course code : 20MCA132
Date : 28/03/2023
Enter number of rows and columns in the matrix : 3
3
Enter all the elements of the matrix :
1 2 3
2 3 4
3 4 5
The given  Matrix is :
1 2 3
2 3 4
3 4 5
The given matrix is a symmetric matrix
```

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

```
public class cpu{
   int price;
    class processor{
      int cores;
      String producer;
      processor(int noC, String manu){
         cores=noC;
         producer=manu;
      }
      void display(){
      System.out.println("\nProcessor info");
      System.out.println("No. of Cores = "+cores);
      System.out.println("Manufacturer = "+producer+"\n");
   }
   }
   static class ram{
      int mem;
      String manuf;
      ram(int memory,String producer ){
         mem=memory;
         manuf=producer;
      }
      void display(){

      System.out.println("\nRAM info");
      System.out.println("Memory = "+mem+" GB");
      System.out.println("Manufacturer = "+manuf+"\n");
         }
   }
   public static void main(String[] args) {
       System.out.println("Name : Anjala Michael");
                  System.out.println("Reg No : SJC22MCA-2007 ");
                  System.out.println("Course : OOPS Lab ");
                  System.out.println("Course code : 20MCA132 ");
```

```
                System.out.println("Date : 28/03/2023");
        cpu.ram obj1= new cpu.ram(8,"Intel");
        cpu obj2 = new cpu();
        cpu.processor obj3 = obj2.new processor(8,"Samsung");
        obj1.display();
        obj3.display();

    }
}
```

OUTPUT

```
(base) sjcet@Z238-UL:~/anjala007/sem 2/java/cycle 1$ javac cpu.java
(base) sjcet@Z238-UL:~/anjala007/sem 2/java/cycle 1$ java cpu
Name : Anjala Michael
Reg No : SJC22MCA-2007
Course : OOPS Lab
Course code : 20MCA132
Date : 28/03/2023

RAM info
Memory = 8 GB
Manufacturer = Intel


Processor info
No. of Cores = 8
Manufacturer = Samsung
```

CYCLE - 2

1. Program to Sort strings.

CODE

```
import java.util.Arrays;
import java.util.Scanner;
public class sortuserstrings {
  public static void main(String[] args) {
    Scanner input = new Scanner(System.in);
    System.out.println("Anjala Michael\n22mca007\nOOPS
LAB\n20MCA132\nDate:26-04-2023");
    System.out.print("Enter the number of strings you want to sort: ");
    int n = input.nextInt();
    String[] names = new String[n];

    System.out.println("Enter the strings to be sorted:");
    for (int i = 0; i < n; i++) {
      names[i] = input.next();
    }
        Arrays.sort(names);
    System.out.println("Sorted Names: ");
    for (String name : names) {
      System.out.println(name);
    }
  }
}
```

OUTPUT

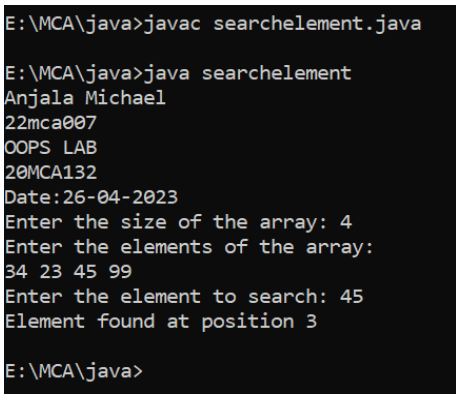
```
E:\MCA\java>javac sortuserstrings.java

E:\MCA\java>java sortuserstrings
Anjala Michael
22mca007
OOPS LAB
20MCA132
Date:26-04-2023
Enter the number of strings you want to sort: 3
Enter the strings to be sorted:
crispin
annu
edwin
Sorted Names:
annu
crispin
edwin
```

2. Search an element in an array.

CODE

```
import java.util.Scanner;
public class searchelement {
  public static void main(String[] args) {
      Scanner input = new Scanner(System.in);
      System.out.println("Anjala Michael\n22mca007\nOOPS
LAB\n20MCA132\nDate:26-04-2023");
      System.out.print("Enter the size of the array: ");
      int n = input.nextInt();
      int[] arr = new int[n];
     System.out.println("Enter the elements of the array:");
      for (int i = 0; i < n; i++) {
        arr[i] = input.nextInt();
    }
    System.out.print("Enter the element to search: ");
    int key = input.nextInt();
    boolean found = false;
    for (int i = 0; i < n; i++) {
      if (arr[i] == key) {
        found = true;
        System.out.println("Element found at position " + (i+1));
        break;
      }
    }
    if (!found) {
      System.out.println("Element not found in the array.");
    }
  }
}
```

OUTPUT



3. Perform string manipulations

CODE

```
import java.util.Scanner;
public class String_man{
   public static void main(String[] args) {
   System.out.println("Anjala Michael\n22mca007\nOOPS
LAB\n20MCA132\nDate:26-04-2023");
       System.out.println("Enter The String");
       Scanner sc = new Scanner(System.in);
       String str1 = sc.nextLine();
       System.out.println("Length of String = "+str1.length());
       System.out.println("Character at First position  = "+str1.charAt(1));
       System.out.println("String Contains 'Col' sequence :"+str1.contains("Col"));
       System.out.println("String ends with e : "+str1.endsWith("e"));
       System.out.println("Replace 'col' with 'kol' : "+str1.replaceAll("Col","kol"));
       System.out.println("LOWERCASE : "+str1.toLowerCase());
       System.out.println("UPPERCASE : "+str1.toUpperCase());
}
}
```

OUTPUT

```
E:\MCA\java>javac String_man.java

E:\MCA\java>java String_man
Anjala Michael
22mca007
OOPS LAB
20MCA132
Date:26-04-2023
Enter The String
hello word
Length of String = 10
Character at First position  = e
String Contains 'Col' sequence :false
String ends with e : false
Replace'col' with 'kol' : hello word
LOWERCASE : hello word
UPPERCASE : HELLO WORD

E:\MCA\java>
```

4. Program to create a class for Employee having attributes eNo, eName eSalary. Read n employ information and Search for an employee given eNo, using the concept of Array of Objects.

CODE

```
import java.util.Scanner;
public class employee {
   int eNo;
   String eName;
   double eSalary;
   public void getdetails(){
      System.out.println("\nEnter the Employee details");
      Scanner sc = new Scanner(System.in);
      System.out.println("Employee number : ");
      eNo=sc.nextInt();
      System.out.println("Name : ");
      sc.nextLine();
      eName=sc.nextLine();
      System.out.println("Salary : ");
      eSalary=sc.nextDouble();
   }
   void display(){
      System.out.println("Empolyee No :"+eNo);
      System.out.println("Name :"+eName);
      System.out.println("Salary Amount"+eSalary+"\n");
   }
   public static void main(String[] args) {
   System.out.println("Anjala Michael\n22mca007\nOOPS
LAB\n20MCA132\nDate:26-04-2023");
      System.out.println("\nEnter the No. of Employee's");
      Scanner sc1 = new Scanner(System.in);
      int num = sc1.nextInt();
      employee arr[]=new employee[num];
      for(int i =0;i<num;i++){
            arr[i]=new employee();
            arr[i].getdetails();

      }
      System.out.println("\nInformations of all the employee's");
      for(int i=0;i<num;i++){
         arr[i].display();
```

```
    }
    boolean state = false;
    System.out.println("\nEnter the Employee Number to get details of a employee");
    int num2= sc1.nextInt();
    for(int i=0;i<num;i++){
        if(arr[i].eNo==num2){
       System.out.println("\nEmployee details");
        arr[i].display();
        }
       }
   }
}
```

OUTPUT

```
E:\MCA\java>java employee
Anjala Michael
22mca007
OOPS LAB
20MCA132
Date:26-04-2023

Enter the No. of Employee's
2

Enter the Employee details
Employee number :
111
Name :
anu
Salary :
30000

Enter the Employee details
Employee number :
112
Name :
binu
Salary :
35000

Informations of all the employee's
Empolyee No :111
Name :anu
Salary Amount30000.0

Empolyee No :112
Name :binu
Salary Amount35000.0


Enter the Employee Number to get details of a employee
111
```

```
Enter the Employee Number to get details of a employee
111

Employee details
Empolyee No :111
Name :anu
Salary Amount30000.0
```