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

      }
        public static void main(String[] args)
        {
              System.out.println("course_name:OOP LAB");
              System.out.println("Course_code:20MCA132");
              System.out.println("  Name     : Aparna Jayakumar");
              System.out.println("Register_no: SJC22MCA-2012");
              System.out.println("Date       :24/03/2023");
        int s;
        Product a,b,c;
        a=new Product();
        b=new Product();
        c=new Product();
        a.getdata("1045A","apple",20);
        b.getdata("1056B","strawberry",40);
        c.getdata("1098C","orange",30);
        if(a.price<b.price  && a.price<c.price)
         s=a.price;
        else if(b.price<a.price && b.price<c.price)
        s=b.price;
```

```
else
s=c.price;
System.out.println("Smallest price=  \n\n"+s);
}
}
```

OUTPUT:

```
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 1$ javac Product.java
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 1$ java Product
course_name:OOP LAB
Course_code:20MCA132
  Name     : Aparna Jayakumar
Register_no: SJC22MCA-2012
Date       :24/03/2023
Smallest price=
20
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 1$
```

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

CODE:

```
import java.util.*;
public class Matrix
{
public static void main(String[] args)
{
            System.out.println("course_name:OOP LAB");
            System.out.println("Course_code:20MCA132");
            System.out.println("  Name     : Aparna Jayakumar");
            System.out.println("Register_no: SJC22MCA-2012");
            System.out.println("   Date    :24/03/2023");
        int r,c;
        Scanner x = new Scanner (System.in);
        System.out.println("Number of rows");
        r=x.nextInt();
        System.out.println("Number of coloumn");
        c=x.nextInt();
          int m1[][]=new int[r][c];
          int m2[][]=new int[r][c];
                    System.out.print(m1[i][j]+" ");
                }
                System.out.println("");
            }
            System.out.println("Second Matrix:");
            for (int i = 0; i < r; i++)
            {  int m3[][] = new int[r][c];
             System.out.println("Enter all the elements of first matrix:");
            for (int i = 0; i < r; i++)
            {
                for (int j = 0; j < c; j++)
                {
                    m1[i][j] = x.nextInt();
                }
            }
```

```
        System.out.println("");
    System.out.println("Enter all the elements of second matrix:");
     for (int i = 0; i < r; i++)
        {
           for (int j = 0; j < c; j++)
           {
              m2[i][j] = x.nextInt();
           }
        }
        System.out.println("");
        System.out.println("First Matrix:");
        for (int i = 0; i < r; i++)
        {
           for (int j = 0; j < c; j++)
           {

           for (int j = 0; j < c; j++)
           {
              System.out.print(m2[i][j]+" ");
           }
           System.out.println("");
        }
        for (int i = 0; i < r; i++)
        {
           for (int j = 0; j < c; j++)
           {
              for (int k = 0; k < c; k++)
              {
                 m3[i][j] = m1[i][j] + m2[i][j];
              }
           }
        }
        System.out.println("Matrix after addition:");
        for (int i = 0; i < r; i++)
        {
           for (int j = 0; j < c; j++)
           {
```

```
                System.out.print(m3[i][j]+" ");
            }
            System.out.println("");
        }
    }

}
```

OUTPUT:

```
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 1$ javac Matrix.java
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 1$ java Matrix
course_name:OOP LAB
Course_code:20MCA132
  Name      : Aparna Jayakumar
Register_no: SJC22MCA-2012
   Date     :24/03/2023
Number of rows
2
Number of coloumn
2
Enter all the elements of first matrix:
1
3
4
5

Enter all the elements of second matrix:
5
6
7
8

First Matrix:
1 3
4 5
Second Matrix:
5 6
7 8
Matrix after addition:
6 9
11 13
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 1$
```

3. Add complex numbers

CODE:

```
public class Complex {
        double real;
         double imag;

           public Complex(double real, double imag) {
              this.real = real;
              this.imag = imag;
           }

           public static void main(String[] args)
           {
              System.out.println("course_name:OOP LAB");
              System.out.println("Course_code:20MCA132");
              System.out.println("  Name     : Aparna Jayakumar");
              System.out.println("Register_no: SJC22MCA-2012");
              System.out.println("   Date    :28/03/2023");
              Complex n1 = new Complex(2.3, 4.5),
                    n2 = new Complex(3.4, 5.0),
                    temp;

              temp = add(n1, n2);

              System.out.printf("\n Sum = %.1f + %.1fi \n", temp.real, temp.imag);
           }

           public static Complex add(Complex n1, Complex n2)
           {
              Complex temp = new Complex(0.0, 0.0);

              temp.real = n1.real + n2.real;
              temp.imag = n1.imag + n2.imag;

              return(temp);
           }
        }
```

OUTPUT

```
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 1$ javac Complex.java
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 1$ java Complex
course_name:OOP LAB
Course_code:20MCA132
  Name     : Aparna Jayakumar
Register_no: SJC22MCA-2012
   Date    :28/03/2023

 Sum = 5.7 + 9.5i
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 1$
```

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

CODE:

```
import java.util.*;
class Symmetric
{
public static void main(String args[])
{
        System.out.println("course_name:OOP LAB");
        System.out.println("Course_code:20MCA132");
        System.out.println("  Name     : Aparna Jayakumar");
        System.out.println("Register_no: SJC22MCA-2012");
        System.out.println("   Date    :28/03/2023");
Scanner sc = new Scanner(System.in);
int i,j,r,c,flag=1;
System.out.println("Enter the number of rows:");
r = sc.nextInt();
System.out.println("Enter the number of columns:");
c = sc.nextInt();
int[][] m = new int[r][c];
int [][] transpose = new int[r][c];
System.out.println("Enter the elements of the matrix") ;
for(i=0;i<r;i++)
{
for(j=0;j<c;j++)
{
m[i][j] = sc.nextInt();
}
}
System.out.println("The elements of the matrix \n") ;
for(i=0;i<r;i++)
{
for(j=0;j<c;j++)
{
System.out.print(m[i][j]+"\t");
}
System.out.println("");
}
for(i=0;i<r;i++)
{
```

```
for(j=0;j<c;j++)
{
transpose[j][i]=m[i][j];
}
}
if(r==c)
{
for(i=0;i<r;i++)
{
for(j=0;j<c;j++)
{
if(m[i][j]!=transpose[i][j])
{
flag=0;
break;
}
}
if(flag==0)
{
System.out.print("\nThe matrix is not symmetric");
break;
}
}
if(flag==1)
{
System.out.print("\nThe matrix is symmetric\n");
}
}
else
{
System.out.print("\nThe matrix is not symmetric\n");
}
}
}
```

OUTPUT

```
The matrix is not symmetricsjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 1$ java c Symmetric.java
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 1$ java Symmetric
course_name:OOP LAB
Course_code:20MCA132
  Name     : Aparna Jayakumar
Register_no: SJC22MCA-2012
   Date    :28/03/2023
Enter the number of rows:
2
Enter the number of columns:
2
Enter the elements of the matrix

1
2
2
1
The elements of the matrix

1       2
2       1
```

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 about 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("course_name:OOP LAB");
      System.out.println("Course_code:20MCA132");
      System.out.println("  Name     : Aparna Jayakumar");
      System.out.println("Register_no: SJC22MCA-2012");
      System.out.println("   Date    :28/03/2023");
      System.out.println("\nRAM info.....");
      System.out.println("Memory = "+mem+" GB");
      System.out.println("Manufacturer = "+manuf+"\n");
   }}
   public static void main(String[] args) {
       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:

```
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 1$ javac Cpu.java
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 1$ java Cpu
course_name:OOP LAB
Course_code:20MCA132
  Name     : Aparna Jayakumar
Register_no: SJC22MCA-2012
   Date    :28/03/2023

RAM info.........
Memory = 8 GB
Manufacturer = Intel


Processor info
No. of Cores = 8
Manufacturer = Samsung

sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 1$
```

CYCLE 2

1. Program to Sort strings

CODE:

```
import java.util.Scanner;
public class Sort
{
   public static void main(String[] args)
   {
      System.out.println("course_name:OOP LAB");
      System.out.println("Course_code:20MCA132");
      System.out.println("  Name     : Aparna Jayakumar");
      System.out.println("Register_no: SJC22MCA-2012");
      System.out.println("   Date    :11/04/2023");
      int count;
      String temp;
      Scanner scan = new Scanner(System.in);
      System.out.println("Enter number of strings you would like to enter:");
      count = scan.nextInt();
      String str[] = new String[count];
      Scanner scan2 = new Scanner(System.in);
      System.out.println("Enter the Strings one by one:");
      for(int i = 0; i < count; i++)
      {
         str[i] = scan2.nextLine();
      }
      scan.close();
      scan2.close();
      for (int i = 0; i < count; i++)
      {
         for (int j = i + 1; j < count; j++) {
            if (str[i].compareTo(str[j])>0)
            {
```

```
                temp = str[i];
                str[i] = str[j];
                str[j] = temp;
            }
        }
    }
    System.out.println("Strings in Sorted Order:\n");
    for (int i = 0; i <= count - 1; i++)
    {
       System.out.print(str[i] + ", ");
    }
    System.out.println("\n");
}
}
```

OUTPUT:

```
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 2$ javac Sort.java
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 2$ java Sort
course_name:OOP LAB
Course_code:20MCA132
  Name     : Aparna Jayakumar
Register_no: SJC22MCA-2012
   Date    :11/04/2023
Enter number of strings you would like to enter:
3
Enter the Strings one by one:
oop
java
python
Strings in Sorted Order:

java, oop, python,
```

2. Search an element in an array.

CODE:

```
import java.util.*;
class Array
{
public static void main(String args[])
{
	System.out.println("course_name:OOP LAB");
	System.out.println("Course_code:20MCA132");
	System.out.println("  Name     : Aparna Jayakumar");
	System.out.println("Register_no: SJC22MCA-2012");
	System.out.println("Date       :05/04/2023");
Scanner sc=new Scanner(System.in);
int i,n,s,flag=0;
System.out.println("enter the number of elements :");
n=sc.nextInt();
int [] a=new int[n];
System.out.println("enter the elements");
for(i=0;i<n;i++)
{
a[i]=sc.nextInt();
}
System.out.println("enter the element to be searched:");
s=sc.nextInt();
for(i=0;i<n;i++)
{
if(a[i]==s)
{
System.out.println("Element " + s + "found at "+ i + " position");
flag=1;
break;
}
}
if(flag==0)
{
System.out.println("Element not found");
}
}
```

```
}
```

OUTPUT

```
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 2$ javac Array.java
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 2$ java Array
course_name:OOP LAB
Course_code:20MCA132
  Name     : Aparna Jayakumar
Register_no: SJC22MCA-2012
Date       :05/04/2023
enter the number of elements :
2
enter the elements
1
4
enter the element to be searched:
4
Element 4found at 1 position
```

3. Perform string manipulation

CODE:

```
import java.util.Scanner;
 public class String_m{
  public static void main(String[] args) {
 System.out.println("course_name:OOP LAB");
 System.out.println("Course_code:20MCA132");
 System.out.println("  Name     : Aparna Jayakumar");
 System.out.println("Register_no: SJC22MCA-2012");
 System.out.println("Date       :05/06/2023");
 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

```
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 2$ javac String_m.java
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 2$ java String_m
course_name:OOP LAB
Course_code:20MCA132
  Name     : Aparna Jayakumar
Register_no: SJC22MCA-2012
Date       :05/06/2023
Enter The String
java programing lab
Length of String = 19
Character at First position  = a
String Contains 'Col' sequence :false
String ends with e : false
Replace'col' with 'kol' : java programing lab
LOWERCASE : java programing lab
UPPERCASE : JAVA PROGRAMING LAB
```

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

CODE:

```
import java.util.Scanner;
public class Employee {
int empid;
String name;
float salary;
public void getInput() {
Scanner in = new Scanner(System.in);
System.out.print("Enter the empid :: ");
empid = in.nextInt();
System.out.print("Enter the name :: ");
name = in.next();
System.out.print("Enter the salary :: ");
salary = in.nextFloat();
}
public void display() {
System.out.println("Employee id = " + empid);
System.out.println("Employee name = " + name);
System.out.println("Employee salary = " + salary);
}
public static void main(String[] args) {
        System.out.println("course_name:OOP LAB");
        System.out.println("Course_code:20MCA132");
        System.out.println("  Name     : Aparna Jayakumar");
        System.out.println("Register_no: SJC22MCA-2012");
        System.out.println("Date       :05/04/2023");
Employee e[] = new Employee[5];
for(int i=0; i<5; i++) {
e[i] = new Employee();
e[i].getInput();
}
System.out.println("**** Data Entered as below ****");
for(int i=0; i<5; i++) {
e[i].display();
}
```

```
}
}
```

OUTPUT

```
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 2$ javac Employee.java
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 2$ java Employee
course_name:OOP LAB
Course_code:20MCA132
  Name     : Aparna Jayakumar
Register_no: SJC22MCA-2012
Date       :05/04/2023
Enter the empid :: 101
Enter the name :: aparna
Enter the salary :: 1000
Enter the empid :: 104
Enter the name :: anu
Enter the salary :: 12346
Enter the empid :: 105
Enter the name :: gopi
Enter the salary :: 13000
Enter the empid :: 104
Enter the name :: achu
Enter the salary :: 12000
Enter the empid :: 106
Enter the name :: ammu
Enter the salary :: 16700
**** Data Entered as below ****
Employee id = 101
Employee name = aparna
Employee salary = 1000.0
Employee id = 104
Employee name = anu
Employee salary = 12346.0
Employee id = 105
Employee name = gopi
Employee salary = 13000.0
Employee id = 104
Employee name = achu
Employee salary = 12000.0
Employee id = 106
Employee name = ammu
Employee salary = 16700.0
sjcet@Z238-UL:~/APARNA JAYAKUMAR/JAVA/cycle 2$
```