20MCA132

OBJECT ORIENTED PROGRAMMING LAB

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:

```java
public class product
{
        int pcode;
        String pname;
        double price;
        double lowest;
        void data(int c, String n, double p){
            pcode=c;
            pname=n;
            price=p;
        }
        void display(){
            System.out.println(pcode+"\t\t"+pname+"\t\t"+price);

        }
        static void findLowest(double price1,double price2, double price3){
        if(price1<=price2 && price1<=price3){
            System.out.println("\nLAPTOP is the lowest price!");

        }
        else if(price2<=price1 && price2<=price3){
            System.out.println("\nWATCH is the lowest price!");
```

```java
        }
        else{
            System.out.println("\n MOBILE is the lowest price!");

        }

    }
    public static void main(String[] args){
    System.out.println("Name:Christin Benny\nReg No:22MCA021
\nCourse Code and Name: 20MCA132, Object Oriented Programming
Lab\nDate:24/03/2023");
        product obj1 = new product();
        product obj2 = new product();
        product obj3 = new product();
        obj1.data(101,"LAPTOP",57000.00);
        obj2.data(102,"WATCH",3000.00);
        obj3.data(103,"MOBILE",20000.00);
    System.out.println("ProductInformation:\nProduct_Code\tProduct_Name\t
Product_Price");
        obj1.display();
        obj2.display();
        obj3.display();
        findLowest(obj1.price,obj2.price,obj3.price);

    }
}
```

OUTPUT:

```
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 1$ javac product.java
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 1$ java product
Name:Christin Benny
Reg No:22MCA021
Course Code and Name: 20MCA132, Object Oriented Programming Lab
Date:24/03/2023
Product Information:
Product_Code     Product_Name      Product_Price
101              LAPTOP            57000.0
102              WATCH             3000.0
103              MOBILE            20000.0

WATCH is the lowest price!
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 1$ █
```

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

CODE:

```java
import java.util.Scanner;
public class add_matrix
{
        public static void main(String args[])
        {
        System.out.println("\nName:Christin Benny\nReg No:22MCA021\nCourse Code
and Name: 20MCA132, Object Oriented Programming Lab\nDate:24/03/2023\n\n");
        int row, col,i,j;
        Scanner in = new Scanner(System.in);
        System.out.println("Enter the number of rows");
        row = in.nextInt();
        System.out.println("Enter the number columns");
        col = in.nextInt();
        int mat1[][] = new int[row][col];
        int mat2[][] = new int[row][col];
        int res[][] = new int[row][col];
        System.out.println("Enter the elements of matrix 1");
        for ( i= 0 ; i < row ; i++ )
        {
        for ( j= 0 ; j < col ;j++ )
        mat1[i][j] = in.nextInt();
        System.out.println();
        }
        System.out.println("Enter the elements of matrix 2");
        for ( i= 0 ; i < row ; i++ )
        {
        for ( j= 0 ; j < col ;j++ )
```

```java
            mat2[i][j] = in.nextInt();
            System.out.println();
            }
            for ( i= 0 ; i < row ; i++ )
            for ( j= 0 ; j < col ;j++ )
            res[i][j] = mat1[i][j] + mat2[i][j] ;
            System.out.println("Sum of matrices:-");
            for ( i= 0 ; i < row ; i++ )
            {
            for ( j= 0 ; j < col ;j++ )
            System.out.print(res[i][j]+"\t");
            System.out.println();
            }
            }
        }
```

OUTPUT:

```
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 1$ javac add_matrix.java
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 1$ java add_matrix

Name:Christin Benny
Reg No:22MCA021
Course Code and Name: 20MCA132, Object Oriented Programming Lab
Date:24/03/2023

Enter the number of rows
2
Enter the number columns
2
Enter the elements of matrix 1
2 3 4 5


Enter the elements of matrix 2
7 8 4 3


Sum of matrices:-
9       11
8       8
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 1$
```

3. Add complex numbers.

CODE:

```java
public class complex
{
    double real, img;

    complex(double r, double i){
        this.real = r;
        this.img = i;
    }

    public static complex sum(complex c1, complex c2){
        complex temp = new complex(0, 0);

        temp.real = c1.real + c2.real;
        temp.img =c1.img + c2.img;
        return temp;
    }

    public static void main(String args[]){
        System.out.println("\nName:  Christin  Benny\nReg  No:  22MCA021\nCourse
Code and Name: 20MCA132, Object Oriented Programming Lab\nDate:24/03/2023\n");
        complex c1 = new complex(5.5, 4);
        complex c2 = new complex(1.2, 3.5);
        complex temp = sum(c1, c2);

        System.out.println("Sum is :" + temp.real+" + "+ temp.img + "i");
    }
}
```

OUTPUT:

```
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 1$ javac complex.java
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 1$ java complex

Name:Christin Benny
Reg No:22MCA021
Course Code and Name: 20MCA132, Object Oriented Programming Lab
Date:24/03/2023

Sum is :6.7 + 7.5i
```

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

<u>**CODE:**</u>

```java
import java.util.Scanner;
 public class SymmetricMatrix
{
   public static void main(String[] args)
   {
System.out.println("\nName:Christin  Benny\nReg  No:22MCA021\nCourse  Code  and
Name: 20MCA132, Object Oriented Programming Lab\nDate:28/03/2023\n");
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the no. of rows : ");
        int rows = sc.nextInt();
        System.out.println("Enter the no. of columns : ");
       int cols = sc.nextInt();
       int matrix[][] = new int[rows][cols];
       System.out.println("Enter the elements :");
       for (int i = 0; i < rows; i++)
       {
        for (int j = 0; j < cols; j++)
        {
            matrix[i][j] = sc.nextInt();
        }
      }
      System.out.println("The matrix is :");
      for (int i = 0; i < rows; i++)
     {
        for (int j = 0; j < cols; j++)
        {
            System.out.print(matrix[i][j]+"\t");
```

```
        }
          System.out.println();
      }
     if(rows != cols)
      {
        System.out.println("The given matrix is not a square matrix");
      }
      else
      {
        boolean symmetric = true;

        for (int i = 0; i < rows; i++)
        {
          for (int j = 0; j < cols; j++)
          {
            if(matrix[i][j] != matrix[j][i])
            {
              symmetric = false;
              break;
            }
          }
        }

        if(symmetric)
        {
          System.out.println("The given matrix is symmetric...");
        }
        else
        {
          System.out.println("The given matrix is not symmetric...");
        }
```

```
        }

        sc.close();
    }
}
```

OUTPUT:

```
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 1$ javac SymmetricMatrix.java
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 1$ java SymmetricMatrix

Name:Christin Benny
Reg No:22MCA021
Course Code and Name: 20MCA132, Object Oriented Programming Lab
Date:28/03/2023

Enter the no. of rows :
3
Enter the no. of columns :
3
Enter the elements :
2 4 4 4 8 8 4 8 8
The matrix is :
2       4       4
4       8       8
4       8       8
The given matrix is symmetric...
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 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 of Processor and RAM.

CODE:

```
public class cpu
{
    class processor{
        int cores;
        String producer;
        processor(int noC, String manu){
            cores=noC;
            producer=manu;
        }
        void display(){
        System.out.println("\nPROCESSOR DETAILS");
        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("\nName:Christin  Benny\nReg  No:22MCA021\nCourse  Code
and Name: 20MCA132, Object Oriented Programming Lab\nDate:28/03/2023\n");
```

```java
        System.out.println("\nRAM DETAILS");
        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:

```
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 1$ javac cpu.java
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 1$ java cpu

Name:Christin Benny
Reg No:22MCA021
Course Code and Name: 20MCA132, Object Oriented Programming Lab
Date:28/03/2023


RAM DETAILS
Memory = 8 GB
Manufacturer = Intel


PROCESSOR DETAILS
No. of Cores = 8
Manufacturer = Samsung

(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 1$
```

CYCLE- 2

1. Program to Sort strings.

CODE:

```java
import java.util.Arrays;
import java.util.Scanner;
 public class StringSort{
        public static void main(String[] args){
        System.out.println("\nName:Christin    Benny\nReg    No:22MCA021\nCourse
Code    and    Name:    20MCA132,    Object    Oriented    Programming
Lab\nDate:04/04/2023\n\n");
        int count=0;
        String tmp;
        Scanner scan=new Scanner(System.in);
        System.out.println("Enter the number of strings:");
        count=scan.nextInt();
        String str_list[]= new String[count];
        Scanner scan1=new Scanner(System.in);
        System.out.println("Enter the strings:");
        for(int i=0;i<count;i++)
                str_list[i]=scan1.nextLine();
                System.out.println("1. Inbuilt Sort\n2. User Defined Sorting");
                int choice;
                choice=scan.nextInt();
                 switch (choice){
                 case 1:
                 Arrays.sort(str_list);
                 System.out.println(Arrays.toString(str_list));
                 break;
                 case 2:
```

```java
            for(int i=0;i<count-1;i++)
            for(int j=i+1;j<str_list.length;j++)
            if(str_list[i].compareTo(str_list[j])>0)
            {
            tmp=str_list[i];
            str_list[i]=str_list[j];
            str_list[j]=tmp;
            }
            System.out.println(Arrays.toString(str_list));
            break;
        }
    }
}
```

OUTPUT:

```
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 2$ java StringSort

Name:Christin Benny
Reg No:22MCA021
Course Code and Name: 20MCA132, Object Oriented Programming Lab
Date:04/04/2023


Enter the number of strings:
3
Enter the strings:
java
network
dbms
1. Inbuilt Sort
2. User Defined Sorting
1
[dbms, java, network]
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 2$
```

2. Search an element in an array.

CODE:

```java
import java.util.Scanner;

public class Search {
    public static void main(String[] args) {
    System.out.println("\nName:Christin Benny\nReg No:22MCA021\nCourse Code and
Name: 20MCA132, Object Oriented Programming Lab\nDate:27/04/2023\n\n");
        int i,j,x=0,s=0;
        boolean state = false;
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the number of elemets in array");
        int num=sc.nextInt();
        String word[]=new String[num];
        sc.nextLine();
        for( i=0;i<num;i++){
        System.out.println("\nEnter a Word\n");
        word[i]=sc.nextLine();
        }
        System.out.println("Enter the element to Search");
        String search = sc.nextLine();
        for( i=0;i<num;i++){
            if(word[i].equals(search)){
                x = i;
                state = true;
                s=x+1;
            }
            }
            if(state){
```

```java
        System.out.println("Element found at  position = "+s);
          }
          else{
        System.out.println("Element found not found");


          }
      }


  }
```

OUTPUT:

```
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 2$ java Search

Name:Christin Benny
Reg No:22MCA021
Course Code and Name: 20MCA132, Object Oriented Programming Lab
Date:27/04/2023


Enter the number of elemets in array
3

Enter a Word

abu

Enter a Word

denzel

Enter a Word

ashin
Enter the element to Search
ashin
Element found at  position = 3
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 2$ █
```

3. Perform string manipulations.

<u>CODE:</u>

```java
import java.util.Scanner;
public class String_man{
    public static void main(String[] args) {
    System.out.println("\nName:Christin Benny\nReg No:22MCA021\nCourse Code and
Name: 20MCA132, Object Oriented Programming Lab\nDate:27/04/2023\n\n");
        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(0));
        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:

```
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 2$ javac String_man.java
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 2$ java String_man

Name:Christin Benny
Reg No:22MCA021
Course Code and Name: 20MCA132, Object Oriented Programming Lab
Date:27/04/2023


Enter The String
protocol
Length of String = 8
Character at First position  = p
String Contains 'Col' sequence :true
String ends with e : false
Replace'col' with 'kol' : protokol
LOWERCASE : protocol
UPPERCASE : PROTOCOL
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 2$
```

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:

```java
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) {
```

```java
        System.out.println("\nName:Christin Benny\nReg No:22MCA021\nCourse Code
and Name: 20MCA132, Object Oriented Programming Lab\nDate:27/04/2023\n");
        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("Informations 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:

```
sjcet@Z238-UL: ~/christinmca22/JAVA/CYCLE 2

(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 2$ javac employee.java
(base) sjcet@Z238-UL:~/christinmca22/JAVA/CYCLE 2$ java employee

Name:Christin Benny
Reg No:22MCA021
Course Code and Name: 20MCA132, Object Oriented Programming Lab
Date:27/04/2023

Enter the No. of Employee's
2

Enter the Employee details
Employee number :
101
Name :
Ashin S
Salary :
50000

Enter the Employee details
Employee number :
102
Name :
Kishor V
Salary :
60000
Informations of all the employee's
Empollyee No :101
Name :Ashin S
Salary Amount :50000.0

Empollyee No :102
Name :Kishor V
Salary Amount :60000.0


Enter the Employee Number to get details of a employee
102

Employee details
Employee No :102
Name :Kishor V
```