

# Oops 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

```
import java.util.*;
class Product{
    int pcode;
    String pname;
    double price;
    void assign(){
        Scanner s=new Scanner(System.in);
        System.out.println("\nEnter the product code");
        pcode=s.nextInt();
        System.out.println("\nEnter the product name");
        pname=s.next();
        System.out.println("\nEnter the product price");
        price=s.nextInt();
    }
    static void lowest(double p1, double p2, double p3){
        if(p1<p2 && p1<p3){
            System.out.println("product 1 with cost "+ p1 + " is of the lowest price");
        }
        else if(p2<p1 && p2<p3){
```

```
        System.out.println("product 2 with cost "+ p2 + " is of the lowest price");
    }
    else{
```

```
System.out.println("product 3 with cost "+ p3 + " is of the lowest price");
    }
```

```
    }
    public static void main(String[] args){
        System.out.println("SANUP");
        System.out.println("SJC22MCA-2048");
        System.out.println("24-03-2023");

        Product obj1 = new Product();
        Product obj2 = new Product();
        Product obj3 = new Product();
        System.out.println("Enter the first product details");
        obj1.assign();
        System.out.println("Enter the second product details");
        obj2.assign();
        System.out.println("Enter the third product details");
        obj3.assign();
        lowest(obj1.price,obj2.price,obj3.price);
    }
}
```

## output

```
sjcet@HP-Z238:~/java/cycle1$ javac product.java
sjcet@HP-Z238:~/java/cycle1$ java product.java
SANUP
SJC22MCA-2048
24-03-2023
Enter the first product details

Enter the product code
100

Enter the product name
apple

Enter the product price
100
Enter the second product details

Enter the product code
101

Enter the product name
orange

Enter the product price
250
Enter the third product details

Enter the product code
103

Enter the product name
watermelon

Enter the product price
200
product 1 with cost 100.0 is of the lowest price
```

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

### Code

```
import java.util.Scanner;

class addmatrix
{
    public static void main(String args[])
    {
        int row, col,i,j;
        Scanner in = new Scanner(System.in);

        System.out.println("SANUP,sjc22mca-2048,24-03-2023");
        System.out.println("");
        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 matrix1");

        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 matrix2");
```

```
for ( i= 0 ; i < row ; i++ )  
{
```

```
for ( j= 0 ; j < col ;j++ )  
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

```
sjcet@HP-Z238:~/java/cycle1$ java matrix.java
SANUP,sjc22mca-2048,24-03-2023

Enter the number of rows
2
Enter the number columns
2
Enter the elements of matrix1
3
4
5
6

Enter the elements of matrix2
2
3
4
5

Sum of matrices:-
5      7
9      11
sjcet@HP-Z238:~/java/cycle1$
```

### 3. Add complex numbers

#### Code

```
public class complex
{
    int r;
    int i;
    complex(int real,int img)
    {
        r=real;
        i=img;
    }
    void display(){
        System.out.println(r+"+"+i+"i");
    }
    static void add(int r1,int i1,int r2,int i2 )
    {
        r1=r1+r2;
        i1=i1+i2;
        System.out.println("After Addition = "+r1+"+"+i1+"i");
    }
    public static void main(String[] args)
    {
        complex first=new complex(3,6);
        complex second=new complex(6,7);
        System.out.println("Sanup - sjc22mca-2048 - 24/03/2023");
        System.out.println(" ");
        System.out.println("Complex Numbers are:");
        first.display();
        second.display();
        add(first.r,first.i,second.r,second.i);
    }
}
```

## Output

```
sjcet@HP-Z238:~/java/cycle1$ javac complex.java
sjcet@HP-Z238:~/java/cycle1$ java complex.java
Sanup - sjc22mca-2048 - 24/03/2023

Complex Numbers are:
3+6i
6+7i
After Addition = 9+13i
sjcet@HP-Z238:~/java/cycle1$
```



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

#### Code

```
import java.util.Scanner;
public class symmetric {
    public static void main(String[] args)
    {
        Scanner sc = new Scanner(System.in);
        System.out.println("Sanup - sjc22mca-2048 - 24/03/2023");
        System.out.println(" ");
        System.out.println("Enter the Number of rows of the Matrix");
        int row = sc.nextInt();
        System.out.println("Enter the Number of Columns of the Matrix");
        int col = sc.nextInt();
        int matrix[][] = new int[row][col];
        int i,j;
        boolean state=true;
        for(i=0;i<row;i++)
        {
            for(j=0;j<col;j++)
            {
                System.out.println("Enter the Element at M("+i+", "+j+")");
                matrix[i][j] = sc.nextInt();
            }
        }
        for(i=0;i<row;i++)
        {
            for(j=0;j<col;j++)
            {
                if(matrix[i][j]!=matrix[j][i]){
                    state=false;
                    break;
                }
            }
        }
        if(state)
```

```

{
System.out.println("Matrix is Symmetric");
}
else
{
System.out.println("Matrix is Antisymmetric");
}
}
}
}

```

### Output

```

sjcet@HP-Z238:~/java/cycle1$ javac symmetric.java
sjcet@HP-Z238:~/java/cycle1$ java symmetric.java
Sanup - sjc22mca-2048 - 24/03/2023

Enter the Number of rows of the Matrix
2
Enter the Number of Columns of the Matrix
2
Enter the Element at M(0,0)
1
Enter the Element at M(0,1)
2
Enter the Element at M(1,0)
3
Enter the Element at M(1,1)
4
Matrix is Antisymmetric
sjcet@HP-Z238:~/java/cycle1$ java symmetric.java
Sanup - sjc22mca-2048 - 24/03/2023

Enter the Number of rows of the Matrix
2
Enter the Number of Columns of the Matrix
2
Enter the Element at M(0,0)
1
Enter the Element at M(0,1)
1
Enter the Element at M(1,0)
1
Enter the Element at M(1,1)
1
Matrix is Symmetric

```

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;acturer = "+producer+"\n");
}
}
static class ram{
    int mem;
    String manuf;
    ram(int memory,String producer ){
        mem=memory;
        manuf=producer;
    }
    void display(){
        System.out.println("SANUP,sjc22mca048,28-03-2023");
        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@HP-Z238:~/java/cycle1$ javac cpu.java
sjcet@HP-Z238:~/java/cycle1$ java cpu.java

RAM info
Memory = 8 GB
Manufacturer = Intel

SANUP,sjc22mca048,28-3-2023

Processor info
No. of Cores = 8
Manufacturer = Samsung

sjcet@HP-Z238:~/java/cycle1$ javac cpu.java
sjcet@HP-Z238:~/java/cycle1$ java cpu.java
SANUP,sjc22mca048,28-03-2023

RAM info
Memory = 8 GB
Manufacturer = Intel

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

## 6. Program to Sort strings

### Code

```
import java.util.Scanner;
import java.util.Arrays;
public class sort {
    public static void main(String[] args) {
        int i,j;
        Scanner sc = new Scanner(System.in);
        System.out.println("SANUP");
        System.out.println("SJC22MCA-2048");
        System.out.println("12-4-2023");
        System.out.println("");
        System.out.println("Enter the number of words");
        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();
        }
        for( i=0;i<num-1;i++){
            for( j=i+1;j<num;j++){
                if(word[i].compareTo(word[j])>0){
                    String temp = word[i];
                    word[i]=word[j];
                    word[j]=temp;
                }
            }
        }
        System.out.println("Sorted Strings using compareTo function =" +Arrays.toString(word));
        System.out.println(word);
    }
}
```

### Output

```
sjcet@HP-Z238:~/java/cycle1/co2$ java sort.java
```

```
SANUP
```

```
SJC22MCA-2048
```

```
12-4-2023
```

```
Enter the number of words
```

```
3
```

```
Enter a Word
```

```
apple
```

```
Enter a Word
```

```
orange
```

```
Enter a Word
```

```
mango
```

```
Sorted Strings using compareTo function =[apple, mango, orange]
```

## 7. Search an element in an array.

### Code

```
import java.util.Scanner;

public class search {
    public static void main(String[] args) {
        int i,j,x=0;
        boolean state = false;
        Scanner sc = new Scanner(System.in);
        System.out.println("SANUP");
        System.out.println("SJC22MCA-2048");
        System.out.println("12-4-2023");
        System.out.println("");
        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;
            }
        }
        if(state){
            System.out.println("Element found at position = "+x);
        }
        else{
            System.out.println("Element found not found");
        }
    }
}
```

### Output



```
sjcet@HP-Z238:~/java/cycle1/co2$ java search.java
SANUP
SJC22MCA-2048
12-4-2023

Enter the number of elemets in array
4

Enter a Word
3

Enter a Word
5

Enter a Word
7

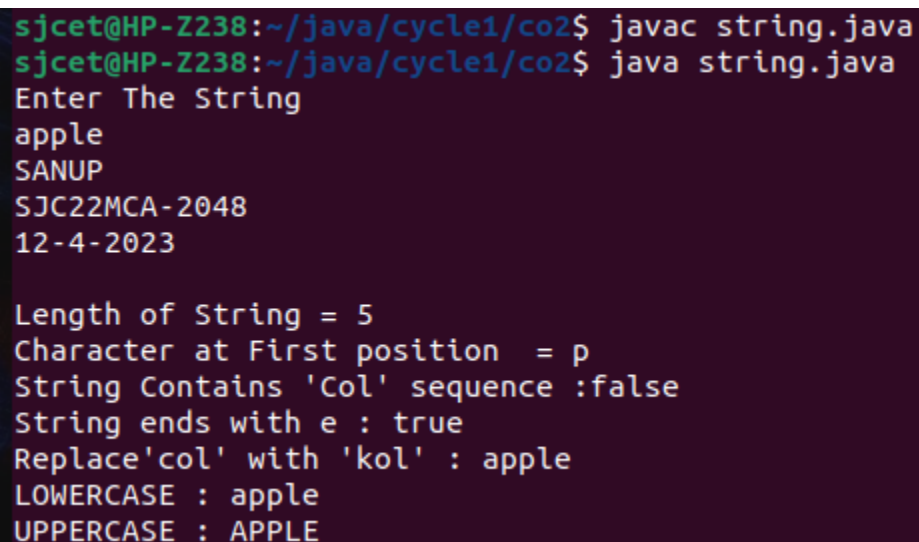
Enter a Word
9
Enter the element to Search
5
Element found at position = 1
```

## 8. Perform string manipulations

### Code

```
import java.util.Scanner;
public class string {
    public static void main(String[] args) {
        System.out.println("Enter The String");
        Scanner sc = new Scanner(System.in);
        String str1 = sc.nextLine();
        System.out.println("SANUP");
        System.out.println("SJC22MCA-2048");
        System.out.println("12-4-2023");
        System.out.println("");
        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@HP-Z238:~/java/cycle1/co2$ javac string.java
sjcet@HP-Z238:~/java/cycle1/co2$ java string.java
Enter The String
apple
SANUP
SJC22MCA-2048
12-4-2023

Length of String = 5
Character at First position = p
String Contains 'Col' sequence :false
String ends with e : true
Replace'col' with 'kol' : apple
LOWERCASE : apple
UPPERCASE : APPLE
```

9. 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(){
        Scanner sc = new Scanner(System.in);
        System.out.println("\nEnter the Employee details");
        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("SANUP");
        System.out.println("SJC22MCA-2048");
        System.out.println("12-4-2023");
        System.out.println("");
        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

```
sjcet@HP-Z238:~/java/cycle1/co2$ javac employee.java
sjcet@HP-Z238:~/java/cycle1/co2$ java employee.java
SANUP
SJC22MCA-2048
12-4-2023
```

Enter the No. of Employee's  
2

Enter the Employee details  
Employee number :  
100  
Name :  
abc  
Salary :  
2000

Enter the Employee details  
Employee number :  
101  
Name :  
def  
Salary :  
2300

Informations of all the employee's  
Empolyee No :100  
Name :abc  
Salary Amount2000.0

Empolyee No :101  
Name :def  
Salary Amount2300.0

Enter the Employee Number to get details of a employee  
100

Employee details  
Empolyee No :100  
Name :abc  
Salary Amount2000.0