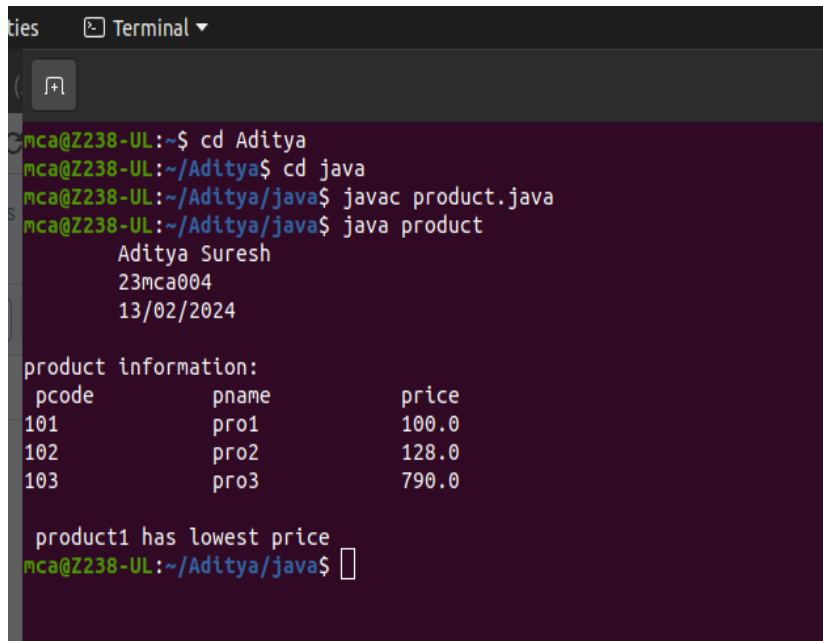# OBJECT ORIENTED PROGRAMMING LAB

CYCLE 1

1. **Define a class 'product' with data members pcode, pname and price. Create 3 objectsof the class and find the product having the lowest price**

Code

```
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 lowest(double price1,double price2,double price3){
if(price1<=price2 && price1<=price3){
System.out.println("\n product1 has lowest price");
}
else if(price2<=price1 && price2<=price3){
System.out.println("\n product2 has lowest price");
}
else{
System.out.println("\n product3 has lowest price");
}
}
public static void main(String[] args){
System.out.println("\tAditya Suresh\n\t23mca004\n\t13/02/2024");
product obj1= new product();
product obj2= new product();
product obj3= new product();
obj1.data(101,"pro1",100.0);
obj2.data(102,"pro2",128.0);
obj3.data(103,"pro3",790.0);
System.out.println("\nproduct information:\n pcode\t\tpname\t\tprice");
obj1.display();
obj2.display();
obj3.display();
owest(obj1.price,obj2.price,obj3.price);
}}
```

Output

```
ties      Terminal ▾

  ⊞

mca@Z238-UL:~$ cd Aditya
mca@Z238-UL:~/Aditya$ cd java
mca@Z238-UL:~/Aditya/java$ javac product.java
mca@Z238-UL:~/Aditya/java$ java product
        Aditya Suresh
        23mca004
        13/02/2024

product information:
 pcode           pname            price
101              pro1             100.0
102              pro2             128.0
103              pro3             790.0

 product1 has lowest price
mca@Z238-UL:~/Aditya/java$ ▯
```

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

    Code

```java
import java.util.Scanner;
public class addmarix{
        public static void main(String args[])
        {
        System.out.println("\tAditya Suresh\n\t23mca004\n\t13/02/2024");
        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 of columns");
        col =in.nextInt();
        int mat1[][] =new int[row][col];
        int mat2[][] =new int[row][col];
        int mat3[][] =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++)
        mat3[i][j]=mat1[i][j]+mat2[i][j];
        System.out.println("Sum of matix:");
        for(i=0;i<row;i++)
        {
        for(j=0;j<col;j++)
        System.out.print(mat3[i][j]+"\t");
        System.out.println();
        }
}
}
```

Output

```
mca@Z238-UL:~/Aditya/java$ javac addmarix.java
mca@Z238-UL:~/Aditya/java$ java addmarix
        Aditya Suresh
        23mca004
        13/02/2024
Enter the number of rows
2
Enter the number of columns
2
Enter the elements of matrix1
1
2

3
4

Enter the elements of matrix2
1
2

3
4

Sum of matix:
2       4
6       8
mca@Z238-UL:~/Aditya/java$ []
```
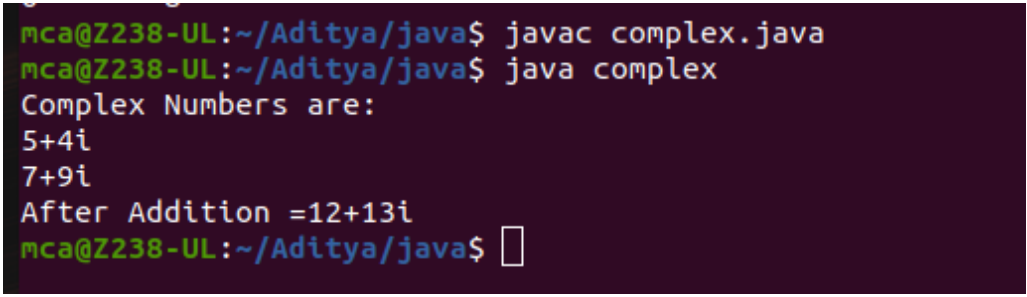
3. Add complex numbers

Code

```java
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(5,4);
        complex second=new complex(7,9);
        System.out.println("Complex Numbers are:");
        first.display();
        second.display();
        add(first.r,first.i,second.r,second.i);
   }

}
```

Output

```
mca@Z238-UL:~/Aditya/java$ javac complex.java
mca@Z238-UL:~/Aditya/java$ java complex
Complex Numbers are:
5+4i
7+9i
After Addition =12+13i
mca@Z238-UL:~/Aditya/java$ 
```

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 symmetric {
public static void main(String[] args) {
 System.out.println("\tAditya Suresh\n\t23mca004\n\t13/02/2024");
   Scanner sc = new Scanner(System.in);
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 Not symmetric");
}
}
}
```

Output

```
mca@Z238-UL:~/Aditya/java$ javac symmetric.java
mca@Z238-UL:~/Aditya/java$ java symmetric
        Aditya Suresh
        23mca004
        13/02/2024
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)
2
Enter the Element at M(1,1)
1
Matrix is Symmetric
mca@Z238-UL:~/Aditya/java$ java symmetric
        Aditya Suresh
        23mca004
        13/02/2024
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 Not 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 ofCPU and print information of Processor and RAM.**

Code

```java
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("\tAditya Suresh\n\t23mca004\n\t13/02/2024");
      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

```
        Aditya Suresh
        23mca004
        13/02/2024

RAM info
Memory = 8 GB
Manufacturer = Intel


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