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20BCE1249

Lab Exercise on Packages

Question 1

Create a class **MATRIX** in a package called *<<yourname>>*. Include a read and print methods to input and output a matrix elements. This class should also include methods to add and subtract two matrices.

Create a TestMatrix class in a default package and let this class to access all the methods of the class MATRIX.

CODE:

Package:

```
package GokulJayan;
import java.util.Scanner;

public class Matrix
{
    Scanner in = new Scanner(System.in);
    int row, col;
    int i,j;
    int[][] ele;
    public void read()
    {
        System.out.print("\nEnter row size: ");
        row=in.nextInt();
        System.out.print("Enter col size: ");
        col=in.nextInt();
        ele=new int[row][col];
        System.out.println("Enter matrix elements: ");
        for(i=0;i<row;i++)
        {
            for(j=0;j<col;j++)
            ele[i][j]=in.nextInt();
        }
    }
    public void print()
    {
        for(i=0;i<row;i++)
        {
            for(j=0;j<col;j++)
            System.out.print(ele[i][j]+" ");
            System.out.println();
        }
    }

    public void add(Matrix M1, Matrix M2)
    {
        if(M1.row==M2.row && M2.col==M2.col)
```

```
      {
        row=M1.row;
        col=M1.col;
        ele=new int[row][col];
        int i,j;
        for(i=0;i<row;i++)
        {
          for(j=0;j<col;j++)
          ele[i][j]=M1.ele[i][j]+M2.ele[i][j];
        }
      }
    }

    public void sub(Matrix M1, Matrix M2)
    {
      if(M1.row==M2.row && M2.col==M2.col)
      {
        row=M1.row;
        col=M1.col;
        ele=new int[row][col];
        int i,j;
        for(i=0;i<row;i++)
        {
          for(j=0;j<col;j++)
          ele[i][j]=M1.ele[i][j]-M2.ele[i][j];
        }
      }
    }
}
```

TestMatrix:

```
import GokulJayan.Matrix;
import java.util.Scanner;
public class TestMatrix
{
  public static void main(String args[])
  {
    Scanner in = new Scanner(System.in);
    int n, i;
    Matrix m1 =new Matrix();
    m1.read();
    Matrix m2 =new Matrix();
    m2.read();

    System.out.println("\nMatrix-1:");
    m1.print();
    System.out.println("\nMatrix-2:");
    m2.print();

    Matrix m3=new Matrix();
    m3.add(m1,m2);
    System.out.println("\nSum:");
    m3.print();
```
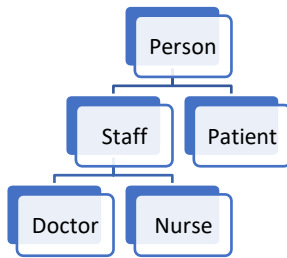
```
        Matrix m4=new Matrix();
        m4.sub(m1,m2);
        System.out.println("\nDifference:");
        m4.print();
    }
}
```

OUTPUT:

```
C:\Gokul\VIT\SEM-4\CSE1007 - Java\Lab\Lab8>javac -d . Matrix.java

C:\Gokul\VIT\SEM-4\CSE1007 - Java\Lab\Lab8>javac TestMatrix.java

C:\Gokul\VIT\SEM-4\CSE1007 - Java\Lab\Lab8>java TestMatrix

Enter row size: 2
Enter col size: 3
Enter matrix elements:
8 6 5
4 3 1

Enter row size: 2
Enter col size: 3
Enter matrix elements:
1 2 0
3 1 0

Matrix-1:
8 6 5
4 3 1

Matrix-2:
1 2 0
3 1 0

Sum:
9 8 5
7 4 1

Difference:
7 4 5
1 2 1
```

Question 2

Consider the inheritance model given below.

where each class is defined in a different package and the class **HospitalDatabase** has a list of patients, doctors and nurses defined in another package. This class should read and display the complete employee's and patients data of the hospital.

CODE:

Package-1 (Person)

package pack1;

import java.util.Scanner;
public class Person {
   Scanner in = new Scanner(System.in);
   String Name;
   int Aadhar;

   public void getName()
   {
     System.out.print("Enter Name   : ");
     Name=in.next();
   }

   public void getAadhar()
   {
     System.out.print("Enter Aadhar No: ");
     Aadhar=in.nextInt();
   }

   public void printName()
   {
     System.out.println("Name   : "+Name);
   }

   public void printAadhar()
   {
     System.out.println("Aadhar No: "+Aadhar);
   }
}

Package-2 (Staff)

```
package pack2;

import pack1.Person;
import java.util.Scanner;
public class Staff extends Person {
    Scanner in = new Scanner(System.in);
    int StaffID;

    public void getStaffID()
    {
        System.out.print("Enter Staff ID : ");
        StaffID=in.nextInt();
    }

    public void printStaffID()
    {
        System.out.println("Staff ID : "+StaffID);
    }
}
```

Package-3 (Patient)

```
package pack3;

import pack1.Person;
import java.util.Scanner;
public class Patient extends Person {
    Scanner in = new Scanner(System.in);
    int PatientID;

    public void getPatientID()
    {
        System.out.print("Enter Patient ID : ");
        PatientID=in.nextInt();
    }

    public void printPatientID()
    {
        System.out.println("Patient ID : "+PatientID);
    }
}
```

Package-4 (Doctor)

```java
package pack4;

import pack2.Staff;
import java.util.Scanner;
public class Doctor extends Staff
{
    Scanner in = new Scanner(System.in);
    String Dept;

    public void getDept()
    {
        System.out.print("Enter Department: ");
        Dept=in.next();
    }

    public void printDept()
    {
        System.out.println("Department : "+Dept);
    }
}
```

Package-5 (Nurse)

```java
package pack5;

import pack2.Staff;
import java.util.Scanner;
public class Nurse extends Staff
{
    Scanner in = new Scanner(System.in);
    int Room;

    public void getRoom()
    {
        System.out.print("Enter Room No: ");
        Room=in.nextInt();
    }

    public void printRoom()
    {
        System.out.println("Room No: "+Room);
    }
}
```

Package-6 (Hospital Database)

```java
package packTest;

import pack3.Patient;
import pack4.Doctor;
import pack5.Nurse;

import java.util.Scanner;

public class HospitalDatabase{
   public static void main(String[] args)
   {
      int i;
      Scanner in = new Scanner(System.in);
      System.out.println("Patients");
      System.out.print("Enter no: of Patients: ");
      int np=in.nextInt();
      Patient P[]= new Patient[np];
      for(i=0;i<np;i++)
      {
         P[i]=new Patient();
         System.out.println("\nPatient-"+(i+1));
         P[i].getName();
         P[i].getAadhar();
      }

      System.out.println("\nDoctors");
      System.out.print("Enter no: of Doctors: ");
      int nd=in.nextInt();
      Doctor D[]= new Doctor[nd];
      for(i=0;i<nd;i++)
      {
         D[i]=new Doctor();
         System.out.println("\nDoctor-"+(i+1));
         D[i].getName();
         D[i].getAadhar();
         D[i].getStaffID();
         D[i].getDept();
      }

      System.out.println("\nNurses");
      System.out.print("Enter no: of Nurses: ");
      int nN=in.nextInt();
      Nurse N[]= new Nurse[nN];
      for(i=0;i<nN;i++)
      {
         N[i]=new Nurse();
         System.out.println("\nNurse-"+(i+1));
         N[i].getName();
         N[i].getAadhar();
         N[i].getStaffID();
         N[i].getRoom();
      }
```

```
        System.out.println("\n\nPatients' Details:");
        for(i=0;i<np;i++)
        {
            System.out.println("\nPatient-"+(i+1));
            P[i].printName();
            P[i].printAadhar();
            P[i].printPatientID();
        }

        System.out.println("\n\nDoctors' Details:");
        for(i=0;i<nd;i++)
        {
            System.out.println("\nDoctor-"+(i+1));
            D[i].printName();
            D[i].printAadhar();
            D[i].printStaffID();
            D[i].printDept();
        }

        System.out.println("\n\nNurses' Details:");
        for(i=0;i<nN;i++)
        {
            System.out.println("\nNurse-"+(i+1));
            N[i].printName();
            N[i].printAadhar();
            N[i].printStaffID();
            N[i].printRoom();
        }
    }
}
```

OUTPUT:

```
C:\Gokul\VIT\SEM-4\CSE1007 - Java\Lab\Lab8>javac -d . Person.java

C:\Gokul\VIT\SEM-4\CSE1007 - Java\Lab\Lab8>javac -d . Staff.java

C:\Gokul\VIT\SEM-4\CSE1007 - Java\Lab\Lab8>javac -d . Patient.java

C:\Gokul\VIT\SEM-4\CSE1007 - Java\Lab\Lab8>javac -d . Doctor.java

C:\Gokul\VIT\SEM-4\CSE1007 - Java\Lab\Lab8>javac -d . Nurse.java
```

```
C:\Gokul\VIT\SEM-4\CSE1007 - Java\Lab\Lab8>javac -d . HospitalDatabase.java

C:\Gokul\VIT\SEM-4\CSE1007 - Java\Lab\Lab8>java packTest.HospitalDatabase
Patients
Enter no: of Patients: 2

Patient-1
Enter Name      : Rahul
Enter Aadhar No: 513264
Enter Patient ID : 1001

Patient-2
Enter Name      : Gill
Enter Aadhar No: 478965
Enter Patient ID : 1002

Doctors
Enter no: of Doctors: 1

Doctor-1
Enter Name      : David
Enter Aadhar No: 457965
Enter Staff ID : 101
Enter Department: Ortho

Nurses
Enter no: of Nurses: 2

Nurse-1
Enter Name      : Steve
Enter Aadhar No: 476523
Enter Staff ID : 501
Enter Room No: 23

Nurse-2
Enter Name      : Lilly
Enter Aadhar No: 789632
Enter Staff ID : 502
Enter Room No: 15
```

```
Patients' Details:

Patient-1
Name     : Rahul
Aadhar No: 513264
Patient ID : 1001

Patient-2
Name     : Gill
Aadhar No: 478965
Patient ID : 1002


Doctors' Details:

Doctor-1
Name     : David
Aadhar No: 457965
Staff ID : 101
Department : Ortho


Nurses' Details:

Nurse-1
Name     : Steve
Aadhar No: 476523
Staff ID : 501
Room No: 23

Nurse-2
Name     : Lilly
Aadhar No: 789632
Staff ID : 502
Room No: 15
```