

LAB EXERCISE ON PACKAGES

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SLOT : L13-L14

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1)Create a class MATRIX in a package called <>. 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.

File name : Matrix.java

Code

```
package sheral;  
import java.util.Scanner;  
public class Matrix  
{  
  
    private int m ;  
    private int n ;  
    int[][] mat1 = new int[m][n];  
    int[][] mat2 = new int[m][n];  
    int[][] add = new int[m][n];  
    int[][] diff = new int[m][n];  
  
    public Matrix(int m , int n)  
    {  
        this.m = m;  
        this.n = n;  
        this.mat1 = new int[m][n];  
        this.mat2 = new int[m][n];
```

```
this.add = new int[m][n];  
this.diff = new int[m][n];  
}
```

```
public void read()
```

```
{
```

```
Scanner sc = new Scanner(System.in);  
System.out.println("Enter elements of 1st matrix ");
```

```
for (int i=0;i<m;i++)
```

```
{
```

```
for (int j=0;j<n;j++)
```

```
{
```

```
mat1[i][j] = sc.nextInt();
```

```
}
```

```
}
```

```
System.out.println("Enter elements of 2nd matrix ");
```

```
for (int i=0;i<m ;i++)
```

```
{  
for (int j=0;j<n;j++)  
{  
mat2[i][j] = sc.nextInt();  
}  
}  
}
```

```
public void sub()  
{  
System.out.println("The difference of 2 matrices is : ");  
for (int i=0;i<m;i++)  
{  
for (int j=0;j<n;j++)  
{  
diff[i][j] = mat1[i][j] - mat2[i][j] ;  
System.out.print(diff[i][j] + " ");  
}  
}
```

```
System.out.println();
```

```
}
```

```
}
```

```
public void add()
```

```
{
```

```
System.out.println("The addition of 2 matrices is : ");
```

```
for (int i=0;i<m;i++)
```

```
{
```

```
for (int j=0;j<n;j++)
```

```
{
```

```
add[i][j] = mat1[i][j] + mat2[i][j] ;
```

```
System.out.print(add[i][j]+ " ");
```

```
}
```

```
System.out.println();
```

```
}
```

```
}
```

```
public void print()  
{  
    System.out.println("Matrix 1 elements are :" );  
    for (int i=0;i<m;i++)  
    {  
  
        for (int j=0;j<n;j++)  
        {  
            System.out.print( mat1[i][j] + " " ) ;  
  
        }  
        System.out.println();  
    }  
}
```

```
System.out.println("Matrix 2 elements are :" );  
for (int i=0;i<m;i++)  
{
```

```
for (int j=0;j<n;j++)  
{  
    System.out.print( mat2[i][j] + " " ) ;  
  
}  
System.out.println();  
}  
  
}  
}
```

File name : TestMatrix.java

Code :

```
import sheral.Matrix;  
  
class TestMatrix  
{  
  
    public static void main(String[] args)
```

```
{
```

```
Matrix m1 = new Matrix(3,4);
```

```
m1.read();
```

```
m1.print();
```

```
m1.sub();
```

```
m1.add();
```

```
}
```

```
}
```

Output :

```
D:\SEM 4\CSE1007_LAB\Matrix>javac -d . *.java

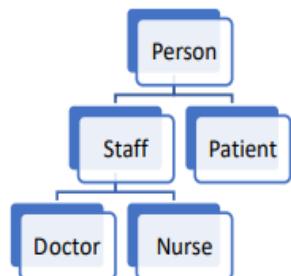
D:\SEM 4\CSE1007_LAB\Matrix>java TestMatrix
Enter elements of 1st matrix
25
21
28
29
27
36
28
39
55
59
74
37
Enter elements of 2nd matrix
19
15
16
11
14
12
21
25
23
17
29
35
Matrix 1 elements are :
25 21 28 29
27 36 28 39
55 59 74 37
Matrix 2 elements are :
19 15 16 11
14 12 21 25
23 17 29 35
The difference of 2 matrices is :
6 6 12 18
13 24 7 14
32 42 45 2
The addition of 2 matrices is :
44 36 44 40
41 48 49 64
78 76 103 72
```

```
D:\SEM 4\CSE1007_LAB\Matrix>javac -d . *.java

D:\SEM 4\CSE1007_LAB\Matrix>java TestMatrix
Enter elements of 1st matrix
25
21
28
29
27
36
28
39
55
59
74
37
Enter elements of 2nd matrix
19
15
16
11
14
12
21
25
23
17
29
35
Matrix 1 elements are :
25 21 28 29
27 36 28 39
55 59 74 37
Matrix 2 elements are :
19 15 16 11
14 12 21 25
23 17 29 35
The difference of 2 matrices is :
6 6 12 18
13 24 7 14
32 42 45 2
The addition of 2 matrices is :
44 36 44 40
41 48 49 64
78 76 103 72
```

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.

File name : Person.java

Code :

```
package p1;  
import java.util.Scanner;
```

```
public class Person  
{
```

```
    String pname;  
    String padhaarno;
```

```
public Person()
{
    this.pname = pname;
    this.padhaarno = padhaarno;

}

public void read()
{
    Scanner sc = new Scanner(System.in);
    System.out.println("Enter name ");
    pname = sc.next();
    System.out.println("Enter adhaar no .");
    padhaarno =sc.next();
}

public void print()
{
    System.out.println("Name is " + pname + "\nAdhaar
no . is " + padhaarno );
}
```

}

File name : Staff.java

Code :

```
package s1;  
import p1.Person;  
import java.util.Scanner;
```

```
public class Staff extends Person
```

```
{
```

```
int stno;
```

```
public Staff()
```

```
{
```

```
super();
```

```
this.stno = stno;
```

```
}
```

```
public void read()
```

```
{
```

```
Scanner sc = new Scanner(System.in);
```

```
super.read();
```

```
System.out.println("Enter staff id no. ");
```

```
stno = sc.nextInt();
```

```
}
```

```
public void print()
```

```
{
```

```
super.print();
```

```
System.out.println("Staff id no. is " + stno);
```

```
}
```

```
}
```

File name : Patient.java

```
package p2;  
import java.util.Scanner;  
import p1.Person;  
  
  
public class Patient extends Person  
{  
  
  
    int name;  
    String diagnosis;  
    int pno;  
    int wdno;  
  
  
    public Patient()  
{  
  
  
        super();  
        this.diagnosis = diagnosis;  
        this.pno = pno;
```

```
this.wdno = wdno ;  
}
```

```
public void read()
```

```
{
```

```
super.read();
```

```
Scanner sc = new Scanner(System.in);
```

```
System.out.println("Enter the type of diagnosis ");
```

```
diagnosis = sc.next();
```

```
System.out.println("Enter the patient id ");
```

```
pno = sc.nextInt();
```

```
System.out.println("Enter the ward no. ");
```

```
wdno = sc.nextInt();
```

```
}
```

```
public void print()
```

```
{
```

```
System.out.println("Details of the patient are ");
```

```
super.print();  
System.out.println("Diagnosis of the patient is : " +  
diagnosis);  
System.out.println("Ward number of the patient is : " +  
wdno);  
System.out.println("Patient id is : " + pno);  
}  
}
```

File name : Doctor.java

```
package d1;  
import s1.Staff;  
import java.util.Scanner;  
  
public class Doctor extends Staff  
{  
  
int roomno;  
String specialist;
```

```
public Doctor()  
{  
super();  
this.roomno = roomno;  
this.specialist = specialist;  
}
```

```
public void read()  
{  
super.read();  
Scanner sc = new Scanner(System.in);  
System.out.println("Enter the room no. ");  
roomno = sc.nextInt();  
System.out.println("Enter the type of specialisation ");  
specialist = sc.next();  
}
```

```
public void print()  
{  
System.out.println("Details of the doctor are " );
```

```
super.print();  
System.out.println("Room no. of the doctor is " +  
roomno);  
System.out.println("Doctor is specialised in " +  
specialist);  
  
}  
  
}
```

File name : Nurse.java

```
package n1;  
import s1.Staff;  
import java.util.Scanner;  
  
  
public class Nurse extends Staff  
{  
  
  
  
  
int wdno;  
  
  
public Nurse()
```

```
{  
super();  
this.wdno = wdno;  
}
```

```
public void read()  
{  
super.read();  
Scanner sc = new Scanner(System.in);  
System.out.println("Enter ward number ");  
wdno = sc.nextInt();  
}
```

```
public void print()  
{  
System.out.println("Details of the nurse are as follows  
");  
super.print();  
System.out.println("The ward no. is " + wdno);  
}
```

```
}
```

File name : HospitalDatabase.java

```
package h;
```

```
import p1.Person;
```

```
import s1.Staff;
```

```
import n1.Nurse;
```

```
import d1.Doctor;
```

```
import p2.Patient;
```

```
public class HospitalDatabase
```

```
{
```

```
    public static void main(String[] args)
```

```
{
```

```
    System.out.println();
```

```
    Doctor[] d = new Doctor[2];
```

```
for (int i=0;i<d.length;i++)  
{  
    d[i] = new Doctor();  
    d[i].read();  
    d[i].print();  
    System.out.println();  
}
```

```
System.out.println("\n");  
Patient[] p1 = new Patient[2];  
for(int i=0;i<p1.length;i++)  
{  
    p1[i]= new Patient();  
    p1[i].read();  
    p1[i].print();  
    System.out.println();  
}
```

```
System.out.println("\n");  
Nurse[] n = new Nurse[2];
```

```
for(int i=0;i<n.length;i++)  
{  
    n[i]= new Nurse();  
    n[i].read();  
    n[i].print();  
    System.out.println();  
  
}  
}  
}
```

Output :

```
D:\SEM 4\CSE1007_LAB\Hospital>javac -d . *.java
D:\SEM 4\CSE1007_LAB\Hospital>java h.HospitalDatabase

Enter name
Sheral
Enter adhaar no .
8657489345
Enter staff id no.
2214
Enter the room no.
45
Enter the type of specialisation
Oncology
Details of the doctor are
Name is Seral
Adhaar no . is 8657489345
Staff id no. is 2214
Room no. of the doctor is 45
Doctor is specialised in Oncology

Enter name
Sheetal
Enter adhaar no .
3434562211
Enter staff id no.
6645
Enter the room no.
25
Enter the type of specialisation
Dermatology
Details of the doctor are
Name is Sheetal
Adhaar no . is 3434562211
Staff id no. is 6645
Room no. of the doctor is 25
Doctor is specialised in Dermatology
```

```
Enter name
Riya
Enter adhaar no .
8533534467
Enter the type of diagnosis
Cancer
Enter the patient id
8834
Enter the ward no.
670
Details of the patient are
Name is Riya
Adhaar no . is 8533534467
Diagnosis of the patient is : Cancer
Ward number of the patient is : 670
Patient id is : 8834

Enter name
Sakshi
Enter adhaar no .
6339299929
Enter the type of diagnosis
Eczema
Enter the patient id
4563
Enter the ward no.
765
Details of the patient are
Name is Sakshi
Adhaar no . is 6339299929
Diagnosis of the patient is : Eczema
Ward number of the patient is : 765
Patient id is : 4563
```

```
Enter name
Geeta
Enter adhaar no .
6654753456
Enter staff id no.
4562
Enter ward number
670
Details of the nurse are as follows
Name is Geeta
Adhaar no . is 6654753456
Staff id no. is 4562
The ward no. is 670

Enter name
Sarita
Enter adhaar no .
3345893223
Enter staff id no.
8583
Enter ward number
765
Details of the nurse are as follows
Name is Sarita
Adhaar no . is 3345893223
Staff id no. is 8583
The ward no. is 765
```