

23-1-24

Lab - 6

Create a package CIE which has two classes - Student and Internals. The class Student has members like usn, name, sem. The class Internals derived from Student has an array that stores the internal marks scored in five courses of the current semester of the student. Create another package SEE which has the class External which is a derived class of Student. This class has an array that stores the SEE marks scored in five courses of the current semester of the student. Import the two packages in a file that declares the final marks of n students in all five courses.

// Student.java

package CIE;

import java.util.Scanner;

public class Student

{

protected String usn = new String();

protected String name = new String();

protected int sem;

public void inputStudentDetails()

{

Scanner scanner = new Scanner
(System.in);

System.out.println("Enter USN:");

usn = scanner.next();

System.out.print("Enter Name:");

name = scanner.next();

System.out.print("Enter Semester:");

sem = scanner.nextInt();

}

public void displayStudentDetails()

{

System.out.println("USN:" + usn);

System.out.println("Name:" + name);

System.out.println("Semester:" + sem);

}

}

// Internals.java

package CIE;


```
import java.util.Scanner;
public class Internals extends
    Student
{
    protected int marks[] = new int[5];
    public void inputCIEmarks()
    {
        Scanner scanner = new Scanner
            (System.in);
        System.out.println("Enter Internal
            Marks for " + name);
        for (int i = 0; i < 5; i++)
        {
            System.out.println("Subject"
                + (i + 1) + "marks: ");
            marks[i] = scanner.nextInt();
        }
    }
}
```

```
//Externals.java
package SEE;
import CIE Internals;
import java.util.Scanner;
public class Externals extends
    Internals
{
    protected int marks[];
    protected int finalMarks[];
```



```
public External()
{
```

```
    marks = new int [5];
    finalMarks = new int [5];
}
```

```
public void inputSEEMarks() {
    Scanner scanner = new Scanner
        (System.in);
    System.out.println("Enter SEE Marks
        for " + name);
    for (int i = 0; i < 5; i++) {
        System.out.print("Subject " + (i+1) +
            "marks: ");
        marks[i] = scanner.nextInt();
    }
}
```

```
public void calculateFinalMarks() {
    for (int i = 0; i < 5; i++)
        finalMarks[i] = marks[i] / 2 + super.marks
            [i];
}
```

```
public void displayFinalMarks() {
    displayStudentDetails();
    for (int i = 0; i < 5; i++)
        System.out.println("Subject " +
            (i+1) + ": " + finalMarks[i]);
}
}
```



```

//Main.java
import SEE.Externals;
public class Main{
    public static void main (String args[])
    {
        int numOfStudents = 1;
        Externals finalMarks[] = new
            Externals[numOfStudents];
        for (int i=0; i<numOfStudents; i++){
            finalMarks[i] = new Externals();
            finalMarks[i].inputStudentDetails();
            System.out.println("Enter CIE marks");
            finalMarks[i].inputCIEmarks();
            System.out.println("Enter SEE marks");
            finalMarks[i].inputSEEmarks();
        }
        System.out.println("Displaying data:\n");
        for (int i=0; i<numOfStudents; i++){
            finalMarks[i].calculateFinalMarks();
            finalMarks[i].displayFinalMarks();
        }
    }
}
  
```

Output :-

```

cd IBM22EE060
javac CIE/Student.java
javac CIE/Internals.java
javac SEE/Externals.java
javac Main.java
java Main
  
```


Enter USN: IBM22EE070

Enter Name: Ara

Enter Semester : 5

Enter CIE marks

Enter Internal Marks for Ara

Subject 1 marks : 34

Subject 2 marks : 35

Subject 3 marks : 36

Subject 4 marks : 32

Subject 5 marks : 37

Enter SEE marks

Enter SEE Marks for Ara

Subject 1 marks : 45

Subject 2 marks : 46

Subject 3 marks : 45

Subject 4 marks : 43

Subject 5 marks : 42

Displaying data:

USN : IBM22EE070

Name : Ara

Semester : 5

Subject 1 : 56

Subject 2 : 58

Subject 3 : 58

Subject 4 : 53

Subject 5 : 58

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30-1-24

Write a program that demonstrates handling of exceptions in inheritance tree. Create a base class called "Father" and derived class called "Son" which extends the base class. In Father class, implement a constructor which takes the age and throws the exception WrongAge() when the input age < 0 . In Son class, implement a constructor that takes both father and son's age and throws an exception if son's age is \geq father's age.

```

import java.util.*;
class WrongAge extends Exception
{
    WrongAge()
    {
        System.out.println("Age Error occurred");
    }
    WrongAge(String s)
    {
        super(s);
    }
}

class InputScanner
{
    Scanner s = new Scanner(System.in);
    int fatherAge;
}
  
```



```
class Father extends InputScanner
{
```

Father() throws WrongAge

```
System.out.println("Enter father's age.");  
fatherAge = s.nextInt();
```

fatherAge = s.nextInt();

if (fatherage < 0)

throw new WrongAge ("Age cannot
be negative");

7

public void display()

2

System.out.println("Father's Age:"
+ fatherAge);

 $+ \text{fatherAge}$

33

class Son extends Father
{

2

```
int sonAge;
```

Son() throws Werangde

5

System.out.println("Enter son's age:");

sonAge = s.nextInt()

if (sonAge > fatherAge)

throw new WrongAge

("Son's age cannot be greater than or equal to father's age")

greater than or equal to father's age

```
else if (sonAge < 0)
```

throw new WrongAge ("Age cannot be negative").

3


```

public void display()
{
    System.out.println("Son's age:"
                        + sonAge);
}

public static void main(String
                           args[])
{
    try
    {
        Son so = new Son();
        so.display();
    }
    catch (WrongAge e) {
        System.out.println("Age error"
                           + e);
        System.out.println(e.getMessage());
    }
}
}

```

Output :-

Enter father's age:

56

Enter son's age:

67

Age error/WrongAge: Son's age cannot
be greater than or equal
to father's age

Son's age cannot be greater than
or equal to father's age.

Enter father's age:

-67

Age error! Wrong Age: Age cannot be negative

Age cannot be negative

30/11/20