Mile1 –Student Grade Calculation -- Project Design

Set of student data is available in an array of Student objects. If the given object has any errors, then, the program is expected to return appropriate error messages. Or, if given object has no data errors, then, we need to find the grade and print the same.

Package 1: **com.mile1.bean**

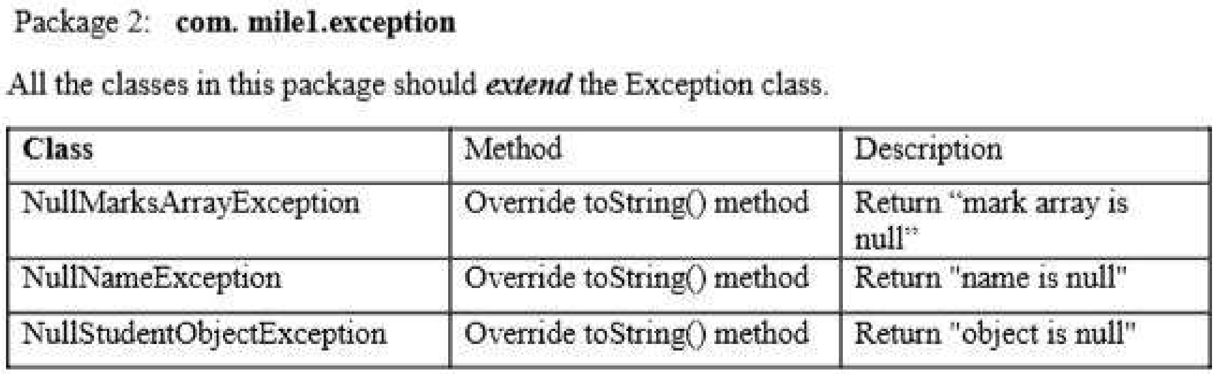
Class Student	
Variables	Description

String name;
int marks [];
String grade;
	Instance variables

Constructors	

public Student () {
 	
}
public Student (String grade, int [] marks, String name)
{
// do the initialization
}
	To be Auto generated
	
	To be Auto generated

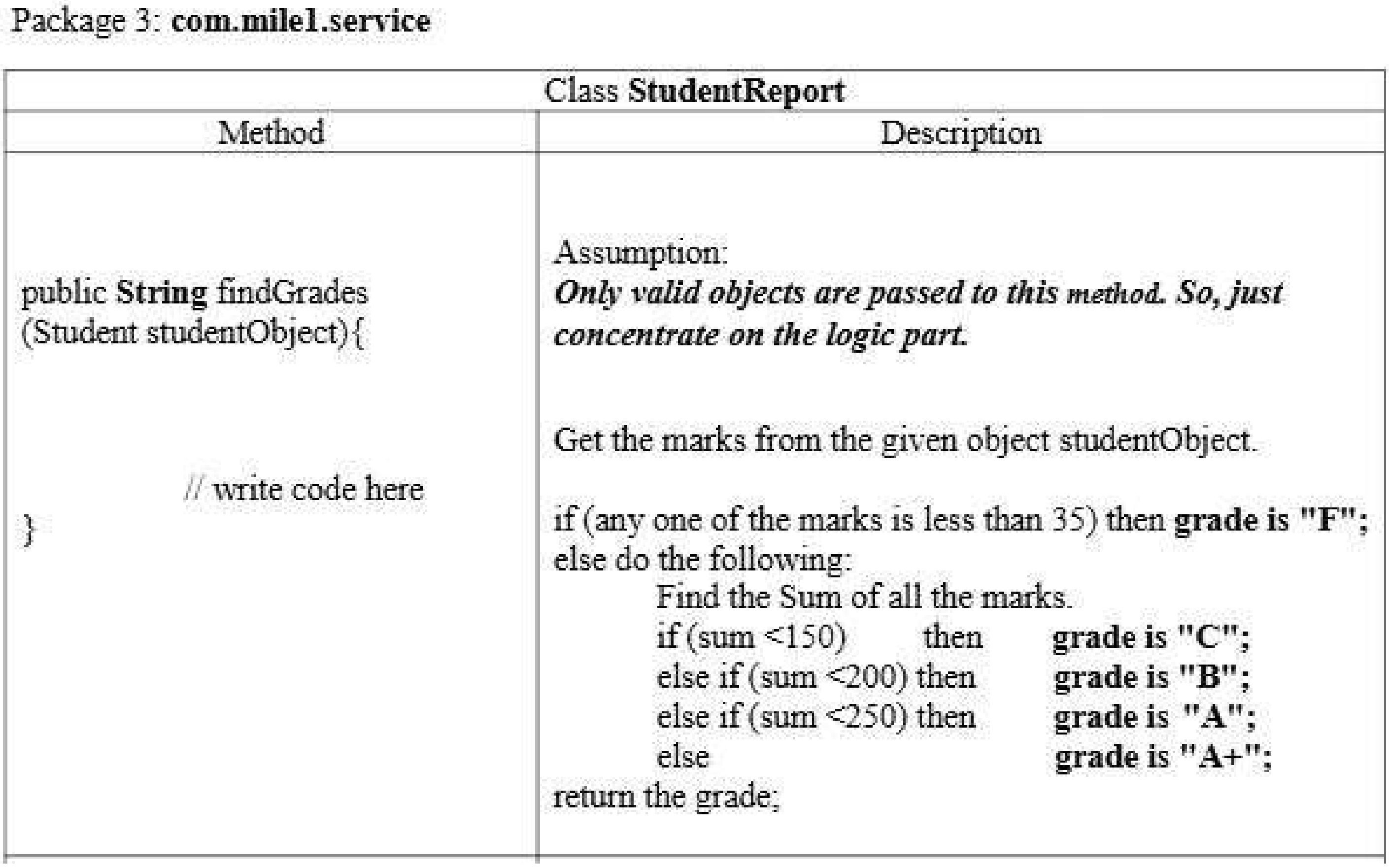
Methods	
Provide public Getters and Setters for all instance variables	To be Auto generated



Package 2: **com. mile1.exception**

All the classes in this package should ***extend*** the Exception class.

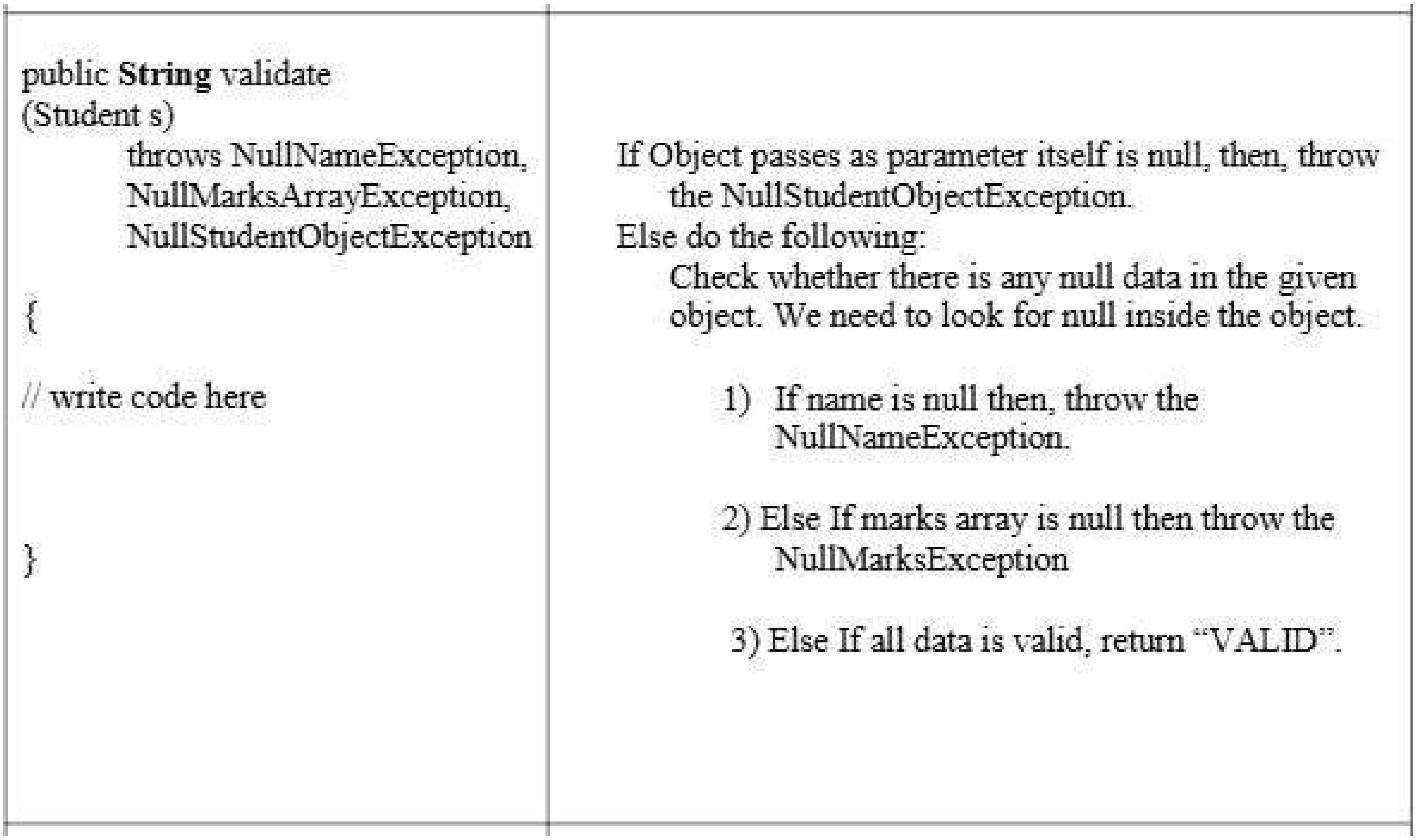
Class	Method	Description
NullMarksArrayException	Override toString() method	Return “mark array is null”
NullNameException	Override toString() method	Return "name is null"
NullStudentObjectException	Override toString() method	Return "object is null"



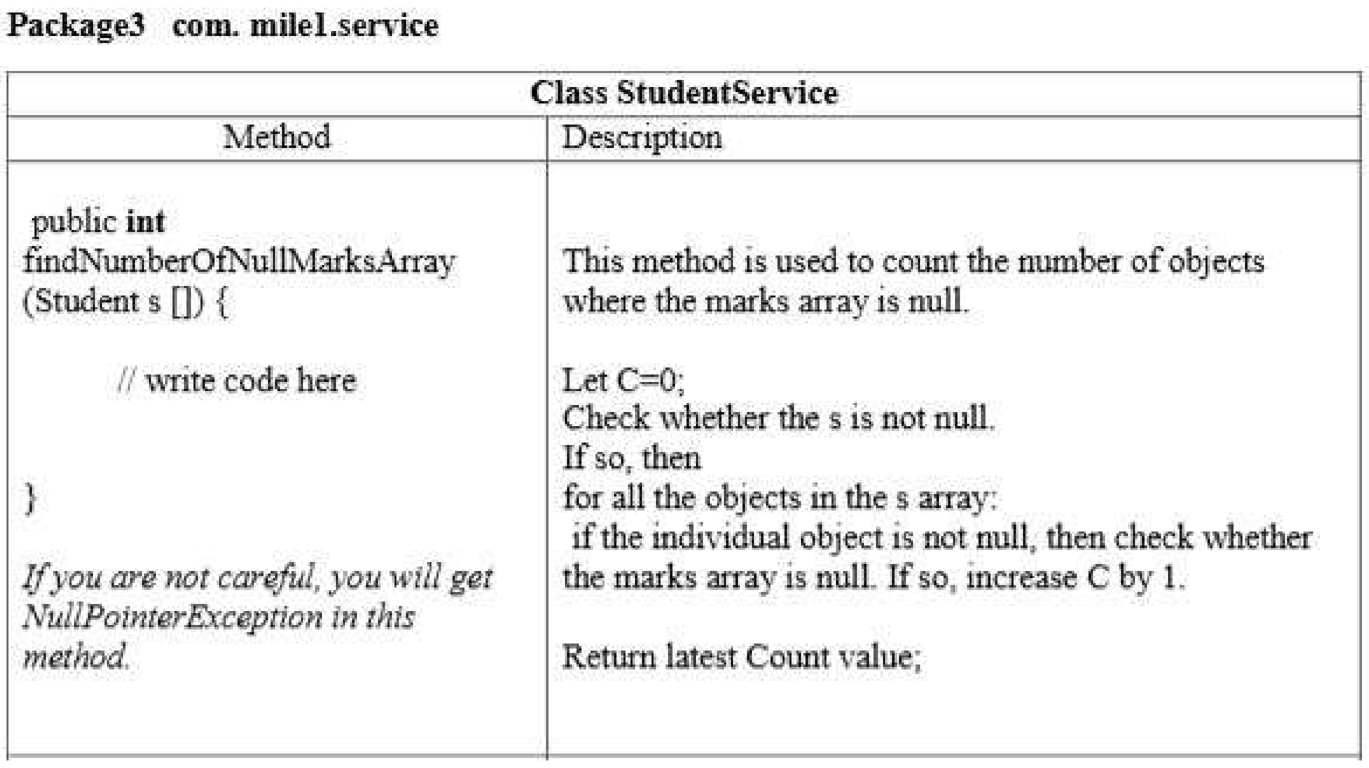
Package 3: **com.mile1.service**

Class **StudentReport**	
Method	Description

public **String** findGrades
(Student studentObject){
 	
// write code here
}
	Assumption:
	Only valid objects are passed to this method. So, just concentrate on the logic part.
	
	Get the marks from the given object studentObject.
	
	if (any one of the marks is less than 35) then **grade is "F";**
	else do the following:
	    Find the Sum of all the marks.
	    if (sum <150) then **grade is "C";**
	    else if (sum <200) then **grade is "B";**
	    else if (sum <250) then **grade is "A";**
	    else **grade is "A+";**
	return the grade;



public **String** validate
(Student s)
throws NullNameException,
NullMarksArrayException,
NullStudentObjectException
{
// write code here
}
	If Object passes as parameter itself is null, then, throw the NullStudentObjectException.
	Else do the following:
	Check whether there is any null data in the given object. We need to look for null inside the object.
	1) If name is null then, throw the NullNameException.
	2) Else If marks array is null then throw the NullMarksException
	3) Else If all data is valid, return "VALID".



Package3   com. mile1.service

Class StudentService	
Method	Description

public **int**
findNumberOfNullMarksArray
(Student s []) {
 	
// write code here
 	
}
 	
If you are not careful, you will get NullPointerException in this method.
	This method is used to count the number of objects where the marks array is null.
	
	Let C=0;
	Check whether the s is not null.
	If so, then
	for all the objects in the s array:
	if the individual object is not null, then check whether the marks array is null. If so, increase C by 1.
	
	Return latest Count value;

public **int** findNumberOfNullName
(Student s []) {
// write code here
}
Note: If you are not careful, you will get NullPointerException in this method.
	This method is used to count the number of objects where the name is null.
	// Code like above method
	// refer findNumberOfNullMarksArray

public **int** findNumberOfNullObjects
(Student s []) {
// write code here
}
If you are not careful, you will get NullPointerException in this method.
	This method is used to count the number of null objects.
	Let C=0;
	Check whether the s is not null.
	If so, then
	for all the objects in the s array,
	if the individual object is null, then increase C by 1.
	Return latest Count value.

Package 4   com. mile1.main

Class StudentMain

Variables

```
static   Student data [] = new Student [4];
```

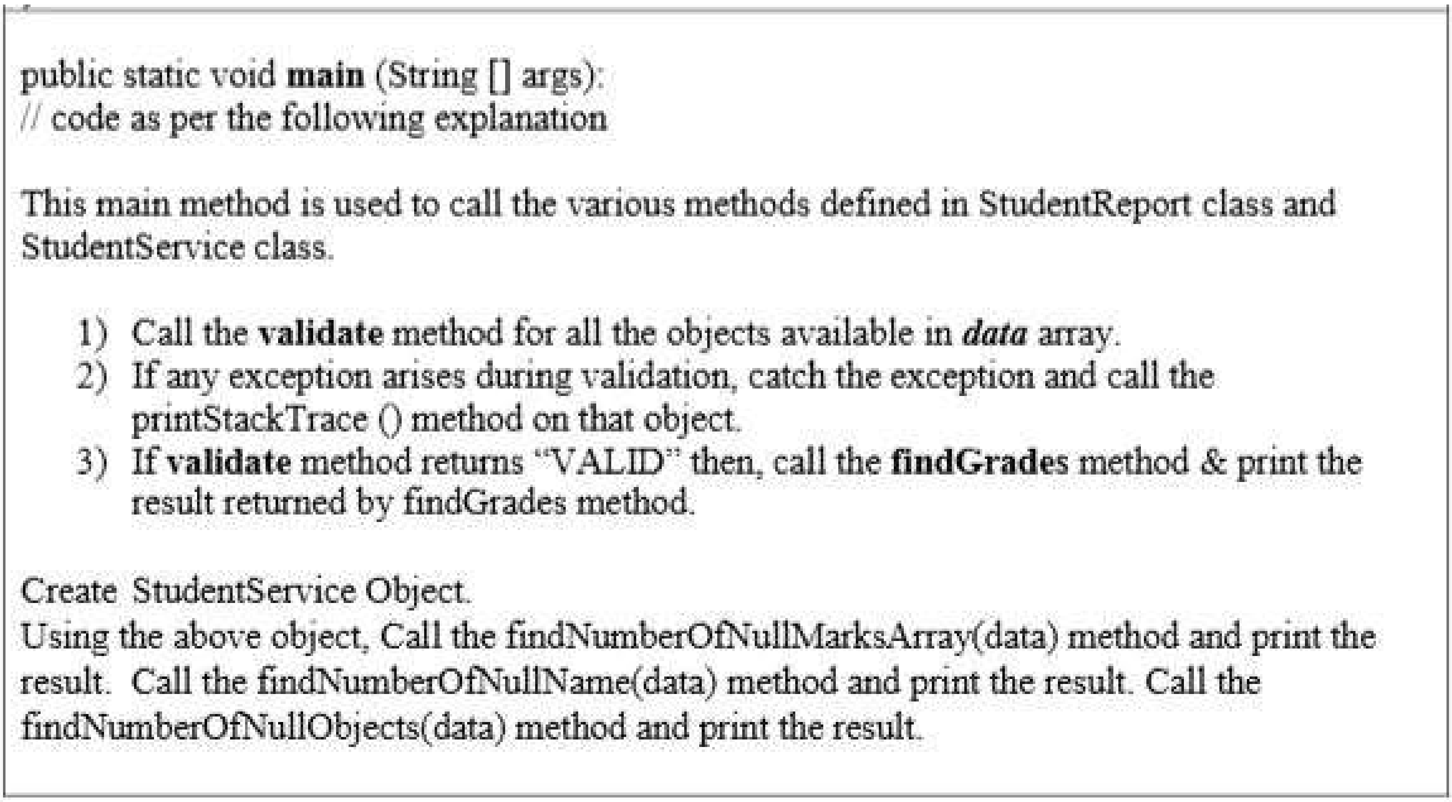
Methods

```
StudentMain () {// Constructor

        for (int i = 0; i < data. length; i++) {
                data [i]= new Student ();
        }

// initialize the objects
          data [0] = new Student ("Sekar", new int [] {85,75,95});
          data [1] = new Student (null, new in t[]{11,22,33});
          data [2] = null;
          data [3] = new Student ("Manoj", null);

}
```



public static void **main** (String [] args):
// code as per the following explanation

This main method is used to call the various methods defined in StudentReport class and StudentService class.

1) Call the **validate** method for all the objects available in ***data*** array.
2) If any exception arises during validation, catch the exception and call the printStackTrace () method on that object.
3) If **validate** method returns "VALID" then, call the **findGrade**s method & print the result returned by findGrades method.

Create StudentService Object.
Using the above object, Call the findNumberOfNullMarksArray(data) method and print the result. Call the findNumberOfNullName(data) method and print the result. Call the findNumberOfNullObjects(data) method and print the result.

Sample Test Cases which are applied on the above project:

TC1 -- Calculate the grades for **valid** objects – Check for A+ grade computation.

TC2 -- Calculate the grades for **valid** objects – Check for F grade computation.

Test for validate method in service package:

Check whether the validate method handles the following situations.

TC3 -- If the Object is null, throw NullStudentObjectException ().

TC4-- If the Name is null, throw NullNameException ().

TC5 -- If the Marks array is null, throw NullMarksArrayException ().

Test for counting methods in service package:

TC6 – Test findNumberOfNullName function.

TC7 – Test findNumberOfNullObjects function.

TC8 -- Test findNumberOfNullName

SAMPLE DATA SET1:

Note that your program will be tested with another set of data. Not this set of data.

```
public void init ()        {

        s [0] = new Student ("A1", new int [] {72,73,74});

        s [1] = new Student ("B1", new int [] {75,76,77});

        s [2] = new Student ("C1", new int [] {99,99,99});

        s [3] = new Student ("C3", new int [] {100,100,99});

        s [4] = new Student ("B2", new int [] {13,88,13});

        s [5] = new Student ("C3", new int [] {14,14,99});

        s [6] = new Student ("A2", new int [] {77,55,12});

        s [7] = new Student (null, new int [] {13,88,13});

        s [8] = new Student ("A2", null);

                // this is invalid object -- so no grade calculation

        s [9] = null; // this is invalid object – so no grade calculation

        expectedgrades =new String [] {"A","A","A+","A+","F","F","F","F"};

}
```