Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ APCS A (Lab Exercises – 4.1)

**Tracking Grades**

A teacher wants a program to keep track of grades for students and decides to create a student class for his program as follows:

* Each student will be described by three pieces of data: his/her name, his/her score on test #1, and his/her score on test #2.
* There will be one constructor, which will have one argument—the name of the student.
* There will be three methods: *getName*, which will return the student's name; *inputGrades*, which will prompt for and read in the student's test grades; and *getAverage*, which will compute and return the student's average.

1. File *Student.java* contains an incomplete definition for the Student class. Save it to your directory and complete the class definition as follows:

a. Declare the instance data (name, score for test1, and score for test2).

b. Create a Scanner object for reading in the scores.

c. Add the missing method headers.

d. Add the missing method bodies.

1. File *Grades.java* contains a shell program that declares two Student objects. Save it to your directory and use the *inputGrades* method to read in each student's test scores, then use the *getAverage* method to find their average. Print the average with the student's name, e.g., "The average for Joe is 87." You can use the *getName* method to print the student's name.
2. Add statements to your Grades program that print the values of your Student variables directly, e.g.:

System.out.println("Student 1: " + student1);

This should compile, but notice what it does when you run it—nothing very useful! When an object is printed, Java looks for a *toString* method for that object. This method must have no parameters and must return a String. If such a method has been defined for this object, it is called and the string it returns is printed. Otherwise the default *toString* method, which is inherited from the Object class, is called; it simply returns a unique hexadecimal identifier for the object such as the ones you saw above.

Add a toString method to your Student class that returns a string containing the student's name and test scores, e.g.:

Name: Joe Test1: 85 Test2: 91

Note that the toString method does not call System.out.println—it just returns a string.

Recompile your Student class and the Grades program (you shouldn't have to change the Grades program—you don't have to call toString explicitly). Now see what happens when you print a student object—much nicer!

// \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

// Student.java

//

// Define a student class that stores name, score on test 1, and

// score on test 2. Methods prompt for and read in grades,

// compute the average, and return a string containing student’s info.

// \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

import java.util.Scanner;

public class Student

{

//declare instance data

//-----------------------------------------------

//constructor

//-----------------------------------------------

public Student(String studentName)

{

//add body of constructor

}

//-----------------------------------------------

//inputGrades: prompt for and read in student's grades for test1 and test2.

//Use name in prompts, e.g., "Enter's Joe's score for test1".

//-----------------------------------------------

public void inputGrades()

{

//add body of inputGrades

}

//-----------------------------------------------

//getAverage: compute and return the student's test average

//-----------------------------------------------

//add header for getAverage

{

//add body of getAverage

}

//-----------------------------------------------

//getName: print the student's name

//-----------------------------------------------

//add header for printName

{

//add body of printName

}

}

// \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

// Grades.java

//

// Use Student class to get test grades for two students

// and compute averages

//

// \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

public class Grades

{

public static void main(String[] args)

{

Student student1 = new Student("Mary");

//create student2, "Mike"

//input grades for Mary

//print average for Mary

System.out.println();

//input grades for Mike

//print average for Mike

}

}