Name_____ APCS A (Lab Exercises – 4.2)

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.

2. 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.

3. 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

    }
}
```