Vanier College
Computer Science Department

Data Structures and OOP

LAB 1

1. Define a class called Odometer that will be used to track fuel and mileage for an automobile. The class should have instance variables to track the miles driven and the fuel efficiency of the vehicle in miles per gallon. Include a mutator method to reset the odometer to zero miles, a mutator method to set the fuel efficiency, a mutator method that accepts miles driven for a trip and adds it to the odometer's total, and an accessor method that returns the number of gallons of gasoline that the vehicle has consumed since the odometer was last reset.
Use your class with a test program that creates several trips with different fuel efficiencies. You should decide which variables should be public, if any.

2. Write a grading program for a class with the following grading policies:

a. There are three quizzes, each graded on the basis of 10 points.
b. There is one midterm exam, graded on the basis of 100 points.
c. There is one final exam, graded on the basis of 100 points.
The final exam counts for 40% of the grade. The midterm counts for 35% of the grade. The three quizzes together count for a total of 25% of the grade. (Do not forget to convert the quiz scores to percentages before they are averaged in.)
Any grade of 90 or more is an A, any grade of 80 or more (but less than 90) is a B, any grade of 70 or more (but less than 80) is a C, any grade of 60 or more (but less than 70) is a D, and any grade below 60 is an F. The program should read in the student's scores and output the student's record, which consists of three quiz scores and two exam scores, as well as the student's overall numeric score for the entire course and final letter grade.
Define and use a class for the student record. The class should have instance variables for the quizzes, midterm, final, overall numeric score for the course, and final letter grade. The overall numeric score is a number in the range 0 to 100, which represents the weighted average of the student's work. The class should have methods to compute the overall numeric grade and the final letter grade. These last methods should be void methods that set the appropriate instance variables. Your class should have a reasonable set of accessor and mutator methods, an equals method, and a toString method, whether or not your program uses them. You may add other methods if you wish.