1. (a) Suppose your friend Hermione lives on a circle, where the only road in her world goes round and round. Define a class CircleTravel for travel in Hermione’s world. Include floating point variables such as radius, radiansCW and radiansCCW.

(b) In addition to the access methods (constructors, setters and getters) and display methods, also define the following two methods for the CircleTravel class: absolute and crowflies, to calculate the absolute total distance traveled and the effective distance traveled “as the crow flies” respectively.

(30 points)

2. This question revisits the Travel class you designed in Assignment 3:

(a) Rename the class MatrixTravel. Revise your class so that the instance variables are protected from access, except via getters and setters. Make sure the same is true for CircleTravel.

(b) In your MatrixTravel class, define a zero-parameter constructor that calls the four-parameter constructor. In CircleTravel, also define a zero-parameter constructor that calls the three-parameter constructor.

(10 points)

3. This question refers and relates to questions 1 and 2…

You are now asked to create an abstract class called Travel is a superclass of both MatrixTravel and CircleTravel.

(a) Determine what are some common variables or methods (if any) that can be moved to the Travel class. What are some requirements you can set, using the keyword abstract, for methods that should be present in both the MatrixTravel and CircleTravel subclasses? Use a diagram to illustrate the relationships between the classes and methods.

(b) In the Travel class, define variables and methods that allow you to calculate speed. This would mean that you need to define a variable for time (call it minutes), and methods such as: getAveSpeed, getEffectiveSpeed, displayAveSpeed, displayEffectiveSpeed.

(c) Create an interface DistanceInterface to extensively document your work. Implement (a) and (b), and create a class Demonstrate to test your classes and methods.

(50 points)

5. Neatness and clarity of presentation. (10 points)