Programming homework

• 1. Objective

The objective of this homework is to specify and implement an object to represent all data and functionality for a rail ticket reservation.

• 2. Specifications

The newly founded New Orleans RailRoad company now offers train service from New Orleans to all Hamlets and to a few major American cities. As with most companies offering transportation as a service, the NORail company has graduated rates for coach service and a flat rate for first-class service. The following chart lists the cost of each mile of coach and first-class service during the week and on the weekend.

<table>
<thead>
<tr>
<th>WEEKDAY PRICE PER MILE</th>
<th>WEEKEND PRICE PER MILE</th>
</tr>
</thead>
<tbody>
<tr>
<td>COACH</td>
<td>FIRST-CLASS</td>
</tr>
<tr>
<td>For 50 miles or under</td>
<td>$0.50</td>
</tr>
<tr>
<td>over 50 miles but less than 250 miles</td>
<td>$0.40</td>
</tr>
<tr>
<td>250 miles or over</td>
<td>$0.30</td>
</tr>
</tbody>
</table>

When a passenger makes a reservation, a reservation number is given to it, along with the ticket information. After a reservation is created, the reservation can be changed on one of the following: day of the week, category, length. A reservation can only be changed 3 times at most.

Special Conditions: After computing the price of a ticket using the given chart, but before computing the final price which includes taxes (8.5%) a discount might be applicable if anyone of the following conditions are met:

a. A ticket issue to a NORail employee gets 80% discount over ticket price.
b. A student (properly identified) gets 25% discount over ticket price.
c. A senior citizen gets 50% discount over ticket price.
d. A two-way ticket gets 20% discount over ticket price.

Note: Employees are not eligible for any other discount besides that of employee. For any other passengers, only two discounts are applicable per ticket. If a ticket qualifies for all three discounts, only the first two discounts (student, senior) are applied.

The values for the ticket properties are:

length to travel: an integer between 1 and 3000
date: any valid date in 2003.
class: 1 for coach, 2 for first-class

NORail employee discount: boolean.
Student Discount: boolean.
Senior Citizen Discount: boolean.
Two-way discount: boolean.

Note: The number of miles given are for a 1 way ticket. If a two-way ticket is requested, the miles entered represent the miles for one way, your cost computations must perform the appropriate adjustments.

• 3. **Design-implementation-testing**
  
a. Proceed to design and implement the class modeling the reservation. Call the package reservations.
  
b. Give 10 examples of data for a reservation to be used as test plan. Include the expected results.

• 4. **The functionality of the class should at least include:**
  
We should be able to create a ticket reservation instance and inquire on the following:

  - tripLength: miles for trip
  - timeOfWeek: time in the week
  - category: 1st or 2nd class.
  - twoWay: is it for a two way ticket?
  - employee: is it for an employee?
  - student: is it for a student?
  - senior: is it for a senior?
  - tax: amount to pay in taxes.
  - discount: amount discounted if any.
  - gross: cost of ticket before taxes and discounts.
  - netPrice: final price of tickets.
  - resNumber: number of reservation.
  - changes: number of changes made to the reservation.

And must support the following commands:

  - changeDay: changes reservation from weekday to weekend and vice-versa.
  - changeClass: changes reservation from first to second and vice-versa.
  - changeMiles: changes reservation; a new number of miles is given.

• 5. **toString() query**

Include in the class the query

```
  public String toString() { ... }
```
This query will write out to system out the state of the ticket. The state information includes the following information:

- Ticket reservation number
- Date which includes day of the week followed by the date.
- Category
- One way or two way ticket.
- Personal discounts: all applicable discounts on a line (at most two).
- Ticket gross
- Ticket discounts
- Ticket taxes
- Ticket total.

Here are two examples of possible ticket states:

Ticket reservation number : SK0110J
Miles: 500
Date: Sunday, 2/2/2003.
Category: Second class
Two way ticket
Personal discounts: Senior.
Ticket gross      $150.0
Ticket discounts  $97.5
Ticket subtotal   $52.5
Ticket taxes      $4.2
Ticket total      $56.7

Ticket reservation number : SKF011JJ
Miles: 3000
Date: Thursday, 11/9/2003.
Category: Second class
One way ticket
Personal discounts: NONE
Ticket gross      $1350.0
Ticket discounts  $0.0
Ticket subtotal   $1350.0
Ticket taxes      $108.0
Ticket total      $1458.0

For the date use the class Date that we partially developed in the lectures. You will find it source in the course web page under homework.
6. **What to submit**
   
   a. Reservation.java. Well formatted and documented. Lack or poor documentation will cost you 25% of grade.
   
   b. Test plan data with expected test results.
   
   c. Tester.
   
   d. A copy of all drJava interaction testing your program.
   
   e. Is the testing complete? If the answer is negative, describe 3 more test cases you should use to test the class. Add the answer to this question at the bottom of the test plan.
   
   f. A report of the final results of your tests. Indicate whether the test was successful, partially successful, not successful at all, or not attempted.

   **Due:** Monday, November 3rd, 2003 at class time.