Problem Set 1 Exercise #25: Riding Trains

Reference: Lecture 3 notes

Learning objective: Selection statements

Estimated completion time: 60 minutes

Problem statement:

[Adapted from CS1010J AY2014/15 Semester 1 PE 1 Exercise 2]

There are 2 parts in this exercise.

Part A. Travel on the MRT

In a certain country, the North East MRT Line consists of 15 stations coded as NE1, NE2, ..., NE15. Commuters are charged a fare based on the number of stations they travel, tabulated below:

Number of stations travelled	Full fare ($)
1	0.87
2 or 3	0.92
4 or 5	1.23
6 or 7	1.48
8, 9 or 10	1.62
11, 12, 13 or 14	1.86

In addition, full-time students are given a 40% discount off the full fare specified above.

You are to <u>compute the fare given the number of stations a passenger has travelled</u> (referred to as the "Original fare" in the sample runs on next page).

Two examples are given below:

- An adult passenger who travelled 7 stations will need to pay a fare of $1.48.

- A student who travelled 9 stations will need to pay a fare of $0.972 ($1.62 * 0.6).

Part B. Travel Early, Travel Free

Since 24 June 2013, the government is funding a trial to provide free travel on the MRT for commuters who end their journey **before 7:45am** on **weekdays** at the following 3 stations: **NE4, NE5 and NE6**. In addition, commuters who exit at **these three stations** **between 7:45am and 8am** (both inclusive) on **weekdays** will be given a discount of 50 cents off their train fare calculated in Part A.

You are to <u>compute the final fare a passenger needs to pay under this Free MRT Rides Scheme</u> (referred to as the "Final fare" in the sample runs on next page).

Three examples are given below:

- An adult passenger who travelled 7 stations and alighted at NE4 at 7:40am on a weekday will not need to pay (i.e. fare is $0).

- An adult passenger who travelled 4 stations and alighted at NE6 at 7:35am on a weekend will need to pay a fare of $1.23.

- A student who travelled 9 stations and alighted at NE5 at 8am on a weekday will need to pay a fare of $0.472 ($1.62 * 0.6 – 0.5).

The passenger identity is encoded as either 0 (meaning adult) or 1 (meaning student).

Days of a week are encoded using the following integers:

- 1, 2, 3, 4 and 5 to represent weekdays (Monday – Friday)

- 6 and 7 to represent weekend (Saturday – Sunday)

Write in the skeleton program **travel.c** that has been loaded into your working directory. You are required to write the following two functions:

- **Compute_original_fare()** that computes the fare as calculated in Part A.

- **Compute_final_fare()** that computes the fare as calculated in Part B.

You must not change the function headers given in the skeleton program. You should print out the fares in **three** decimal places.

Four sample runs are shown below with user's input shown in **bold.**

Sample run #1:

```
Enter your identity (0 for adult, 1 for student): 0
Which day did you travel? 3
How many stations did you travel? 7
Where did you alight the train? NE 4
What time did you alight (hour min)? 7 40
Original fare = $ 1.480
Final fare = $ 0.000
```

Sample run #2:

```
Enter your identity (0 for adult, 1 for student): 0
Which day did you travel? 6
How many stations did you travel? 4
Where did you alight the train? NE 6
What time did you alight (hour min)? 7 35
Original fare = $ 1.230
Final fare = $ 1.230
```

Sample run #3:

```
Enter your identity (0 for adult, 1 for student): 1
Which day did you travel? 2
How many stations did you travel? 9
Where did you alight the train? NE 5
What time did you alight (hour min)? 8 0
Original fare = $ 0.972
Final fare = $ 0.472
```

Sample run #4:

```
Enter your identity (0 for adult, 1 for student): 1
Which day did you travel? 4
How many stations did you travel? 11
Where did you alight the train? NE 2
What time did you alight (hour min)? 7 18
Original fare = $ 1.116
Final fare = $ 1.116
```