EEL 4732/5733 Advanced Systems Programming

Preliminary Assignment 1

Important Note: This is not a graded assignment. Therefore, there is no deadline for this one. However, we strongly recommend you implement the three transformer programs described below to help you save time for Assignment 1, which will involve some advanced topics and having the transformer programs ready will make your life easier.

Transformer I: Reads the real-estate agent data from the standard input. The data is in the following format (on each line):

Agent Name, Agent Id, Transaction Id, Real Estate Location, Original Price, Sale Price, Customer Rating

where,

Agent Name: 10 characters max
Agent Id: Exactly 5 characters, in the range of [00000-99999]
Transaction Id: 10 characters, in the range of [0000000000-9999999999]
Real Estate Location: Two letter state code
Sale Price/Original Price: Max 14 characters, in the range of [0-999,999,999.00]
Customer Rating: Max 3 characters, in the range of [0-5.0]

It transforms the data into two streams; the price information is output on the standard output and the rating information is output on the standard error.

The price information will be in the following format:

Agent Name, Agent Id, Transaction Id, Real Estate Location, Sale Price, Loss/Gain

where the existing fields will be formatted as described above and Loss/Gain represents Sale Price – Original Price and is formatted the same way as the Sale Price except it may have the sign symbol (– /+) (so 15 characters max).

The rating information will be output in the following format:

Agent Id, Real Estate Location, Customer Rating

where all the fields will be formatted as described above.

You need to ensure that both outputs include all the relevant data in the input.

Transformer II: Reads the price information (as described above for Transformer I) from the standard input and transforms it into two types of outputs: 1) the agent's average performance data to appear on the standard output and 2) the state market data to appear on the standard error.

The agent's average performance data will be in the following format:

Agent Name, Agent Id, Average Loss/Gain

where all the fields will be formatted as described above and the Average Loss/Gain represents the average loss/gain for all the real estate sold by the agent across all states.

The state market data will be in the following format:

Real Estate Location, Average Loss/Gain

where all the fields will be formatted as described above and the Average Loss/Gain field will represent the average loss/gain of all real estate transactions performed within the state by all the agents.

Transformer III: Reads the real estate agent rating information (as described above for Transformer I) from the standard input and transforms it into two types of outputs: 1) the agent's average rating data and 2) the state's average rating data.

The agent's average rating data will be in the following format:

Agent Id, Average Customer Rating

where Average Customer Rating will represent the average of all the ratings received by the corresponding agent as denoted by the Agent Id across all the states in which the agent sold real estate.

The state's average rating data will be in the following format:

Real Estate Location, Average Customer Rating

where Average Customer Rating will represent the average of all the customer ratings within the state denoted by the *Real Estate Location* field for all the agents that sold real estate within that state.

Important Notes:

1) You are expected to test your implementations on a Linux system.
2) You can avoid typing the input for your program that receives data from the standard input using redirection, e.g., save all the data in file.txt and on the command prompt run your code as

   $ ./transformerI < file.txt

The < symbol performs redirection, which means that the content of file.txt is presented to the transformerI program as if the data is flowing from the standard input. In this course, you will learn about redirection in detail. For now, just consider it as a useful feature!