Comp 2071: Data Structures, Spring, 2016

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Lab 3

Group 14

Due: 2/23/2016

Analysis:

1. In general, how useful is the queue data structure? Can you think of other uses aside from those discussed in the applications chapter?

The importance of queue can be seen everywhere, specifically the concept of first in first out is not only useful in data structure, but also very essential in our life. Some specific examples can be waiting line, management, network printer, services, and keyboard. For example, students who print out papers first will get processed by the network printer first. Another type of queue is priority queue. In priority queue, it assigns a person/item based on the nature of their importance. For example, a patient with an emergency can be treated first at a hospital despite his/her time of arrival, because he/she is given the highest priority.

2. If we didn’t have the queue data structure, how else could you implement the FIFO (first in first out) concept?

We could have used a linked list to implement a FIFO concept. We would then have an add method that only adds elements to the end of the list, a remove method that only removes the first element. Since a linked list would not need to be resized, such as when there are more elements than in an array, it would make adding an element to the array O(1) when we have a tail pointer.

SUMMARY

1. About your team:

a. How did you “divide up” the work so that each student still met the objectives for the assignment (i.e., learn, understand and apply the concepts). Include details of who did what.

Rixing Wu: Code review, Train route and Simulation classes, other classes,

Greg Lee: Train class

Terrance Curley: Station class, Queue ADT

Elvin Xu: Passenger class, Documentation

Rixing served the leader of this lab assignment. He gave out an outline of what the program would be and split up the coding work to each one of us. We also took advantage of the free time to discuss the code and help each other to figure out if struggling

b. How did you coordinate code changes/testing?

We met during our free time to discuss how to approach the problem properly. Since Rixing had

an overall image of what this program would be like, he often gave advice to us on fixing or bettering our codes.

c. Other observations about working with a partner?

This is a time-consuming and complex project. It was nice that Rixing had a picture of how to tackle the problem, so that he could guide us in splitting up the work and ensuring our assigned coding work compile properly. Also, splitting up the work helped each member to focus on what needed to be in our own coding part, making it possible to generate a good solution to the problem.

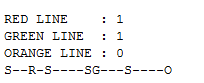
2. Where did you have trouble with this assignment? How did you move forward? What topics still confuse you?

This project was much greater in scope than the others. Because of this, the most difficult aspect of the project was deciding how to solve the problem as a group. The problem was very broad and did not specify how to simulate a system of trains. At first we struggled with grasping what was required of us, and how to create a solution. We were able to make this easier for ourselves my designing the algorithms together first, and coming up with ideas as a group. This meant that we could all form ideas for all of the classes before working on implementation.

3. What did you learn from this assignment? (Please be specific)

One important thing we learned about teamwork is how to accommodate changes to each member’s code (different class files specifically). Although we talked about how to split up the coding work, each member was writing and implementing his own methods and variables. This had created difficulty in how we are going to bring everyone’s work together in the end so that the program could be compile properly and successfully. This lab allowed us to understand better in dealing with multiple different class files when the class files were written by different individuals.

4. How could this assignment be improved in the future?



The output in the console window can be improved as shown above. It will be nice to have two separate train routes, in which one route heads east and the other one heads west. The idea of having two separate train routes offers a better display of how trains travel, rather than having trains just going forward and back in one route. In addition, the output can be more descriptive in specifying the passengers enter/exit.