

Brennan C. Muir

Assignment 2 - Stacks and Queues

PHASE 1: SPECIFICATION

Write a JAVA application to solve the following problem:

1. Design and implement a Java class for stacks using linked-lists (instead of the ones from the Java library), i this class should have at least two functions push() and pop();
2. Design and implement a Java class for queues using linked-lists (don't use built-in queue related Java classes), this class should have at least two functions add() and delete();;
3. Now, design and implement a strategy of using two stacks to implement the functionality of a queue;
4. Use two queues to implement a stack;
5. Implement a function, minValue() for stack, which returns the minimum value with a time complexity $O(1)$; (Hint: can two stacks help solve this problem?) (Note: this is an example of a tradeoff between space and time!)
6. Your implementations should work easily on int, float, double, and String type values – use Java generics.

PHASE 2: DESIGN

My program is composed of a Driver, LinkedList Class, Stack and Queue Classes, and a Node Class. The Driver runs the whole program, including popping and pushing for stacks and add/delete for Queue. It finally checks for a minValue in a stack.

PHASE 3: RISK ANALYSIS

It's possible for the MinValue(); method to print multiple lines.

PHASE 4: VERIFICATION

From the tests that I have run, I did not run into any issues regarding my algorithms. I could not implement the 2 stacks to queue, and 2 queues to stack.

PHASE 5: TESTING

Tested using Gupta's provided files

PHASE 6: REFINING THE PROGRAM

I would maybe have made a "prettier" output. Used 2 stacks to make queue and 2 queues for stack

PHASE 7: PRODUCTION

I prepared a copy of the entire program for Lab TA's evaluation, as specified by the TA. Then, I sent electronically the copy to the Lab TA.

PHASE 8: MAINTENANCE

To fully benefit from the program evaluation feedback received from the Lab TA, I will perform program maintenance