

List Based Stacks and Queues

10-10-2011

Opening Discussion

- Minute essay comments:
 - No copying of stack and queues.
 - Triply linked lists?
 - No manifests.

Stacks/Queues with Linked Lists

- The last time we talked about stacks and queues we implemented the ADTs using arrays. Part of the idea of an ADT though is that the implementation can vary as long as it has the right behavior.
- Since you now know how to write linked lists, we want to look at how we would write stacks and queues using linked lists.

Code

- I want to write a ListStack and a ListQueue. These should implement MyStack and MyQueue, but instead of using arrays (like ArrayStack and ArrayQueue), they should have a linked list inside of them.
- Remember that it is essential that the implementation be $O(1)$ for all operations.

Priority Queue ADT

- A priority queue has the same methods as a normal queue, only the contents are ordered not only by arrival time, but also by a priority. So dequeue gets the highest priority object and if several have that priority, it gets the one that has been there the longest.
- One way to implement a priority queue is with a sorted linked list. To make this flexible, you could have it take a comparison function that tells you the ordering. That would be provided when the priority queue is constructed. Or require Ordered.
- What order are the various operations for this implementation of a priority queue?

Refactoring

- This is something that you do when you don't want to change the functionality of your code, but you want to change how it does something.
- You typically refactor your code when it “smells.” Here are a few of the many different smells.
 - Long method
 - Large class
 - Duplicate code
 - Shotgun surgery
 - Switch statements
- Scala tools don't yet refactor all that well, but the language does.

Minute Essay

- What do you see as the relative advantages and disadvantages of the array and list based implementations of stacks and queues?
- There is no class on Wednesday of Thursday. Work on projects.
- Midterm is the following Wednesday.