Stacks and Queues

10-31-2001

Opening Discussion

- What did we talk about last class?
- Do you have any questions about assignment #4?
- What did you think about Dr. Marcy's talks? For those who went ot the 4pm talk did you notice how much computers played a role in everything he did?

Simple Data Structures

- Today we are going to look at two simple data structures that appear commonly in different contexts in many programs.
- Data structures are generic ways of organizing information in a program in well ordered and predictable ways. Different data structures serve different purposes in programs.

LIFO vs. FIFO

❚ These two acronyms describe the order in which data is processed for the two data structures we are discussing today.
❚ FIFO = First In, First Out = Queue
  ❚ This is like getting in a line. First person there is the first person served.
❚ LIFO = Last In, First Out = Stack
  ❚ When you take something out of a LIFO structure it is the last thing that you put into it.

Pushing and Popping

❚ These data structures only require two operations (behaviors). Adding an items and taking an item out.
❚ The standard terminology for putting objects into these simple structures is to push them on.
❚ When we take something off we call it a pop.

Stacks as Arrays

❚ Stacks are very easy to implement with arrays. In fact, they are equivalent to the list implementation we did earlier where add is push and remove is pop.
❚ Stacks don't allow insertion.
❚ In a pure implementation you can't even search them, they only allow you to push and pop.

Queues as Arrays

- Queues are a bit more difficult to implement as arrays. You have to keep track of both ends of where data is stored because you push on one end and pop off the other.
- Pop doesn't have to do a shift though if you implement it as a circular queue. When you do that, you allow the ends to "wrap around"

Minute Essay

- What did we talk about today?
- Remember that we have no class on Friday as I'll be out of town. I'll try to find something good for you to think about while I'm gone.
- Also, assignment #4 is due on Friday. Just give it to Nicole in the CS office.