Chapter 4

The Queue ADT

Knowledge Goals

You should be able to

* describe a queue and its operations at an abstract level
* define a queue interface
* describe algorithms for implementing queue operations using an array
* compare fixed and floating-front approaches to an array-based implementation of a queue
* explain how to implement an unbounded queue using arrays
* describe algorithms for implementing queue operations using a linked list
* use order of growth analysis to describe and compare the efficiency of queue algorithms
* define interarrival time, service time, turnaround time, and waiting time for elements on a queue
* explain how concurrent threads can interfere with each other resulting in errors, and how such interference can be prevented

Skill Goals

You should be able to

* implement the bounded Queue ADT using an array
* implement the unbounded Queue ADT using an array
* implement the unbounded Queue ADT using a linked list
* draw diagrams showing the effects of queue operations for a particular implementation of a queue
* use the Queue ADT as a component of an application
* calculate turnaround and waiting times for queue elements, given arrival times and service requirements
* use our queue simulation system to investigate properties of real-world queues
* implement a program that properly uses threads to take advantage of the parallelism inherent within a problem solution