COMP 200: Elements of Computer Science
Fall 2004
Homework 4, Due Monday, October 15 2004

Follow the homework guidelines posted on the website

This homework requires you to write pseudocode for two algorithms, using a notation that looks something like the way that algorithms are expressed in the book. (See, for example, ***find min & max*** on page 86.) Do not try to write these programs in Scheme.

Implementing Queues

1. Assume that you have a vector named Q of unbounded length — that is, Q is effectively infinite in its length. Write the pseudocode for three functions that implement a queue:

   a. ***Add*** takes a single argument and adds it to the queue.

   b. ***Remove*** takes no arguments. It removes the next element from the queue and returns it. If the queue is empty, it writes out an error message and returns zero.

   c. ***Empty*** takes no arguments. It resets the queue's state so that the queue is empty.

   Recall that a queue is a first-in, first-out data structure (see page 38 in the book).

2. Assume that your vector Q is limited to 2,000 elements. How does your code change? You may assume that no more than 1,000 elements are in the queue at any time, but the total number of invocations of both ***Add*** and ***Remove*** will be much larger than 2,000.

   Show the code for ***Add***, ***Remove***, and ***Empty*** under these assumptions.