CS III Homework #3 Due: Friday, February 15, 2008 (5 PM)

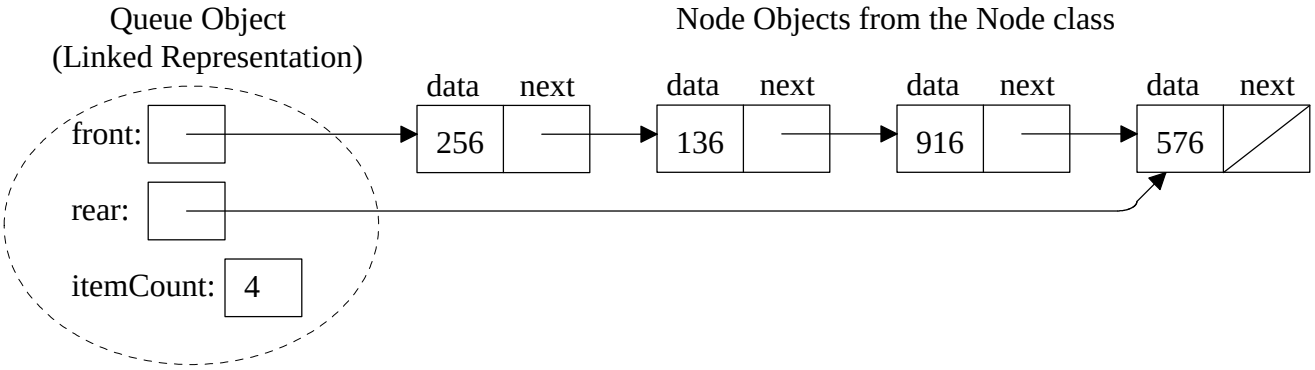
You are to implement a radix sort algorithm to sort non-negative (base 10) integers. A radix sort for base 10 integers is a mechanical sorting technique that utilizes a collection of "bins": one for a main bin and 10 digit-bins. Each bin acts like a queue and maintains its values in the order that they arrive. The radix sort algorithm consists of one stage for each digit in the numbers. At the begins and end of each stage, all of the numbers are in the main bin. Initial all of the numbers are in the main bin in some "random" order.

The stages consider the numbers from the least significant digits (one's place) to the most significant digits. A stage consists of

- moving all numbers from the main bin one at a time from the main bin into the digit bin corresponding the number's digit
- collect up the digit bins from bin 0 to bin 9 and placing it back into the main bin

After the final stage (i.e., considering the most significate digits of the numbers), the main bin will be in sorted order.

To make the radix sort efficient, you will need to use a linked (not a list) representation of a queue. A conceptual view of a linked queue object would be:



Collecting the digit bins together into the main bin would only need pointer/reference assignments with the numbers remaining in their nodes.

You are to electronically submit and hand in hardcopies of:

- a one page overview of the design of your program and directions for running your program (file: design.txt)
- all of your program files, and
- the output produced by running your program. In Windows, IDLE has a File | Print Window menu options that you can use for a text-based game. (If you do a GUI, you'll need to do several screen captures and paste them into a Word or Open Office document)