XJTLU | Computing

Lists

Problem 1.

(a) Provide a recursive pseudocode routine that reverse the elements in a queue, Q, using only the operations `isEmpty`, `size`, `add` and `delete`.

The operation `add` appends an element to the rear end of the queue.

The operation `delete` removed an element from the front of the queue.

Note that recursion gives you an implicit stack; you may not use any explicit data structures.

The complexity of your program should run in $O(n)$ time, where n is the size of the queue Q.

Give modest comments.

(b) Provide a non-recursive pseudocode routine that reverses the elements in a queue, Q, using only the operations `isEmpty`, `size`, `add`, and `delete` (as defined in part (a) above) and a second queue R.

You may not use any other data structures, just Q and R.

You can assume there is no memory limit for Q and R.

Your program should run in $O(n^2)$ time.

Give modest comments.