Elementary data structures

Exercises

1. Rewrite ENQUEUE and DEQUEUE to detect underflow and overflow.

2. How would you implement a queue using two stacks? Analyse the running time of the queue operations.

3. Can you implement the dynamic set operations INSERT and DELETE on a singly-linked list in $O(1)$ time?

4. Implement a stack using a singly-linked list. What are the running times of PUSH and POP using this implementation?

5. Implement a queue by a singly-linked list. What are the running times of ENQUEUE and DEQUEUE using this implementation?

6. As written in the lecture, each loop iteration in the LIST-SEARCH' procedure requires two tests: one for $x \neq L.nil$ and one for $x.key \neq k$. How could you eliminate the test for $x \neq L.nil$ in each iteration?