

Boğaziçi University
Department of Physics

Phys 499

Spring 2007

Problem Set #4
Due in class Wednesday, 11 Apr 2007

Reading:

Problem 1: (20 pts) Cormen 10.2-1

Can the dynamic-set operation INSERT be implemented on a singly linked list in $O(1)$ time? How about DELETE?

Problem 2: (20 pts) Cormen 10.2-2

Implement a stack using a singly linked list L . The operation PUSH and POP should still take $O(1)$ time.

Problem 3: (20 pts) Cormen 10.2-3

Implement a queue by a singly linked list L . The operation ENQUEUE and DEQUEUE should still take $O(1)$ time.

Problem 4: (40 pts)

Consider that you have n unsorted numbers represented by a doubly linked list. Write a pseudocode that implements the insertion sort algorithm using doubly linked lists. You are free to use the pseudocodes listed in the book, but write them on paper for completeness. What is the order of operation to sort n numbers in Θ notation? Compare this with an ordinary insertion sort algorithm. Which algorithm you expect to run faster, under what conditions in terms of the size of the input set?