Homework 4: Queues and Lists

Data Structures

Write pseudo-code for problems requiring code. Do not write Java, Python or C++. You are responsible for the appropriate level of detail. For the questions asking for justification, please provide a detailed mathematically oriented discussion. A proof is not required.

1. Develop an ADT specification for a priority queue. A priority queue is like a FIFO queue except that items are ordered by some priority setting instead of time. In fact, you may think of a FIFO queue as a priority queue in which the time stamp is used to define priority.

2. Write an algorithm to reverse a singly linked list, so that the last element become the first and so on. Do NOT use Deletion - rearrange the pointers.

3. What is the average number of nodes accessed in search for a particular element in an unordered list? In an ordered list? In an unordered array? In an ordered array? Note that a list could be implemented as a linked structure or within an array.

4. Write a routine to interchange the mth and nth elements of a singly-linked list. You may assume that the ranks m and n are passed in as parameters. Allow for all the ways that m and n can occur. You must rearrange the pointers, not simply swap the contents.