LaSalle College
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Advanced Data Structure: 420-J13-AS

Practice Set 4

Theory

1. What is the difference between an array and an ArrayList?
2. What is the difference between an ArrayList and List?
3. What is the difference between a Dictionary and a HashTable?

Programming

A. Implement class **MyStack<T>** which implements the Stack ADT, with the value *top* and operations *StackEmpty(), Push(x) and Pop()*.
B. Implement the class **MyQueue<T>** which implements the Queue ADT, with the values *head* and *tail* and operations *Enqueue(x)* and *Dequeue()*.
C. Improve the **MyQueue<T>** class to detect underflow and overflow.
D. Implement the class **MyLinkedListNode<T>** with member pointers *prev* and *next*. Then use it to implement the class **MyLinkedList<T>** which implements the List ADT, with values *head, tail,* and operations *Search(k), Insert(x), and Delete(x)*, where *k* is the key to search for and *x* is the node to delete.
E. Reimplement the previous linked list using sentinels.
F. Add the *Reverse()* operation to **MyLinkedList<T>** which reverses the list (*head* swaps with *tail*, *prev* swaps with *next*). The algorithm you use must be in-place (only use constant storage).
G. Implement another class **MySinglyLinkedList<T>** which is singly linked instead of doubly.
H. ***HARD*** Then also add a *Reverse()* operation to **MySinglyLinkedList<T>** following the same restrictions as question F.