CSE 3010 – Data Structures & Algorithms

Lecture #13

Lecture #14

Lecture #15

What will be covered today

- Understanding operations of stack using linked list
- Introduction to List data structure

[Refer class notes for detailed explanation on implementation of stack using linked list]

List abstract data type

- Container of ordered items
- Number of items can be counted
- Items can occur more than once
  - Each occurrence of an item is distinct
- Items can be moved around in a list
- Can find predecessor or successor of a node or an item
- Can be searched based on a key
- Can be sorted in ascending or descending order
- ….

No restrictions of whatsoever on a List data structure

Most generic data structure

LIST – Algebraic specification of operations

Types:

LIST, ITEM, BOOLEAN, POS

where ITEM is of some type the LIST will contain

BOOLEAN is either True or False

POS is {INTEGER >=0}

Operations:

```
create:                          -> LIST
insert: LIST x ITEM              -> LIST
insert: LIST x POS x ITEM        -> LIST
remove: LIST x ITEM              -> LIST U ERROR
remove: LIST x POS               -> LIST U ERROR
size: LIST                       -> {INTEGER >=0}
contains: LIST x ITEM            -> BOOLEAN
fetch: LIST x POS                -> ITEM U ERROR
isEmpty: LIST                    -> BOOLEAN
```