University of Engineering and Technology Lahore
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Data Structures

Doubly linked list

In a doubly-linked list, each list element contains two references–one to its successor and one to its predecessor. There are many different variations of doubly-linked lists. In this problem you are supposed to implement a doubly linked list either with or without sentinels. As we know *Doubly*

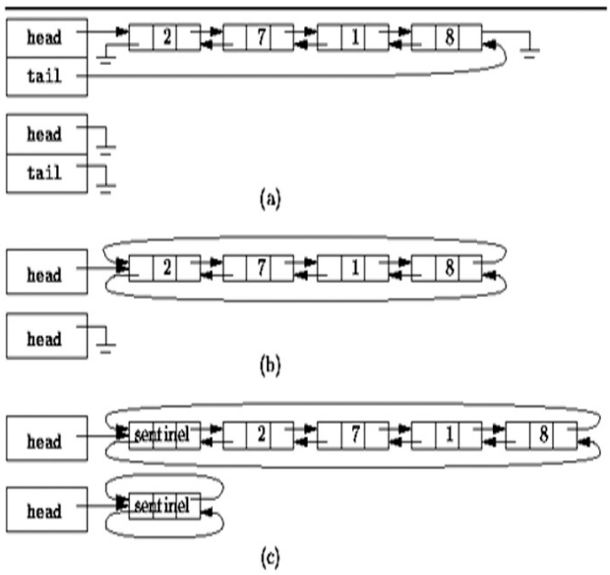

Figure 1: Various types of doubly linked lists

Linked list as a basic data structure with the following functions to hold basic integers in it. We will be utilising this for further tasks.

- `insertT` -to insert integer `l` in D-linked list at the tail of the list
- `insertH` - insert integer `l` in D-linked list at begining(head of the list)
- `insertAT` - insert integer `l` in D-linked list at any particular point `pos`
- `delete` -to delete any particular integer `l` from list
- `print` -print complete D-linked list
- `search` -returns the node number of searched value

1. **Polynomials as linked lists**
   Create a polynomial with the D-linked list, that is used to store a long polynomial with only one unknown variable and n number of coefficients and exponents. Each node of the list holds the coefficient and exponent for one term.

   Tasks assigned:

   (a) Tailor the original linked list to hold polynomials in it

   (b) Provide to following functions to work on polynomials

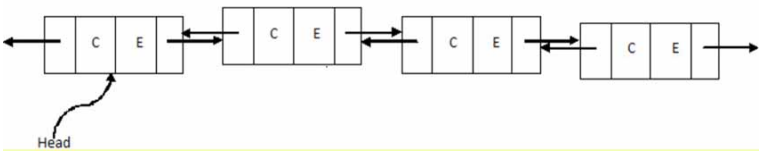

Figure 2: Linked list representation for a polynomial

- `insert(fraction coeff, int expo)` -to store the term at its appropriate place
  Your terms of polynomials can be given in any order, it will be good if node insertion is done inorder of increasing exponents
- `searchNode(int expo)` -to search the node with given exponent
- `add` -operation to add two polynomials
- `subtract` -operation to subtract two polynomials
- (Bonus points)`multiply` -operation to multiply two polynomials
- `getTotal` -operation for total number of terms in polynomial
- `print` -regular function to print polynomial