BMI2123 Data Structures

ASSIGNMENT 1:

SOLUTION PAPER

1- Source code is attended to zip file.

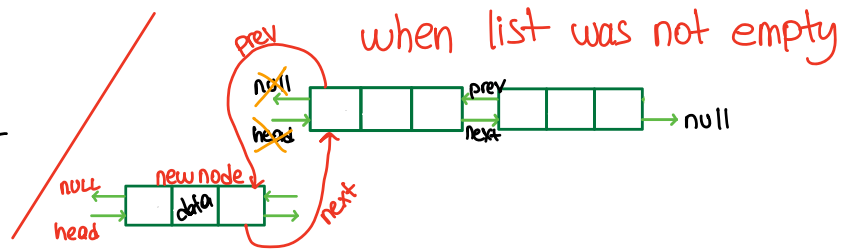
CODES' STEPS:

import <iostream> library
define Node structure

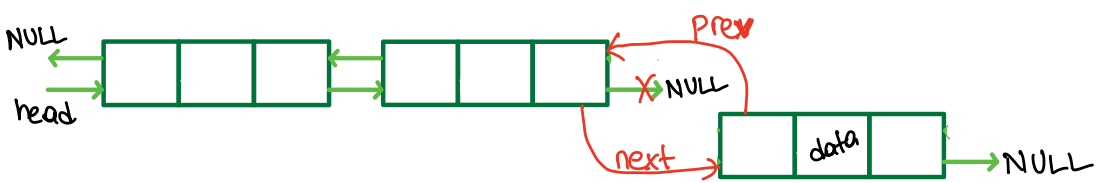
firs bit: pointer of previous node's third bit
second bit: data
third bit:pointer of next node' first bit

define Double Linked List structure
&abilities(functions)
Pointer of head
Create an empty double linked list

Explanation of addFront
1-create a node
2-insert data
3-if list is empty;
New node's next is NULL
if list is not empty:
new node's next is head.
4- New node's prev is NULL
5-if list has items
head's prev is new node
6-new head is new node

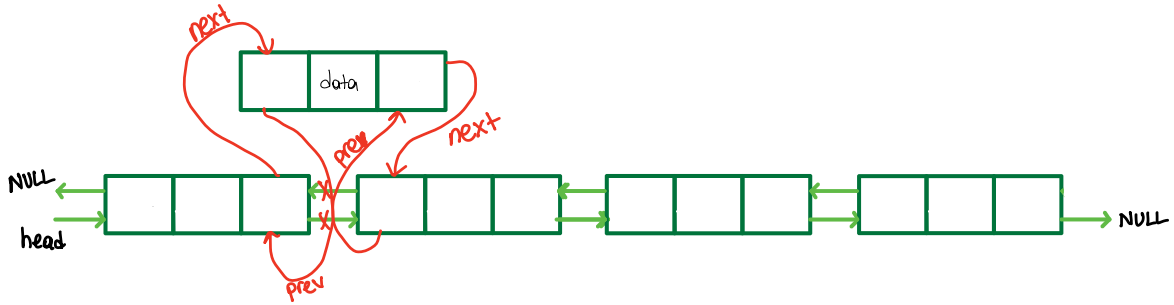


Explanation of addTail
1-create a node
2-insert data
3-new node's next is NULL
4-Enter the list



5-Go the list's last item
6-Add new node to last item's next
7- new node's prev is (ex)last item.

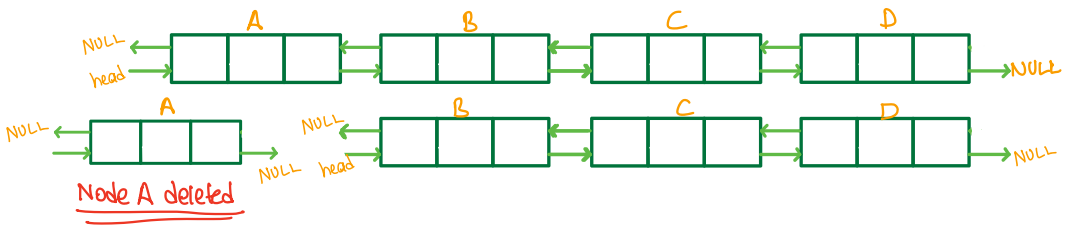
Explanation of addSecond
1-create a node
2-insert data
3-go to the after of list's head (second item's node)
Ex second node's prev is new node
New node's next is equal ex second node
New node is equal to first node's next
4-first node is temp's prev



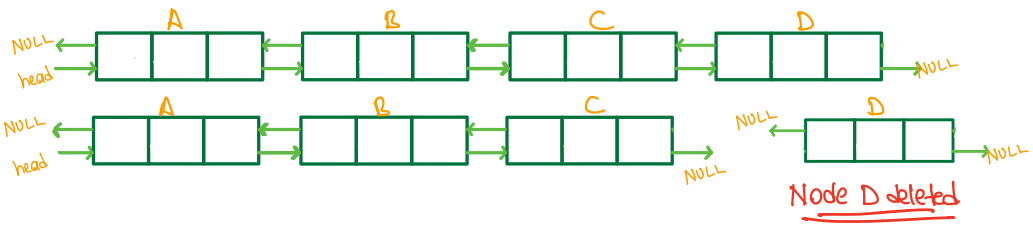
Explanation of getFront
1-enter the list
2-if nod's prev is equal to Null,that's mean is this nod is first node.
Print node's data on the screen.

Explanation of getTail
1-enter the list
2-go to the before list's last item.
Node is equal to this item's next(node=last item)
3-print node's data on the screen

Explanation of removeFront
1-enter the list
2-if node's prev is equal to NULL
This Node equal to head
Node's next is new head
New head's prev is NULL



Explanation of removeTail
1-enter the list
2-go to the before list's last item,
nod is equal to this node's next(node=last item)
3-node' prev's next is equal to NULL
4-node's prev is equal to NULL



Explanation of removeAll
1-enter the list

2-until list is be empty

Node is equal to head

Head's next is equal to head

Explanation of isEmpty

this function shows whether list is empty.

1-Check the head is null.

2-if head is null, print empty

is not null,print not empty

Explanation of printListItems

this function prints all items on the screen

1-enter the list

2until node's next is null,print data on the screen, Next node will be new node(in this situation, our last item does not print and that's new name is node)

3-last time , node print on the screen

2-

```
void function(int n) {
        int i, count =0;
        for(i=1; i*i<=n; i++)
                count++;

}
```

int i----------1
Count=0----------1
For loop------sqrt(n)
+------------------------------
2+sqrt(n)=O(sqrt(n))

Function will execute sqrt(n) times in the worst case.

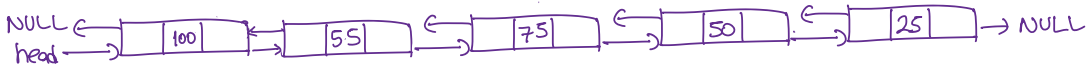
My main code is Templete

addFront(50) =

addFront(75) = 

addFront(100) = 

addTail(25) = 

addSecond(55) = 

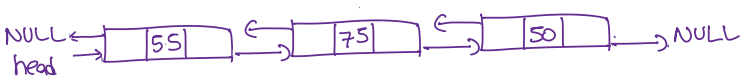
printListItems() = 100 55 75 50 25

getFront() = front item is 100

getTail() = tail item is 25

removeFront() = 

printListItems() = 55 75 50 25

removeTail() = 

printListItems() = 55 75 50

removeAll() = head = NULL

isEmpty() = list is empty