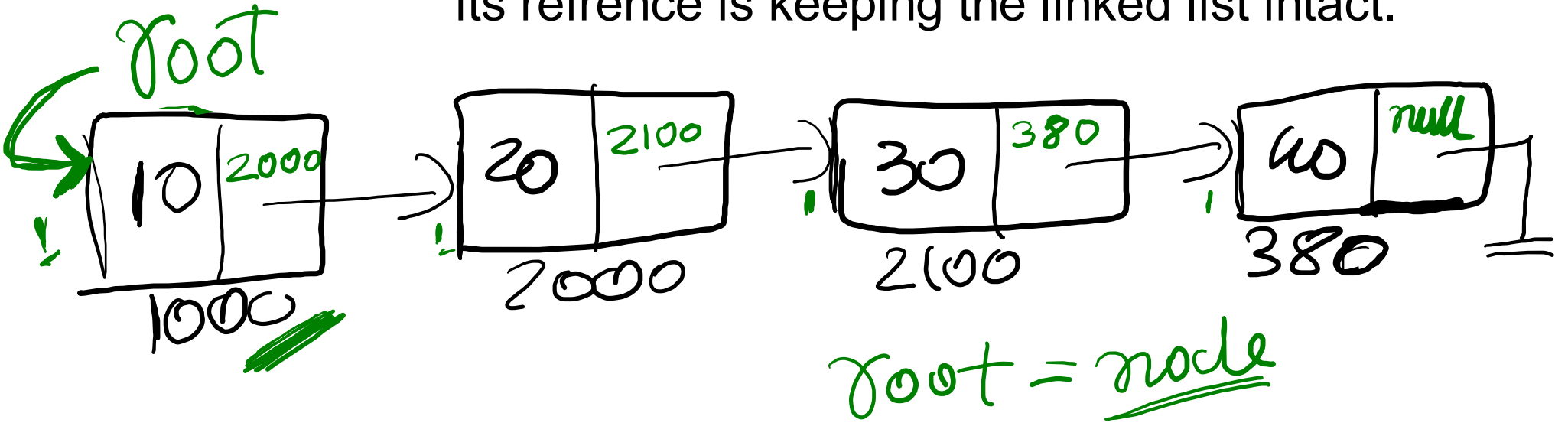
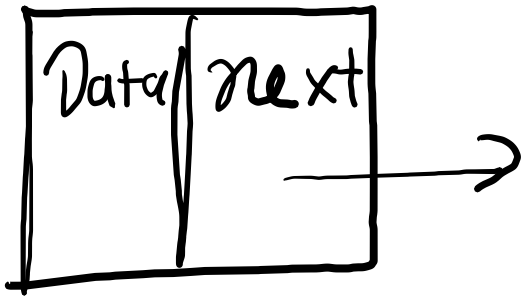
Linked List

collection of nodes arranged in sequential manner such that each node referes to next node.
we only store 1st node called root/head
its refrence is keeping the linked list intact.



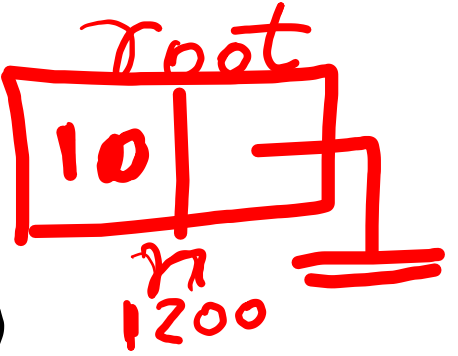


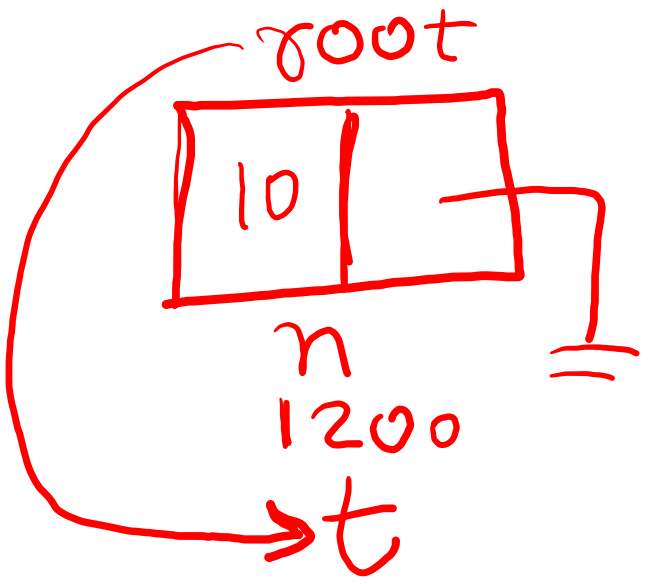

```
class Node
{
    int data;
    Node next;
    Node(int data)
    {
        this.data = data;
        next = null;
    }
}
```

Node.n = new Node(10);

root = n;

Node(10)





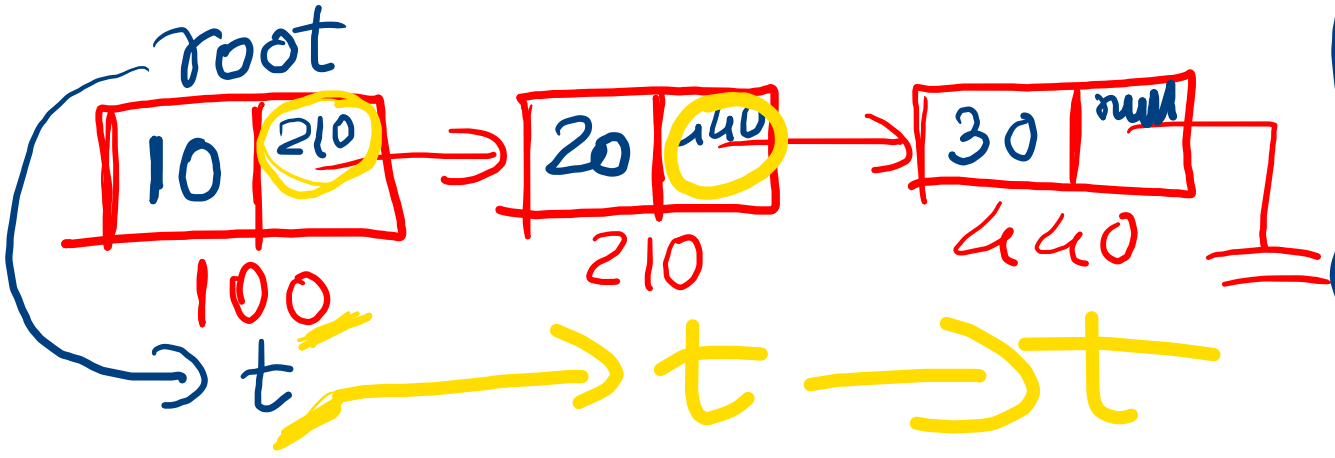
Node n = new Node(10);

root = n;

root ⇒ 1200

Node t = root;

t ⇒ 1200



① root is 1st or left most

② right most has next null

```
Node t=root;
t=t.next;
```

t=210

insert left/right

delete left/right

search

print

---

delete key

insert it

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Search (Ctrl+I)

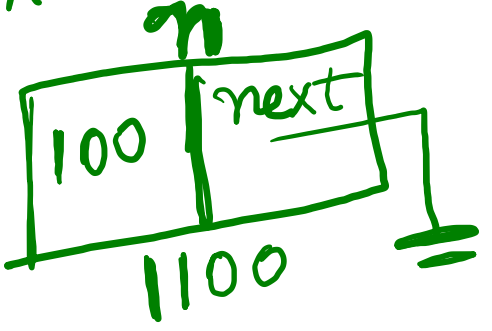
<default confi...

...va SortingDemo.java SearchDemo.java Treemain.java GraphDemo.java StackDemo.java QueueLinearDemo.java CircularQueueDemo.java PriorityQueueDemo.java LinkedListLinear.java

Source History

```
10   */
11   class Node
12   {
13       int data;
14       Node next;
15       Node(int data)
16       {
17           this.data=data;
18           next=null;
19       }
20   }
21   public class LinkedListLinear {
22
23   }
```

Node n= new Node(100);



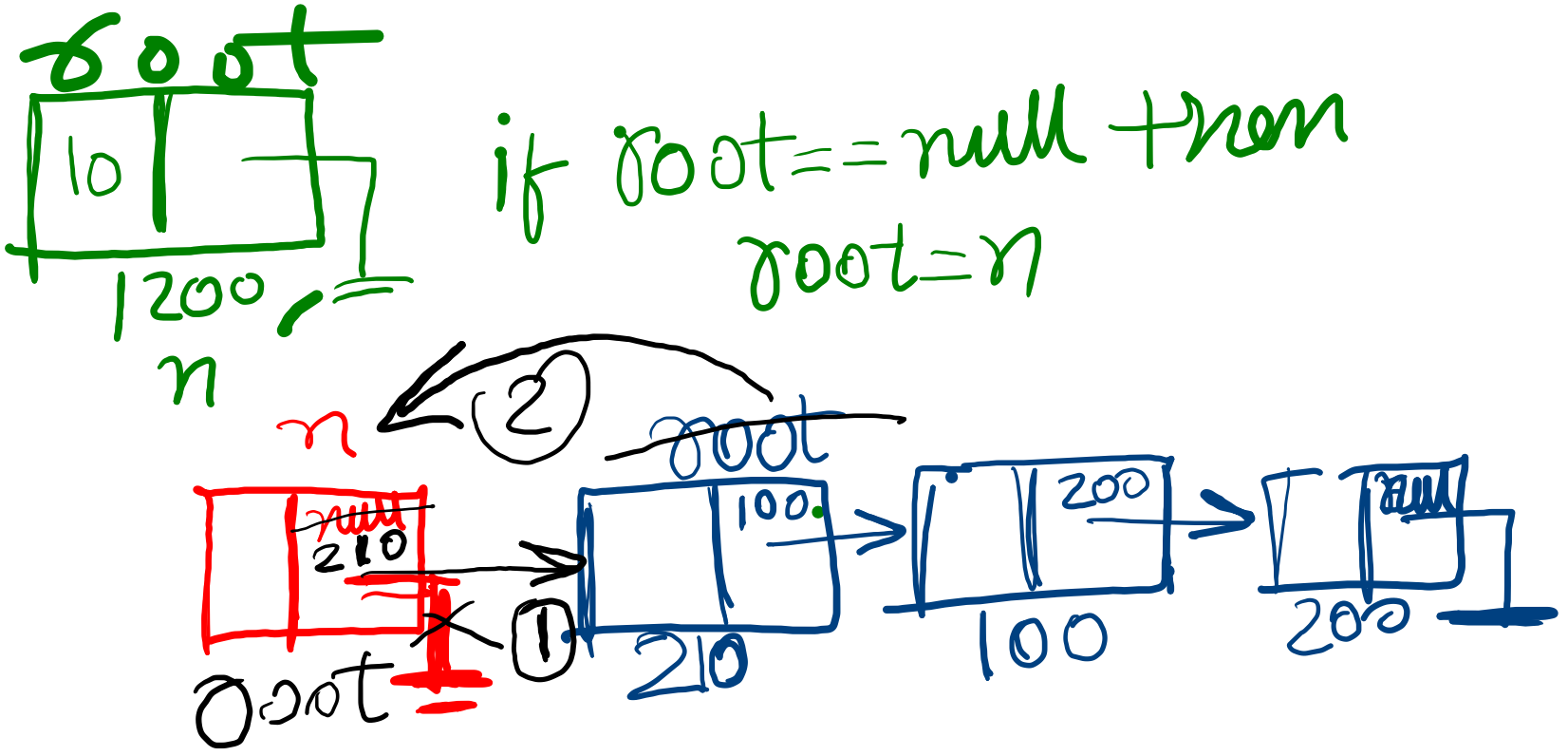
Output

20:2 INS

Search

ENG IN

09:17 25-11-2022


root
10
1200
n
if root==null then
root=n
n
2
root
null
210
100
200
null
1
root
210
100
200

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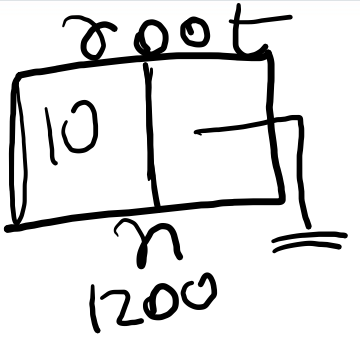
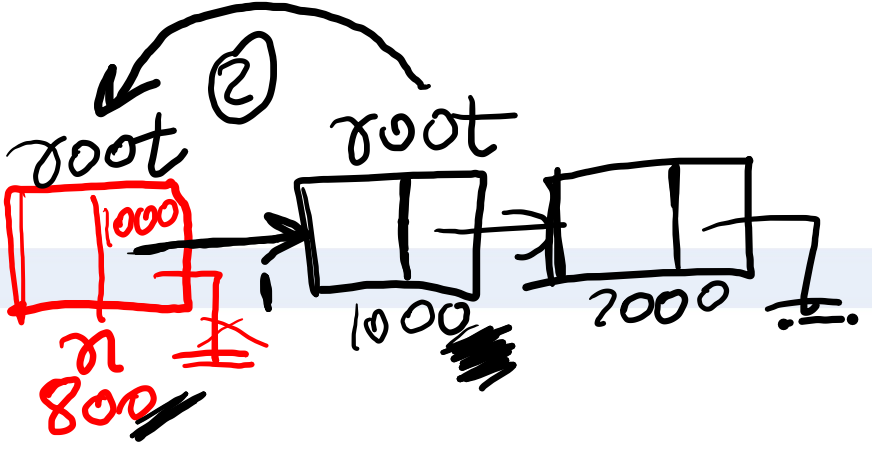
...va SortingDemo.java | SearchDemo.java | Treemain.java | GraphDemo.java | StackDemo.java | QueueLinearDemo.java | CircularQueueDemo.java | PriorityQueueDemo.java | LinkedListLinear.java

Source History

```
30  void insertLeft(int data)
31  {
32     Node n=new Node(data);
33     if(root==null)
34     {
35        root=n;
36     }
37     else
38     {
39        n.next=root;//1
40        root=n;//2
41     }
42     }
43
```





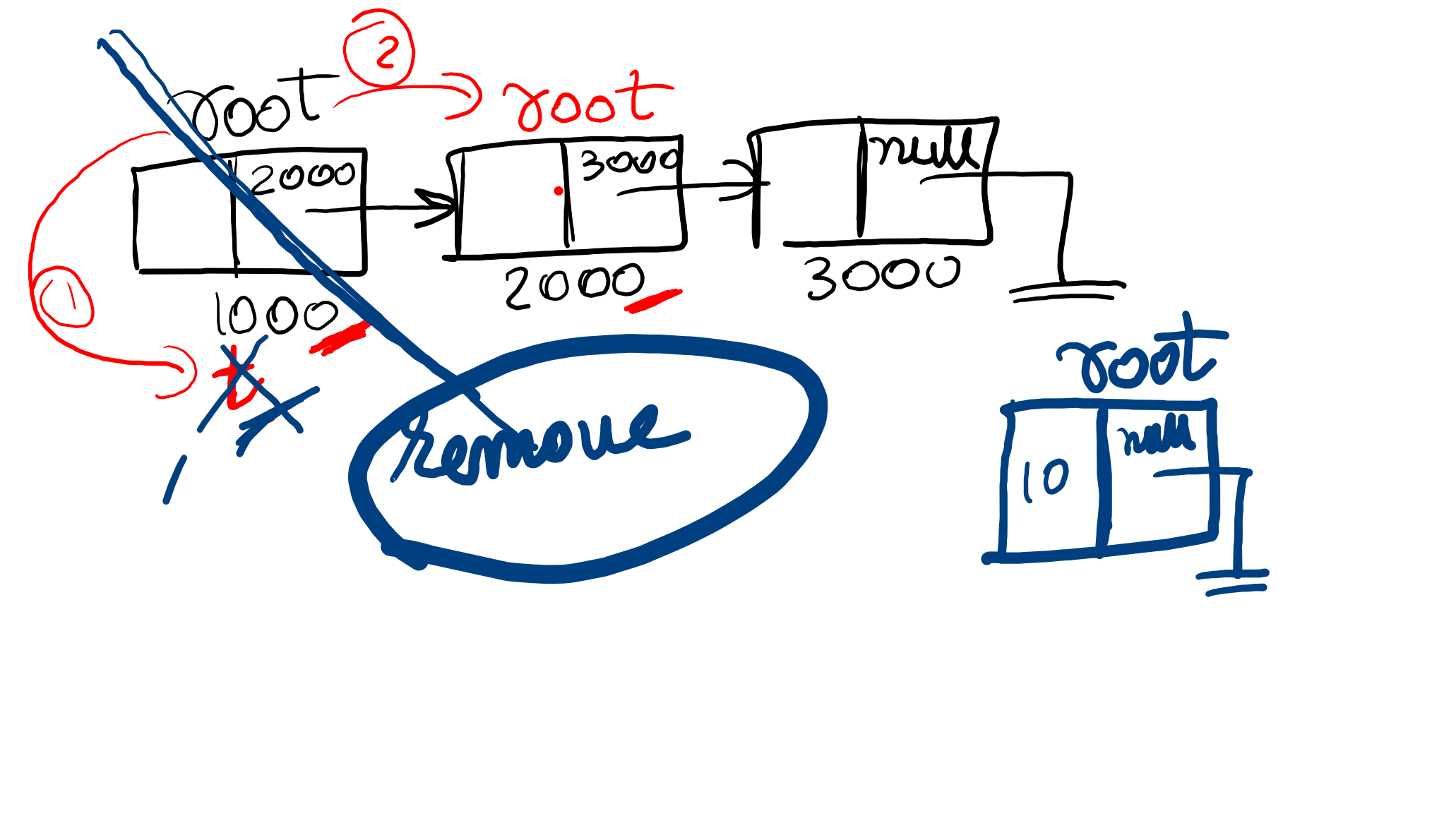
Output

40:20 INS

Search

ENG IN

09:30 25-11-2022


root
2
root
2000
3000
null
1000
2000
3000
1
remove
root
10
null

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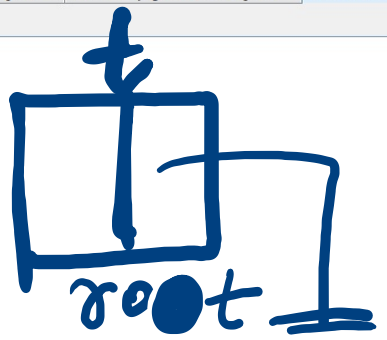
...va SortingDemo.java | SearchDemo.java | Treemain.java | GraphDemo.java | StackDemo.java | QueueLinearDemo.java | CircularQueueDemo.java | PriorityQueueDemo.java | LinkedListLinear.java

Source History

```
43  void deleteLeft()
44  {
45      if(root==null)
46      {
47          System.out.println("List Empty");
48      }
49      else
50      {
51          Node t=root;//1
52          root=root.next;//2
53          System.out.println("Deleted:"+t.data);
54      }
55      }
56
```



t is local gets deleted after call

last root

Output

53:48 INS

Search

ENG IN

09:42 25-11-2022

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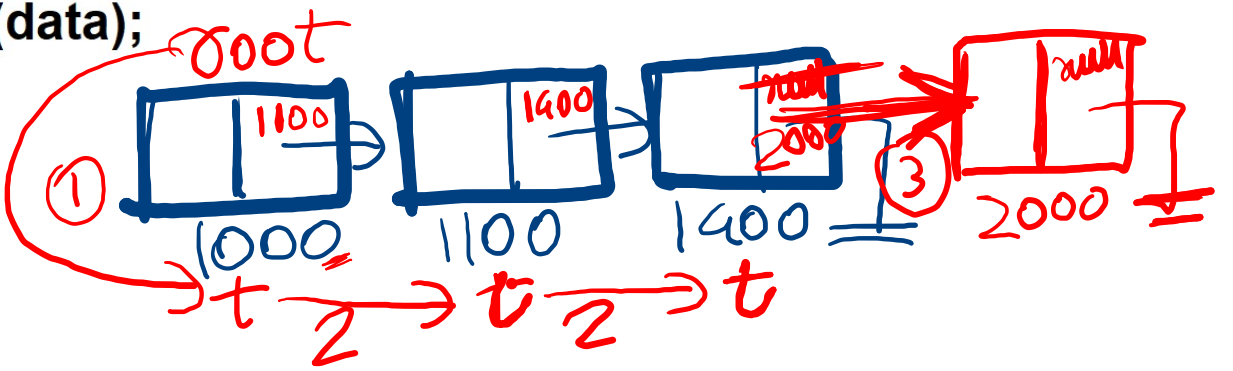
...va SortingDemo.java | SearchDemo.java | Treemain.java | GraphDemo.java | StackDemo.java | QueueLinearDemo.java | CircularQueueDemo.java | PriorityQueueDemo.java | LinkedListLinear.java

Source History

```
56  void insertRight(int data)
57  {
58      Node n=new Node(data);
59      if(root==null)
60      {
61          root=n;
62      }
63      else
64      {
65          Node t=root;//1 use t to search right
66          while(t.next!=null)//2
67              t=t.next;
68          t.next=n;//3
69      }
```



Output

56:19 INS

Search

ENG IN

09:51 25-11-2022

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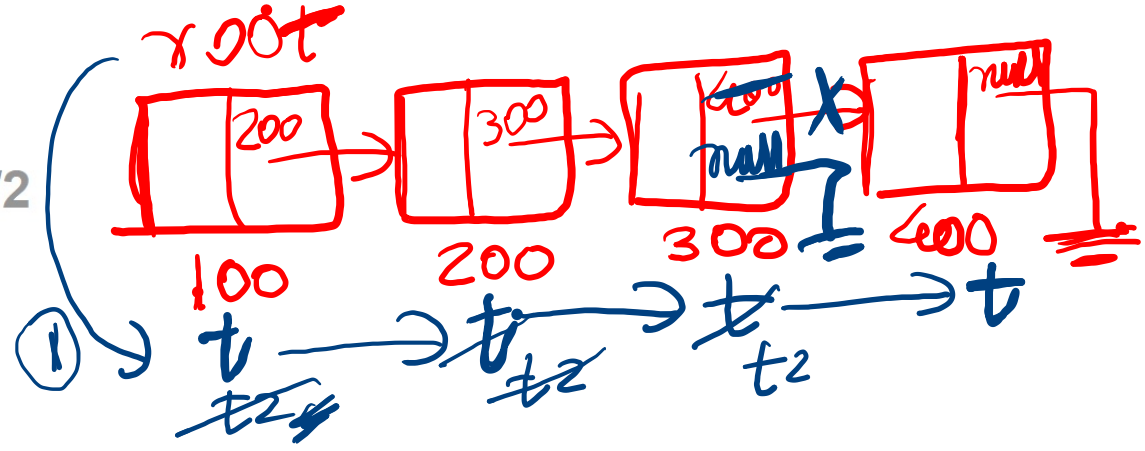
...ve SortingDemo.java | SearchDemo.java | Treemain.java | GraphDemo.java | StackDemo.java | QueueLinearDemo.java | CircularQueueDemo.java | PriorityQueueDemo.java | LinkedListLinear.java

Source History

```
79          else
80          {
81              Node t,t2;
82              t=t2=root;
83              while(t.next!=null)//2
84              {
85                  t2=t;
86                  t=t.next;
87              }
88              t2.next=null;//break link
89              System.out.println("Deleted:"+t.data);
90          }
91      }
92
```



Output

92:2 INS

Search

ENG IN 10:04 25-11-2022

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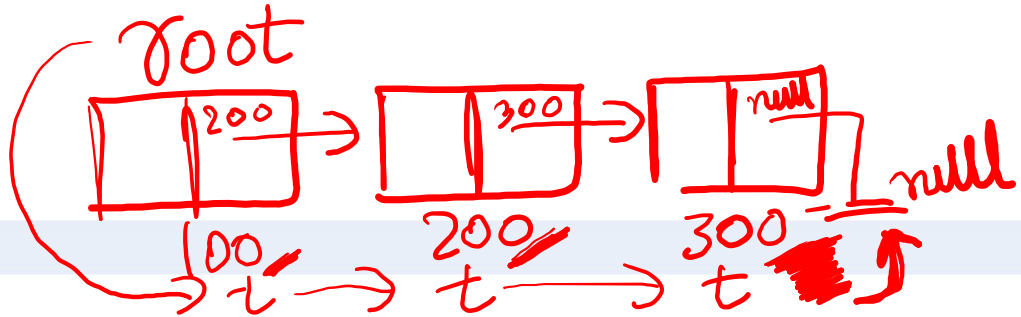
Search (Ctrl+I)

<default confi...

...va SortingDemo.java | SearchDemo.java | Treemain.java | GraphDemo.java | StackDemo.java | QueueLinearDemo.java | CircularQueueDemo.java | PriorityQueueDemo.java | LinkedListLinear.java

Source History

```
96              System.out.println("List Empty");
97          }
98          else
99          {
100             Node t;
101             t=root;
                while(t!=null)//2
103             {
104                 System.out.println(t.data);
105                 t=t.next;
106             }
107
108         }
109     }
```



Output

102:17 INS

Search

ENG IN 10:13 25-11-2022

Search

ENG IN 10:12 25-11-2022

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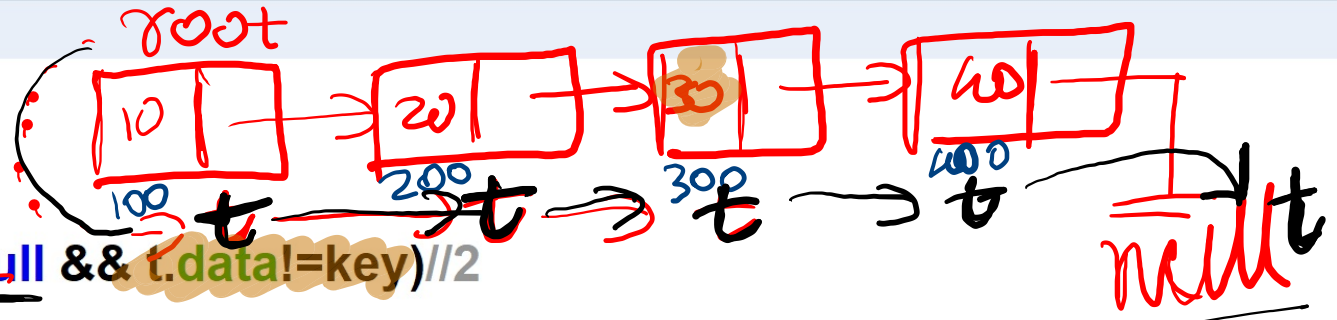
...va SortingDemo.java | SearchDemo.java | Treemain.java | GraphDemo.java | StackDemo.java | QueueLinearDemo.java | CircularQueueDemo.java | PriorityQueueDemo.java | LinkedListLinear.java

Source History

```
138     {
139         Node t;
140         int c=0;
141         t=root;
142         while(t!=null && t.data!=key)//2
143         {
144             t=t.next;
145             c++;
146         }
147         if(t!=null)//found
148             System.out.println("Found at "+c+" from root");
149         else
150             System.out.println("Not Found");
151     }
```



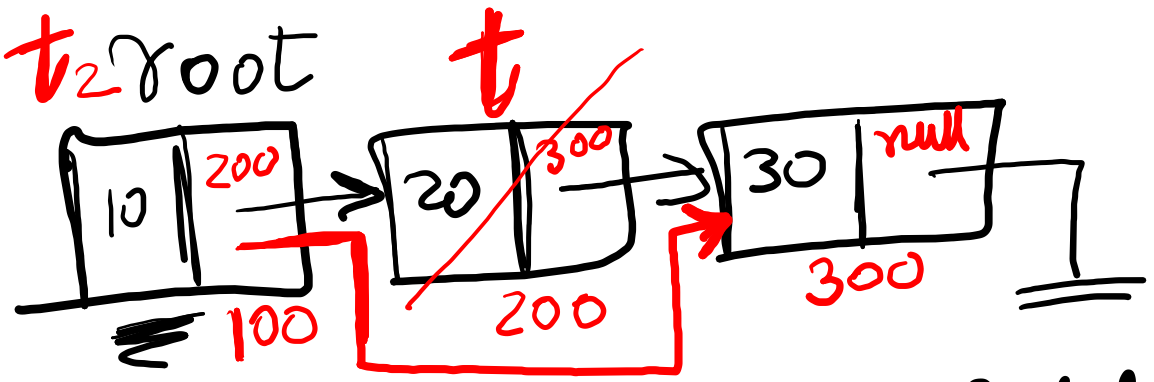
Output

138:7 INS

Search

ENG IN

10:20 25-11-2022



Case 1: key ⇒ root ⇒ Delete_Left

Case 2: key ⇒ at last ⇒ Delete Right

Case : k = in between

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Search (Ctrl+I)

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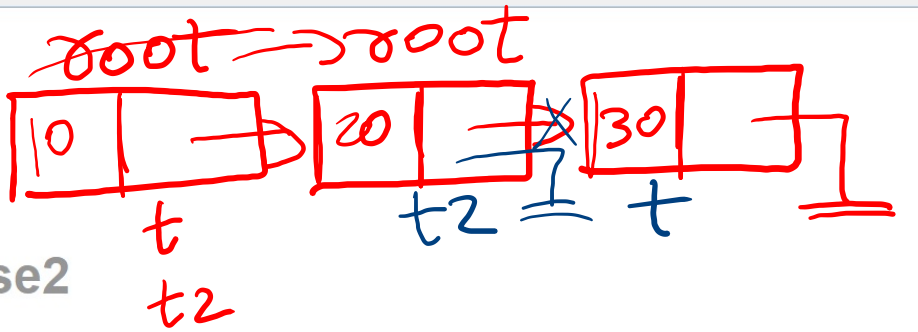
...va SortingDemo.java × SearchDemo.java × Treemain.java × GraphDemo.java × StackDemo.java × QueueLinearDemo.java × CircularQueueDemo.java × PriorityQueueDemo.java × LinkedListLinear.java ×

Source History

```
173             if(t==root)//case 1
174             { root=root.next;
175             }
176
177             else if(t.next==null)//case2
178             {  t2.next=null;
179             }
180             else//case 3
181             {  t2.next=t.next;
182             }
183
184             System.out.println("Deleted:"+t.data);
185         }
186     }
```



delete(10)

delete(30)

Output

183:14 INS

Search

ENG IN

11:22 25-11-2022

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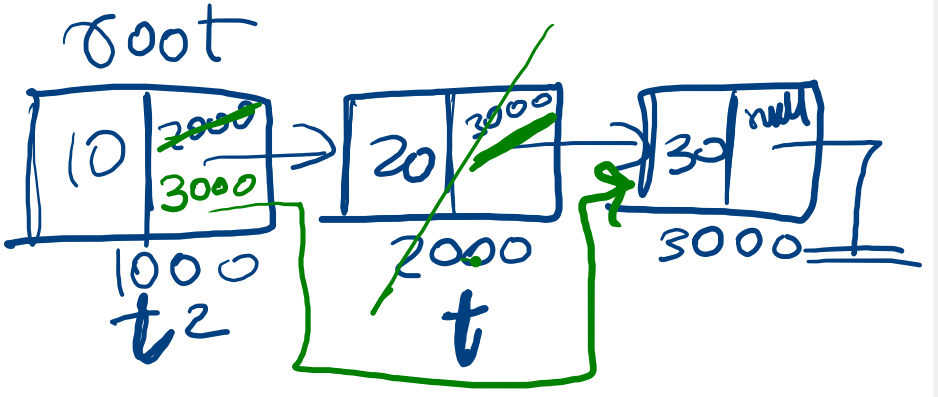
Search (Ctrl+I)

<default confi...

...va SortingDemo.java × SearchDemo.java × Treemain.java × GraphDemo.java × StackDemo.java × QueueLinearDemo.java × CircularQueueDemo.java × PriorityQueueDemo.java × LinkedListLinear.java ×

Source History

```
173             if(t==root)//case 1
174             { root=root.next;
175             }
176
177             else if(t.next==null)//case2
178             {  t2.next=null;
179             }
180             else//case 3
181             {  t2.next=t.next;
182             }
183
184             System.out.println("Deleted:"+t.data);
185         }
186     }
```



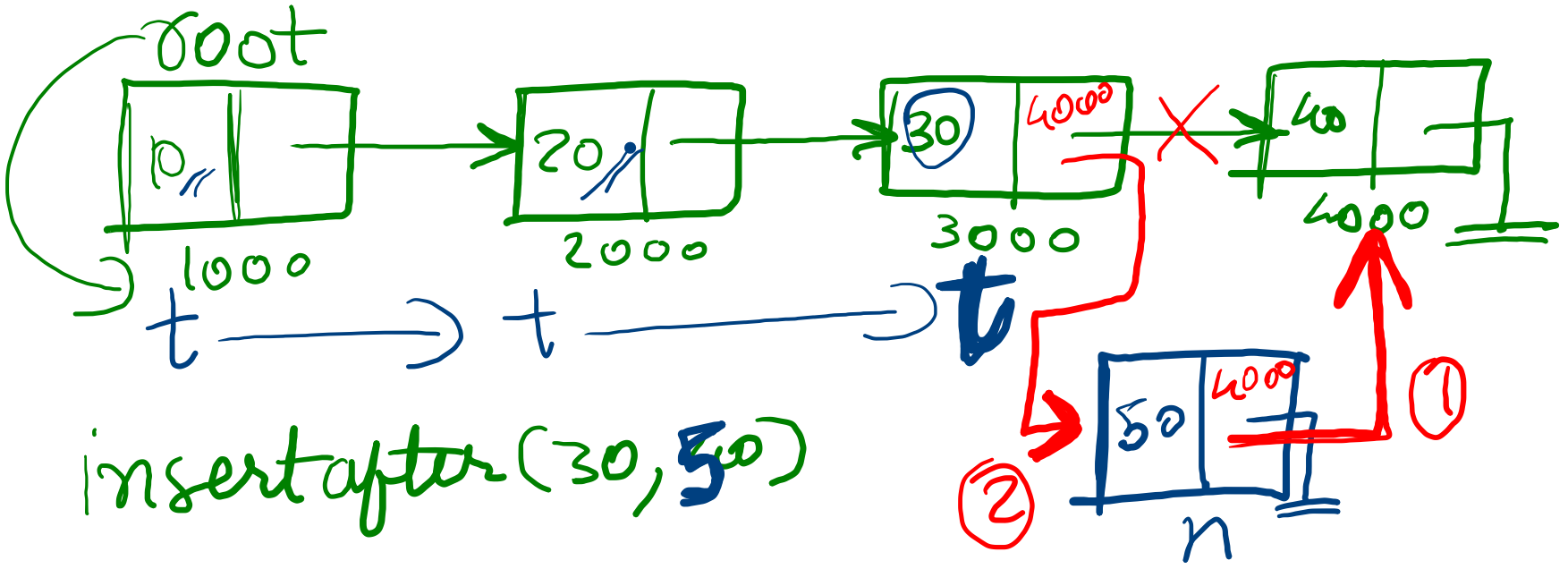
Output

183:14 INS

Search

ENG IN

11:22 25-11-2022

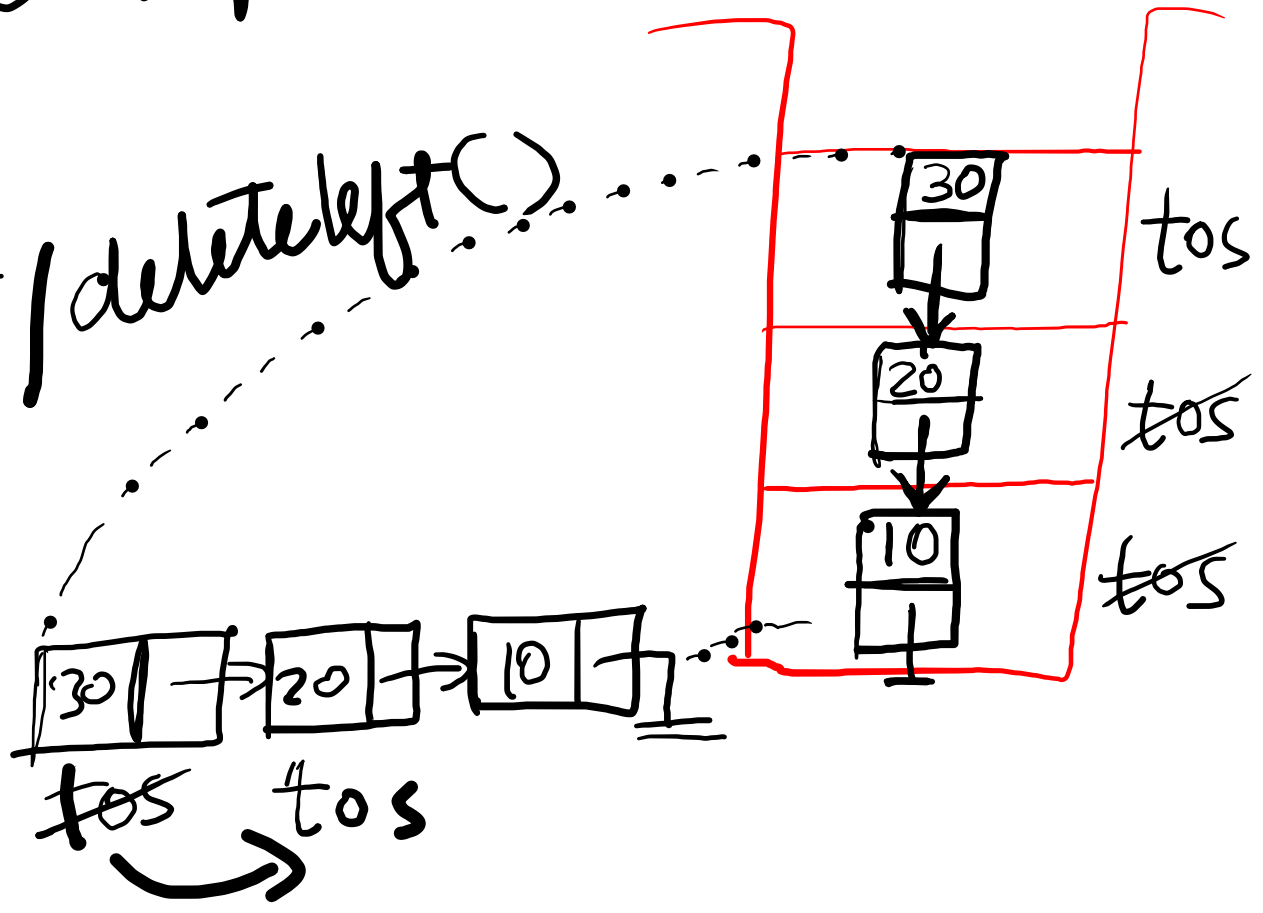

root
10
1000
20
2000
30
4000
3000
40
4000
t
t
t
50
4000
n
1
2
insertafter(30, 50)

Push(10) / insertLeft(.data)

Push(20)

Push(30)

pop():30 / deleteLeft()



DataStructures_MET_2022 - NetBeans IDE 8.2

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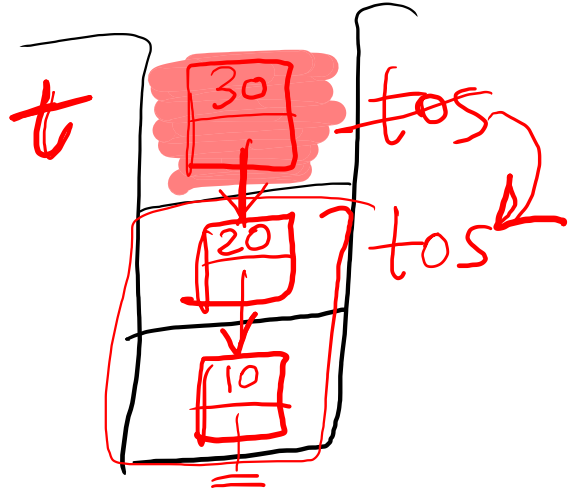
Search (Ctrl+I)

<default confi...

...va SearchDemo.java | Treemain.java | GraphDemo.java | StackDemo.java | QueueLinearDemo.java | CircularQueueDemo.java | PriorityQueueDemo.java | LinkedListLinear.java | DynamicStackDemo.java

Source History

```
37  void pop()
38  {
39      if(tos==null)
40      {
41          System.out.println("Stack Empty");
42      }
43      else
44      {
45          Node t=tos;//1
46          tos=tos.next;//2
47          System.out.println("Poped:"+t.data);
48      }
49  }
50  void printStack()
```



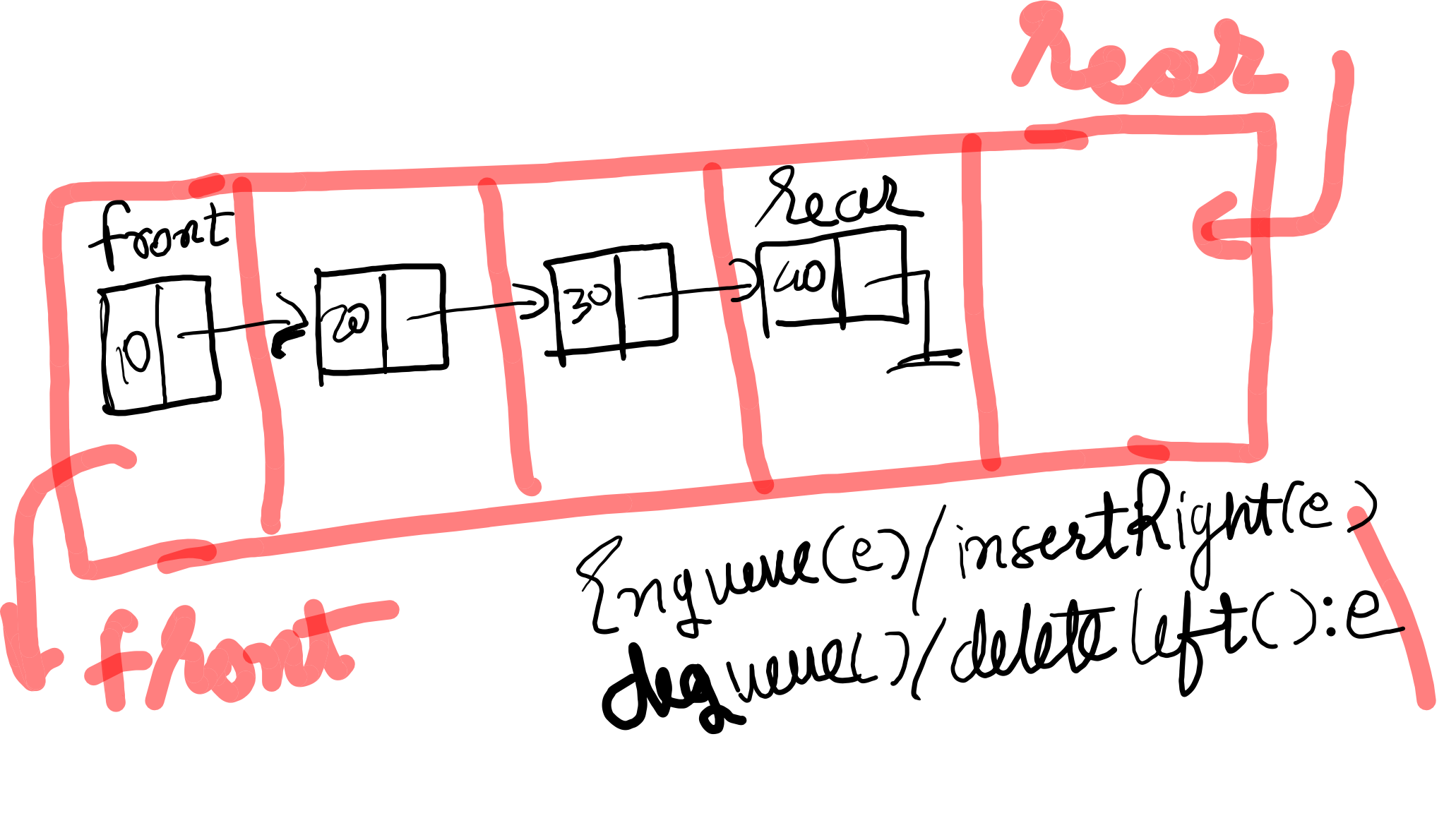
Output

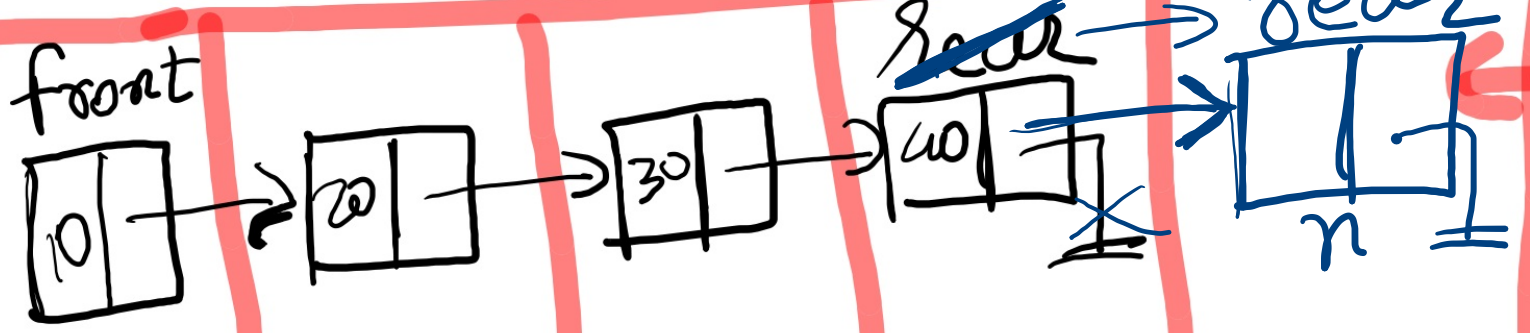
50:3 INS

Search

ENG IN

11:58 25-11-2022


rear
front
front
10
20
30
rear
40
Enqueue(e)/insertRight(e)
dequeue()/deleteLeft():e

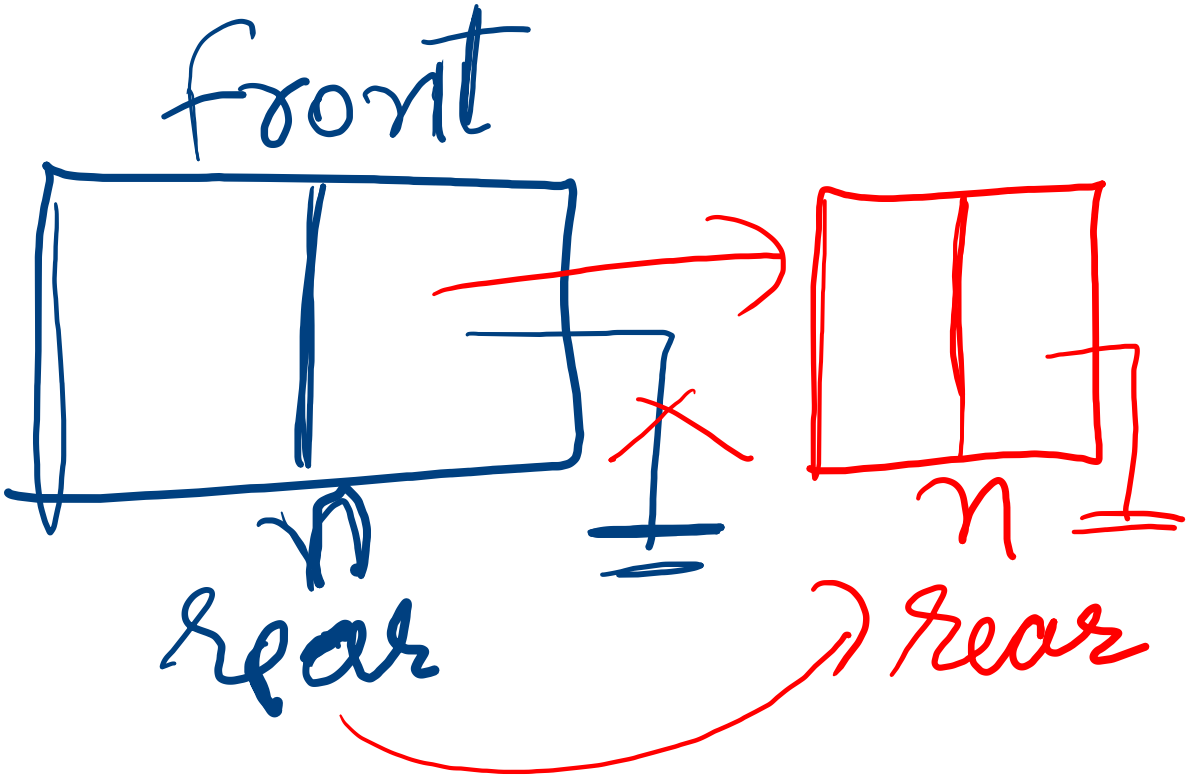


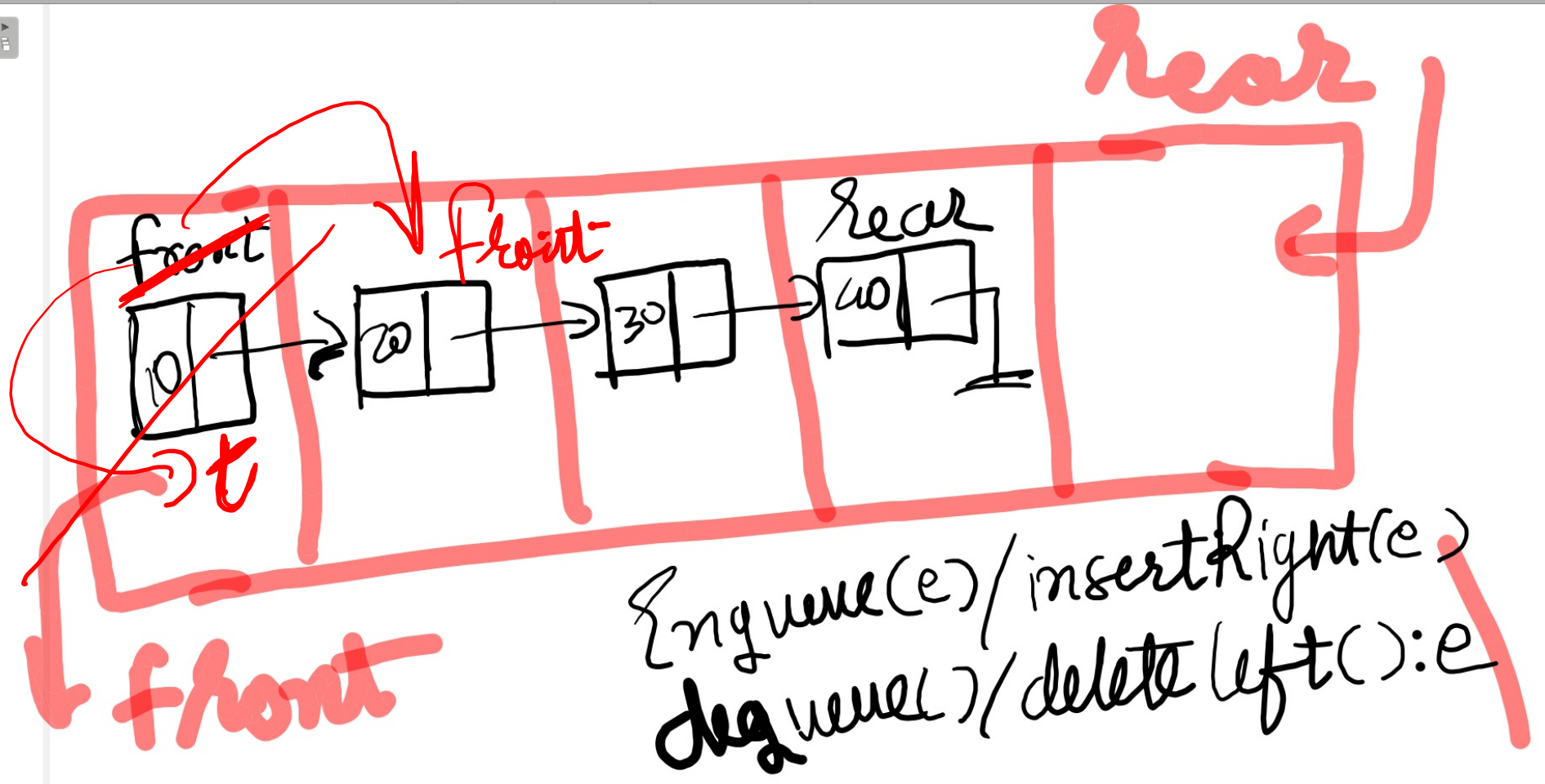
rear

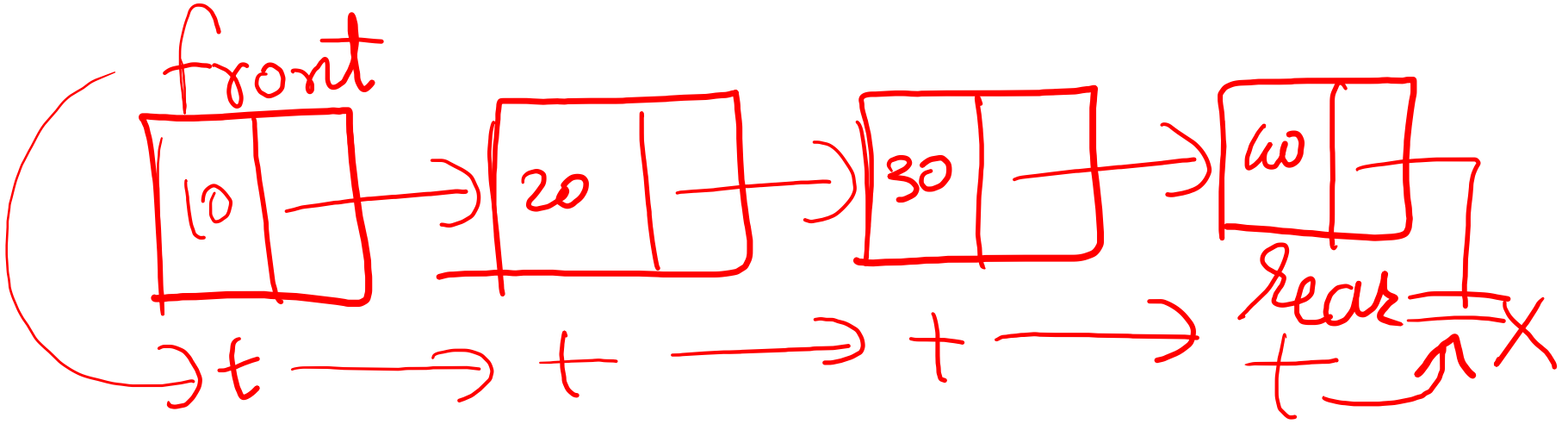
front

enqueue(e) / insertRight(e)

dequeue() / deleteLeft():e


front
n
rear
n
rear




front
10
20
30
40
rear
t
t
t
t
X