ID 2272583

Exam for 30175- LC Data Structures & Algorithms

After inserting your student ID and the module name in the title, header and footer, write your answers between here and the statement of good academic conduct. Your ID and the module name will automatically appear on any subsequent pages.

Q1.(a)

```
void delete_nth(int n)
{
        //WRITE THE CODE THAT SHOULD BE HERE
        If(size < n or n < 0)
        {
                throw IllegalArgumentException
        }
        Node  TempNode = first;
        For (int i = 0;i < n; i++){
                If(i==n-1){
                        NodeIn(TempNode).next = NodeIn(TempNode).next.next
                        return
                }
                TempNode = TempNode.Next
        }
}
```

(b)

delete_all_from_start()
n×1
O(n)

delete_all_from_end()
n + n-1 + n-2 + ··· + 1
= (n+1)n / 2
∴ O(n²)

```
void delete_all(){
        If(size > 0){
        first = END
        }
        return
}
```

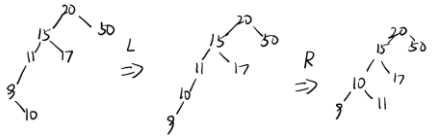
Q2.

(a)

```
stack = new BTNode[]
top = 0
size = 0

printTree(BTNode t){
        push(t, stack)
        While(true){
                If(top(stack).left != END){
                        push(top(stack).left, stack)
                        print(top(stack).left)
                }
                else if(top(stack).right != END){
                        push(top(stack).right, stack)
                        print(top(stack).right)
                }
                else{
                pop(stack)
                }
        }
}
```

(b)



Q3.

(a)

(i)

A → 11 → 3
B → 1
C → 1 → 2
D → 9 → 1 → 4
E → 0
F → 5

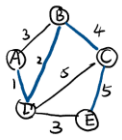
index	0	1	2	3	4	5	6	7
array	E	B	C	A	D	F		

(ii)

A → 11 → 3
B → 1
C → 1+7 → 0
D → 9 → 1 → 3+1 → 2
E → 0+3 → 3 → 0+3x2 → 6
F → 1+5 → 1+5+2 → 1+5x3 → 1+5x4 → 5

index	0	1	2	3	4	5	6	7
array	C	B	D	A		F	E	

(b)



A	B	C	D	E	
0,A	∞,B	∞,C	∞,D	∞,E	
0,A ✓	∞,B	∞,C	1,A	∞,E	A
0,A ✓	3,D	∞,C	1,A ✓	∞,E	D
0,A ✓	3,D ✓	7,B	1,A ✓	∞,E	B
0,A ✓	3,D ✓	7,B ✓	1,A ✓	12,C	C
0,A ✓	3,D ✓	7,B ✓	1,A ✓	12,C ✓	E

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