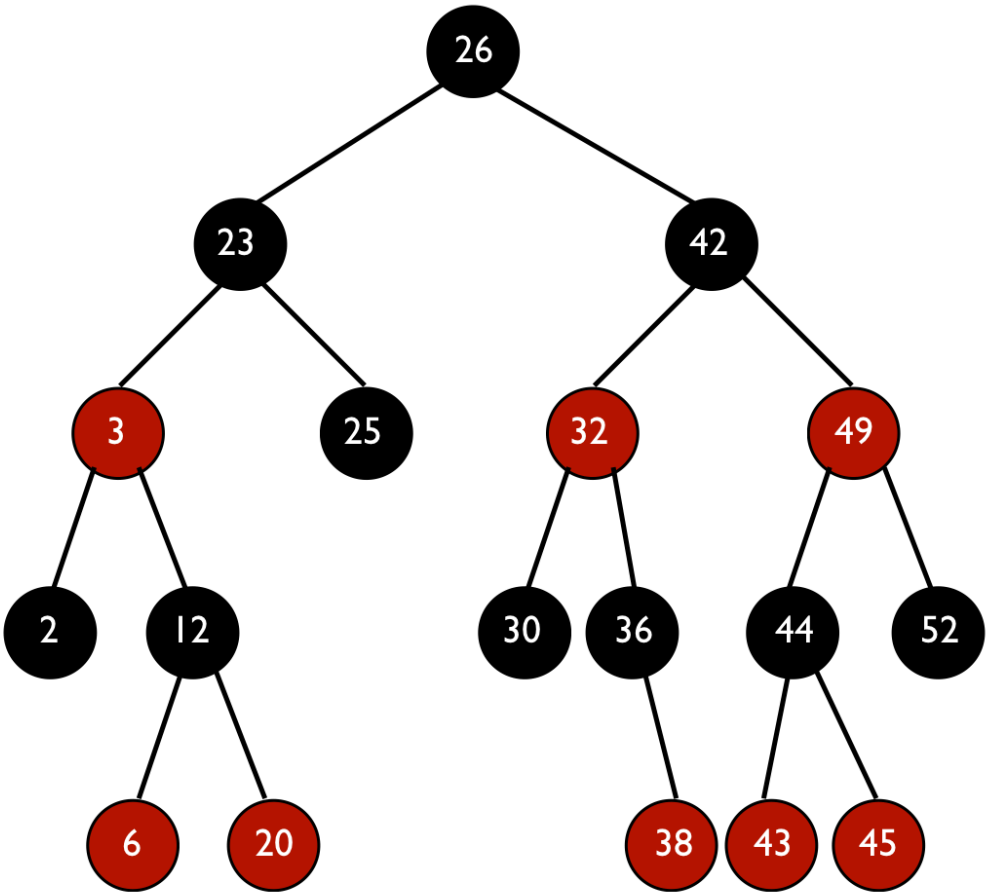
CS 202

Homework 4

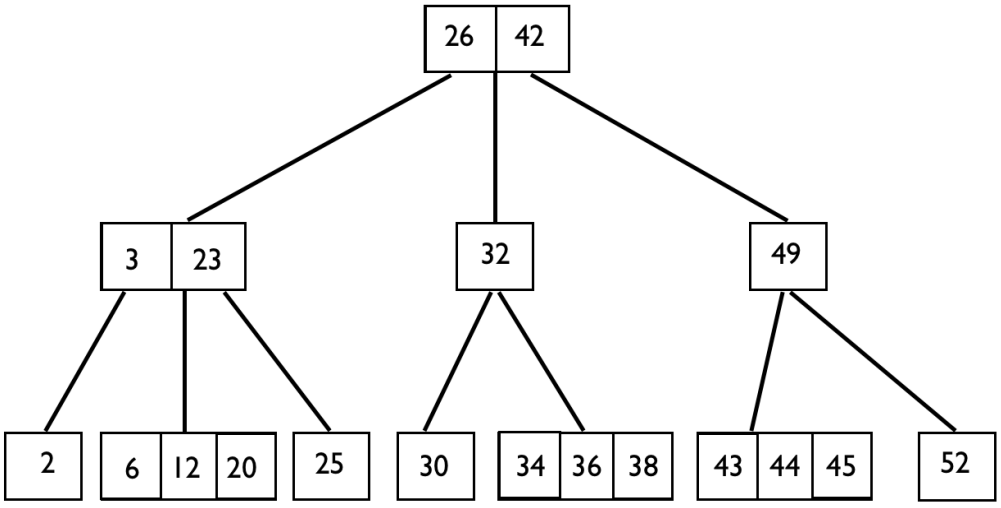
Kerem Ayöz
21501569 Section: 1

Question 1

a-)



b-)



Question 2

a-) Every node is 3-node in that case and the maximum number of nodes in that tree is $3^h - 1$

b-) After inserting letter "I", height of the tree becomes 3.

c-) Because it has the properties of the binary search tree, we can sort these 'n' elements by using inorder traversal, which is done in O(n) time.

d-) No because the root of the subtree may be a red-node but root of the red-black tree cannot be a red-node.

Question 3

Data Structure	Insert	isMember
Unsorted array	O(1)	O(n)
Red-Black tree	O(logn)	O(logn)
Hashing	O(1)	O(m)
Priority queue using a heap	O(logn)	O(logn)
Sorted linked list	O(n)	O(n)

*n is the number of elements in that structure, m is the number of elements in the hash table