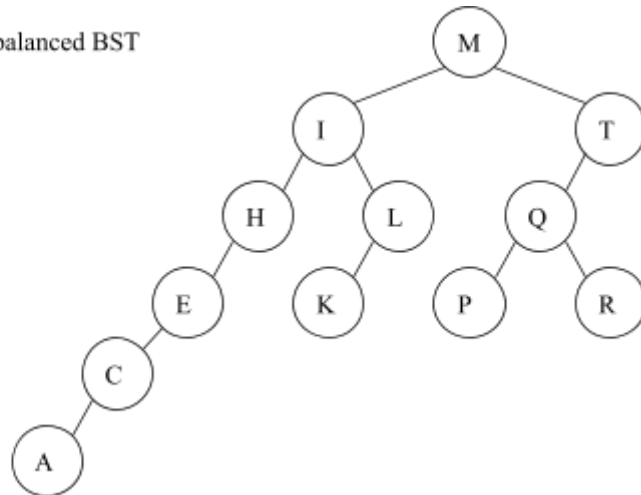


Homework 5: Binary Search Trees and B+ Trees

1. Suppose you have these inputs: M, I, T, Q, L, H, R, E, K, P, C, A.

a. Show the binary search tree for these inputs:

Question 1: Unbalanced BST



i.

b. Show how to store the binary search tree in an array with the node structure (key, left, right):

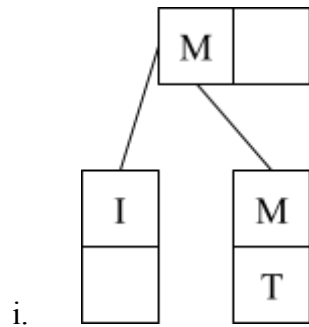
i.

Key:	Left:	Right:
M	I	T
I	H	L
T	Q	
Q	P	R
L	K	
H	E	
R		
E	C	
K		
P		
C	A	
A		

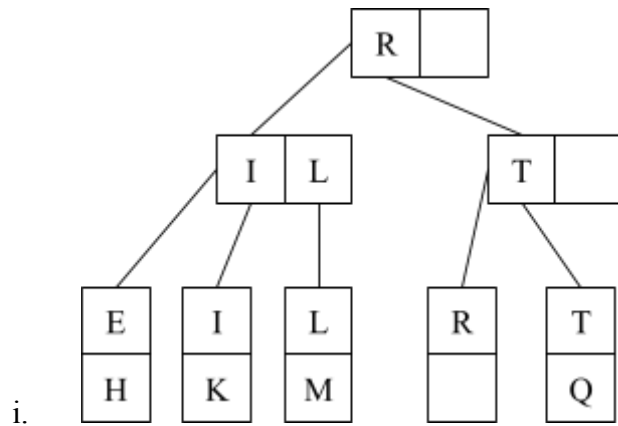
Homework 5: Binary Search Trees and B+ Trees

2. Show the B+-tree of order three (namely each node has a maximum of **three keys/descendants** (see hw5-2)) that result from loading the following sets of keys in order:

a. M, I, T

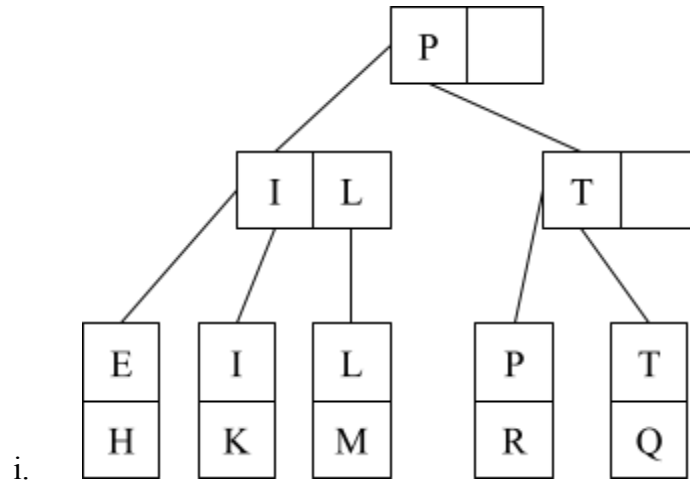


b. M, I, T, Q, L, H, R, E, K

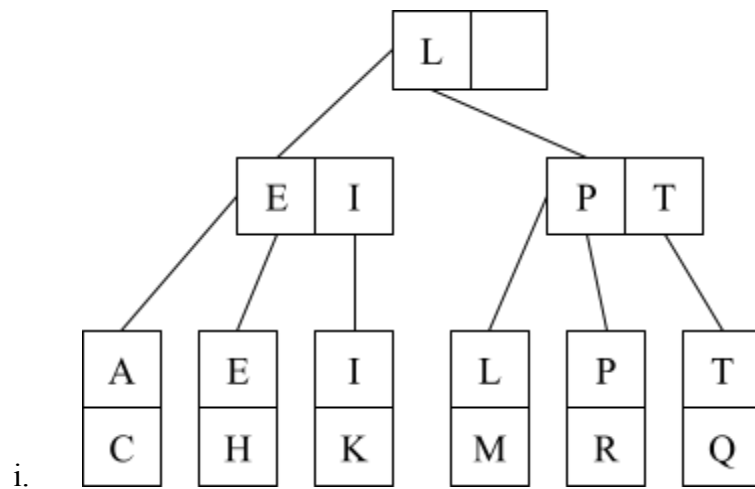


Homework 5: Binary Search Trees and B+ Trees

c. M, I, T, Q, L, H, R, E, K, P



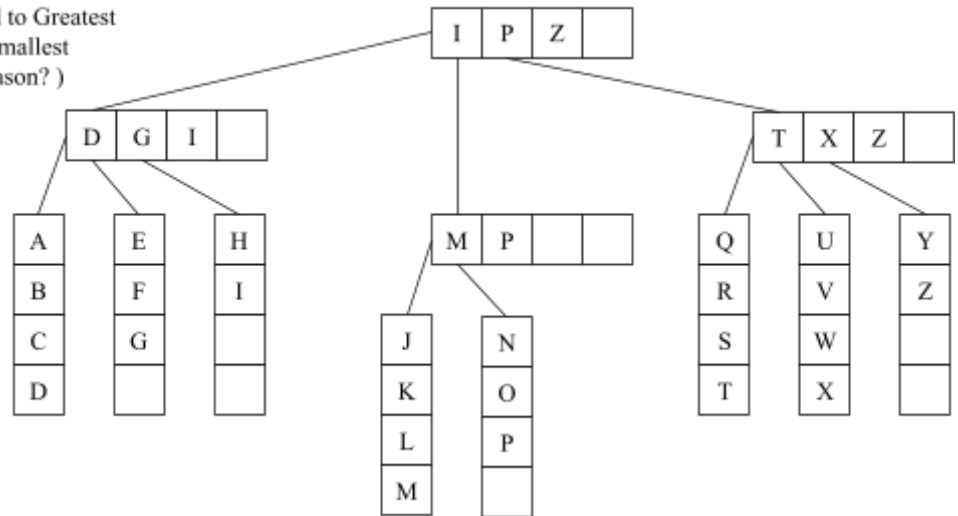
d. M, I, T, Q, L, H, R, E, K, P, C, A



Homework 5: Binary Search Trees and B+ Trees

3. Show the trees that result after each of the keys N, T, H, and Y is deleted individually and separately from the following B+-tree. Do not delete the keys based on the results you got. Each key should be deleted from the original tree:

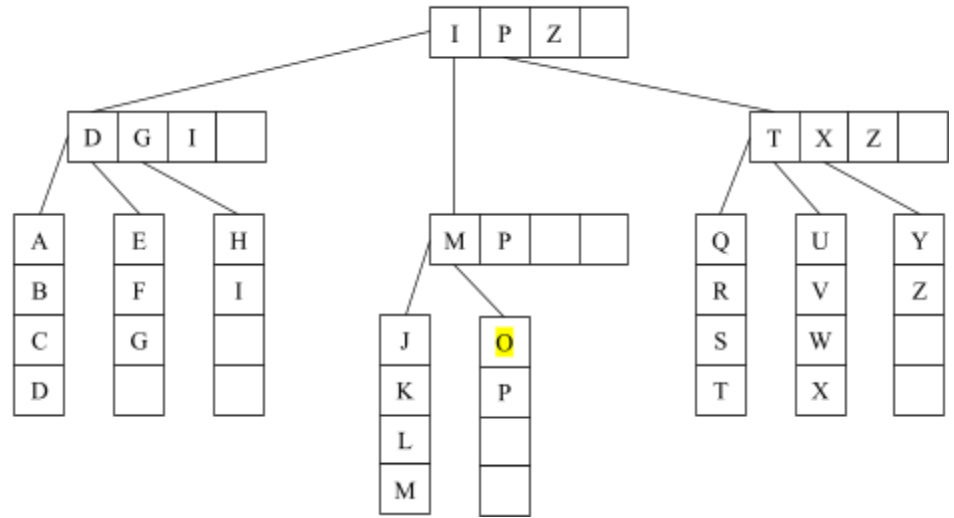
Question 4: Original B+ Tree
(Keys are mapped to Greatest Value instead of Smallest Value for some reason?)



a.

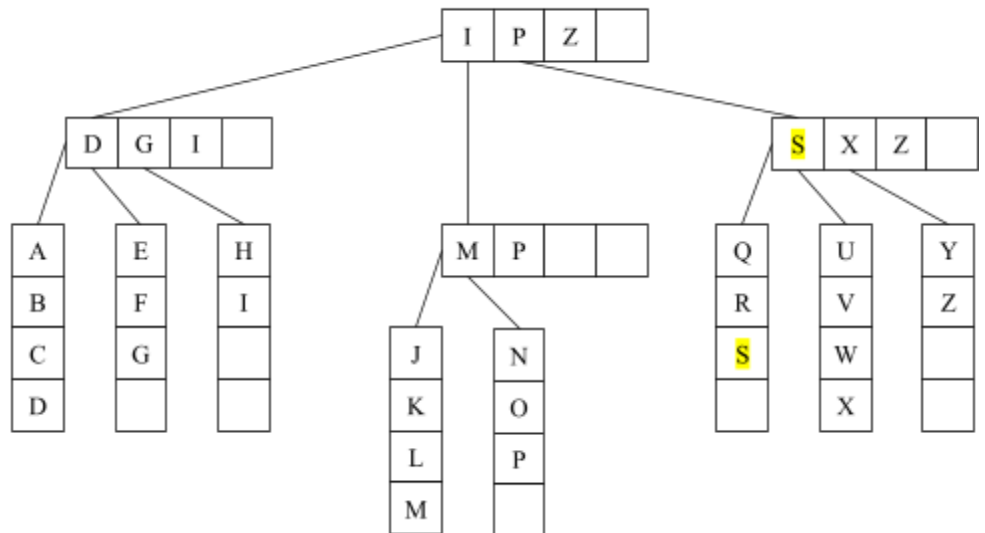
Homework 5: Binary Search Trees and B+ Trees

Question 4: Delete N



b.

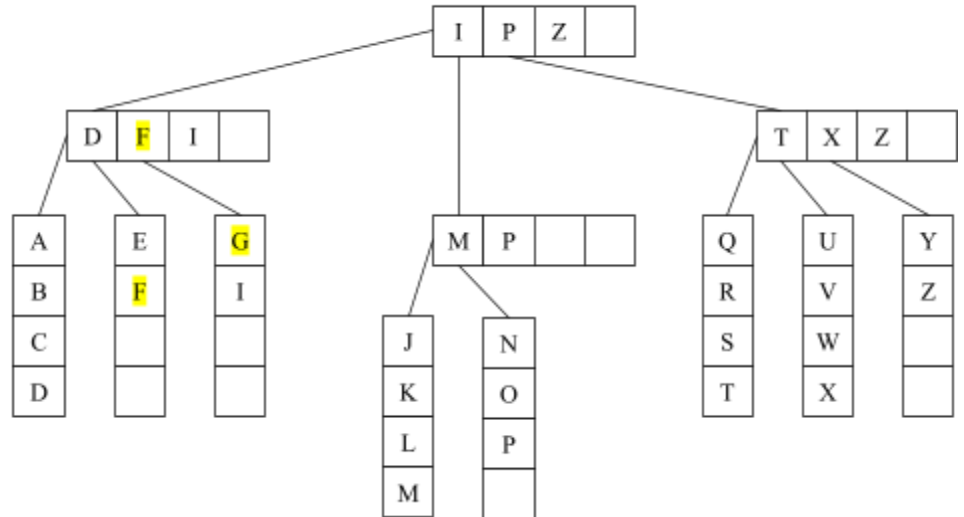
Question 4: Delete T



c.

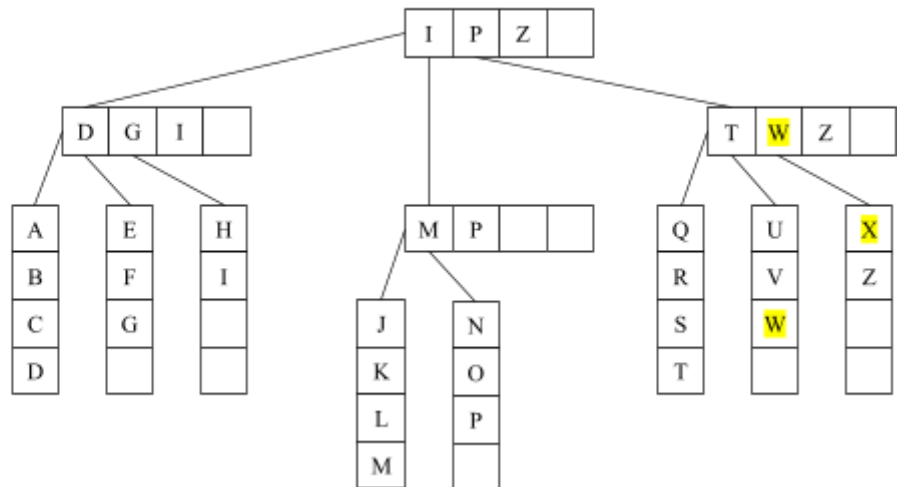
Homework 5: Binary Search Trees and B+ Trees

Question 4: Delete H



d.

Question 4: Delete Y



e.