CS220 - Lesson 20 – Tree Worksheet - Solution

The Lesson 19 worksheet asked you to determine the amount of data in a binary tree at each level of the tree, and for the entire tree to each level. Perform the same analysis for a **ternary** tree. Determine a generalize formula for the number of nodes at each level of the tree and for the total tree based on the height of the tree.

	Nodes in Level:	Total nodes in tree:
Level 0:	1	1
Level 1:	3	4
Level 2:	9	13
Level 3:	27	40
Level n:	3^n	3^n + totalNodes(n-1) recursion!!!!!!!!!!

Given a n-ary tree, how many possible nodes are on each level of the tree and in the total tree?

	Nodes in Level:	Total nodes in tree:
Level 0:	1	1
Level 1:	k	k+1
Level 2:	k^2	$k^2 + k + 1$
Level 3:	k^3	$k^3 + k^2 + k + 1$
Level n:	k^n	$\sum_{i=0}^{n} k^i$

How many different type of nodes are in a 2-3-4 tree (including internal and leaf nodes)?

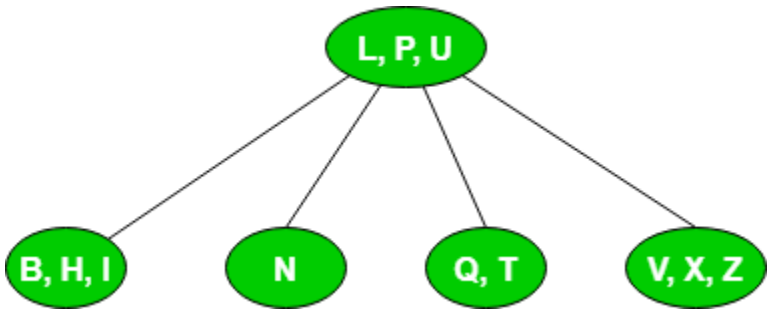
4 node types:

- Internal: 2-Node, 3-Node, and 4-Node
- Leaf

An internal node always has one more child than the number of keys. True or False?

True

Insert G into the 2-3-4 Tree shown below.



SOLUTION: