HABIB UNIVERSITY

Data Structures & Algorithms

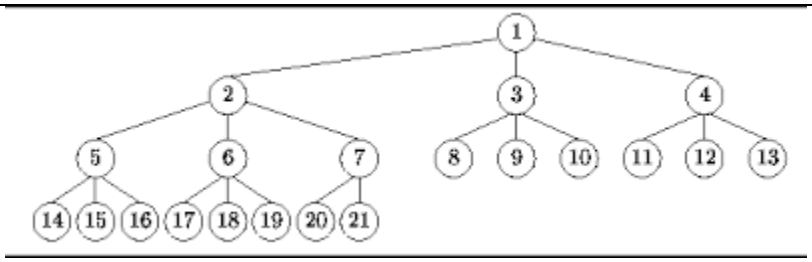
CS/CE 102/171 Spring 2023

Instructor: Maria Samad

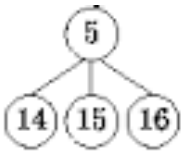
Trees Terminology

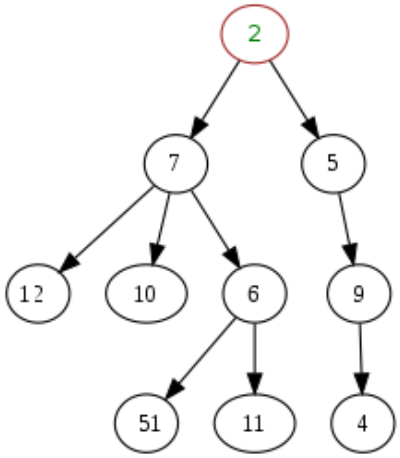
Student Name: _____

For the given trees, answer each of the specified questions:

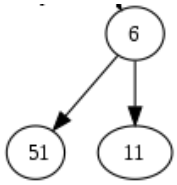


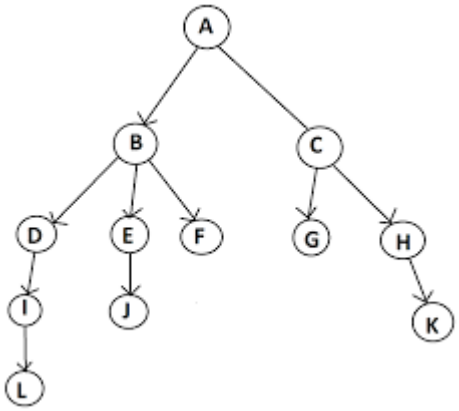
a. Parent of Node 7: ***Node 2***
b. Root Node: ***Node 1***
c. Is Node 2 an ancestor of Node 19? ***Yes***
d. Is Node 2 an ancestor of Node 9? ***No***
e. Child(ren) of Node 6: ***Nodes 17, 18 & 19***
f. Number of children of Node 7: ***2***
g. Is Node 20 a descendant of Node 1? ***Yes***
h. Is Node 13 a descendant of Node 2? ***No***
i. Siblings of Node 9: ***Nodes 8 & 10***
j. Cousins of Node 11: ***Nodes 5, 6, 7, 8, 9 & 10***
k. Leaves of the given tree: ***Nodes 14, 15, 16, 17, 18, 19, 20, 21, 8, 9, 10, 11, 12 & 13***
l. Is the given tree ordered or unordered? ***Ordered***
m. Name all the internal nodes of the given tree: ***Nodes 1, 2, 3, 4, 5, 6 & 7***
n. Name all the external nodes of the given tree: ***Nodes 14, 15, 16, 17, 18, 19, 20, 21, 8, 9, 10, 11, 12 & 13***
o. Draw the leftmost subtree of the Node 2:



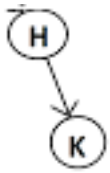


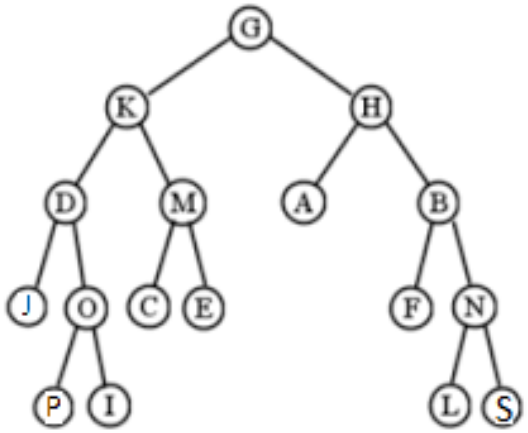
a. Parent of Node 6: ***Node 7***
b. Root Node: ***Node 2***
c. Is Node 7 an ancestor of Node 9? ***No***
d. Is Node 7 an ancestor of Node 6? ***Yes***
e. Child(ren) of Node 6: ***Nodes 51 & 11***
f. Number of children of Node 51: ***None***
g. Is Node 11 a descendant of Node 7? ***Yes***
h. Is Node 4 a descendant of Node 7? ***No***
i. Siblings of Node 10: ***Nodes 6 & 12***
j. Cousins of Node 10: ***Node 9***
k. Leaves of the given tree: ***Nodes 12, 10, 51, 11 & 4***
l. Is the given tree ordered or unordered? ***Unordered***
m. Name all the internal nodes of the given tree: ***Nodes 2, 7, 5, 6 & 9***
n. Name all the external nodes of the given tree: ***Nodes 12, 10, 51, 11 & 4***
o. Draw the rightmost subtree of Node 7:





a. Parent of Node E: ***Node B***
b. Root Node: ***Node A***
c. Is Node C an ancestor of Node K? ***Yes***
d. Is Node E an ancestor of Node L? ***No***
e. Child(ren) of Node D: ***Node I***
f. Number of children of Node B: ***3***
g. Is Node K a descendant of Node A? ***Yes***
h. Is Node K a descendant of Node B? ***No***
i. Siblings of Node J: ***None***
j. Cousins of Node J: ***Nodes I***
k. Leaves of the given tree: ***Nodes L, J, F, G & K***
l. Is the given tree ordered or unordered? ***Ordered***
m. Name all the internal nodes of the given tree: ***Nodes A, B, C, D, E, H & I***
n. Name all the external nodes of the given tree: ***Nodes L, J, F, G & K***
o. Draw the rightmost subtree of Node C:





a. Parent of Node N: ***Node B***
b. Root Node: ***Node G***
c. Is Node K an ancestor of Node I? ***Yes***
d. Is Node F an ancestor of Node B? ***No***
e. Child(ren) of Node D: ***Nodes J & O***
f. Number of children of Node B: ***2***
g. Is Node P a descendant of Node M? ***No***
h. Is Node I a descendant of Node K? ***Yes***
i. Siblings of Node G: ***None***
j. Cousins of Node J: ***Nodes C & E***
k. Leaves of the given tree: ***Nodes J, P, I, C, E, A, F, L & S***
l. Is the given tree ordered or unordered? ***Unordered***
m. Name all the internal nodes of the given tree: ***Nodes G, K, H, D, M, B, O & N***
n. Name all the external nodes of the given tree: ***Nodes J, P, I, C, E, A, F, L & S***
o. Draw the left subtree of Root Node: