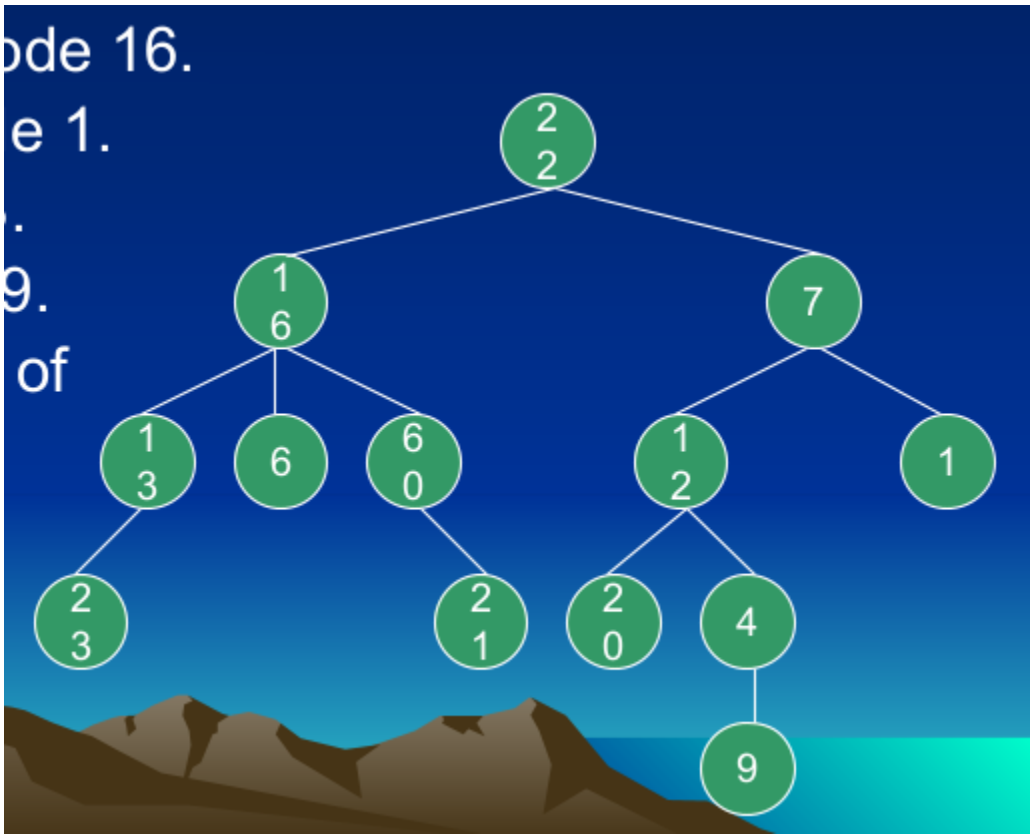
QUIZ

1. Name three properties of a tree.
    - connected
    - acyclic (no cycle)
    - undirected
2. Is a tree a forest?
   Yes, but a forest is not a tree because it is not connected.
3. What do you call the special designated node in a tree?
    - root
4. What is the minimum number of nodes in a tree?
    - 1 node
5. Can a tree have no subtrees at all?
    - Yes

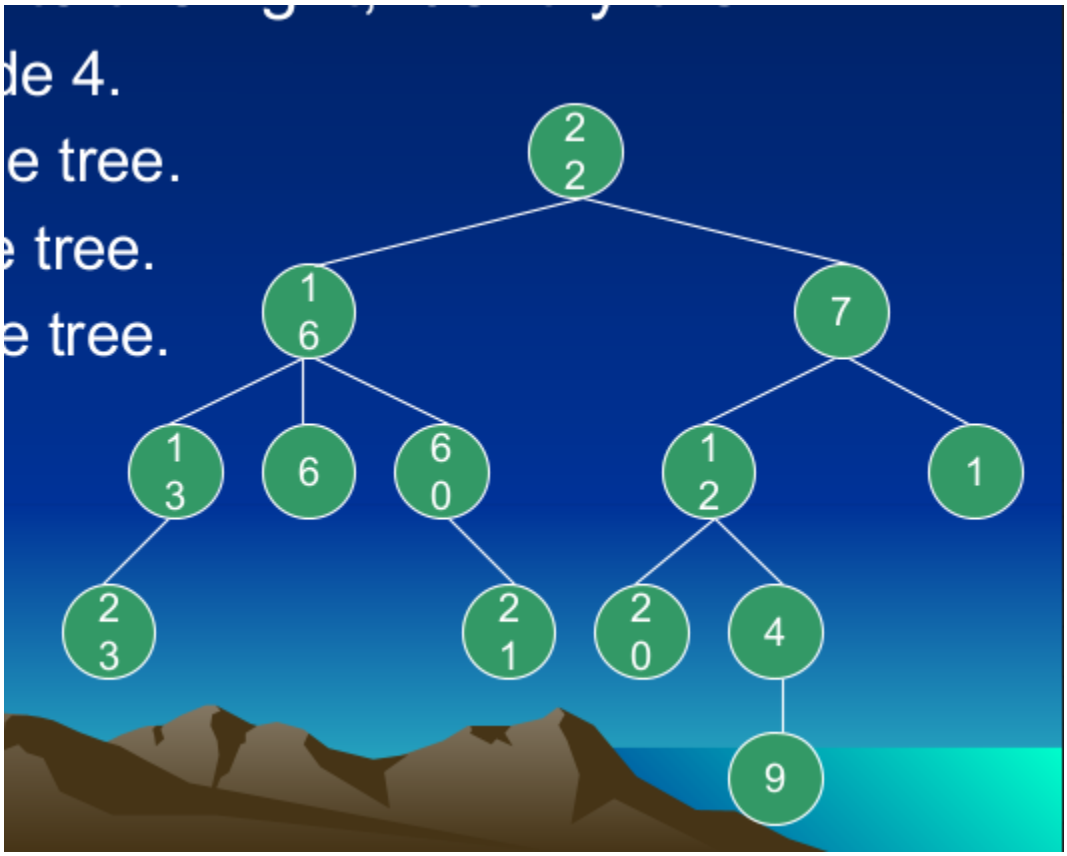
Given the three, identify the following:



6. Children of node 16
    - 13,6,60
7. Parent of node 1
    - 7
8. Siblings of 23
    - None

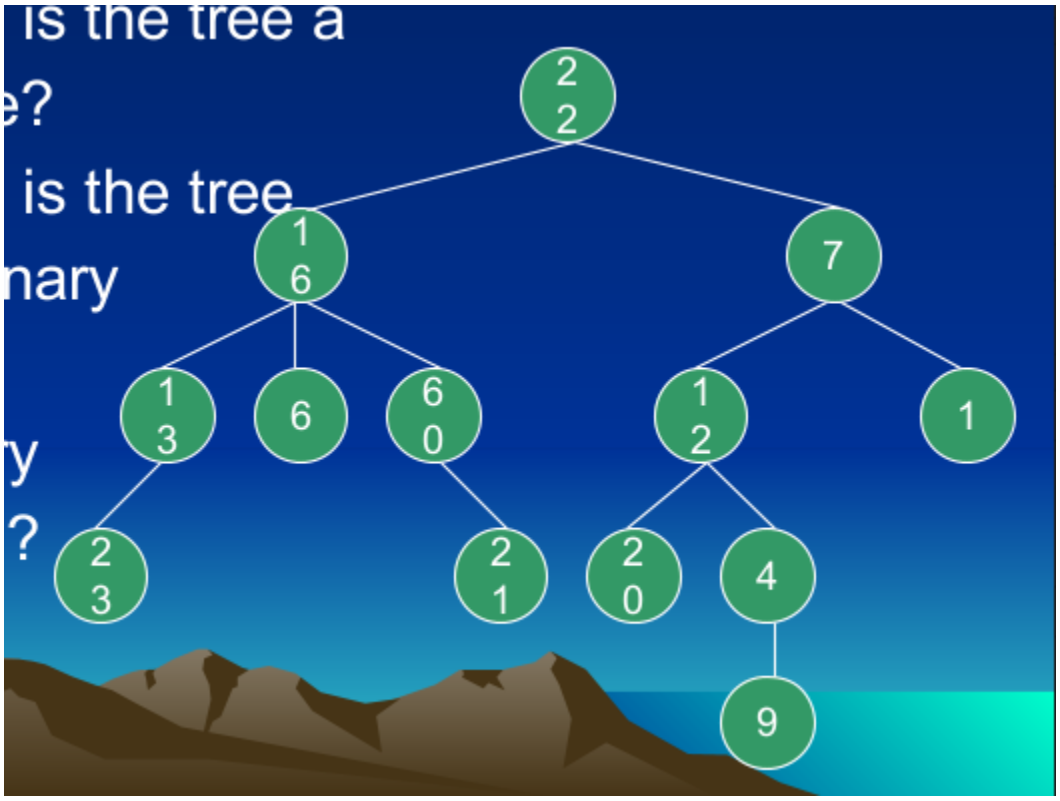
9. Ancestors of 9
    - 4, 12, 7, 22
10. Descendants of 16
    - 13, 6, 60
11. Leaves
    - 1, 23, 21, 9, 6, 20
12. Non-leaves
    - 22, 16, 7, 13, 60, 12, 4

Given the tree, identify the following:

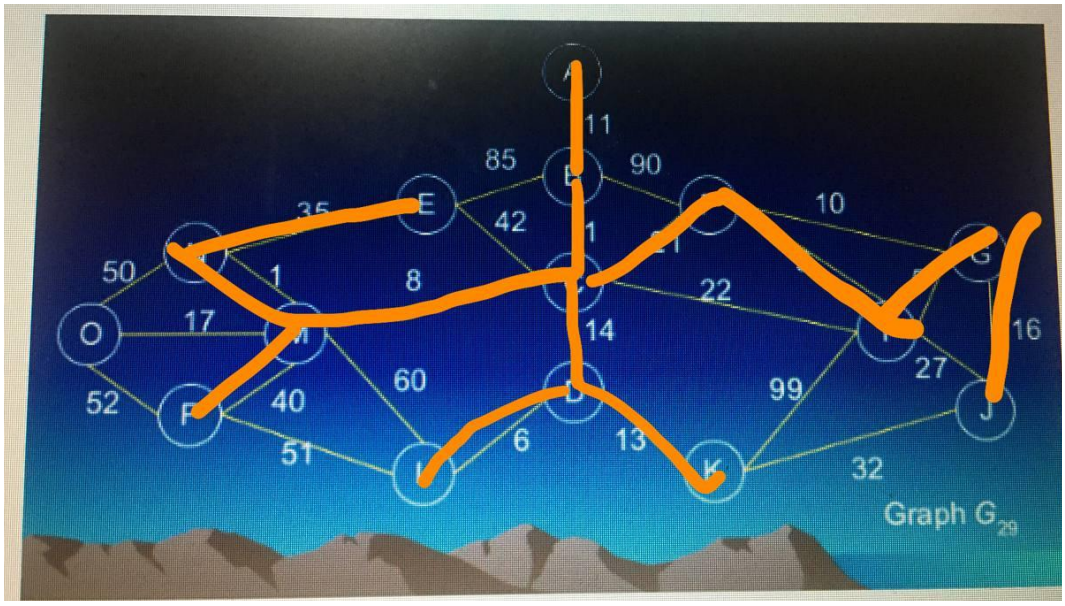


13. Depth of node 4
    - Depth 3
14. Degree of the tree
    - Degree 3
15. Height of the tree
    - Height 4
16. Weight of the tree
    - 6
17. Is the tree a binary tree?
    - No

Given the tree, identify the following:



18. Removing 6, is the tree a full binary tree?
    - No
19. Removing 6, is the tree a complete binary tree?
    - No
20. Is a full binary tree complete?
    - No
21. Is a complete binary tree full?
    - Yes
22. How many leaves does a complete n-ary tree of height h have?
    - n^h
23. What is the height of a complete n-ary tree with m leaves?
    - $log_n m$
24. What is the number of internal nodes of a complete n-ary tree of height h?
    - $1 + n + n^2 + \ldots + n^{h-1} = \sum_{i=0}^{h-1} = \frac{n^h - 1}{n-1}$
25. What is the total number of nodes a complete n-ary tree of height h have?
    - $n^h - 1$



Kruskal

Edge(b,c) w(b,c)=1
Edge (m,n) w(m,n) = 1
Edge (g,i) w(g,i) = 5
Edge (d,l) w(d,l) = 6
Edge c,m) w(c,m) = 8
Edge (f,i) w(f,i) = 9
Edge (f,g) w(f,g) = 10
Edge (a,b) w(a,b) = 11
Edge (d,k) w(d,k) = 13

Edge (c,d) w(c,d) = 14
Edge (g,j) w(g,j) = 16
Edge (m,o) w(m,o) = 17
Edge (c,f) w(c,f) = 21
Edge (c,i) w(c,i) = 22
Edge (i,j) w(i,j) = 27
Edge (j,k) w(j,k) = 32
Edge (e,n) w(e,n) = 35
Edge (m,p) w(m,p) = 40

Edge (c,e) w(c,e) = 42
Edge (n,o) w(n,o) = 50
Edge (l,p) w(l,p) = 51
Edge (o,p) w(o,p) = 52
Edge (l,m) w(l,m) = 60
Edge (b,e) w(b,e) = 85
Edge (b,f) w(b,f) = 90
Edge (i,k) w(i,k) = 99

Total: 197

Prim's

Edge(b,c) w(b,c)=1
Edge (m,n) w(m,n) = 1
Edge (g,i) w(g,i) = 5
Edge (d,l) w(d,l) = 6
Edge (c,m) w(c,m) = 8
Edge (f,i) w(f,i) = 9
Edge (a,b) w(a,b) = 11
Edge (d,k) w(d,k) = 13
Edge (c,d) w(c,d) = 14

Edge (g,j) w(g,j) = 16
Edge (m,o) w(m,o) = 17
Edge (c,f) w(c,f) = 21
Edge (e,n) w(e,n) = 35
Edge (m,p) w(m,p) = 40

Total: 197