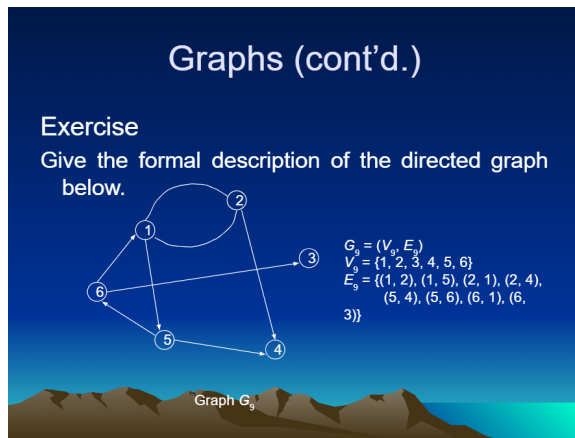


NAME: PAGLINAWAN, KING JOHN ADAMZ R.
 COURSE & SECTION: BSCPE 2-1

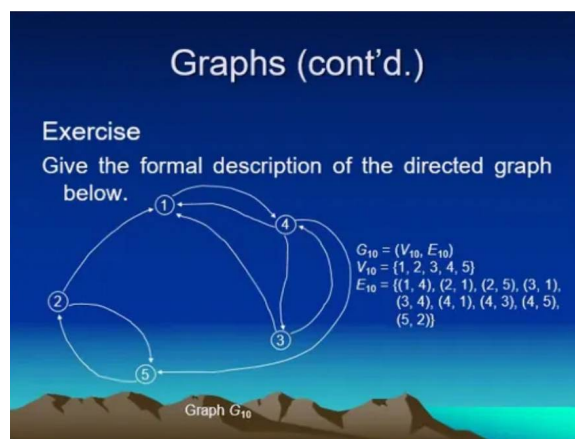
DATE: JANUARY 11, 2023

Final term exercises and activities



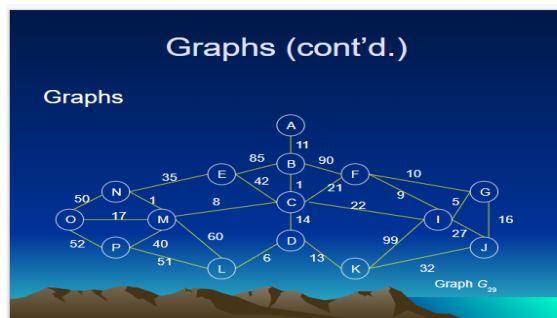
$G_9 = (V_9, E_9)$
 $V_9 = \{1, 2, 3, 4, 5, 6\}$
 $E_9 = \{(1, 2), (1, 5), (2, 1), (2, 4), (3, 1), (3, 5), (4, 2), (4, 3), (5, 4), (5, 6), (6, 1), (6, 3)\}$

| INDEGREE | OUTDEGREE |
|----------|-----------|
| 1 is 2 | 1 is 2 |
| 2 is 1 | 2 is 2 |
| 3 is 1 | 3 is 0 |
| 4 is 2 | 4 is 0 |
| 5 is 1 | 5 is 2 |
| 6 is 1 | 6 is 2 |



$G_{10} = (V_{10}, E_{10})$
 $V_{10} = \{1, 2, 3, 4, 5\}$
 $E_{10} = \{(1, 2), (1, 3), (1, 4), (2, 1), (2, 5), (3, 1), (3, 4), (4, 1), (4, 3), (4, 5), (5, 2)\}$

| INDEGREE | OUTDEGREE |
|----------|-----------|
| 1 is 3 | 1 is 1 |
| 2 is 1 | 2 is 2 |
| 3 is 1 | 3 is 2 |
| 4 is 2 | 4 is 3 |
| 5 is 2 | 5 is 1 |



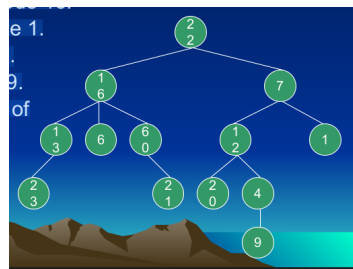
| KRUSKAL | PRIM'S |
|--|--|
| $W(B,C)= 1$ $W(M,N)=1$ $W(G,I)= 5$ $W(D,L)= 6$ $W(C,M)=8$ $W(F,I)= 9$ $W(A,B)=11$ $W(D,K)=13$ $W(C,D)=14$ $W(G,J)=16$ $W(M,O)=17$ $W(C,F)=21$ $W(E,N)=35$ $W(M,P)=40$ | $W(A,B)=11$ $W(B,C)= 1$ $W(C,M)=8$ $W(M,N)=1$ $W(C,D)=14$ $W(D,L)= 6$ $W(D,K)=13$ $W(M,O)=17$ $W(C,F)=21$ $W(F,I)= 9$ $W(G,I)= 5$ $W(G,J)=16$ $W(E,N)=35$ $W(M,P)=40$ |
| TOTAL:197 | TOTAL:197 |

Exercises on Trees

1. Name the three properties of a tree.
2. Is a tree a forest?
3. What do you call the special designated node in a tree?
4. What is the minimum number of nodes in a tree?
5. Can a tree have no subtrees at all?

Given the tree to the right, identify the ff.:

6. Children of node 16.
7. Parent of node 1.
8. Siblings of 23.
9. Ancestors of 9.
10. Descendants of 16.
11. Leaves.
12. Non-leaves.
13. Depth of node 4.
14. Degree of the tree.
15. Height of the tree.
16. Weight of the tree.
17. Is the tree a binary tree?
18. Removing 6, is the tree a full binary tree?
19. Removing 6, is the tree a complete binary tree?
20. Is a full binary tree complete?
21. Is a complete binary tree full?
22. How many leaves does a complete n-ary tree of height h have?
23. What is the height of a complete n-ary tree with m leaves?
24. What is the number of internal nodes of a complete n-ary tree of height h?
25. What is the total number of nodes a complete n-ary tree of height h have?



Answers:

1.
 - Free Tree/Tree (for short)-A connected, acyclic (no cycle), undirected graph.
 - A tree is, therefore, a forest, but a forest is not a tree because it is not connected.
 - A tree must contain at least 1 node or the root node. And tree can have no subtrees at all.
2. YES
3. ROOTS
4. 1
5. YES
6. NODES 13, 6 AND 60
7. NODE 7
8. NONE
9. 4,12,7,22
10. 13,6,60,23,21
11. 23,21,20,9,1
12. 13,16,60,12,4,7,22
13. 3 DEPTH
14. 3 DEGREE
15. 4 HEIGHT
16. 6 LEAVES
17. NO
18. NO
19. NO
20. NO
21. YES
22. n^h
23. $\log_n m$
24. $\frac{n^h - 1}{n - 1}$
25. $n^h - 1$