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BSCPE 2-2

CPEN65 Data Structures and Algorithm
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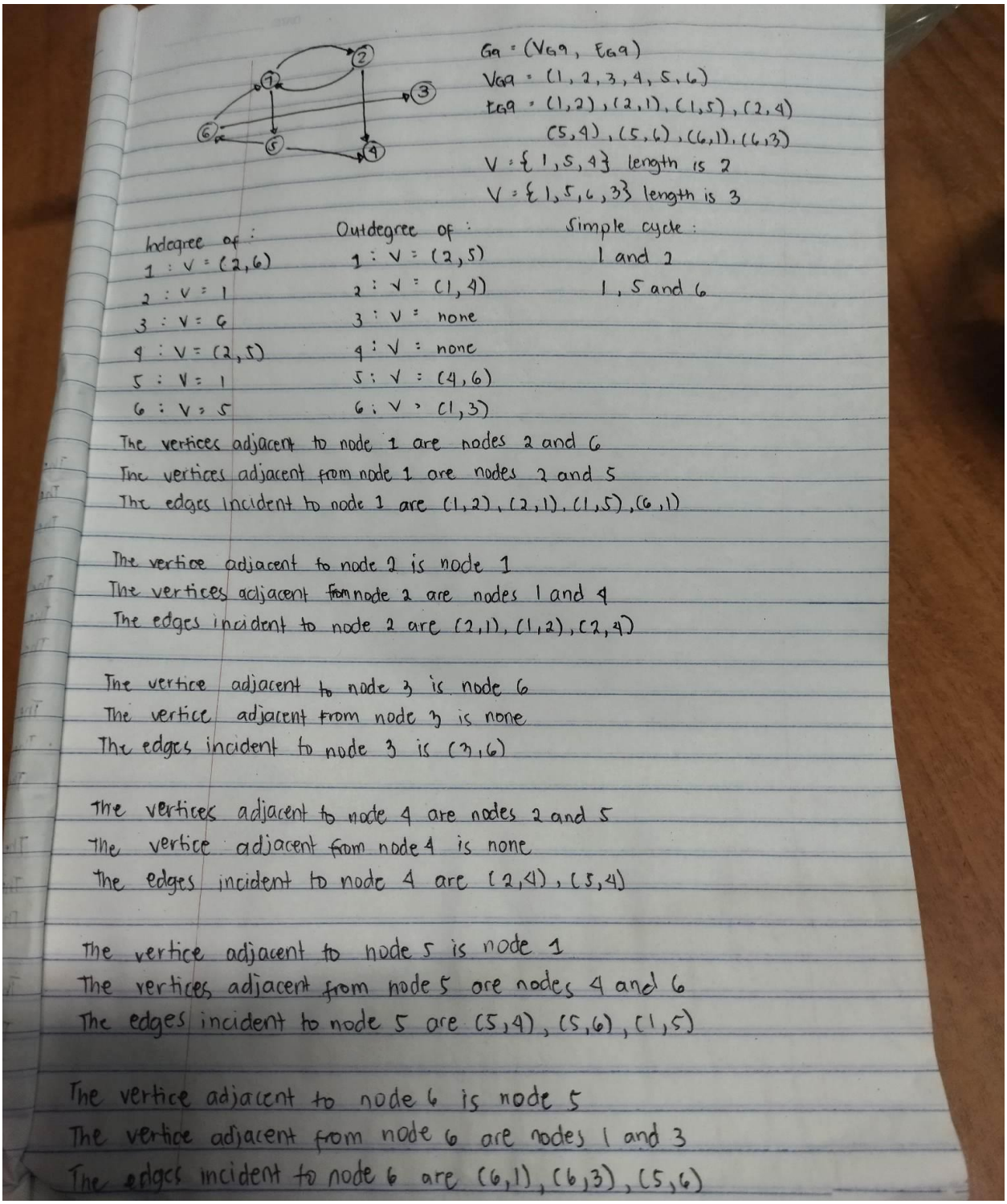
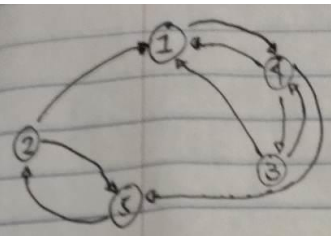
Activity on Graphs





$G_{10} = (V_{G10}, E_{G10})$

$V_{G10} = (1, 2, 3, 4, 5)$

$E_{G10} = (1,4), (2,1), (2,5), (3,1), (3,4)$
$(4,1), (4,3), (4,5), (5,2)$

Indegree of:
1 : V = (2, 3, 4)
2 : V = 5
3 : V = 4
4 : V = (1, 3)
5 : V = (2, 4)

Outdegree of:
1 : V = 4
2 : V = (1, 5)
3 : V = (1, 4)
4 : V = (1, 3, 5)
5 : V = 2

Simple cycle:
1, 4, and 3
1, 4, 5, and 2
2 and 5

The vertices adjacent to node 1 are nodes 2, 3, 4
The vertices adjacent from node 1 is node 4
The edges incident to node 1 are (1,4), (4,1), (3,1), (2,1)

The vertices adjacent to node 2 is 5
The vertices adjacent from node 2 are nodes 1 and 5
The edges incident to node 2 are (2,1), (2,5), (5,2)

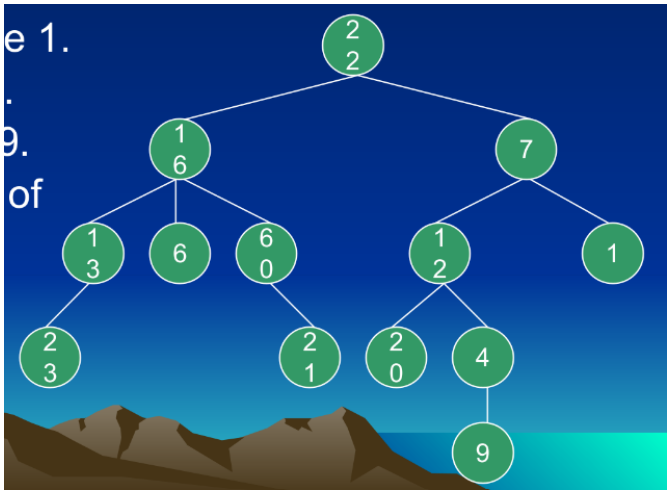
The vertices adjacent to node 3 is node 4
The vertices adjacent from node 3 are nodes 1 and 4
The edges incident to node 3 are (3,1), (3,4), (4,3)

The vertices adjacent to node 4 are nodes 1 and 3
The vertices adjacent from node 4 are nodes 1, 3, 5
The edges incident to node 4 are (1,4), (4,1), (4,3), (3,4), (4,5)

The vertices adjacent to node 5 are nodes 2 and 4
The vertices adjacent from node 5 is node 2
The edges incident to node 5 are (5,2), (2,5), (4,5)

Short Quiz on Trees (cont'd.)

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



6. Children of node 16.

- nodes 13, 6, 60

7. Parent of node 1.

- 7

8. Siblings of 23.

- none

9. Ancestors of 9.

- nodes 22, 7, 12, 4

10. Descendants of 16.

- nodes 13, 6, 60

11. Leaves.

- nodes 23, 6, 21, 20, 9, 1

12. Non-leaves.

- nodes 22, 16, 7, 13, 60, 12, 4

13. Depth of node 4.

- node 4 has depth 3

14. Degree of the tree.

- this tree has degree 3

15. Height of the tree.

- this tree has height 4

16. Weight of the tree.

- the weight of this tree is 6

17. Is the tree a binary tree?

- No

18. Removing 6, is the tree a full binary tree?

- Yes

19. Removing 6, is the tree a complete binary tree?

- Yes

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?

k=3, h=4
k^h = 3^4 = 81

23. What is the height of a complete n-ary tree with m leaves?

(logm^n) = log 3^6 = 1.6309

24. What is the number of internal nodes of a complete n-ary tree of height h?

k^h – 1/ k-1 = 3^4-1 / 3-1 = 40

25. What is the total number of nodes a complete n-ary tree of height h have?

[(k^(h+1))-1]/(h-1)

[(3^(4+1))-1]/(4-1) = 80.67 or 81