

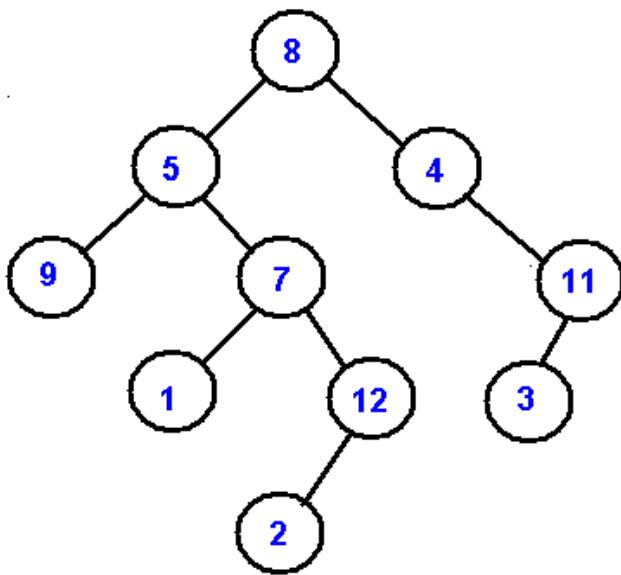
CP 213: DATA STRUCTURES AND ALGORITHMS ANALYSIS**TEST 1 (15 Marks)****Time: 25 Minutes****Date: _____****Instructions: Attempt ALL questions provided.****Question One**Study Figure 1 and Figure 2 the answer the questions that follows. **(1 Mark Each)**

Figure 1: Tree Data Structure

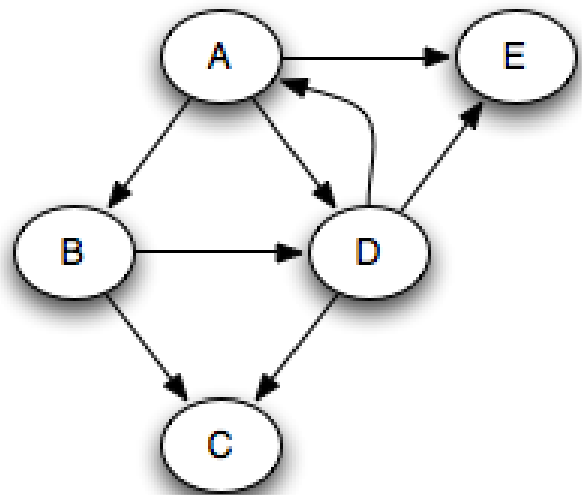


Figure 2: Graph Data Structure

Hint: Start at A

- a. Regarding Figure 1, state the output of the following tree traversal algorithm:
 - i. Level order traversal _____
 - ii. Inorder traversal _____
 - iii. Postorder traversal _____
 - iv. Preorder traversal _____
- b. Regarding Figure 2, state the output of the following graph traversal algorithm:
 - i. Depth First Search (DFS) _____
 - ii. Breadth First Search (BFS) _____
- c. State the programming concept that is used in the graph traversal applied in (b):
 - i. BFS _____
 - ii. DFS _____

Question Two

Fifteen notorious thieves, having just pulled off a massive heist, are forced to flee through a single narrow, one-way underground maintenance tunnel — a long, cramped, dead-end passage deep beneath the maximum-security prison walls, originally built for emergency repairs but now their only path to temporary safety outside the perimeter. Each thief is identified by three fixed attributes: their Convict Number, full alias/name, and gang/crew affiliation.

The group is led by “Ironfist” Rocco (Convict No. 101) of the Steel Vipers syndicate. As he crawls in first, he pushes all the way to the far sealed end to make room. Every thief who follows does the same — the second ends up second-from-the-back, the third third-from-the-back, and so on — until the final man to squeeze in, “Ghost” Malik of the Shadow Jackals, stays nearest the entrance hatch they breached.

If the lookout will signal that the pursuing guards are closing in and it's time to bolt, the thieves will begin crawling back out; otherwise, they proceed escaping. The tunnel is far too tight for anyone to overtake or squeeze past another.

In case the lookout will signal, “Ghost” Malik — who had been at the front during the initial breach — now leads the escaping line. The Shadow Jackals head the formation, while the crew's original leader, “Ironfist” Rocco of the Steel Vipers, brings up the rear. Throughout the entire tense maneuver, every thief's Convict Number, alias/name, and gang affiliation stay inseparably tied to them.

Write a program that displays the order that the thieves exited from the tunnel imagining that the thieves.

(3.5 Marks Each)

a. Managed flee the prison

b. Failed to flee from the prison

Name: _____ **Reg Number:** _____

Scores:

Name: _____ **Reg Number:** _____

Scores: