Course: Data Structures (CSE CS203A, 114-1)
Take-Home Quiz IV: Tree/Heap/Graph

Due: December 16, 2025, 17:00 (Room R1102)
Important Notice: You must print this take-home quiz sand **write your answers by hand with a pen**.

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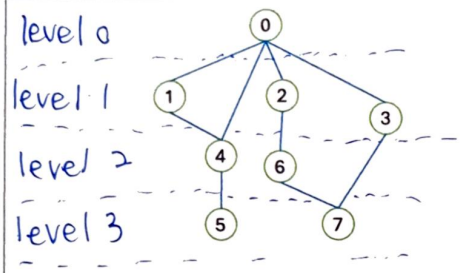
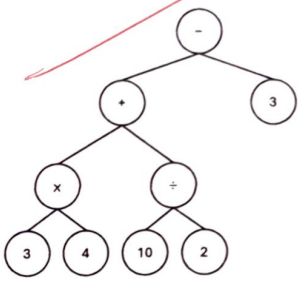
Q1 Figure	Q2 Figure
	

Q1. (30 pts) Explain Breadth-First Search (BFS) on the graph and provide the BFS traversal order for the graph shown in Q1 Figure.

A1:

Quene (FIFO) . level-by-level .

0 → 1 → 2 → 3 → 4 → 6 → 7 → 5

Q2. (30 pts) In tree traversal, one common method is inorder traversal. Please use inorder traversal to print the arithmetic expression represented by the expression tree in Q2 Figure, and then evaluate it to compute the final result.

A2:

Inorder traversal ⇒ from left to parent (middle) to right

3 × 4 + 10 ÷ 2 − 3

= 12 + 5 − 3

= 14 #

Q3. (40 pts) A binary tree is a fascinating data structure with many variations, including binary search trees, AVL trees, red-black trees, complete binary trees, and max/min heaps. These variations can be classified as shape-based (structural constraints) or criteria-based (rules such as ordering). Choose one shape-based tree and one criteria-based tree, and provide a brief description of each.

A3:

shape-based tree :

Complete Binary Tree

Every level except the last is completely filled, and all nodes in the last level are filled from left to right.

criteria-based tree :

Max Heap

A complete binary tree which the value of each node is greater or equal to the values of its children (Parent ≥ Children)

complete shape

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