Assignment 6

This assignment contains four parts, A through D. Each part is worth 10 points. Complete all parts to receive full credit. Submit your completed assignment in PDF format by the due date.

Part A

Problem 1

(a) State the definition of a balanced tree. (b) Describe how a balanced tree is maintained in an insertion operation.

Problem 2

(a) Describe the structure and operation of a B-tree. (b) Explain how a B-tree supports efficient search, insert, and delete operations.

Part B

Problem 3

(a) Explain the concept of a red-black tree. (b) Describe the properties of a red-black tree.

Problem 4

(a) Discuss the importance of maintaining a balanced tree. (b) Explain how a red-black tree achieves balance.

Part C

Problem 5

(a) State the definition of a binary search tree. (b) Describe how to implement a binary search tree using a linked list.

Problem 6

(a) Explain the concept of a heap. (b) Describe how a heap is used in priority queues.

Part D

Problem 7

(a) State the definition of a graph. (b) Describe the different types of graphs and their characteristics.

Problem 8

(a) Explain the concept of a directed graph. (b) Describe how to determine if a graph is strongly connected.

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Thank you.