2ND ROUND SET-A

Using AI to answer the questions will result in disqualification.

Question number -1

Given an AVL tree storing numeric values, design an algorithm to efficiently return the sum of all values within a given range [L, R].
Follow-up: How would your approach scale if each tree update must propagate features for downstream ML models?

Question number -2

Suppose you must store and retrieve large model weight files distributed across a database. Explain how a B-Tree supports fast search and insert operations at scale.
Follow-up: How does this apply to feature vector lookups in recommender systems?

Question number -3

Outline an algorithm for finding a minimum spanning tree (MST) in a distributed system.
Follow-up: In what real-world ML scenario would you use MSTs (e.g., sensor network feature selection)?

Question number -4

For a tree- or graph-based feature index in a memory-constrained environment, compare slab allocation vs. garbage collection as memory management strategies.
Follow-up: Which option better supports predictable latency for online serving in ML systems?