Discrete Mathematics (BCSC 1010)

Assignment-3

Poset and Lattices

Q1. Imagine you have a set of integers, and the relation "less than or equal to" ($\leq$) defines the partial order on this set. Is this a poset? Explain.

Q2. In a project management context, consider a set of tasks with the relation "task A can be started before task B" as the partial order. Explain whether this forms a poset.

Q3. Consider a set of all subsets of a given set S, and the relation "subset A is a subset of or equal to subset B" defines the partial order. Is this a lattice? Why or why not?

Q4. In a company, the hierarchy of job positions forms a poset, where higher-level positions are "greater" than lower-level ones. Is this poset totally ordered, partially ordered, or neither? Explain.

Q5. In a Boolean algebra, you have the set {0, 1} with the operations of AND, OR, and NOT. Determine if this forms a lattice.

Q6. Let R be the relation on the set of people such that xRy if x and y are people and x is older than y. Show that R is not a partial ordering.

Q7. Draw the Hasse diagram representing the partial ordering {(a, b) |a divides b} on {1, 2, 3, 4, 6, 8, 12}.