

COL202 Quiz 3

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TOTAL POINTS

5 / 5

QUESTION 1

1 Problem 1 5 / 5

! + 1 pts ****Correct base case:** True for $|X| = 1$ as the graph has only one element.**

! + 1 pts ****Correct induction hypothesis:** Every poset of size n has a topological sorting.**

****Correct inductive step:** Using maximal/minimal element to go from poset of size $n+1$ to n .**

£ + 1 pts Arguing that the maximal/minimal element will be present as the poset is finite.

£ + 2 pts Removing the maximal/minimal element from the poset of size $n+1$ to move to the inductive hypothesis defined for a poset of size n .

****Correct inductive step:** Go from a poset of size n to a poset of size $n+1$.**

! + 1 pts **Proving that the new set is still a poset.**

! + 2 pts **Proving $P(n+1)$ is true.**

£ + 1 pts ****Partially correct inductive step:****
Going from a poset of size n to one of size $n+1$ does not generalise for an arbitrary poset of size $n+1$.

£ - 0.75 pts Not following the guidelines of writing an induction proof or proofs in general.

****Proof by Induction****

1. State that the proof uses induction on $|X|$.
2. Define an appropriate predicate P .
3. Prove that $P(0)$ is true. This is called the base case
4. Prove that $P(n)$ implies $P(n+1)$ for every non-negative integer n . This is called the inductive step.
5. Invoke induction.

£ + 0 pts Incorrect or no solution

