Qiyao Zhou

Z5379852

Question 3

3.1:

When n=3, X has edges between (1,2) and (1,3), Y has edges between (1,2) and (2,3).
At this point the topological ordering of X is (1, 2, 3) or (1, 3, 2) and the topological ordering of Y is (1, 2, 3), both having the same -topological ordering (1, 2, 3).So X and Y are non-trivial.

3.2:

From the question, it is clear that both X and Y are directed acyclic graphs, and the topological ordering of the graph can be solved using a greedy algorithm as follows.
1. Select the point from X with an entry of 0 and output it
2. Determine if the entry degree of the point in Y is 0. If it is 0, delete the point and all edges starting from the point from X and Y. If it is not 0, the required topological sequence does not exist and the algorithm terminates.
3. Repeat the first two operations until X is empty and the output is the requested topological sequence.
The total time complexity is O(V+E) = O(n^2)