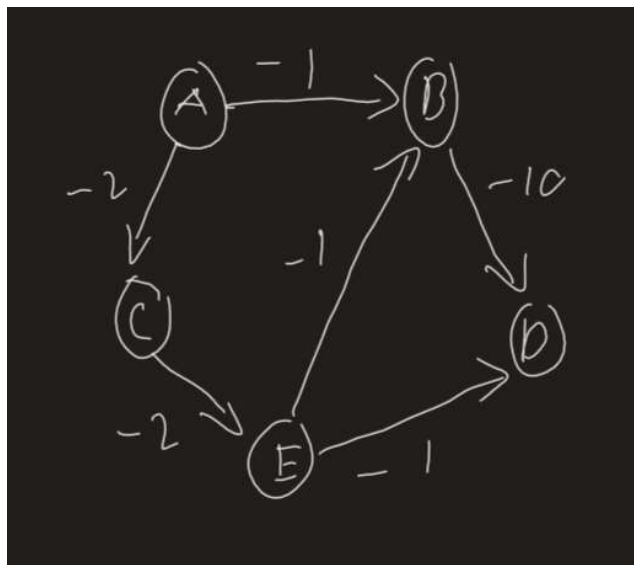Jonathan Koning

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HW 5

2) Suppose that the only negative edges are those that leave the starting node s. Does Dijkstra's algorithm find the shortest path from s to every other node in this case? Justify your answer carefully.

No, Dijkstra's algorithm does not work with only negative numbers because a node is removed from the heap when all input the smallest distance is found to it. The algorithm assumes that the distances will increase and therefore will not consider that a value will get smaller. Consider the following example:

The algorithm will remove B before it checks the distance from B to D because the distance from ACED is just as long as the distance from ACEB. The algorithm will assume that the distance from B to D will only increase the total and will therefore remove B from contention.