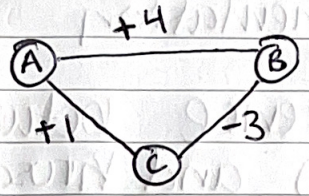
CS325 Homework 6

1. BFS: A, B, D, G, F, C, E

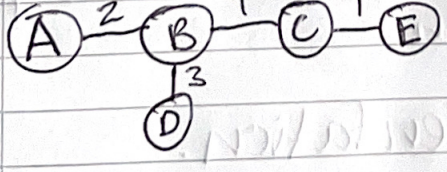
   DFS: A, B, G, F, C, E, D
   OR
   A, B, F, C, E, D, G

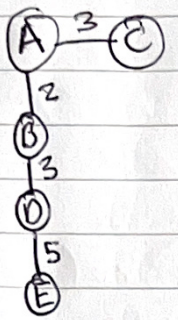
2. Sample Graph:



Using Dijkstras Alg. w/ negative weights is not possible because Dijstras Alg. is supposed to exhaust all possibilities to find the shortest path. In the sample graph we can see that A→C = 1, A→B = 4, C→B = -3, but in the end we fail to come across A→C→B = -2, where A→B then = -2, the algorithm then fails in this sense. Also, when solving real world problems, such as the maps application from the exploration, we see that negative values wouldn't even be applicable to distances.

3. a MST: min: 7



b. 

value of weights: 13

4 a. Code Implementation

b. The difference between Prims Algorithm (PA) and Krosgals Algorithm (KA) is that PA starts at any vertex whereas KA starts w/ minimum weighted edge. PA ~~era~~ goes over ~~nodes~~ vetecices multiple times where KA goes just once over each, because of this and their starting points PA only works on connected graphs and KA can generate a forest if needed.

5. a. The programming algorithm that would solve this problem woold be a DP algorithm that implements Dijkstra's algorithm to perform a mode of BFS. There would be an element of back-tracking, sey hitting a barrier or solution longer than already calculated solution.

b. code implementation.

c. This implementation would be $O(M \cdot N)$ for any maze $M \times N$.

↳ Overall : $\boxed{O(n)}$