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Problem 1

Points:

work with Zimeng Liu

"I did not consult anyone except my group members".

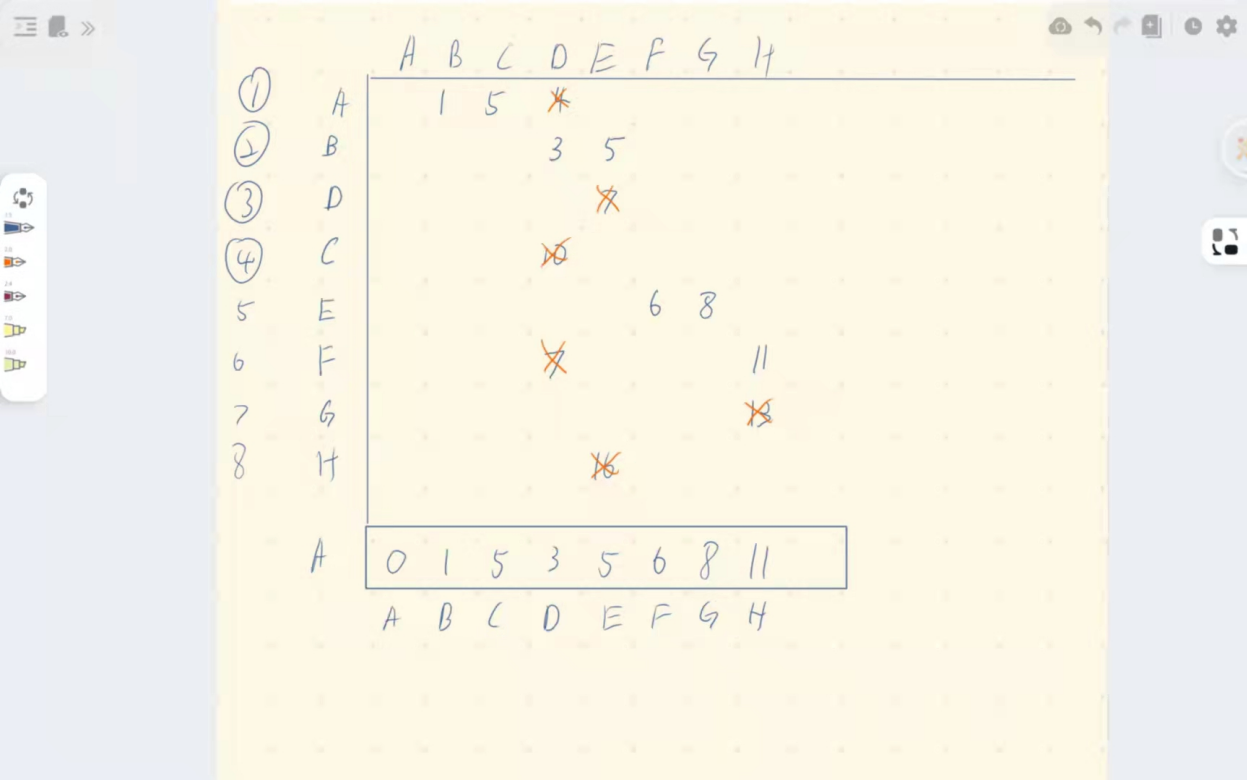
non-class material:

https://www.youtube.com/watch?v=$_lHSawdgXpI$

https://stackoverflow.com/questions/13159337/why-doesnt-dijkstras-algorithm-work-for-negative-weight-edges

Problem 2

Points:



Problem 3 **Points:**

use the Dijkstra's algorithm with extra conditions, if the bridge limit is under the maximum weight, then we mark a huge number instead of the real length, so we exclude this path.

Problem 4

Points:

1.

since the shortest path from 1 to n and the conditions is to pass the vertex v, we can separate them into two question, first is to find the shortest route from 1 to v and the second is from v to n, and these can be found by D(G, 1, v) and D(G, v, n).

2.

min((D(G, 1, v) + D(G, v, w)+ D(G, w, n)), ((D(G, 1, w) + D(G, w, v)+ D(G, v, n))

Problem 5 **Points:**

Yes, it will work, although the algorithm will close vertex if the algorithm thinks the shortest path has been found, and never explore it again, but since there will not be any negative edge besides the edge leaves the starting point, the algorithm will not be effected.

we still can use Bellman-Ford algorithm to solve shortest path problems with negative edges length