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Recitation: 7

Problem 1

Points:

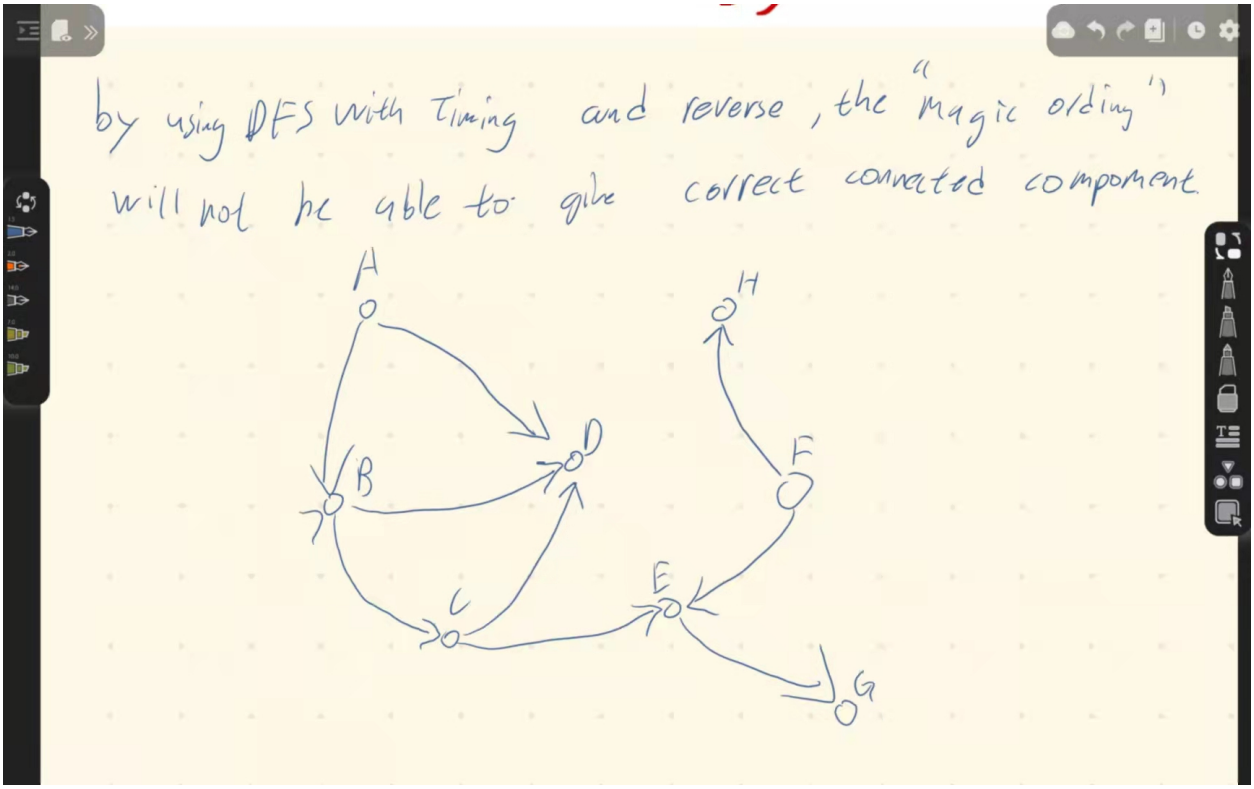
work with Zimeng Liu

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

non-class material: https://www.geeksforgeeks.org/detect-cycle-in-a-graph/

Problem 2

Points:



Problem 3 **Points:**

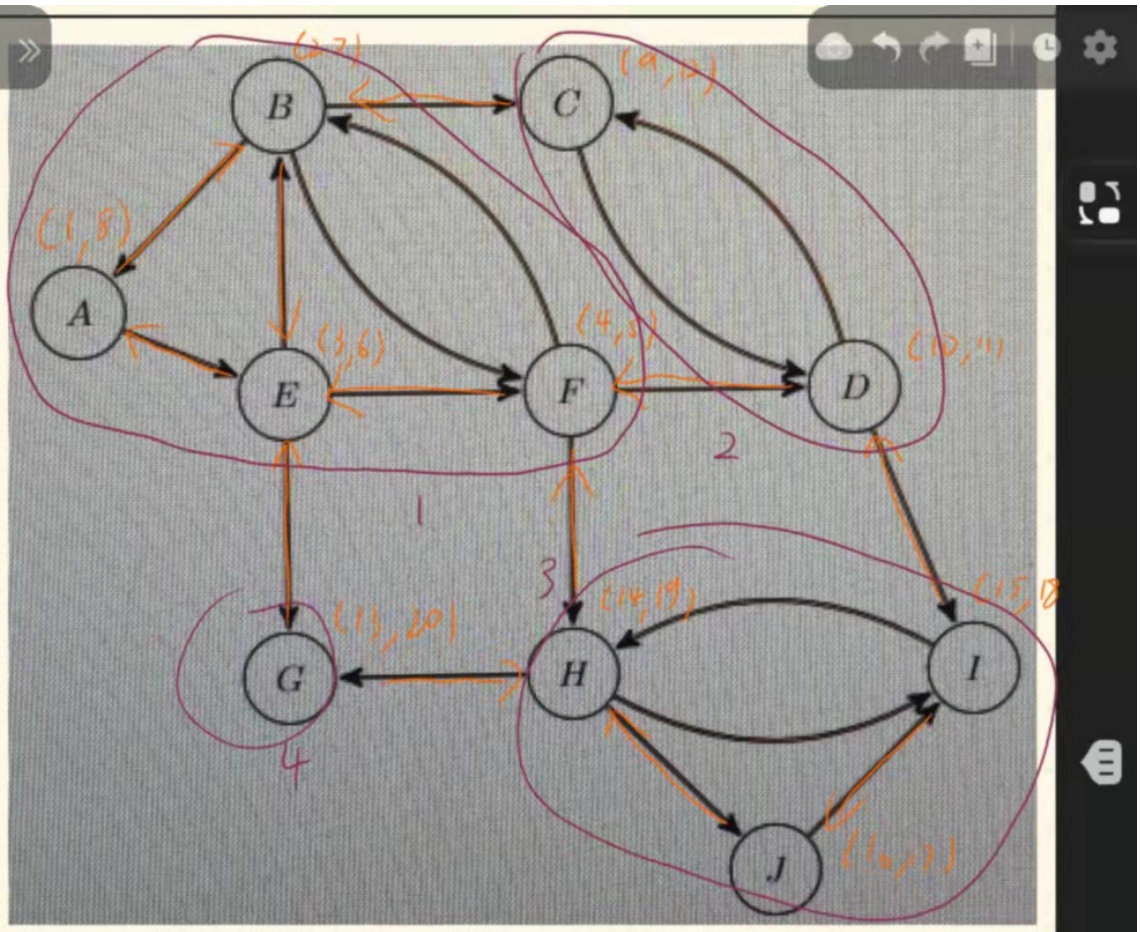
First run the BFS, and set the vertex t as nod, as we start from t, mark every visited nod , as the algorithm goes, mark the following nod as visited and if we found a nod in the edge are not visited, we can know the algorithm have not reached the point and can determin there does not exist the cycle.

Problem 4 **Points:**

First, goes over the graph by using DFS-with-timing, and record the point that have the biggest difference between two timing, and run a BFS to this point, to ensure the point can reach all other points from it.

Problem 5

Points:



① : ABFE
② CD
③ HIJ
④ G

① is source in G^R and sink in G

④ is sink in G and source in G^R

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A (1, 8)

B (2, 7)

C (9, 12)

D (10, 11)

E (3,6)

F (4, 5)

G (13, 20)

H (14, 19)

I (15, 18)

J (16, 17)
```

2.

source connected component1,2,3,4

3.

source connected components 1 is source in G and sink in GR source connected components 4 is sink in G and source in GR

5.

the minimum number is 1