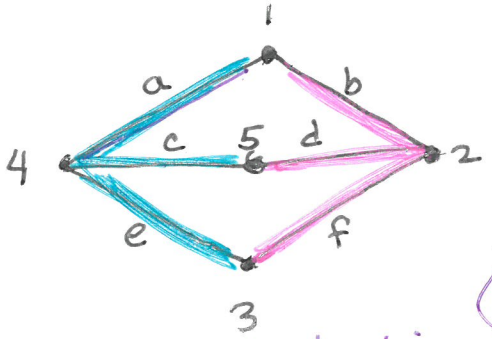


Other proof technique

✓ 4 is adjacent to 3 edges.
only allowed to use 2 (-1)†

✓ 2 is adjacent to 3 edges, only allowed 2 (-1)†

4 = 6 - 2† edges I am allowd to use

I have 5 vertices, only 4 allowed edges
I cant make a Ham. cycle.

* 6 = 6 total edges in the graph

† -2 : 2 cannot be used
(one of ace, one of bdf)

Prove there is no H-cycle

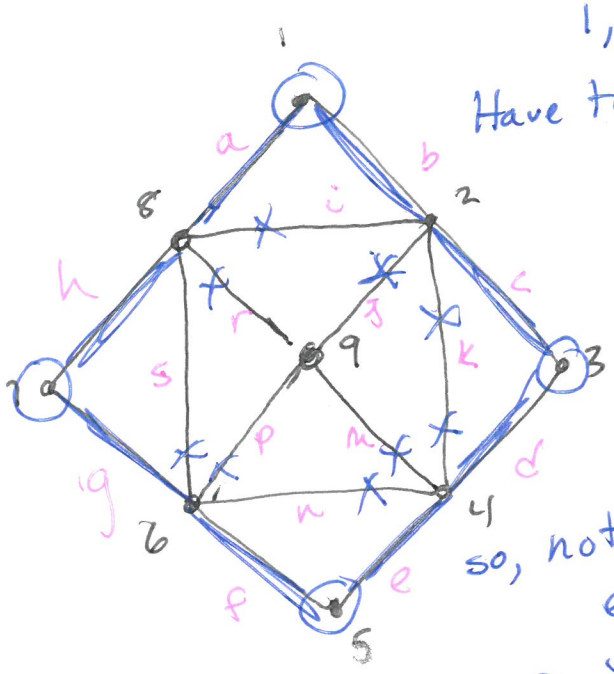
- vert. 1, 5, 3 have to have 2 edges each

SO
Have to use a, b
c, d
e, f

that makes 4 adjacent to 3 edges.
So it cant be a Ham. cycle

A Hamiltonian cycle must have

- each vertex adjacent to 2 edges
- Number of vertices = number of edges in the cycle



1, 3, 5, 7 have deg. 2.

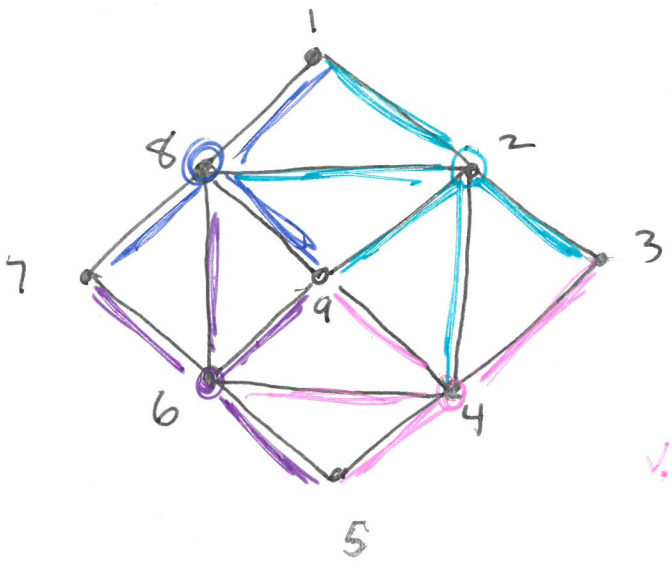
Have to use edges a-h

If I use a-h I can't use any other edges adjacent to 2, 4, 6, 8

so, not allowed any other edges.

Can't get to v. 9

So no Ham. cycle



9 vertices

16 edges

✓ 2 is adjacent to 5 edges. Only use 2

−3

✓ 4 is adj to 4 new edges. only use 2

−2

✓ 8 is adj to 3 new edges. Only use 2

−1

✓ 6 is adj to 4 new edj

Only use 2

−2

Edges we're allowed to use:

$16 - 3 - 2 - 2 - 1 = 8$ edges < 9 vert.

∴ Not enough edges to make a Ham Cycle