

CS 70 Discussion 2B:

tinyurl.com/frank-discussion

6/30/2020

1 (a) Any pair of vertices in a tree are connected by exactly 1 path.

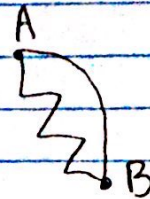
True by definition

A tree is a connected graph having n vertices and $(n-1)$ edges, no cycles, and only one path between every pair of vertices.



(b) Adding an edge between two vertices of a tree creates a new cycle.

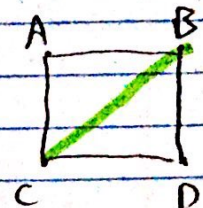
True.



True b/c in a tree there already exists one unique path between every pair of vertices.

(c) Adding an edge in a connected graph creates exactly one new cycle.

False.



1 cycle
↓
3 cycles

5:20

2

L R Prove: If graph is bipartite, then the graph has no tours of odd length.



5 min

5 min

Proof: WLOG we start our tour at a vertex $l_0 \in L$. We take a step along any edge incident to vertex l_0 . Where do I end up now? I am in set R . B/c all edges in a bipartite graph, by definition, go in between sets L and R . So now I am in a vertex $v_1 \in R$. I take a step along any edge incident to v_1 , and then I will be inside set L again. This pattern continues, and in order for me to finish my tour back at $l_0 \in L$, I must have taken an even number of steps whilst traversing edges of the graph.

5:30