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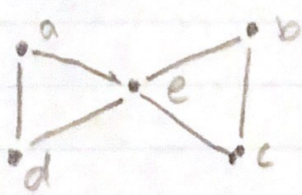
HW 7

1.1. Lets assume this is false. if we have an VBG that is not EBG, we can remove some edge e and destroy the connectedness of the graph. If this were true, then removing either vertex that edge e were connected to would also destroy the connectedness of the graph.

If a graph is vertex biconnected it must also be edge biconnected.

* This would contradict the statement that the graph is vertex biconnected.

1.2. 

This graph is edge biconnected but not vertex biconnected.

Removing any edge would leave the graph connected, but removing vertex e would disconnect the graph. This statement is false.

[redacted]

2.1. worst case number of vertices of $L(G) = E$ $\rightarrow$ $V' = E$ worst case

2.2. worst case degree of a vertex in $L(G) = E-1$.

2.3. assuming we have a vertex adjacency list for G, for each entry E in the adjacency list (ex: 1:2 or 1:4 are entries), take the second number. Look up the adj list for that vertex (so 2:1, 3, 4 or 4: 1, 2, 3). Each of the edges connecting those vertices are adjacent to the original edge going from 1:2. Add those edges to the adjacency list of L(G).

from ex. given:

G) 1: 2, 4
2: 1, 3, 4
3: 2, 4
4: 1, 2, 3

L(G) a: b, e, d
b: a, e, c
c: b, d, e
d: a, c, e
e: a, b, c, d, e

2.4 The worst case run time is $O(v^2)$. This would occur if each vertex is connected by an edge to every other vertex. The less edges the faster the run time.