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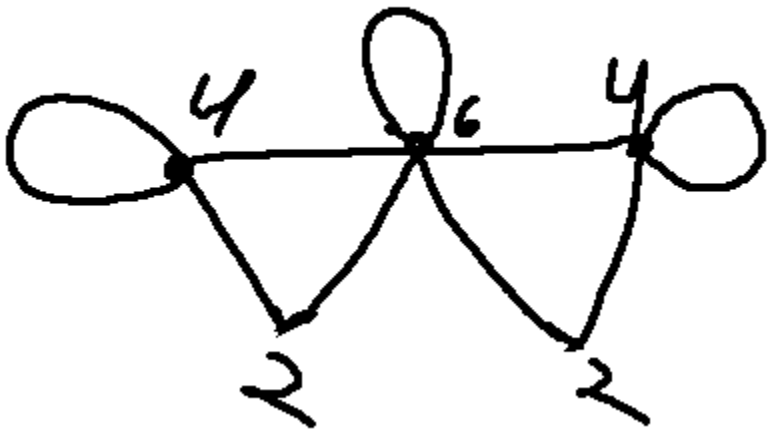
CS-225: Discrete Structures in CS
Homework 9, Part 2
Exercise Set 10.1: Problem #(2, 9.b, 17, 20, 21)

2.
a. Walk
b. Simple circuit
c. Closed walk
d. Circuit
e. Trail
f. Path

9.
b.

Yes.

Graph G has 5 vertices of degrees 2, 2, 4, 4, and 6. If a graph has a Euler circuit, then every vertex of the graph has a positive, even degree by Theorem 10.1.2. Therefore, Graph G has a Euler circuit.



17.

The graph G in this problem does not have a Euler circuit. As stated previously, Graph G with a Euler circuit by definition must have vertices with positive, even degrees.

As seen in the graph below, vertex C and vertex D both have degrees of 3, as they're connected by edge to B, D, and F, in C's case, or A, C, and E in D's case.

Thus, this graph does not contain a Euler circuit.

20.

By the definition of a Euler trail, the trail from v to w must have v and w be of odd degree, with all the vertices having an even degree. The Euler trail in problem 20 from u to w satisfies the first case where the initial and final vertices have odd degrees, but vertices e and h have degrees of 3, which are not even.

Thus, u to w is not a Euler trail.

21.

Graph 21 contains the Euler trail: $u \rightarrow v_0 \rightarrow v_7 \rightarrow v_6 \rightarrow v_3 \rightarrow u \rightarrow v_1 \rightarrow v_2 \rightarrow v_3 \rightarrow v_4 \rightarrow v_6 \rightarrow w \rightarrow v_4 \rightarrow v_5 \rightarrow w$