

CS 271 Homework 9 - Fall 2006

October 25, 2006

Sec 9.1, Solution 24(a) We can have one vertex for each e-mail address, and a directed edge from the sender to each message to the receiver.

Solution 24(b) Just like part (a), except that the graph is built across the span of a week.

Sec 9.1, Solution 32 The vertices of the directed graph represent cities. Whenever there is a nonstop flight from city A to city B, we put a directed edge into the graph from vertex A to vertex B, and label that edge with the flight time. This type of graph is called a weighted directed graph.

Sec 9.2, Solution 8 In this directed multigraph there are 4 vertices and 8 edges. The degrees are $\deg^-(a) = 2$, $\deg^+(a) = 2$, $\deg^-(b) = 3$, $\deg^+(b) = 4$, $\deg^-(c) = 2$, $\deg^+(c) = 1$, $\deg^-(d) = 1$, and $\deg^+ = 1$

Sec 9.2, Solution 24 This graph is bipartite. The two sections are $\{c, f\}$ and $\{a, b, d, e\}$

Sec 9.3, Solution 34 These two graphs are isomorphic, since each is an unbranching path with 5 vertices. One isomorphism is $f(u_1) = v_1, f(u_2) = v_2, f(u_3) = v_4, f(u_4) = v_5, f(u_5) = v_3$

Sec 9.3, Solution 40 These graphs are not isomorphic because the degrees of the vertices are not the same.

Sec 9.4, Solution 2(a) This is a path of length 4, but not a circuit, since it ends at a different vertex from the one it started at. It is simple, because no edge is repeated.

2(b) This is a path of length 4 and it is a circuit. It is not simple, since it uses an edge more than once.

2(c) This is not a path, since there is no edge from d to b .

2(d) This is not a path, since there is no edge from b to d .