CS 624: Analysis of Algorithms

Assignment 7

Due: Monday, March 29, 2021

1. Exercise 22.2-2 (page 601).

2. Exercise 22.2-6 (page 602).

3. Exercise 22.2-7 (page 602).

   I want to give you some advice about this problem, particularly if you are not familiar with some rather silly features of U.S. culture:

   This problem deals with how professional wrestling matches are set up.

   These matches are almost never done honestly—they are staged. And in a typical match, one of the wrestlers is promoted as a "good guy"—here referred to as a "babyface", and the other one is publicized as a "bad guy"—maybe sneaky, dishonest, or in some other way disreputable. In American slang, a "heel" (the same word as the bottom of your foot—not "heal") is sometimes used to refer to a disgusting or dishonest person. It's really somewhat archaic—you hardly hear it anymore.

   The point is that in this problem we just have a set of wrestlers. None of them are really "good" or "bad"—they're just wrestlers. And they are presumably scheduled to fight each other—that is what determines the set of rivalries.

   So we have a graph whose nodes are the wrestlers, and each edge of which specifies a fight that will take place between the two wrestlers that it joins. And certainly a wrestler can participate in more than one match. Further, the graph can't be changed—it's already fixed; the matches and the wrestlers are already determined.

   The question then is this: can the organizers of the wrestling tournaments figure out a way to say that some of these wrestlers are "babyfaces" and the others are "heels" in such a way that every match is between a "babyface" and a "heel"?

   It's a very silly problem, I know. But it is kind of funny. And people who organize "professional" wrestling really do think in these terms.

4. Exercise 22.3-2 (page 610).

5. Exercise 22.3-8 (page 611). The notation $u.d$ in that problem refers to the "discovery time" or (as it is called in my notes) the "start time" for vertex u in the depth-first walk.

6. Exercise 22.3-9 (page 612). (And here, $u.f$ is the "finish time" for node u.)