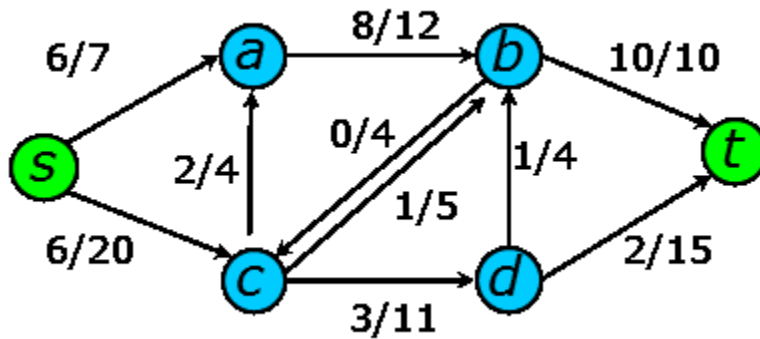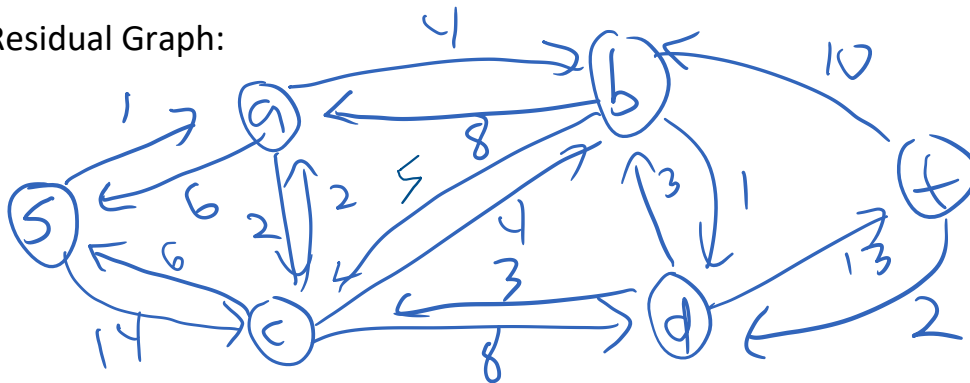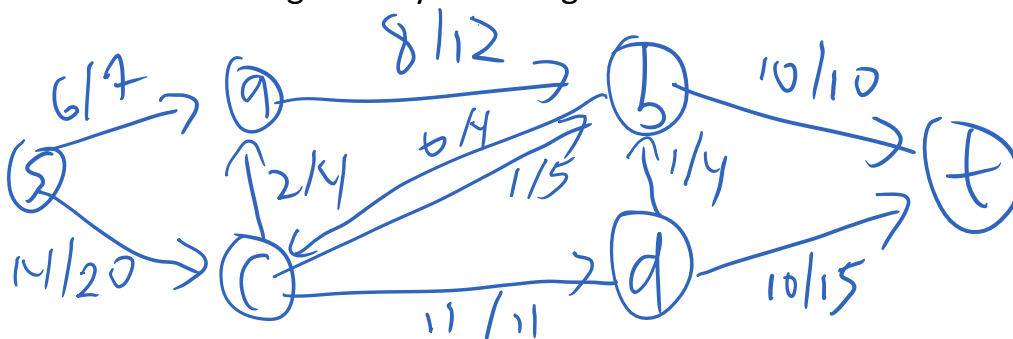## Group Problem Set #8 Solutions

1. Compute the residual network of the graph with the following flow, and then find an augmenting path and apply it to the graph.

Residual Graph:

   If we pick the path S -> C -> D -> T the smallest edge on this path has a value 8 so we can augment by 8.   This gives us:

2. UAA needs a committee to pick the name of a new mascot! Exactly one faculty member must be chosen from each academic department to serve on this committee. Some faculty members are affiliated with multiple departments, but each committee member will represent only one department. For example, if Dr. Mock is affiliated with both the

Department of Overworking Students and the Department of Absurdity, then if he is chosen as the representative for the Department of Overworking Students then someone else must represent the Department of Absurdity.

If there are n faculty members and D departments, describe how max flow could be used to select faculty members from departments to comprise the committee.

The source is linked to each faculty who in turn is linked to each of their departments. The departments link to the sink with a weight of 1, so only one person from each department can be on a committee. In the diagram below, Faculty F_1 is a member of Department D_1 and D_2. But since the flow into F_1 is only 1, he cannot represent two departments in the final selection to the sink, t.