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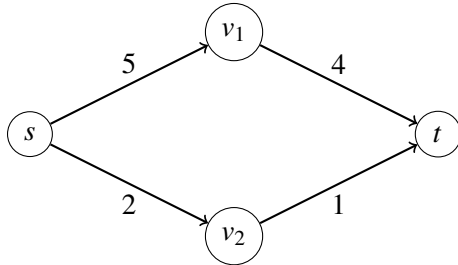**Recitation:** 8

Problem 0   **Points:**

Acknowledgements

(a) I did not work in a group.

(b) I did not consult without anyone my group members.

(c) I did not consult any non-class materials.

Problem 1 **Points:**

The given statement is False. If f is a maximum $s - t$ flow in G, then f need not to saturate every edge out of s with flow.

Counter Example:

Here, the maximum flow on the upper branch will be 4 since the bottleneck capacity for the path $s \Rightarrow v_1 \Rightarrow t$ is 4. The maximum flow on the lower branch will be 1 since the bottleneck capacity for the path $s \Rightarrow v_2 \Rightarrow t$ is 1.

Clearly, both the edges out of s have flow value $f(e) < c_e$ where c_e is the capacity of the edges coming out of node s. Therefore,

$$v(f) = \sum_{e \text{ out of } s} f(e) < \sum_{e \text{ out of } s} c_e = C$$

Problem 2

<div style="border:1px solid black; display:inline-block; padding:4px;">**Points:**</div>

Problem 3

Points: