Decide whether the following statements are true or false. If true, give a short explanation. If false, give a counterexample. Let G be a flow network with a source s, a sink t, and a positive integer capacity c_e on every edge e.

[5 marks] If f is a maximum $s - t$ flow in G then f saturates every edge out of s with flow (that is for all edges e out of s, we have, $f(e) = c_e$).

[2 marks]   FALSE
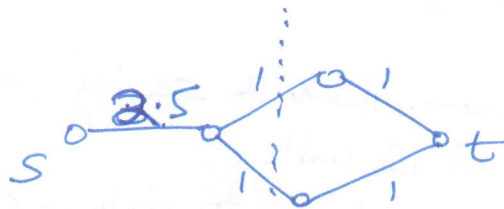
3 marks —   counterexample
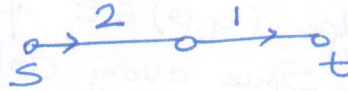
maxflow = 1 does not saturate edge out of s.

[5 marks] Let (A, B) be a minimum $s - t$ cut with respect to these capacities. Suppose we add 1 to every edge capacity. Then (A, B) is still a minimum $s - t$ cut with respect to these new capacities.

2 marks :   FALSE .

3 marks :   COUNTER EXAMPLE

mincut has capacity 2.
After every edge capacity increases by 1, the mincut changes & now has capacity 3.5