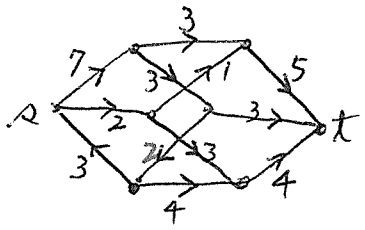
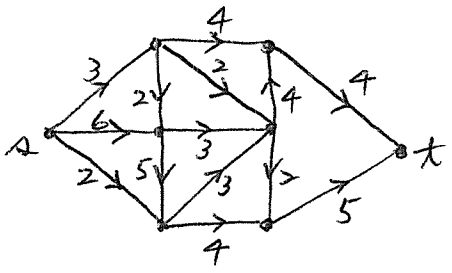
Graph Theory

Exercise B (3 points each) Due Nov. 2 (11:10)

1. Give a proof of the Menger's theorem which is different from the one given in class. If possible, use the idea of max-flow min-cut theorem.
2. Use the max-flow min-cut theorem to prove the Hall's SDR theorem. Also, give a couple of applications in using SDR.
3. Find the maximum flow of the following two networks respectively:



(a)



(b)

4. Prove that, for $k \geq 2$, in a k-connected graph G any k vertices are contained in a cycle of G.
5. Prove or disprove that in any bipartite graph of size 16, there exists an induced subgraph of size 8.
6. (Bonus) Find a C_4-free subgraph of $K_{91,91}$ with as many edges as possible. (Explain your answer.)