You may do this assignment in LATEXor by hand or in a combination of the two. Regardless of how you proceed, make sure it's easy to read.

1. One last problem from DLN, posted on Moodle as "DLN's Firetrucks Problem."

2. Consider the flow network $G = (V, E)$ below, with source s, sink t, and edge capacities $c(u, v)$.
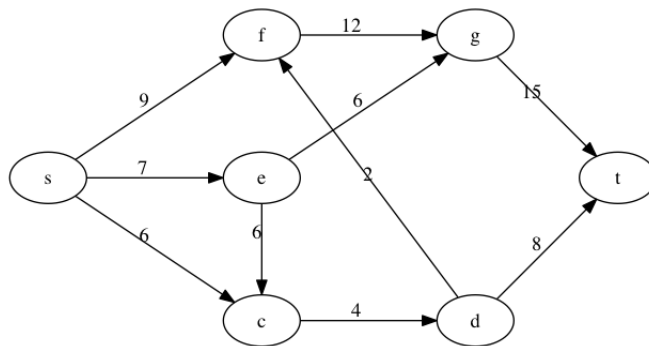
(a) Starting with a flow $f(u, v) = 0 \forall (u, v) \in E$, find an augmenting path. Write down the path as a sequence of nodes and add the path to f. Draw the resulting flow (showing $f(u, v)$ for each edge, and also the total value $\nu(f)$). Also draw the resulting residual graph G_f. Repeat until there are no augmenting paths remaining.

(b) How many distinct cuts does G have?

(c) What is the capacity of the cut $(\{s, c, d, f\}, \{t, e, g\})$?

(d) Identify a minimum-capacity cut (A, B) of G.

(e) The maximum flow value has a relationship to cut capacities. What is this relationship? Which theorem/lemma/corollary in the book articulates the relationship? Are the flow f and cut (A, B) identified in your work above consistent with this relationship? (If not, why not?)