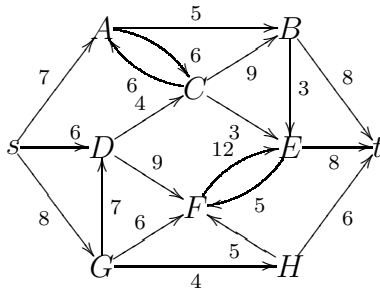


Homework 4

Due: Thursday, May 17

- Let (G, c) be a network with distinguished vertices s and t . A *minimum cut* in G is a pair of sets (X, Y) such that $V = X \cup Y$, $s \in X$, $t \in Y$, $X \cap Y = \emptyset$ and $c(X, Y)$ is minimal. Suppose (X, Y) and (A, B) are minimal cuts. Show that $(X \cup A, Y \cap B)$ is also a minimal cut.
- Find a maximum flow in the network



- Let G be an undirected graph, and let s and t be non-adjacent vertices in G . Show

$$\left(\begin{array}{c} \text{Maximum number of pairwise} \\ \text{vertex disjoint paths from } s \text{ to } t \end{array} \right) = \left(\begin{array}{c} \text{Minimum number of vertices whose} \\ \text{removal separates } s \text{ from } t \end{array} \right)$$
- Let $A_i = \{i - 1, i, i + 1\} \cap \{1, 2, \dots, n\}$, $i = 1, 2, \dots, n$. Let S_n denote the number of SDR's of the collection $\{A_1, A_2, \dots, A_n\}$. Determine S_n and $\lim_{n \rightarrow \infty} S_n^{1/n}$.
- Write a paper proposal for your final paper. That is, give
 - A title,
 - An abstract,
 - A primary source (if applicable).