**MA515 Homework #10**
**Due Wednesday, December 1**

1. Fix positive integer $n$. An $n \times n$ matrix is said to be *doubly stochastic* if all entries are nonnegative, the sum of the entries in every row equals 1, and the sum of the entries in every column equals 1. An $n \times n$ matrix is said to be a *permutation matrix* if every entry is either a zero or a one, and there is exactly one 1 in every row and in every column. Use the existence of basic feasible solutions from linear programming, and total unimodularity to prove the following theorem: Every doubly stochastic matrix is a convex combination of permutation matrices.

2. Exercise (Intersection of three matroid polytopes), p. 106.

3. Problem (Scheduling, continued), p. 108.

4. Exercise (Weighted matching), p. 112.