205B Homework #2, due Tuesday 6 February

Durrett Chapter 6 Exercises 2.7, 2.8, 2.9, 3.10, 3.11, 3.12

1. Give an example to show that, if X_n is a Markov chain and f a function defined on its state space, then $f(X_n)$ need not be a Markov chain.

2. Show that for $K < \infty$ and $a > 0$ there is a constant $C(K, a) < \infty$ such that: in every finite irreducible chain

$$\max_{i,j} \mathbb{E}_i T_j \le C(K, a)$$

where $K =$ number of states and $a = \min\{p(i, j) : p(i, j) > 0\}$.