This assignment is due at the beginning of class on Friday, February 5.

1. Durrett Exercise 5.5.2.
2. Durrett Exercise 5.5.5.
3. Durrett Exercise 5.5.6 ("last result" refers to Exercise 5.5.5).
4. Durrett Exercise 5.5.8 (assume $Y_n$ is a martingale).
5. Let $N$ be a stopping time.
   (a) Prove that $\mathcal{F}_N$ (definition on p.182) is a $\sigma$-field.
   (b) Prove that if $M$ is a stopping time and $M \leq N$ then $\mathcal{F}_M \subset \mathcal{F}_N$. (In particular, taking $M = 0$ gives $\mathcal{F}_0 \subset \mathcal{F}_N$.)
   (c) We flip a sequence of coins and let $N$ be the coin number of the first Head. Determine $\mathcal{F}_N$ explicitly, i.e., list the events that generate it. (See Section 2.1.4 for the probability space.)

The following problems from Durrett are recommended for extra practice but are not to be handed in:
5.5.1,
5.7.1, 5.7.2, 5.7.3, 5.7.4 (change conclusion to $X_n^\theta \to 0$ in probability), 5.7.7, 5.7.8, 5.7.9.