# 5th Exercise sheet Model Theory
# 4 Mar 2015

**Exercise 1** Show that a theory is small exactly if $T$ has countably many completions, each of which is small.

**Exercise 2** Show that all prime models of a nice theory $T$ are isomorphic. Prove also that they are strongly $\omega$-homogeneous.

*Hint:* Use the familiar back-and-forth techniques.

**Exercise 3** Let $T$ be a theory in a countable language without a binary tree of consistent formulas. Show that $T$ is small.

**Exercise 4** Let $T$ be the theory of $(\mathbb{R}, <, Q)$ where $Q$ is a predicate for the rational numbers. Does $T$ have a prime model?

**Exercise 5** (Chocolate bar exercise) Give an example of a complete theory $T$ in an uncountable language which has exactly one countable model but for which not all $S_n(T)$ are finite.