

Formal Learning Theory

Homework 3

(due on Friday, March 1st at 1pm)

February 22nd, 2013

Ex. 1 Consider the class $\mathcal{L} = \{K \cup \{x\} \mid x \notin K\}$.

- (a) Show that \mathcal{L} is effectively learnable.
- (b) Is \mathcal{L} a uniformly recursive family of languages? Is \mathcal{L} a uniformly recursively enumerable family of languages? Please provide a justification (proof is not necessary).

Ex. 2 Consider the class $\mathcal{L} = \{L_i \mid i \in \mathbb{N}\}$, such that for $1 \leq i < j$, $L_i \subset L_j$, and $L_0 = \bigcup_{i \in \mathbb{N}^+} L_i$, where $\mathbb{N}^+ = \mathbb{N} - \{0\}$. Show that \mathcal{L} is not identifiable.

Ex. 3 Consider the learner M defined in the proof of the effective version of Angluin's theorem.

- (a) Is M always consistent? Why/why not?
- (b) Is M always conservative? Why/why not?

Ex. 4 In the handout of Lecture 6 ("Uniformity and Angluin's Theorem") the proof of Proposition 1 is wrong. Provide a correct proof.

Ex. 5 Show that the class of all finite languages is recursively incrementally identifiable. Use recursion over sequences (see Handout of Lecture 3).