Indian Institute of Technology Dharwad

CS 202: Tutorial 2 (January 21, 2022)

1. Show that $\{a^p \mid p \text{ is a prime number}\}$ is not regular, using Pumping Lemma for regular languages.

2. Show that $\{a^p \mid p \text{ is a prime number}\}$ is not regular, using MyHill-Nerode Theorem.

3. Construct a DFA for $L_1 \cap L_2$ when L_1, L_2 defined over Σ are regular languages.

4. Construct a DFA for $L_1 \cup L_2$ when L_1, L_2 defined over Σ are regular languages.

5. Show that $FirstHalves(L)$ is regular, when L is regular.

   For any set of strings L, define the set FirstHalves(L)=$\{x \mid \exists_y |y| = |x| \text{ and } xy \in L\}$. For example, FirstHalves($\{a, ab, bab, bbab\}$)=$\{a, bb\}$.