CS 5000: Theory of Computation

Assignment 4: Showing Languages to be Regular and Non-Regular

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Learning Objectives

1. Pumping Lemma for Regular Languages
2. Proofs by Contradiction
3. Finite State Machines

Problem 1 (5 points)

This assignment has only one problem that has a list of languages. For each language, state if it is regular or not. Sketch a proof of your statement.

1. $L = \{a^n b^n c^n | n \geq 0\}$.
2. $L = \{xx^R | where\ x^R\ is\ the\ reversal\ x\}$, for $\Sigma = \{a\}$.
3. $L = \{xcx^R | where\ x \in \{a, b\}^*\}$.
4. $L = \{a^n c^m b^p | n + m = p\}$.
5. $L = \{0^n 1^m | n \geq m\}$.