

Theory of Computation, CSCI 438 spring 2022
Nonregular Languages, pg. 77-82, Feb. 2

Pumping Lemma is used to show that a given language cannot be regular.

Pumping Lemma (Theorem 1.7, page 78)

If A is an infinite regular language then there exists a p (the pumping length) where any string $s \in A$, where $|s| \geq p$, s can be divided $s=xyz$ where

1. $xy^iz \in A$ for all $i \geq 0$
2. $|y| > 0$ and
3. $|xy| \leq p$

The Pumping Lemma is based on the Pigeonhole Principle.

Pigeonhole Principle:

n boxes, m items and each item must go into a box
if $n < m$ then at least one box must have more than 1 item in it