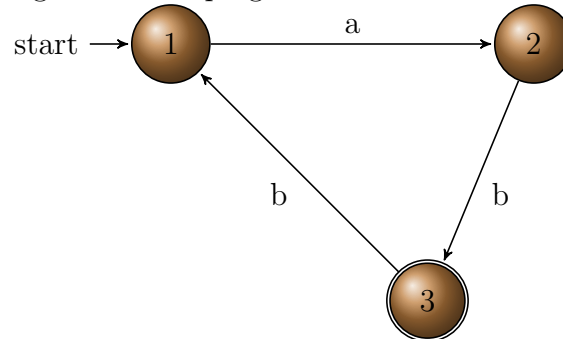


CS375 Week 6

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Figure 1: Pumping Lemma Contradiction



0.1

$$L = \{a^n b^{2n} \mid n \geq 1\} = \{abb, aabbbb, aaabbbbb, \dots\}$$

Proof. For any regular language L , there exists a number p such that for any string w in L of length at least p there are strings x, y, z such that

- $w = xyz$
- $|xy| \leq p$
- $|y| \geq 1$
- Then $x = a^n, y = a^n, z = b^{p+1}$
- $xy^2z \in L$
- This is a contradiction so language is nonregular.

□

0.2

1. Palindromes

- (a) If $w = xyz$.
- (b) And if $x = a, y = b, z = a$.
- (c) or if $x = b, y = a, z = b$.
- (d) Then $w = a^{90+1}ba^{90}$

(e) and $w = b^{90+1}ab^{90}$

(f) Therefore Palindromes are nonregular

2. Equal

(a)

0.3