

Recitation 3

John Chilton

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$\{w \mid w \text{ is not a palindrome}\}$

$$\{wtw \mid w, t \in \{0, 1\}^+\}$$

What are some strings people tried to derive contradictions with?

A Quick Note About Homeworks

- ▶ These problems are hard. On proof problems prepare yourself for spending a lot of time
- ▶ Be sure to understand the problem thoroughly first
 - ▶ What are some examples?
 - ▶ What are some related problems that are easier?
 - ▶ How is this the same and how is this different then the problems you have seen so far?
- ▶ When you see examples in the book, in lecture, in recitation, etc. think about the why not just the mechanics
- ▶ Unclear about a question, ask about it on the forum
- ▶ Not sure if your answer is right, e-mail John
- ▶ Form study groups, share ideas and approaches, NOT answers
- ▶ Start early

$$\Sigma = \{a, b, c, d\}$$

$$A = \{a^k b^l c^m d^n \mid k + l = m + n\}$$

What are some strings in this language, what are the interesting cases?

What are some easier languages that are related? Give CFGs for these languages.

Give a CFG for B .

$$\Sigma = \{a, b, c, d\}$$

$$B = \{a^k b^l c^m d^n \mid k = l + m = n\}$$

What are some strings in this language, what are the interesting cases?

Prove B is not context-free.

Pumping Lemma for context-free languages

- ▶ $s = uvxyz$
- ▶ $|vxy| \leq p$
- ▶ $|vy| > 0$
- ▶ $uv^i xy^i z \in L$

$$\Sigma = \{0, 1, 2\}$$

$$C = \{w \mid w \text{ contains an equal number of 0s, 1s, and 2s}\}$$

Prove C is not context-free.

Pumping Lemma for context-free languages

- ▶ $s = uvxyz$
- ▶ $|vxy| \leq p$
- ▶ $|vy| > 0$
- ▶ $uv^i xy^i z \in L$

$$\Sigma = \{0, 1, \#\}$$

$$D = \{w\#t \mid w \text{ is a substring of } t \}$$

What are some strings in this language, what are the interesting cases?

Prove D is not context-free.

Pumping Lemma for context-free languages

- ▶ $s = uvxyz$
- ▶ $|vxy| \leq p$
- ▶ $|vy| > 0$
- ▶ $uv^i xy^i z \in L$