

CS 280: Homework 7

Date of Handout: 12 Nov 99

Due Date: 19 Nov 99 in class

Due date is a **FRIDAY**.

Problem 1: (*20 points*) Write context free grammars for the following languages.

(a)

$$\{a^n b^{4n} \mid n \geq 1\}$$

(b)

$$\{a^m b^n \mid m < n\}$$

(c)

$$\{a^m b^n \mid m > n\}$$

(d)

$$\{a^m b^n \mid m > 3n\}$$

Problem 2: (*10 points*) Prove that the language $\{a^n b^{2n} c^{2n} \mid n \geq 1\}$ is not context free using the pumping lemma.

Problem 3: (*10 points*) Write a Turing machine (use the definition given in class) which accepts the language $\{a^n b^n \mid n \geq 1\}$. Write down your Turing machine as a DFA-like diagram explained in class.