
MIDTERM 2

CS 373: THEORY OF COMPUTATION

Date: Thursday, March 28, 2013.

Instructions:

- This is a closed book exam. No notes, cheat sheets, textbook, or printed material allowed.
- You have 90 minutes to solve this exam.
- This exam has 4 problems. Problems 1,2 and 4 are worth 10 points, while problem 3 is worth 20 points. The points are not a measure of the relative difficulty of the problems.
- Please write your name on the top of *every* page in the space provided.
- If your solution does not fit in the space provided, and continues onto one of the back sheets, please indicate clearly where we should look for the solution.
- Unless otherwise stated, “prove that”, “show that” for a problem means you need to formally prove what you are claiming.
- You may use, without proof, any result that you were asked to prove in the homework or was proved in the lecture. If you use such a result, please explicitly state the result (like “ ‘Reverse of regular languages is regular’ was proved in a homework”, instead of “this was shown in a homework”).

Name	
Netid	

Discussion: W 10:00–10:50 W 11:00–11:50 W 12:00–12:50
 W 2:00–2:50 W 3:00–3:50 W 4:00–4:50

Problem	Maximum Points	Points Earned	Grader
1	10		
2	10		
3	20		
4	10		
Total	50		

You may use without proof that the following languages are not context-free

- $L_{anbncn} = \{a^n b^n c^n \mid n \geq 0\}$; the alphabet for this language is $\{a, b, c\}$.
- $L_{a=c \wedge b=d} = \{a^i b^j c^i d^j \mid i, j \geq 0\}$; the alphabet for this language is $\{a, b, c, d\}$.
- $E = \{ww \mid w \in \{0, 1\}^*\}$; the alphabet for this language is $\{0, 1\}$.
- $A_1 = \{0^n 1^{2n} 0^{2n} 1^n \mid n \geq 0\}$; the alphabet for this language is $\{0, 1\}$.
- $L_{ww^Rw} = \{ww^Rw \mid w \in \{0, 1\}^*\}$; the alphabet for this language is $\{0, 1\}$.
- $S = \{a^{n^2} \mid n \geq 0\}$; the alphabet for this is $\{a\}$.