

**Homework 8**  
**Cpt S 317, Spring 2009**  
**Due Date: April 24, 2009**

Total points: 41

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For questions on Turing Machine design, give your TMs consistent with the state diagram form shown in the example Figure 8.10 in the text, unless otherwise specified.

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1. (5 points) Let  $L$  be a CFL. We will define:

$$Prefix(L) = \{x \mid x \text{ is a prefix of some string } w \in L\}.$$

Prove that CFLs are closed under the  $Prefix()$  operation.

2. (10 points) Exercise 8.2.2 parts b and c. For this question, build a basic single-track TM with or without storage, whichever of the two gives you the best design convenience.
3. (5 points) Exercise 8.2.3 part a. For this question, build a basic single-track TM with or without storage, whichever of the two gives you the best design convenience.
4. (5 points) Exercise 8.2.5 part b.
5. (8 points) Exercise 8.4.6.
6. (8 points) Exercise 8.4.7.