Homework 6: Turing Machines

CS 390 — Spring 2009

Assigned: March 23
Due: March 31 (Tuesday) 3:25

Problem 1 [30 points]

Give implementation-level description of Turing machines that decide the following languages over the input alphabet $\{0, 1\}$:

1. $\{w \mid w$ contains twice as many 0s as 1s $\}$

2. $\{w \mid w$ does not contain twice as many 0s as 1s $\}$

Problem 2 [20 points]

Exercise 3.9
Hint: For part (a), show that 2-PDAs can simulate Turing Machines, and for part (b), show that Turing Machines can simulate 3-PDAs.

Problem 3 [40 points]

Show that the collection of decidable languages is closed under the operation of:

1. Concatenation

2. Star

3. Complementation

4. Intersection

Problem 4 [10 points]

Exercise 3.6