9 Homework

Due: Thursday, April 4, 2013.

Problems

Required: 4 of the following 5 problems
Points: 25 points per problem

1. Do the Problem 5.1

   Show that EQ_{CFG} is undecidable.

2. Do the Problem 5.9

   Let $T = \{< M > | M \text{ is a TM that accepts } W^R \text{ whenever it accepts } w\}$. Show that a T is undecidable.

3. Do the Problem 5.20

   Prove that there exists an undecidable subset of $\{1^*\}$.

4. Use a mapping reduction to prove that

   $DECIDER_{TM} = \{< M > | M \text{ is a TM and } M \text{ is a decider}\}$

   is undecidable.

5. Prove that $REGULAR_{TM}$ (defined on p. 191 of Sipser) is neither Turing-recognizable nor co-Turing-recognizable. *Hint:* For part of this you should create one new mapping reduction.