Assignment 8  
Computer Science 235

Reading.  Sections 5.1 and 5.3

1) Show that $EQ_{CFG}$ is undecidable.  (*Hint:* Use the fact that $ALL_{CFG}$ is undecidable as indicated in Theorem 5.13 on page 225.)

2) Show that $EQ_{CFG}$ is co-Turing-recognizable.

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

4) Consider the problem of determining whether a single-tape Turing machine ever writes a blank symbol over a nonblank symbol during the course of its computation on any input string. Formulate this problem as a language and show that it is undecidable.

5) Consider the problem of determining whether a Turing machine $M$ on an input $w$ ever attempts to move its head left when its head is on the left-most tape cell. Formulate this problem as a language and show that it is undecidable.