Homework 10

*3.20 Show that single-tape TMs that cannot write on the portion of the tape containing the input string recognize only regular languages.

A4.12 Let $A = \{\langle M \rangle | \ M$ is a DFA that doesn't accept any string containing an odd number of 1s$\}$. Show that A is decidable.

A4.14 Let $\Sigma = \{0,1\}$. Show that the problem of determining whether a CFG generates some string in 1^* is decidable. In other words, show that

$$\{\langle G \rangle | \ G \text{ is a CFG over } \{0,1\} \text{ and } 1^* \cap L(G) \neq \emptyset\}$$

is a decidable language.

4.17 Consider the problem of deciding, on input a pair of DFAs D' and D'', whether they recognize the same language. Prove that this problem can be solved by testing D' and D'' on all strings up to a certain size. Calculate a size that works.

*4.27 Let $E = \{\langle M \rangle | \ M$ is a DFA that accepts some string with more 1s than 0s$\}$. Show that E is decidable. (Hint: Theorems about CFLs are helpful here.)