Problem Set 5 — Due Friday, February 21, 1997

Problem 1. Design a TM (give a transition diagram) which visits each tape cell infinitely often.

Problem 2. Page 148, Problem 3.11.

Problem 3.

Part A. Page 149, Problem 3.14.

Part B. Page 149, Problem 3.15.

Problem 4. Recall that an *unrestricted grammar* is like a CFG except that the rules are of the form $\alpha \to \beta$, where $\alpha, \beta \in (V \cup \Sigma)^*$. (Eg., the rule $AbCA \to CDb$ is permitted.) The language of such a grammar, $L(G)$, is defined in the natural way: anywhere you see α as a substring of a sentential form, you may replace α within this sentential form by β.

Show that if L is Turing acceptable then L is generated by some unrestricted grammar G.

Problem 5.

Part A. Page 169, Problem 4.10.

Part B. Page 169, Problem 4.12.