Problem Set 7 — Due Thrusday, March 6, 1997

Problem 1. Classify the following languages as **decidable**, **acceptable** (but not decidable), **co-acceptable** (but not decidable), or **neither** acceptable nor co-acceptable. Prove all your answers, giving decision procedures or reductions.

A. $L_A = \{\langle M \rangle : M \text{ accepts some even-length string}\}$.

B. $L = \{\langle M \rangle : \ M \text{ accepts some palindrome}\}$.

C. $L = \{\langle M \rangle : \ L(M) \text{ is Turing-decidable}\}$.

D. $L = \{\langle M \rangle : \ L(M) \text{ is Turing-acceptable}\}$.

E. $L = \{\langle M \rangle : \ M \text{ never prints a "0" (regardless of the input)}\}$.

F. $L = \{\langle \phi \rangle : \ \phi \text{ is a Boolean formula which has } no \text{ satisfying assignment}\}$.

G. $L = \{\langle G_1, G_2 \rangle : \ G_1 \text{ and } G_2 \text{ are CFGs which generate the same CFL.}\}$.

H. $L = \{\langle \alpha \rangle : \ \alpha \text{ is shortest regular expression for } L(\alpha)\}$.