

CS-172  
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## Quiz 3

April 9, 1993

1. (20 points) Recall that any language,  $L$ , falls into one of four categories:

- (a)  $L$  is recursive
- (b)  $L$  is r.e. but not recursive
- (c)  $\bar{L}$  is r.e. but not recursive
- (d) Neither  $L$  nor  $\bar{L}$  are r.e.

Note that proofs for categories 2,3 or 4 will typically have two parts — one concerning  $L$  and the other  $\bar{L}$ .  
Classify the following language and give a proof.

$$L = \{\langle M \rangle : L(M) = \{\epsilon\}\}$$

(Do not confuse  $\{\epsilon\}$  with  $\emptyset$ .)

2. (10 points) Show the following language is recursive:

$$L = \{\langle M \rangle : M \text{ eventually writes a symbol other than blank when started on blank tape.}\}$$