

## Quiz 9

**Firstname Lastname:** \_\_\_\_\_ **ID#** \_\_\_\_\_ **Seat#** \_\_\_\_\_

- Please don't turn in this quiz and then promptly leave. It's demoralizing.
- Please don't sit next to anyone you know.
- Please don't turn over this paper until you are asked to.
- When you finish, please put this side up once again.

Have a nice weekend,  
phil rogaway

For this quiz I want you to prove that

$$A = \{\langle M, k \rangle : M \text{ is a TM that accepts at least one string of length } k\}$$

is undecidable. Do this with a reduction involving  $A_{\text{TM}}$  or  $\overline{A_{\text{TM}}}$ . Make your proof succinct, legible, and logical. Write exclusively in grammatical English sentences.