Tutorial 7

Exercise 1 (compulsory)

Show that $\leq_m$ is a transitive relation.

Exercise 2 (compulsory)

Show that A_{TM} is not mapping reducible to E_{TM}. In other words, show that there is no computable function that reduces A_{TM} to E_{TM}.

Hint: Use proof by contradiction and the known facts about these two problems. Also the fact that $A \leq_m B$ iff $\overline{A} \leq_m \overline{B}$ might be handy.

Exercise 3 (compulsory)

Show that if A is recognizable and $A \leq_m \overline{A}$, then A is decidable.

Exercise 4 (compulsory)

Show that $REGULAR_{TM}$ is neither recognizable nor co-recognizable.

Hint: Modify a similar proof for EQ_{TM} from Lecture 7.

Exercise 5 (optional)

Exercise 5.4 on page 239.

Exercise 6 (optional)

Problem 5.9 on page 239 (in international edition), or Problem 5.21 (in standard edition).