

Homework Assignment #9
Due: Tuesday July 23, 2012 at 7:00 p.m.

1. Let

$COMP_{TM} = \{\langle M_1, M_2 \rangle : M_1 \text{ and } M_2 \text{ are TMs with the same input alphabet and } L(M_1) = \overline{L(M_2)}\}.$

(a) Is $COMP_{TM}$ recognizable? Prove your answer is correct.

(b) Is $\overline{COMP_{TM}}$ recognizable? Prove your answer is correct.

(c) Is $COMP_{TM}$ decidable? Prove your answer is correct.

2. Let $INTERSECT_{TM} = \{\langle M_1, M_2 \rangle : L(M_1) \cap L(M_2) \neq \{\}\}.$
Give a deterministic algorithm that recognizes $INTERSECT_{TM}$.
Explain why your solution is correct.