Week 13 Tutorial Session

(1) Prove that the following languages are NP-complete:

   (a) $L_1 = \{ \langle \varphi \rangle \mid \varphi \text{ is a boolean formula with at least two satisfying assignments} \}$

   (b) $\text{HALF-Clique} = \{ \langle G \rangle \mid G \text{ is a graph on } n \text{ vertices containing a clique of size at least } n/2 \}$

(2) Consider the following language:

   $L = \{ \langle M \rangle \mid M \text{ does not accept } \varepsilon \}$.

   Prove that $L$ is unrecognizable by directly reducing from $\overline{A_{TM}}$, where

   $\overline{A_{TM}} = \{ \langle M, w \rangle \mid \text{Turing machine } M \text{ rejects or infinite-loops on input } w \}$

   is a known unrecognizable language.