Week 13 Tutorial Session

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

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

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

(2) Suppose some polynomial-time algorithm \( A \) decides the decision problem

\[ \text{CLIQUE} = \{ \langle G, k \rangle \mid \text{Graph } G \text{ contains a clique of size } k \}. \]

Using \( A \), give a polynomial-time algorithm to search for a clique of size \( k \) in a graph \( G \), whenever such a clique exists.