

**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) 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.