Reading Material

We will talk about polynomial time reductions between problems and the complexity classes P and NP. You should read KT Chapter 8:

- section 8.0
- section 8.1
- section 8.3 (except the proof of 8.10)
- section 8.4 (only the introduction and the subsection *A General Strategy for Proving New Problems NP-Complete*).

Exercises

1 NP Solve exercise KT 8.1.

2 Customer Analysis Solve exercise KT 8.2.

3 Summer Camp Solve exercise KT 8.3.

4 Resource Reservation Solve exercise KT 8.4.

5 Clique For an undirected graph $G = (V, E)$ a clique is a subset $V' \subseteq V$ of the vertices such that all vertices in V' are neighbors, i.e., for all $v, w \in V', y \neq w : (v, w) \in E$. We say that G has a k-clique if $|V'| = k$.
Consider the following problem:

CLIQUE
Input: An undirected graph $G = (V, E)$ and a natural number k.
Output: YES if the graph G has a k-clique, and NO otherwise.

5.1 Show that Clique set is in NP.

5.2 Show that Clique is NP-complete by giving a reduction from Independent Set.