COMP260 Spring 2014:
Lecture 4 Homework

This homework is **due Thursday, February 13th** at the beginning of class.

Problem 1. *Prove that every perfect matching is a minimum edge cover.*

Problem 2. *Prove that for any graph $G = (V, E)$ with maximum matching $E' \subseteq E$, there exists a minimum edge cover E'' with $E' \subseteq E''$ and $|E''| - |E'| = |V| - 2|E'|$. That is, every maximum matching can be extended into a minimum edge cover by adding one edge per vertex.*

Theorem 1. *The 3-regular vertex cover problem is* NP*-hard.*

Problem 3. *Prove that the* 3*-uniform hypergraph edge cover problem is* NP*-hard (hint: use Theorem 1).*