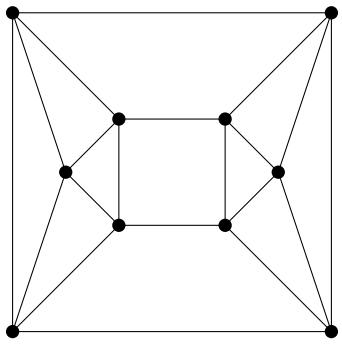
CSDS 455: Applied Graph Theory
Homework 4
Due Monday, September 7 before the start of class

Homework rules: You are welcome to work with others to solve these problems. If you do get help from someone else (or from some other resource), please indicate that on your homework.

For this assignment, you will need to look up definitions for matchings in non-bipartite graphs and generalizations of matchings called k-factors.

Problem 1: In the graph drawn below, exhibit a k-factor for each k in $\{0, 1, 2, 3, 4\}$.



Problem 2: Let G be a k-regular, bipartite graph. Prove that G can be decomposed into r factors if and only if r divides k.

Problem 3: For each $k > 1$, construct a k-regular simple graph having no 1-factor.