Theory of Computation

Homework 12.

Due Date: Monday, November 24.

Chapter 4: No. 20, 21.
Chapter 5: No. 3, 4.

5. Definition: A coloring of a graph is an assignment of colors to the vertices of the graph, such that every pair of adjacent vertices is assigned distinct colors.
Consider the following Vertex Color (VC) problem.
Input: An undirected graph $G = (V, E)$ and a positive integer $k$.
Question: Is there a $k$-coloring of $G$, a coloring that uses $k$ colors?
Show that Vertex Color has a polynomial time verifier.

6. Consider the following Bin Packing problem.
Input: A sequence $s_1, s_2, \ldots, s_n$ of $n$ object sizes, a positive integer $k$, and a bin size $b$.
Question: Can the $n$ objects be partitioned among the $k$ bins, so that the total size of the objects in any one bin is at most $b$?
Show that Bin Packing has a polynomial time verifier.

Challenge problem: Chapter 4: No. 22.