

Remember that, although you are encouraged to work together, all of your write-ups must be your own (no copying someone else's solution - not even with minor wording changes.) **List the names of everyone you worked with on the HW!** You are encouraged to **not** look online for solutions - your time is better spent wrestling with the proof yourself or getting help from the professor, than squandering it online.

1. READING

Read Section 5.1 carefully and answer the following questions. Memorize the definitions of ***k*-coloring**, **proper coloring**, **chromatic number**, **cartesian product of graphs**. We will go over the proof of 5.1.21 and 5.1.22 in class.

2. READING COMPREHENSION

- (1) Give an example of a 4-critical graph.
- (2) Explain the terms in the inequality $\chi(G) \geq \frac{n(G)}{\alpha(G)}$. Also explain the proof.
- (3) Give an example (i.e. draw the graphs) other than the examples in 5.1.10 of the cartesian product of two graphs.
- (4) Explain the proof of 5.1.11 in your own words.
- (5) In Example 5.1.15, explain the sentence "The number of registers needed is the chromatic number of the graph."
- (6) At the bottom of page 195 is an example of an interval graph and its interval representation. Find another example (one which is not a subgraph of the given graph).
- (7) Explain the proof of Theorem 5.1.19.