**Universität des Saarlandes**
**FR 6.2 Informatik**

**Prof. Dr. Benjamin Doerr, Dr. Danny Hermelin, Dr. Reto Spöhel** **Summer 2011**

# Graph Theory: Test 10 (Monday, June 20, 2011)

*Time: 20 Minutes*

**Name:** _____

Answer each of the following questions. If proofs are needed, a short sketch of the main argument is sufficient. If counterexamples are needed, it suffices to give the example (unless it is not obvious why this is a counterexample). All questions can be answered in about two lines. Each item is worth one point.

a) For which graphs $G$ is the line graph $L(G)$ complete?

b) Give a planar drawing of the line graph of the complete graph $K_4$.

c) True or false: For any graph $G$, we have $\omega(G) \leq \chi(G)$. (Recall that $\omega(G)$ is the order of a largest complete subgraph in $G$, and $\chi(G)$ is the chromatic number of $G$.) Explain your answer or give a counterexample.

d) What is the definition of a perfect graph?

e) Give an example of a graph which is not perfect.

f) Give an example of a connected graph on 100 vertices which is perfect, and all of its subgraphs (**note:** not necessarily *induced* subgraphs) are perfect.

g) What is the definition of an interval graph?

h) Explain how the bipartite graph is constructed from the given poset in Fulkerson's proof of Dilworth's Theorem.

**Feedback:**

How many hours did you spend working on the last assignment sheet?

The material covered last week was [ ] easy, [ ] fine, [ ] difficult, [ ] very difficult.

Comments?