Homework assignment two

Due Friday September 27, 2002, 4:00 PM

1. Yeomans, problem 2.1.
2. Yeomans, problem 2.2.
3. Yeomans, problem 2.3.
4. Yeomans, problem 2.4.
5. Estimate the susceptibility critical exponent $\gamma$ for the two-dimensional ferromagnetic Ising model as follows.

   (a) Using one of your existing Monte Carlo codes, do a run at a bunch of temperatures near the critical temperature, calculating $\chi$ at each temperature. A lattice size of around 100 by 100 should be sufficient.

   (b) Then, make a log-log plot of the susceptibility $\chi$ versus the reduced temperature $T - T_c$. The slope of line is the critical exponent. Be sure to determine error bars to go along with your estimated slope.

   (c) Compare your result with the known, exact critical exponent. Also compare your results with each other. Discuss briefly.

   (d) Comment on sources of error in your calculation. You may wish to consult section 8.3.1 of Newman and Barkema.