CS140 Final Project Progress Report

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Serial Results

The Metropolis Monte Carlo simulation for the Potts Lattice Gas (PLG) model was implemented in C++. The melting point and phase diagram for our test system were calculated, as shown below in Figures 1 and 2. The melting point is indicated by the peak in the heat capacity, which is at $kT = 1.35$ for this system. As for the phase diagram, the two phase region ends at $kT = 1.05$. Above this value, the solid can exist as an even mixture, while the solid will split into a species 1 rich phase and a species 2 rich phase within the two phase region (i.e. not perfect mixing). These two values will be used to ensure the algorithm remains formally correct after parallelization.

Figure 1. Heat Capacity ($\frac{dE}{dT}$) vs. Temperature (kT)

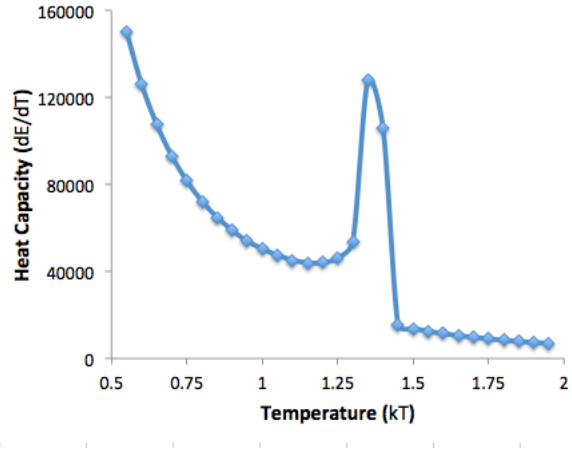
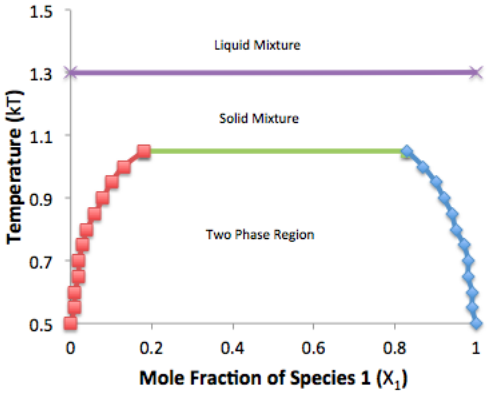


Figure 2. Phase Diagram



Serial Performance