Consider a di-atomic 1D crystal, i.e. a 1D crystal with a basis consisting of two atoms, with mass M and m. The spring constant is k for any bonding, and the lattice constant is *a*. In the 2nd diagram, an out-of-phase normal mode is suggested. What should be the relationship for u and v, for this to be a normal mode? What is the normal mode frequency? Plot the atomic displacements as a function of position, as a series of "spikes." What is the wave vector of this normal mode?