Homework assignment 6

1. Write a program to simulate wave motion on a string with free ends. Do this by using boundary conditions that always give the ends of the string the same displacement as the points that are one spatial unit in from the ends. Study how the waves are reflected from the ends of the string and compare the results with the behavior with fixed ends. You should find that the reflected wave packets are not inverted.

'3. Set up a wavepacket that doesn't split up into two pieces (as we observed with our gaussian packet in Figure 6.1), but moves uniformly in one direction. Hint: In the simulations discussed (so far) in this section we have assumed that the string is at rest prior to $t = 0$. In order to construct a single wavepacket that does not immediately split you will have to properly specify both the initial displacement and velocity of the string.

4. Write a program to simulate a sinusoidal wave (with frequency omega) generated by a point source located at the center of you simulation grid. The size of your simulation box should be much large than the wave length generated so that you can see clearly how the wave generated at the source, propagating along the axis and bounced from the edges. Your program should also run long enough so that you can monitor how the reflected waves interfere with the source.