

**Problem E12:**

In the three-dimensional harmonic oscillator problem the energies are given by the formula

$$E_{n_1, n_2, n_3} = (n_1 + n_2 + n_3 + \frac{3}{2})\hbar\omega_0,$$

where each quantum number  $n_i$  can be any non-negative integer, 0, 1, 2, etc. Make an energy level diagram showing all the energy levels up to and including  $\frac{9}{2}\hbar\omega_0$ . Determine the number of degenerate states at each level, and give the quantum numbers of each state.