LED Cube
(Courtesy of Todd Nelson and Ryan Straily)

The software consists of two major parts; the cube control section and the display effects. The cube control section loads the bits into the shift registers, cycles through the planes, and controls the timing of these functions. The display effects control which LEDs are on at what time and for how long in order to create desired displays.

Each time the interrupt is called the current ground layer is incremented by one. This causes the 8 planes to be repeatedly grounded one at a time, in order. Plane 0 is grounded. After 1.6ms plane 1 is grounded. After 1.6ms plane 2 is grounded and so on. After plane 7 the cycle repeats.

Additionally, each time the interrupt is called the 64 bits that correspond to the current ground layer are loaded into the shift registers. The global array “cube” is two dimensional meaning it has two index variables. The first index value corresponds to the 64 bits for an 8x8 plane of LEDs. These values are stored as eight hex numbers—each corresponding to eight bits for each shift register. The second index corresponds to the ground layer. The advantage of this approach is that as the current ground layer is incremented in the interrupt, the corresponding 64 data bits are easily selected in the array.