Pre-loading ROM contents

The tkgate simulator allows you to add RAM and ROM modules to your circuits. By default, these memory components take an 8-bit address and store 8-bits per entry, which is perfect for this assignment. The trick is to pre-load these memory modules with values from some pre-written file. To see how you can make such a memory module, pre-load its contents, and then use it, follow these steps:

1. In emacs/gedit, open a new file and name it, say, test.mem.

2. Type, as text and in the following format, a few values to be loaded into the memory:

   0/ 00 02 04 06 08 0a 0c 0e
   8/ ff ee dd cc bb aa 99 88

   In this format, the number preceeding the slash is the address (in hexidecimal) at which the next group of values should be loaded. In the example above, the values will be loaded starting at address 0. The values that follow the slash are pairs of hexidecimal digits, where each pair represents a 1-byte value. Here, I chose meaningless but distinct values that should make it easy to determine that the memory module loaded the values correctly.

3. Open tkgate and create a new file.

4. Left-click in the design space. Select Make → Memory → ROM.

5. Double-click on the ROM module and a Gate Parameters window will appear. Click the Details tab, and then the Browse button. Navigate your way to your test.mem file and select it. Click OK.

6. To the left of the ROM, create a DIP Switch. Solder its output to the A input of the ROM.

7. To the right of the ROM, create a 7-Seg. LED (Hex). Solder the D output of the ROM to the input of that LED.

8. Below the ROM, create a Ground and solder it to the $\overline{OE}$ input.

To test this structure, start the simulator and run the simulation. You can double-click on the DIP switch to enter a new value (in hexidecimal) that will be presented as an address to the ROM. Given the example file above, only addresses 0 through f will produce an output. You should see, for each address, the corresponding two-digit hexidecimal value from the value corresponding to that location.