

Homework Set 4

DUE: Feb 5, 1999, 12:30 pm

Please show *all* of your work. Solutions not involving DesignWorks do not have to be typeset, but may be if desired. In any case, your solutions must be legible.

- 1) Katz problem 4.15 (a), (b), (c) and (d). Draw your solution to part (a) in DesignWorks, using a Mux8 device from the Primlog library with its EN input tied to 0. In (b), you may use an OR gate that has less than 16 inputs. In (c), draw a block diagram of the ROM, label the address lines, and explain what bit values you would store at each memory location. In (d), don't forget to minimize the logic before implementation. Only part (a) must be in DesignWorks, but the others may be if you wish.
- 2) Katz problem 4.1. Use the minimized logic equation on pg. 224 directly (you don't need to rederive this equation).
- 3) You have a collection of 16 DVDs. To keep track of your favorite movies, you bar-coded each DVD. Unfortunately, the bar-coding system only outputs a four-bit number, with no information as to whether the DVD is one of your favorites. Create a system that will output a 1 if the bar-coding system detects a favorite DVD. Your favorite DVDs are numbers 0, 5, 6, 9, 10, 12, and 15, which doesn't simplify nicely via a K-map. Implement the function using a 4:16 decoder and 3-input OR gates.
- 4) Katz problem 4.18 part (a).
- 5) Katz problem 4.20 part (a). The memory size is 65536×8 bits, where each "word" in the problem statement is 8 bits wide. Also, "2764" is just the part number of the $8k \times 8$ bit ROM, so it can be ignored since you are drawing your solution by hand.