

Practice Final Exam – CpE 100
University of Nevada, Las Vegas

NAME: _____

Open book and closed notes. No extra paper, do your work on this exam, use the back if needed. When possible, put a box around your answers.

Show your work for credit and be neat!

1. Sketch the state diagram, and hardware implementation for a state machine that can detect the sequence 011. Use the back of this sheet of paper if needed. (20 points)

2. If a memory uses 10-bits for addressing 8-bit words then how many memory elements are in the memory? What is the capacity of the memory in bits? In Bytes? (10 points)

3. Sketch the design of a digital circuit that will divide a clock signal by 4. (5 points)

4. How would you implement a comparator for comparing two 4-bit digital words to determine which one is larger using adders? (10 points)

5. What is the following hexadecimal number in binary, decimal, and octal: 0xF9CD. (5 points)

6. Show how to subtract 10 from 22 using two's complement numbers. (10 points)

7. Write the truth table for $A\bar{C} + B + ABC$ and sketch the logic gate implementation. (5 points)

8. Design a digital logic circuit that takes a 3-bit input code that corresponds to the days of the week, that is, 001 is Sunday, 010 is Monday, 011 is Tuesday, etc. and generates an output high, $Y (= 1)$, when it's either a Monday or Friday. Show both your Boolean expression for the design and the logic gate implementation. (15 points)

9. Sketch the design of a 3-bit decoder implemented using only 3-input NOR gates. When the input is 000 the 0-output goes high, and when the input is 010 the 2-output goes high, etc. (10 points)

10. Work Exercise 2.24 on page 100 of the textbook. (10 points)