Midterm Exam – CpE 100 Spring 2021
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. Show how to represent 54 in binary. How many bits do you need? (5 points)

2. What is 1110 0011 in decimal? (5 points)

3. What is the following hexadecimal number in binary, decimal, and octal: 0xA9CD. (5 points)

4. Work exercise 1.8 on page 37 of the textbook. (5 points)

5. Show how to represent −55 in two's complement. How many bits do you need? (5 points)

6. Show how to subtract 15 from 9 using two's complement numbers. (5 points)

7. Work exercise 1.66 on page 45 of the course textbook. (10 points)

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

9. Work Exercise 2.13(a) on page 98 of the textbook. (5 points)

10. Show how to implement an XNOR gate using 2-input NOR gates. (10 points)

11. 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 Tuesday or Thursday. Show both your Boolean expression for the design and the logic gate implementation. (15 points)

12. Sketch the design of a 3-bit decoder implemented using 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)

13. Work Exercise 2.39 on page 103 of the textbook. (15 points)