*The* UNIVERSITY *of* NORTH CAROLINA *at* CHAPEL HILL

**Comp 541 Digital Logic and Computer Design**
Fall 2014

**Homework #1: Combinational Logic**
*Issued Fri 9/19/14; Due Mon 9/29/14 (hardcopy due in class)*

*Self-Study Questions (do not submit):* Textbook exercises 1.9, 1.11, 1.21, 1.47, 1.87, 2.1, 2.3, 2.13, 2.15, 2.17, 2.27, 2.33, 2.35, 2.37, 2.43. Solutions: http://booksite.elsevier.com/9780123944245

*Exercises to be submitted:*

- *Chapter 1 Exercises:* 1.22, 1.46, 1.60[(c)-(d) only], 1.74, 1.88
- *Redo Example 1.23 (page 34):* Redo this example, but with the following numbers: 8 watt-hour battery, 500 MHz operation, 4 W of antenna broadcast power. All other numbers remain the same.
- *Chapter 2 Exercises:* 2.2[(c)-(d) only], 2.4[(c)-(d) only], 2.14, 2.24, 2.26, 2.40, 2.44, and Interview Question 2.2.
- Prove the Boolean Identity #15 on Slide #10 of Lecture 3 using any of the other identities on that slide: $(X + Y)(X + Z) = X + YZ$. Note: Show step-by-step Boolean simplification.
- For the Karnaugh Map shown below, draw the "ovals" on top of it showing the optimal implementation of the output *Y*. Write the resulting Boolean expression.

| Y: CD \ AB | 00 | 01 | 11 | 10 |
|---|---|---|---|---|
| 00 | 1 | 1 | 1 | 1 |
| 01 | 0 | 1 | 1 | 0 |
| 11 | 0 | X | 1 | X |
| 10 | 1 | 0 | 0 | X |