ECE/Comp. Sci. 352 – Digital System Fundamentals

Homework #1 (Fall 2000)

Homework 1 covers materials in chapter 1 and Sections 2.1 - 2.4 of the text book. You need NOT turn in the homework. However, you are strongly advised to work it out. Short solutions will be posted on course web home page shortly. We encourage you to work with your classmates as a group so that you can learn from each other.

Problems labeled with an (*) indicate that a solution is available in the Prentice Hall companion Website Gallery.

1. (number systems) Problem 1–2, text book, p. 24

2. (base conversion) *Problem 1–4, text book, p. 24


5. (base conversion) Perform the following conversions without executing actual divisions and multiplications:
   
   (10110101.1101)₂ to (N)₈.
   
   (27643.35)₈ to (N)₂.
   
   (10101011101111101101)₂ to (N)₁₆.
   
   (ABADABA.D0)₁₆ to (N)₂ to (N)₈.
   
   (76421.65)₈ to (N)₁₆.

6. (base conversion) Find the base r for which the following relationship holds:
   
   \((A1)ₐ × (B2)ₐ = (8852)ₐ\)
   
   where \(A = (10)₁₀\) and \(B = (11)₁₀\).


8. (binary code) Assuming A is a 32-bit unsigned binary number. How many different positive integers can be represented by A? Let B be encoded with 32 bit unsigned BCD code. How many different positive integers can be represented by B?

9. (binary code) Show the bit configuration that represents the decimal number 712₁₀
   
   (a) in BCD code:
   
   (b) in ASCII code:

10. (binary code) Calculate the even parity for the following binary numbers:
    
    \(A = 10111000011₂\), \(B = 1111111111₁₂\)
13. (Boolean Algebra/Theorems) Problem 2–4, text book, pp. 84.
14. (Algebraic Simplification) Problem 2–6(b),(d), text book, pp. 84.
15. (Complement of Boolean Function) *Problem 2–9(c), text book, pp. 85.
17. (Sum of Products, Product of Sums) Book problem 2–11, page 85.
18. (Expressions minimization via K-Map) *Book problem 2-12(c), page 85.
19. (Logic realization from Boolean Expression) *Book problem 2-13(b), page 85.
20. (K-Map, three variables) Book problem 2-15(c), page 86.
21. (K-Map, four variables) Book problem 2-16(c), page 86.
22. (Equation directly to K-Map) Book problem 2-18(b), page 86.