

Week #9 Homework

1. Begin by writing down the octal representation for ASCII “a” and “b” using the hex values 61_H and 62_H. Then write down the octal representation of the 16-bit word formed by putting the two bytes for “ab” together. Why are the individual identities of the two characters lost? What is “ba” in octal? Now do the same things, but using hexadecimal notation.
2. Do by hand, although you'd normally use a calculator for such arithmetic:
 - a) Convert to decimal: 1110101.0110₂
 - b) Convert to decimal: 11.01010101₂
 - c) Convert to binary: 1023₁₀
 - d) Convert to binary: 1023_H
 - e) Convert to hexadecimal: 1023₁₀
 - f) Convert to hexadecimal: 101110101101₂
 - g) Convert to hexadecimal: 61453₁₀
3. Show how to use the exclusive-OR gate as an “optional inverter”, *i.e.*, it inverts an input signal or buffers it without inversion, depending on the level at a control input.
4. Using two-input gates, show how to make:
 - a) INVERT from NOR
 - b) OR from NORs
 - c) OR from NANDs
5. Show how to make:
 - a) a 3-input AND from 2-input ANDs
 - b) a 3-input OR from 2-input ORs
 - c) a 3-input AND from 2-input NANDs