ECE 370: Digital Systems-Logic Design

Sample Test: Chapter 5-Part 1
Spring 2005

Positional Number Systems and Unsigned Arithmetic

1. Describe in detail, how to convert a number in any radix to a decimal number. In particular, make sure to note the how to handle the whole and fractional parts of the number in any radix.

2. Describe in detail, how to convert any decimal number to any radix. In particular, make sure to note the how to handle the whole and fractional parts of the decimal number.

3. What are the values of the unknowns *x*, *y*, and *z* below by performing the required conversions. Use at most five radix places in your answer:
   a) $100111011.100111_2 = x_8 = y_{16} = z_{10}$
   b) $174003.052_8 = x_{16} = y_2 = z_{10}$
   c) $ADF23C.01B7E_{16} = x_8 = y_2 = z_{10}$
   d) $100100.1002_{10} = x_8 = y_2 = z_{16}$

4. Perform the following unsigned binary addition showing all intermediate carry values.

   (a) 110101 + 11001 (b) 101110 + 100101 (c) 11011101 + 1100011 (d) 1110010 + 1101101

5. Repeat problem 2, this time performing subtraction and showing intermediate borrow values.

6. Perform the following unsigned octal addition showing all intermediate carry values.

   (a) 1372 + 4631 (b) 47135 + 5125 (c) 175214 + 152405 (d) 110321 + 56573

7. Repeat problem 4, this time performing subtraction and showing intermediate borrow values.

8. Perform the following unsigned hexadecimal addition showing all intermediate carry values.

   (a) 1372 + 4631 (b) 4F1A5 + B8D5 (c) F35B + 27E6 (d) 1B90F + C44E

9. Repeat problem 6, this time performing subtraction and showing intermediate borrow values.