Welcome to CSE 370
Introduction to Digital Design

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TA information

- Email
  - Tian Sang: sang@cs.washington.edu
- Office hour
  - Monday 4:30-5:30 pm, Sieg 226a
  - Friday, 1:30-2:30 pm, Sieg 226b
  - Right after lectures

Conversions (Appendix A)

- Binary/octal/hexadecimal to decimal
  - Sum by position weight

$12F_{16} = 1*16^2 + 2*16^1 + F$

$= 256 + 32 + 15 = 303_{10}$

$10.0011_2 = 2^1 + 2^{-3} + 2^{-4}$

$= 2 + 0.125 + 0.0625 = 2.1875_{10}$

Conversions (Appendix A)

- Decimal to binary/octal/hexadecimal
  - Successive division for the integer part

    $209_{10} = 321_8 = D1_{16} = 11010001_2$
  - Successive multiplication for the fraction part

    $0.1875_{10} = 0.\ 0011_2 = 0.14_8 = 0.3_{16}$

Conversions (Appendix A)

- Binary to octal and hexadecimal
  - Bit grouping

    $11010001_2 = (11)(010)(001)_2 = 321_8$

    $11010001_2 = (1101)(0001)_2 = D1_{16}$

Conversions (Appendix A)

- Octal and hexadecimal to binary
  - Expand each bit

    $D1_{16} = (11)(010)(001)_2 = 11010001_2$

    $25_8 = (010)(101)_2 = 010101_2$

Binary arithmetic operations

- Almost the same as those for decimal numbers.
- Just remember: a carry/borrow worth 2

Data representation (Chapter 5)

- Representation of 14: 0000 1110
- Representation of –14:
  - In signed-magnitude: 1 000 1110
  - In signed-1's complement: 1 111 0001
  - In signed-2's complement: 1 111 0010

Overflow conditions

- Read page 246-248 of the textbook for the solution for question 4 of assignment 1.

Reference

- More detailed information can be found in Chapter 3, *Computer System Architecture* 3rd edition, M.Morris Mano, Prentice-Hall.