COMP1917: 07 Binary and Hexadecimal

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Introduction

- Computers store values in 0s and 1s. (Binary or base 2)
- We think of numbers using digits 0-9 inclusive. (Decimal or base 10)
- To ease our reading of binary values, we sometimes use hexadecimal:
    - Hex, or base 16
    - 0-9 and A-F inclusive (A=10, B=11, C=12 ...)

Skills to Cover (Binary and Decimal)

- Conversion:
  - Decimal to Binary
    - Subtraction method
    - Division method
  - Binary to Decimal
- Addition of binary numbers

Skills to Cover (Hexadecimal)

- Conversion:
  - Binary to Hex
  - Hex to Binary

Negative Numbers in Binary

- Representation in Two's Complement
- Conversion:
    - "Flip the bits (binary digits) and add one"
    - Decimal to Binary
    - Binary to Decimal
- Subtraction of Binary Numbers

Overflows

- 8 bit, signed:
  - ▸ $127 + 1 = ?$
  - ▸ $-128 - 1 = ?$