CSARCH Lecture Series: Signed Integer Representation (sign and magnitude)

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Overview

Reflect on the following question:

- Why is sign and magnitude representation not recommended for signed integer representation?

Overview

- This sub-module introduces the concept of representing signed integer using sign & magnitude representation
- The objective is as follows:
  - ✓Describe the process of representing signed integer using sign and magnitude

Integer

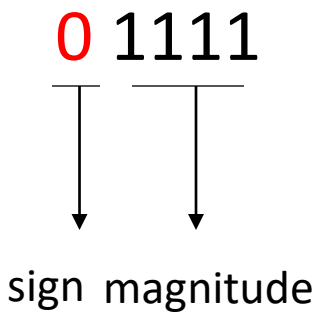
- For an introduction of signed integer, please refer to the lecture series on Signed Integer Representation – 2’s complement

Sign and Magnitude

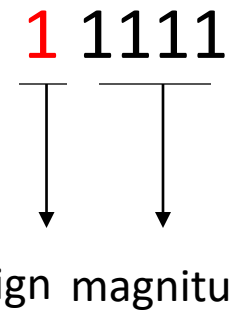
- In sign and magnitude representation, the most significant bit is used as sign bit to represent positive (0) or negative(1)
- The remaining bits are used to represent the magnitude

Sign and Magnitude

- What is the sign and magnitude representation of +15?



- What is the sign and magnitude representation of -15?



Sign and Magnitude

- Given an *n*-bit binary, the range of the value that can represented for signed integer is from $-(2^{n-1})-1$ to $+(2^{n-1})-1$
- Reflection: what is the 8-bit sign and magnitude representation of +0 and -0

- What is the sign and magnitude representation of +0?

0 00000000

sign magnitude

- What is the sign and magnitude representation of -0?

1 00000000

sign magnitude

- sign and magnitude representation is NOT used as standard for signed integer. One reason is that it has 2 representation for decimal 0

Try

Decimal	(8-bit) Sign and magnitude representation
+100	
-100	

To recall …

- What have we learned:
  - ✓Describe the process of representing signed integer using sign and magnitude