15-213 Recitation 2 - 1/29/01

Outline

- Integer Representations
- Integer Arithmetic Examples
- Homework Practice

Shaheen Gandhi

e-mail:

sgandhi@andrew.cmu.edu

Office Hours:

Wednesday 1:30 – 2:30

Integer Representations: Unsigned

Pros

\+ Large Integer Space

Cons

\- Only Represents Positive Integers

Range

$$0 \ldots 2^n - 1$$

Integer Representations: Signed Magnitude

Pros

\+ Get Negative Numbers to play with

\+ Easy to understand

Cons

\- Two Zeroes

\- Smaller Integer Space than Unsigned

Range

$$-(2^{n-1}-1) \ldots 2^{n-1}-1$$

Integer Representations: Two's Complement

Pros

+ Easy for hardware implementation
+ Math operations are intuitive
+ Easy enough for a programmer to deal with
+ Because everyone else uses it…

Cons

- A little bit confusing at first

Range

$$-2^{n-1} \ldots 2^{n-1} - 1$$

Integer Arithmetic:
Two's Complement Arithmetic

Which of the following overflow (or underflow)?

0110	0110	1110
+ 0011	+ 0001	- 1011
1001	0111	0011
yes	no	no