

HW1.4. Overflow (Randomized)

Overflow occurs when the result of the arithmetic **exceeds the range of numbers that can be represented** by the computer (either greater than the largest value that can be represented or less than the smallest value that can be represented). This leads to a mathematically inconsistent result.

For the addition operations below, find the result (in decimal) that would be given by a computer that **only supports 8-bit, 2's complement** arithmetic.

*Hint: what is the range of values that can be represented in 8-bit, 2's complement?
-128~127*

When performing binary arithmetic, any extra bits (coming from arithmetic carries) outside the computer's supported number of bits are discarded.

Recall that when using 2's complement notation, the leftmost bit, commonly called the most significant bit (MSB), always indicates whether the corresponding decimal equivalent is positive (MSB = 0) or negative (MSB = 1). When MSB = 1, the binary string represents a negative number and you would have to do the 'invert all bits + 1' procedure to get the magnitude of that negative number.

...126 127 -128 -127 ... -107

Q1.1: $113 + 36?$

integer **-107**



Q1.2: $-22 + -21?$

integer **-43**



10 01110001 (113)+ 00100100 (36)-----

Save & Grade 20 attempts left

Save only

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Homework 1

Assessment overview

Total points: 100/100

Score: 100%

Question

Value: **16**

History: **16**

Awarded points: **16/16**

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