Name: _____

CIS 351 Sample NR2 Problem

1 September 2025

NR2: Two's Complement

To receive credit, you *must* show your work.

(a) Convert -42 from decimal to and *eight-bit* two's complement number:

(b) Convert 11010100 from two's complement to decimal:

(c) What is the range of integers that can be represented using 8 two's complement bits?

(d) How many bits are needed to store integers between -76 and 37 (*inclusive*) using two's complement?

(e) Write the six *successive* two's complement numbers by using the pattern. Do *not* convert to decimal or any other number base. Add notes to the right documenting your thought process. (You need only enough notes to convince me that you didn't just convert to base 10 on a scratch sheet of paper.)
x : 11100001
$x + 1$: _____
$x + 2$: _____
$x + 3$: _____
$x + 4$: _____
$x + 5$: _____
$x + 6$: _____

CIS 351 Sample NR2 Problem Solutions

Tue 2nd Sept, 2025

NR2: Two's Complement

To receive credit, you *must* show your work.

(a) Convert -42 from decimal to and *eight-bit* two's complement number: 11010110

(b) Convert 11010100 from two's complement to decimal: -44

(c) What is the range of integers that can be represented using 8 two's complement bits? $-128 - 127$

(d) How many bits are needed to store integers between -76 and 37 (*inclusive*) using two's complement?
8 bits

(e) Write the six *successive* two's complement numbers by using the pattern. Do *not* convert to decimal or any other number base. Add notes to the right documenting your thought process. (You need only enough notes to convince me that you didn't just convert to base 10 on a scratch sheet of paper.)
$x : 11100001$
$x + 1$: _____ 11100010
$x + 2$: _____ 11100011
$x + 3$: _____ 11100100
$x + 4$: _____ 11100101
$x + 5$: _____ 11100110
$x + 6$: _____ 11100111