

Soln:

This problem reinforces your understanding of the relation between two's-complement and unsigned representations, as well as the effects of the C promotion rules. Recall that $TMin_{32}$ is $-2,147,483,648$, and that when cast to unsigned it becomes $2,147,483,648$. In addition, if either operand is unsigned, then the other operand will be cast to unsigned before comparing.

Expression	Type	Evaluation
$-2147483647-1 == 2147483648U$	Unsigned	1
$-2147483647-1 < 2147483647$	Signed	1
$-2147483647-1U < 2147483647$	Unsigned	0
$-2147483647-1 < -2147483647$	Signed	1
$-2147483647-1U < -2147483647$	Unsigned	1

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This exercise provides a concrete demonstration of how sign extension preserves the numeric value of a two's-complement representation.

- A. $[1100] \quad -2^3 + 2^2 = -8 + 4 = -4$
- B. $[11100] \quad -2^4 + 2^3 + 2^2 = -16 + 8 + 4 = -4$
- C. $[111100] \quad -2^5 + 2^4 + 2^3 + 2^2 = -32 + 16 + 8 + 4 = -4$