

CSCI 341: Computer Organization
WS 1: Integer Representation

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| 1 | <p>Can you tell if the following number is two's complement? If so, how, if not why?</p> <p style="text-align: center;">1001001001001000</p> <p>Solution: No, the context needs to be given. Just because a binary number begins with a 1 does not mean that we can assume it is two's complement, and just because a binary number does not begin with a 1 does not mean we can assume it is not two's complement. Whether or not it is entirely depends on how it is being used in the logic of the program. Conventions can help determine when it is likely to be two's complement, but conventions are not always followed.</p> |
| 2 | <p>Assume the previous number is two's complement; convert it to hex and decimal. (Remember, show your work.)</p> <p>Solution: 1001 0010 0100 1000 = 0x9248 $-2^{15} + 2^{12} + 2^9 + 2^6 + 2^3 = -28088$</p> |
| 3 | <p>Convert integer binary 11010001 to hex</p> <p>Key: 0xD1</p> |
| 4 | <p>Convert 8-bit unsigned binary 11001100 to decimal</p> <p>Key: 204</p> |
| 5 | <p>Convert 8-bit unsigned number 0xCD to decimal and binary</p> <p>Key: 205, 11001101</p> |
| 6 | <p>Convert 65 to hexadecimal</p> <p>Key: 0x41</p> |
| 7 | <p>Convert 34 to binary</p> |

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| | Key: 100010 |
| 8 | Convert the 8-bit, 2's complement 10110101 to decimal Key: -75 |
| 9 | Convert decimal $(-1)_{10}$ to 9-bit 2's complement binary Key: 111111111 |
| 10 | Convert 8-bit 2's complement binary 11001101 to decimal and hex Key: -51, 0xCD |
| 11 | What is the largest possible 16-bit unsigned binary number? Key: $1111111111111111 = 2^{16} - 1 = 65535$ |
| 12 | What is the largest possible 16-bit signed binary number in 2's complement? Key: $0111111111111111 = 2^{15} - 1 = 32767$ |