

Name:

ID

Quiz2 **SAMPLE KEY**

- 1) Perform the following HEX addition:

$$\begin{array}{r} 1 \quad 1 \\ \text{D A 1 F} \\ + 4 \text{ 5 8 F} \\ \hline 1 \text{ F A E} \end{array}$$

- 2) Perform the following binary subtraction:

Change the subtraction to addition:

$$\begin{array}{r} 10001111 \\ - 01000000 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ 10001111 \\ + 11000000 \\ \hline 01001111 \end{array}$$

- 3) Assume the operation in the previous question (2) is performed as:

- **unsigned addition.** Discuss the correctness of the 8-bit result obtained.
Carry out =1 . That means the 8 bits result is incomplete (wrong)
- **signed (2's complement) addition.** Discuss the correctness of the 8-bit result obtained.
Overflow =1 That means the 8 bits result is wrong

- 4) 0x7F is an 8 bits 2's complement number, what is the decimal equivalent?

The most significant bit is 0. That means the number is positive.

You can convert from HEX directly ($7 \times 16 + 15 \times 1 = +127$)

OR from binary (01111111) which is +127

- 5) 0xFFFFFE8 is a 32 bit 2's complement number, what is the decimal equivalent?

The most significant bit is 1. That means the number is negative.

By considering sign extension, you don't need to worry about all the 32 bits.

Consider Only: 10 1000 (All the remaining left bits are 1)

The weights to be added: $-32 + 8 = -24$

So 0xFFFFFE8 is -24 (using sign extension concept)

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6) In a 2's complement system, the lowest negative number is -1048576, what is the biggest positive number?

(The same magnitude of the negative -1)

1048575

7) 30 is stored in a computer system. If the number is shifted 3 bits to the left, what will be its decimal equivalent?

This shifting is simply equivalent to multiplying by 2^3 (8), which means the shifted number = $30 * 8 = 240$

8) 1010111100111001 shifted 4 bits to the right. Interpreting this operation as integer division:

- What is the divisor (i.e., the number being divided by)? **16**
- What is the remainder in decimal? **The shifted out bits: $(1001)_2$. Which is 9.**

9) In 8 bits system fill in the following table by the decimal equivalent considering the designated system:

	unsigned	Signed Magnitude	1'st complement	2'st complement
0x41 01000001	65	+65	+65	+65
0x9C 10011100	=128+28 156	-28	-99	=-128+28 -100