

Name: _____

EGR 204

PS# _____

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4-45 Overflow happens when the result of a math operation requires more bits than the hardware provides. (See your textbook, page 165-167, for details.) Assuming the hardware of the 4-bit ripple carry adder shown in Figure 4-5 (textbook page 154) perform the following additions. For each case, write a sentence or two that describes, using decimal numbers, what addition problem has been done, what sum the hardware gives, and state whether or not overflow occurs in the given hardware. Note that this hardware works with 4-bit numbers for input and output. (The C4 bit shown in Figure 4-5 is not part of the sum. A 4-bit computer cannot store a number with a fifth bit.)

Assuming the numbers are unsigned integers add

a.) $0110_2 + 0110_2$. b.) $0010_2 + 0100_2$. c.) $1100_2 + 0110_2$. d.) $1111_2 + 0001_2$.

Assuming the numbers are signed integers in the twos complement form, add

e.) $0110_{2C} + 0110_{2C}$. f.) $0010_{2C} + 0100_{2C}$. g.) $1010_{2C} + 1010_{2C}$. h.) $1110_{2C} + 1100_{2C}$.