

Homework 1

Chapter 2

Problem 1)

Give the expanded representation for each of the following numbers. Then multiply each term and record as a decimal number.

Problem 2)

Convert each of the following decimal numbers to a binary number:

Problem 4)

Convert each of the following unsigned binary numbers to an unsigned decimal number:

Problem 9)

Convert each of the following hex numbers to a binary number:

Problem 10)

Convert each of the following binary numbers to a hex number:

Problem 14)

Perform the indicated operations for the binary numbers of arbitrary length.

(b)	$\begin{array}{r} \%110110 \\ + \%110110 \\ \hline \end{array}$	(e)	$\begin{array}{r} \%11001 \\ - \%01101 \\ \hline \end{array}$
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Problem 15)

Perform the indicated operations for the hex numbers of arbitrary length.

(c)	$\begin{array}{r} \$555575 \\ + \$000F34 \\ \hline \end{array}$	(g)	$\begin{array}{r} \$76543 \\ - \$65AC1 \\ \hline \end{array}$
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Problem 22)

Find the 32-bit two's complement of the following hex numbers:

(b)  $\$A07A30D0$

Problem 24)

Sign extend each of the following 8-bit numbers to a 16-bit two's complement number:

(b)	$\%10000001$	(c)	$\%01100001$
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Problem 26)

Perform the following operations on 16-bit two's complement hex numbers. Indicate (YES or NO) whether signed overflow occurs.

(e)	$\begin{array}{r} \$AF76 \\ + \$1701 \\ \hline \end{array}$	(g)	$\begin{array}{r} \$FF06 \\ + \$AF76 \\ \hline \end{array}$	(h)	$\begin{array}{r} \$8701 \\ - \$70CD \\ \hline \end{array}$
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Problem 27)

Perform the following operations on the 16-bit unsigned hex numbers. In each case, indicate whether unsigned overflow occurs.

$$\begin{array}{rcl} \text{(c)} & \begin{array}{r} \$AF76 \\ + \$10FA \\ \hline \end{array} & \text{(d)} \quad \begin{array}{r} \$7FFF \\ + \$FFFE \\ \hline \end{array} \end{array}$$

Problem 28)

For 6-bit signed magnitude numbers, give the representation for each of the following decimal numbers:

$$\text{(c) } 31 \qquad \qquad \qquad \text{(d) } -31$$

What is the range of these numbers?

Problem 29)

For 6-bit one's complement numbers give the representation for each of the following decimal numbers:

$$\text{(c) } 31 \qquad \qquad \qquad \text{(d) } -31$$

What is the range of these numbers?

Problem 34)

Let  $U = \$FF0C$  and  $V = \$67AB$ . Compute the 16-bit result for each of the following operations:

$$\begin{array}{l} \text{(d)} \quad \text{NOT}(U \text{ AND } V) \\ \text{(e)} \quad \quad \quad U \text{ EOR } V \\ \text{(f)} \quad \text{(NOT } U) \text{ EOR } V \end{array}$$

Problem 36)

Using a bit table, verify the equation

$$X \text{ EOR } Y = (\text{NOT } X \text{ AND } Y) \text{ OR } (X \text{ AND NOT } Y)$$

X	Y	NOT X AND Y	X AND NOT Y	X EOR Y

Problem 38)

Give the mask and the bit operation for each of the following situations:

- (a) To toggle bit 3 in an 8 bit register
- (b) To turn off bits 5 and 6 in a register
- (c) To turn on bit 7 in a register