

Chapter 1 Test Materials

1. a) Convert the following numbers to binary:

45

4CA9h

- b) Convert the following numbers to decimal:

1011101₂

5Ah

- c) Convert the following numbers to hex:

89

101100011101₂

- d) What is -14 in 8 bit 2's complement notation?

- e) What is the 8 bit 2's complement number 11101011₂ in decimal?

2. (a) Convert the following numbers to binary:

29 =

3CD9h =

- (b) Convert the following numbers to decimal:

110100B =

5Ah =

- (c) Convert the following numbers to hex:

101101011101B

176

3. (a) Convert the following numbers to binary:

52 =

7EAFh =

- (b) Convert the following numbers to decimal:

10111001B =

19Bh =

- (c) Convert the following numbers to hex:

$$1011010111010B =$$

$$210 =$$

4. Do the following arithmetic problems by converting to 8 bit 2-s complement binary numbers, performing the arithmetic in binary, then converting the result back to a signed decimal number. Indicate where overflow occurs. (Hint: 72 = 1001000B, 67 = 1000011B, and 39 = 100111B)

$$\begin{array}{r} -72 \\ -39 \\ \hline \end{array}$$

$$\begin{array}{r} -67 \\ -72 \\ \hline \end{array}$$

$$\begin{array}{r} -72 \\ 67 \\ \hline \end{array}$$

$$\begin{array}{r} -67 \\ -39 \\ \hline \end{array}$$

5. Do the following arithmetic problems by converting to 8 bit 2-s complement binary numbers, performing the arithmetic in binary, then converting the result back to a signed decimal number. Indicate where overflow occurs, and why. (Hint: 83 = 1010011B, 58 = 111010B, and 47 = 101111B)

$$\begin{array}{r} 58 \\ -47 \\ \hline \end{array}$$

$$\begin{array}{r} -58 \\ -47 \\ \hline \end{array}$$

$$\begin{array}{r} -58 \\ -83 \\ \hline \end{array}$$

$$\begin{array}{r} -58 \\ 83 \\ \hline \end{array}$$

6 Do the following base conversions...

- a to base 10: 1011010B 0a6eh
- b to hex: 101101110010101B
- c to binary: 0a6eh

7 Do the following arithmetic problems by converting to 8-bit 2's complement, performing the arithmetic, and then converting back to the decimal answer. Indicate any overflow that occurs.

$$\begin{array}{r} 28 \\ -75 \\ \hline \end{array}$$

$$\begin{array}{r} -28 \\ -75 \\ \hline \end{array}$$

$$\begin{array}{r} 82 \\ -75 \\ \hline \end{array}$$

$$\begin{array}{r} -82 \\ -75 \\ \hline \end{array}$$

- 8. a) Convert to binary: 482
- b) Convert to hex: 10110101001011B
- c) Convert to decimal: 0ABH

3. (20) Given that $35 = 00100011B$, $87 = 01010001B$, and $51 = 00110011B$, do the following arithmetic problems by translating to 8-bit 2's complement form, doing the arithmetic in that form, and translating the result back to decimal. Indicate where overflow occurs, and why.

$$\begin{array}{r} 35 \\ -87 \\ \hline \end{array}$$

$$\begin{array}{r} -51 \\ 87 \\ \hline \end{array}$$

$$\begin{array}{r} -35 \\ -87 \\ \hline \end{array}$$

$$\begin{array}{r} -51 \\ -87 \\ \hline \end{array}$$