

Pierce College

Comp 516

Homework #2

Unsigned Arithmetic

1. Addition with Conversion

$$137_{10} \rightarrow \underline{\hspace{2cm}}_{16} \rightarrow \underline{\hspace{2cm}}_8 \rightarrow \underline{\hspace{2cm}}_{10}$$

$$91_{10} \rightarrow \underline{\hspace{2cm}}_{16} \rightarrow \underline{\hspace{2cm}}_8 \rightarrow \underline{\hspace{2cm}}_{10}$$

+

$$\underline{\hspace{2cm}}_{10} \rightarrow \underline{\hspace{2cm}}_{16} \rightarrow \underline{\hspace{2cm}}_8 \rightarrow \underline{\hspace{2cm}}_{10}$$

2. Subtraction with Conversion

$$137_{10} \rightarrow \underline{\hspace{2cm}}_{16} \rightarrow \underline{\hspace{2cm}}_8 \rightarrow \underline{\hspace{2cm}}_{10}$$

$$91_{10} \rightarrow \underline{\hspace{2cm}}_{16} \rightarrow \underline{\hspace{2cm}}_8 \rightarrow \underline{\hspace{2cm}}_{10}$$

-

$$\underline{\hspace{2cm}}_{10} \rightarrow \underline{\hspace{2cm}}_{16} \rightarrow \underline{\hspace{2cm}}_8 \rightarrow \underline{\hspace{2cm}}_{10}$$

3. Addition with Conversion

$$137_{10} \rightarrow \underline{\hspace{2cm}}_7 \rightarrow \underline{\hspace{2cm}}_3 \rightarrow \underline{\hspace{2cm}}_{11}$$

$$91_{10} \rightarrow \underline{\hspace{2cm}}_7 \rightarrow \underline{\hspace{2cm}}_3 \rightarrow \underline{\hspace{2cm}}_{11}$$

+

$$\underline{\hspace{2cm}}_{10} \rightarrow \underline{\hspace{2cm}}_7 \rightarrow \underline{\hspace{2cm}}_3 \rightarrow \underline{\hspace{2cm}}_{11}$$

4. Subtraction with Conversion

$$137_{10} \rightarrow \underline{\hspace{2cm}}_9 \rightarrow \underline{\hspace{2cm}}_4 \rightarrow \underline{\hspace{2cm}}_{16}$$

$$91_{10} \rightarrow \underline{\hspace{2cm}}_9 \rightarrow \underline{\hspace{2cm}}_4 \rightarrow \underline{\hspace{2cm}}_{16}$$

-

$$\underline{\hspace{2cm}}_{10} \rightarrow \underline{\hspace{2cm}}_9 \rightarrow \underline{\hspace{2cm}}_4 \rightarrow \underline{\hspace{2cm}}_{16}$$

5. Addition with Conversion

$$21_4 \rightarrow \underline{\hspace{2cm}}_7 \rightarrow \underline{\hspace{2cm}}_3 \rightarrow \underline{\hspace{2cm}}_{11}$$

$$13_4 \rightarrow \underline{\hspace{2cm}}_7 \rightarrow \underline{\hspace{2cm}}_3 \rightarrow \underline{\hspace{2cm}}_{11}$$

+

$$\underline{\hspace{2cm}}_4 \rightarrow \underline{\hspace{2cm}}_7 \rightarrow \underline{\hspace{2cm}}_3 \rightarrow \underline{\hspace{2cm}}_{11}$$

6. Subtraction with Conversion

$$21_4 \rightarrow \underline{\hspace{2cm}}_5 \rightarrow \underline{\hspace{2cm}}_{16} \rightarrow \underline{\hspace{2cm}}_8$$

$$13_4 \rightarrow \underline{\hspace{2cm}}_5 \rightarrow \underline{\hspace{2cm}}_{16} \rightarrow \underline{\hspace{2cm}}_8$$

-

$$\underline{\hspace{2cm}}_4 \rightarrow \underline{\hspace{2cm}}_5 \rightarrow \underline{\hspace{2cm}}_{16} \rightarrow \underline{\hspace{2cm}}_8$$

Signed Arithmetic (16 bit registers)

7. Addition with Conversion

$$\begin{array}{r} 137_{10} \rightarrow \underline{\hspace{2cm}}_{16} \rightarrow \underline{\hspace{2cm}}_2 \rightarrow \underline{\hspace{2cm}}_8 \\ 91_{10} \rightarrow \underline{\hspace{2cm}}_{16} \rightarrow \underline{\hspace{2cm}}_2 \rightarrow \underline{\hspace{2cm}}_8 \\ + \\ \underline{\hspace{2cm}}_{10} \rightarrow \underline{\hspace{2cm}}_{16} \rightarrow \underline{\hspace{2cm}}_2 \rightarrow \underline{\hspace{2cm}}_8 \end{array}$$

8. Subtraction with Conversion

$$\begin{array}{r} 137_{10} \rightarrow \underline{\hspace{2cm}}_{16} \rightarrow \underline{\hspace{2cm}}_2 \rightarrow \underline{\hspace{2cm}}_8 \\ - 91_{10} \rightarrow \underline{\hspace{2cm}}_{16} \rightarrow \underline{\hspace{2cm}}_2 \rightarrow \underline{\hspace{2cm}}_8 \\ \underline{\hspace{2cm}}_{10} \rightarrow \underline{\hspace{2cm}}_{16} \rightarrow \underline{\hspace{2cm}}_2 \rightarrow \underline{\hspace{2cm}}_8 \end{array}$$

9. Convert the following unsigned numbers:

a. $34_{10} \rightarrow \underline{\hspace{2cm}}_5$

b. $34_5 \rightarrow \underline{\hspace{2cm}}_{10}$

c. $34_{10} \rightarrow \underline{\hspace{2cm}}_{13}$

d. $34_5 \rightarrow \underline{\hspace{2cm}}_{13}$

10. Convert the following from sign & magnitude to **2's complement binary**
(signed) representation:

a. $-96_{16} \rightarrow$ _____₂ **12 bit register**

b. $-96_{10} \rightarrow$ _____₂ **12 bit register**

3. Convert the following from **2's complement** (signed) representation
in 12 bit registers
to the sign & magnitude representation normally used in base 10:

a. $9F8_{16} \rightarrow$ _____₁₀

b. $011010110011_2 \rightarrow$ _____₁₀

c. $5A2_{16} \rightarrow$ _____₁₀

d. $101011101101_2 \rightarrow$ _____₁₀

4. Compute the following values:

a. $56FA$
 $+10CB_{\text{base16}}$

b. $56FA$
 $--10CB_{\text{base16}}$

c. 765
 $+557_{\text{base8}}$

d. 765
 $--557_{\text{base8}}$

e. $56FA$
 $+10CB_{base11}$

f. $56FA$
 $--10CB_{base11}$

g. 654
 $+556_{base7}$

h. 654
 $--556_{base7}$