

Hw10

Monday, November 8, 2021 4:25 PM

1) [1 point]

Write the 6-digit sign and magnitude representation of (-5413)₆

(-5413)₆ = SM()₆
Looks good

$(-5413)_6 = SM(505413)_6$

2) [1 point]

Write the 6-digit diminished radix representation of (-6326)₉

(-6326)₉ = DR()₉
Try again

$8888 - 6326 = 2562$
padding is adding R-1 to the left $\Rightarrow 882562$

3) [1 point]

Write the 6-digit radix representation of (-1210)₃

(-1210)₃ = R()₃
Try again

$222222 - 1210 = 221012$
 $221012 + 1 = 221013$
3 can't be a number in base 3 \Rightarrow turn it into a 0 and add 1 to the next place $\Rightarrow 221020$

4) [1 point]

Write the 12-digit signed two's complement representation of the decimal number (-346)₁₀

(-346)₁₀ = R()₂

$346/2 = 173 - 0$ $173/2 = 86 - 1$ $86/2 = 43 - 0$ $43/2 = 21 - 1$ $21/2 = 10 - 1$
 $10/2 = 5 - 0$ $5/2 = 2 - 1$ $2/2 = 1 - 0$ $1/2 = 0 - 1$
 0001010101010
 1110101010101010
 $0101 + 1 = 0110$
 1110101010101010

5) [1 point]

Write the sign-extended 8-digit signed two's complement representation of the 6-digit signed two's complement value (111100)₂

(111100)₂ = R()₂

6) [1 point]

Write the sign-extended 8-digit signed two's complement representation of the 6-digit signed two's complement value (000110)₂

(000110)₂ = R()₂

7) [1 point]

The value of A is 41 and the value of B is 14.

Write the 8-digit two's complement representation of A and -B:

A = R()₂
-B = R()₂

$41 \Rightarrow 00101001$
 $-14 \Rightarrow 00001110 \Rightarrow 11110001 + 1 \Rightarrow 11110010$

Now compute the 8-digit two's complement addition of the two binary quantities above.

A-B = R()₂

$(41) - (14) = 27$
 $00101001 + 11110010 = 10001011$
 $16 + 8 + 2 + 1 = 27$

Now convert that binary value back to a negative or positive number in base 10. (Express it with only as many digits as you need. Make sure the result is A - B.)

A-B = R()₁₀

Now write the value of -A and B as 8-digit two's complement numbers.

-A = R()₂
B = R()₂

$-41 \Rightarrow 00101001 \Rightarrow 11010111 + 1 \Rightarrow 11010111$
 $14 \Rightarrow 00001110$

Now compute the 8-digit two's complement addition of the two binary quantities above.

-A+B = R()₂

$(-41) + (14) = -27$
 $11010111 + 00001110 = 11100101$

Now convert that binary value back to a negative or positive number in base 10. (Express it with only as many digits as you need. Make sure the result is B - A.)

-A+B = R()₁₀

This is an example of how you can check your own work when constructing the answers to questions.

8) [1 point]

For the questions below, the value of A = R(00272837)₁₀ and B = R(00799737)₁₀.

Write the 8-digit ten's complement of B:

-B = R()₁₀

$(10^8 - 1) - 00799737 + 1 = 99200263$

Write the 8-digit ten's complement addition of A and -B:

A-B = R()₁₀

$99200263 + 00272837 = 99473100$

Now, write the 8-digit ten's complement of A:

-A = R()₁₀

$(10^8 - 1) - 00272837 + 1 = 99727163$

Write the 8-digit ten's complement addition of -A and B:

-A+B = R()₁₀

$99727163 + 00799737 = 100526900$

9) [1 point]

For the following 8-bit binary addition,

$$\begin{array}{r} 11110100 \\ + 00011101 \\ \hline \end{array}$$

$C_1 = G_0$
 $C_0 = G_0 + C_m \cdot P_0$
 $C_1 = G_1 + C_0 \cdot P_1$
 $C_2 = G_2 + C_1 \cdot P_2$
 $C_3 = G_3 + C_2 \cdot P_3$
 $G_0 = 0 \cdot 1 = 0$
 $G_1 = 0 \cdot 0 = 0$
 $G_2 = 1 \cdot 1 = 1$
 $G_3 = 0 \cdot 1 = 0$
 $G_4 = 1 \cdot 1 = 1$
 $G_5 = 1 \cdot 0 = 0$
 $G_6 = 1 \cdot 0 = 0$
 $G_7 = 1 \cdot 0 = 0$
 $P_0 = 0$
 $P_1 = 0$
 $P_2 = 0$
 $P_3 = 1$
 $P_4 = 0$
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