

# 作业2.

5. 11) ~~\*=11011~~

先写出两者的变形补码

$[x]_{补} = 0011011$ ,  $[y]_{补} = 0000011$

两者相加

$$\begin{array}{r} 0011011 \\ + 0000011 \\ \hline 0011110 \end{array}$$

符号位不变, 没溢出

12) 同理

$[x]_{补} = 0011011$

$[y]_{补} = 1110101$

相加

$$\begin{array}{r} 0011011 \\ + 1110101 \\ \hline 111001000 \end{array}$$

符号位为 00, 不变  
故无溢出

13) 同理

$[x]_{补} = 1110110$

$[y]_{补} = 1100001$

相加

$$\begin{array}{r} 1110110 \\ + 1110001 \\ \hline 1110111 \end{array}$$

符号位为 11, 不变  
故无溢出

$$\begin{array}{r} 1101100 \\ - 1101100 \\ \hline 0011100 \end{array}$$

$$\begin{array}{r} 1111100 \\ + 1101100 \\ \hline 1101100 \\ + 1111100 \\ \hline 0101110 \end{array}$$

进位五, 进位 10 进位五

$$\begin{array}{r} 1010011 \\ + 1110100 \\ \hline 1010011 \\ + 1110100 \\ \hline 0011111 \end{array}$$

进位无, "11" 进位五

$$\begin{array}{r} 1100100 \\ + 1101100 \\ \hline 1101100 \\ + 1100100 \\ \hline 0111100 \end{array}$$

进位五, 进位五

~~6. (1)  $[x]_{\text{补}} = 0011011$ ,  $[y]_{\text{补}} = 1111111$~~

~~相减~~

~~$$\begin{array}{r} 0011011 \\ - 1111111 \\ \hline 0011100 \end{array}$$~~

~~7. 1100000 = 补[x], 1101100 = 补[y]~~  
40 补码

~~$$\begin{array}{r} 1101100 \\ + 1100000 \\ \hline 0111100 \end{array}$$~~

~~$$\begin{array}{r} 1101100 \\ + 1100000 \\ \hline 0111100 \end{array}$$~~

~~溢出, 溢出~~

6. (1)  $[x]_{\text{补}} = 0011011$ ,  $[y]_{\text{补}} = 0011111$

$[x]_{\text{补}} + [y]_{\text{补}}$  如下:

$$\begin{array}{r} 0011011 \\ + 0011111 \\ \hline 0111010 \end{array}$$

由于出现 01, 故正溢出.

(2)  $[x]_{\text{补}} = 0010111$ ,  $[y]_{\text{补}} = 1100101$

$[x]_{\text{补}} + [y]_{\text{补}}$  如下

$$\begin{array}{r} 0010111 \\ + 1100101 \\ \hline 1111100 \end{array}$$

由于符号位为 "11", 故无溢出.

(3)  $[x]_{\text{补}} = 0011011$ ,  $[y]_{\text{补}} = 0010011$

$[x]_{\text{补}} + [y]_{\text{补}}$  如下

$$\begin{array}{r} 0011011 \\ + 0010011 \\ \hline 0111100 \end{array}$$

符号位变化, 溢出

溢出

$1101100 = \text{补}[x]$

$1010111 = \text{补}[y]$

$1101100$  溢出

$1010111$  溢出

$$\begin{array}{r} 000010011 \end{array}$$

溢出, 00 溢出

溢出

溢出

$0110111 = \text{补}[x]$

$1000011 = \text{补}[y]$

$0110111$  溢出

$1000011$  溢出

$$\begin{array}{r} 111001111 \end{array}$$

溢出, 11 溢出

溢出

$$E = 127 + e$$

7. 1)  $[x]_{\text{原}} = 011011, [y]_{\text{原}} = 111111$

$[x]_{\text{补}} = 011011, [y]_{\text{补}} = 100001$

$|x| = 011011, |y| = 111111$

$$\begin{array}{r} \phantom{x} \phantom{11011} \\ x \phantom{11111} \\ \hline \phantom{11011} \phantom{11011} \\ \phantom{11011} \phantom{11011} \\ \phantom{11011} \phantom{11011} \\ \phantom{11011} \phantom{11011} \\ \phantom{11011} \phantom{11011} \\ \phantom{11011} \phantom{11011} \\ \hline 1101000101 \end{array}$$

故符号位为  $0 \oplus 1 = 1$

故结果为负数, 故  $[x \times y]_{\text{原}} = 11101000101$

补码阵列乘法器, 同上  $|x| \times |y| = 1101000101$

$[x \times y]_{\text{补}} = 0010111011$

符号位为  $1 \oplus 0 = 1$

故结果为负数, 故结果为  $10010111011$



$$-11011 \quad (3) x=11011, \quad y=-10011$$

(2) 原码阵列乘法器

$$[X]_{\text{原}} = 11111, [y]_{\text{原}} = 11101$$

$$[X]_{\text{补}} = 1.00001, [y]_{\text{补}} = 1.00101 = 1.01, 110110 = 1.1$$

$$|x| = 1111, |y| = 1101$$

$$|x| \times |y| \text{ 如 (1) 理为 } 1101000101$$

符号位为  $1 \oplus 1 = 0$ , 故结果为正数.

$$\therefore [x \times y]_{\text{原}} = 01101000101$$

补码阵列乘法器.

$$[x \times y]_{\text{补}} = 0001011011$$

~~数~~

$$\begin{array}{r} 11011 \\ 11111 \times \\ \hline 11011 \\ 11011 \\ 11011 \\ 11011 \\ 11011 \\ \hline 10100010 \end{array}$$

$$1 = 1 \oplus 0 \text{ 结果为 } 1$$

$$8. (1) [x]_{\text{原}} = 0.11011, [y]_{\text{原}} = 1.11111 = 1.11111 \times 2^5$$

$$= 2^5 \times (0.11011) \quad = -2^5 \times 0.11111$$

$$\begin{array}{r}
\begin{array}{r} 0.11111 \end{array} \overline{) \begin{array}{r} 0.110110 \\ - 0.011111 \\ \hline 0.0001110 \\ 0.0011111 \\ \hline 0.00011100 \\ 0.00011111 \\ \hline 0.00011100 \\ - 0.00011111 \\ \hline \cancel{0.00000000} \\ 0.00001101 \end{array}}
\end{array}$$

符号位为  $-1 \oplus 1 = -1$ , 结果为负数

$\therefore x \div y$  的商为  $-0.1001$ , 余数为  $0.00001101$

$$(2) [x]_{\text{原}} = 0.01011 \times 2^5, [y]_{\text{原}} = 0.11001 \times 2^5$$

符号位为  $-2^5 \div 2^5 = -1$ , 故结果为负数.

$$\begin{array}{r}
\begin{array}{r} 0.1101 \end{array} \overline{) \begin{array}{r} 0.010110 \\ - 0.001101 \\ \hline 0.0010010 \\ - 0.0001101 \\ \hline 0.00001010 \\ 0.00001101 \\ \hline 0.000010100 \\ - 0.00001101 \\ \hline 0.000000011 \end{array}}
\end{array}$$

$\therefore$  商为  $-0.1101$ , 余数为  $0.000000011$