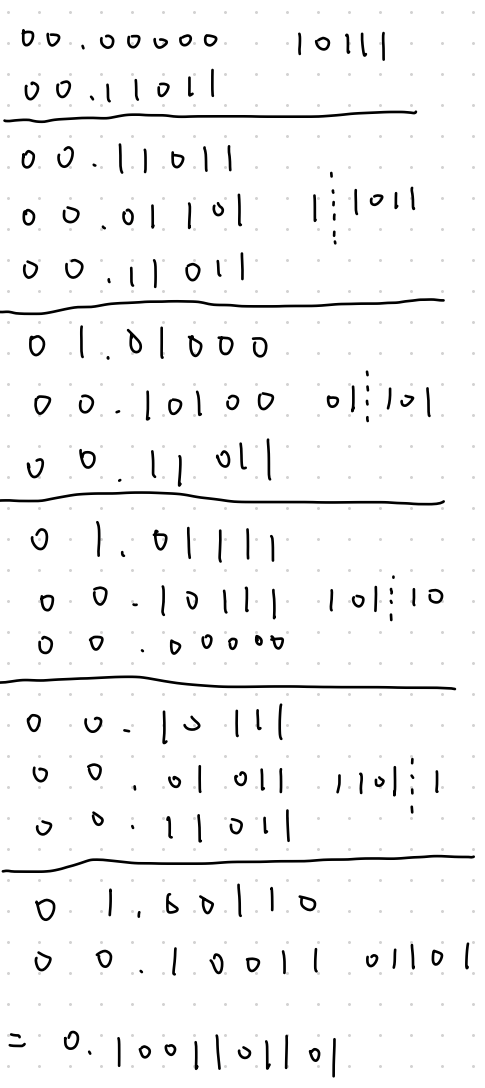
1.

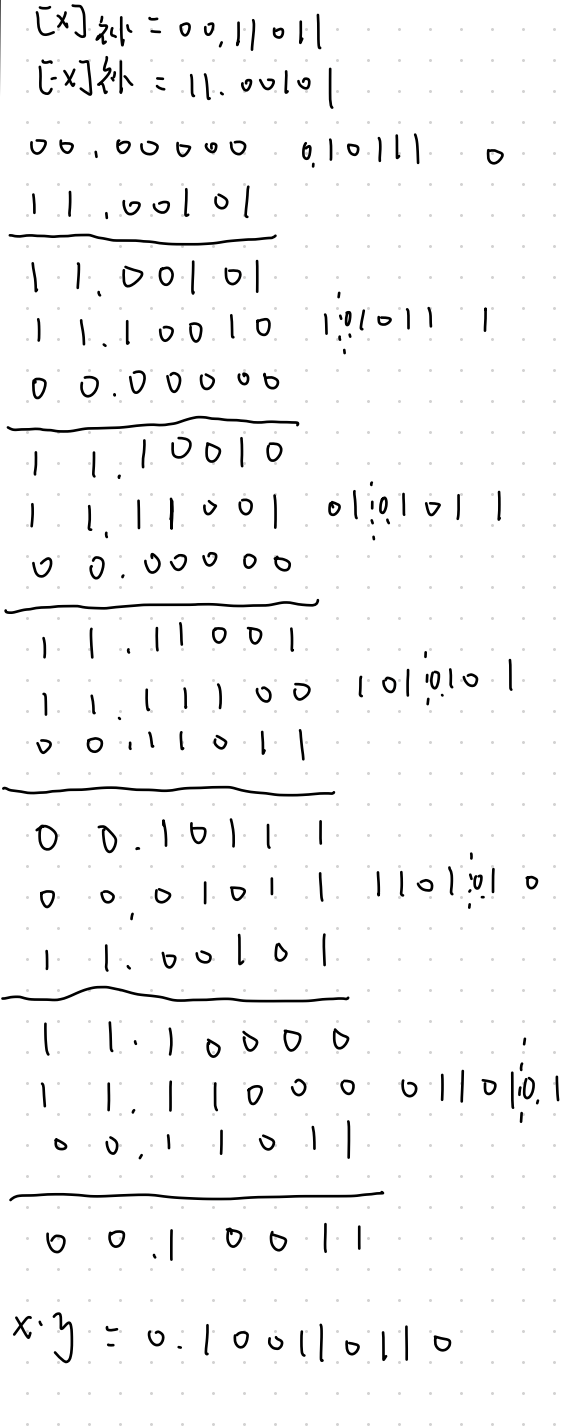
(1)

原码：



$x \cdot y = 0.100110110$

补码：



$x \cdot y = 0.100110110$

(2)

原码:

```
00.000000   10101
00.10101
----------------
00.10101
00.01010    1|1010
00.00000
----------------
00.01010
00.00101    01|101
00.10101
----------------
00.11010
00.01101    001|10
00.00000
----------------
00.01101
00.00110    1001|1
00.10101
----------------
00.11011
00.01101    11001
```

$P_s = P_x \oplus P_y = 1$

$x \cdot y = -0.1101111001$

补码:

$[X]_补 = 00.10101$

$[-X]_补 = 11.01011$

```
00.00000    1.01011 0
11.01011
----------------
11.01011
11.10101    1|1.0101 1
00.00000
----------------
11.10101
11.11010    11|1.010 1
00.10101
----------------
00.01111
00.00111    111|1.01 0
11.01011
----------------
11.10010
11.11001    0111|1.0 1
00.10101
----------------
00.01110
00.00111    00111|1. 0
11.01011
----------------
11.10010
```

$x \cdot y = 1.1001000111$

$= -0.0110111001$

2、 00.11011

(1) 原码： 11.00101

00.00000 010111 0
11.00101

11.00101
11.11001 01 | 0101 1
01.10110

01.01111
00.01011 1101 | 01 0
00.11011

01.00110
00.01001 10110 | 0

$P_s = P_x \oplus P_y = 1$

$x \cdot y = 1.0100110110 1$

补码：

$x = 0.11011$. $[x]_补 = 0.11011$

$y = -0.10111$. $[y]_补 = 1.01001$

取三符号位：

$[x]_补 = 000.11011$

$2[x]_补 = 001.10110$

$[-x]_补 = 111.00101$

$2[-x]_补 = 110.01010$

000.00000 1.01001 0
000.11011

000.11011
000000110 11 | 1.010 0
110.01010

110.10000
111.10100 0011 | 1.01
111.00101

110.11001
111.01100 10011 | 1.0

$[x \cdot y]_补 = 1.0110010011$

(2)

```
00.000000   010101    0
00.010111
---------
00.010111
00.000101   11⁝0101   0
00.010111
---------
00.011100
00.000111   0011⁝01   0
00.010111
---------
00.011110
00.000111   100011⁝   0
```

$P_s = P_x \oplus P_y = 0$

$x \cdot y = 0.000111100011$

$= 0.111100011$

$[x]_补 = 0.010111$ $[y]_补 = 0.010101$

三符号位表示:

$[x]_补 = 000.010111$

$2[x]_补 = 000.101110$

$[-x]_补 = 111.101001$

$2[-x]_补 = 111.010010$

```
000.000000   0.010101 0
111.010010
----------
111.010010
111.110100   10⁝0.010101
111.101001
----------
111.011101
111.110111   0110⁝0.0101
111.101001
----------
111.100000
111.111000   000110⁝0.01
000.010111
----------
000.001111
000.000111   100011⁝00
```

$[x \cdot y]_补 = 0.000111100011$

$= 0.111100011$

3.

(1)

原码

$|Y| = 0.1010$

$[-|Y|]_{补} = 11.0110$

```
00.1001      00000
11.0110
-----------
11.1111      00000
11.1110      00000
00.1010
-----------
00.1000      0000:1
01.0000      000:10
11.0110
-----------
00.0110      000:11
00.1100      00:110
11.0110
-----------
00.0010      00:111
00.0100      0:1110
11.0110
-----------
11.1010      0:1110
00.1010
-----------
00.0100
```

$P_S = P_x \oplus P_y = 1$

∴ x/y 的商为 -0.1110

余数为 0.0100×2^{-4}

补码：

$[x]_{补} = 00.1001$

$[y]_{补} = 11.0110$

$[-y]_{补} = 00.1010$

```
00.1001      0000:0
11.0110
-----------
11.1111      0000:1
11.1110      000:00
00.1010
-----------
00.1000      000:10
01.0000      00:100
11.0110
-----------
00.0110      00:100
00.1100      0:1000
11.0110
-----------
00.0010      0:1000
00.0100      1000
```

x/y 的商为 1.0001

余数为 0.0100×2^{-4}

(2) 原码

$|x| = 0.1010$

$[-Y]_{补} = 11.0011$

```
  00.1010   00000
+ 11.0011
-----------------
  11.1101   00000
  11.1010   0000 0
+ 00.1101
-----------------
  00.0111   0000 1
  00.1110   000 10
+ 11.0011
-----------------
  00.0001   000 11
  00.0010   00 110
+ 11.0011
-----------------
  11.0101   00 110
  10.1010   0 1100
+ 00.1101
-----------------
  11.0111
  00.1101
-----------------
  00.0100
```

$\because P_S = P_x \oplus P_y = 1$

x/y 商为 -0.1100

余数为 0.0100×2^{-4}

补码：

$[x]_{补} = 11.0110$

$[y]_{补} = 00.1101$

$[-y]_{补} = 11.0011$

```
  11.0110   0000 0
+ 00.1101
-----------------
  00.0011   0000 1
  00.0110   000 10
+ 11.0011
-----------------
  11.1001   00 010
  11.0010   00 100
+ 00.1101
-----------------
  11.1111   00 100
  11.1110   0 1000
+ 00.1101
-----------------
  00.1011   0 1001
  01.0111   0 1001
```

正溢出的余数要怎么处理？

x/y 商为 1.0011

余数 1.0110×2^{-4}

4.

(1)

$3.3125 = (11.0101)_2 = 0.011010 \times 2^3$

$6.125 = (110.001)_2 = 0.110001 \times 2^3$

⇒ 00.011010

00.110001 0

01.001011

正溢 ⇒ 尾数右移，阶码加1.

00.100101

最终结果：0.100101×2^4

(2)

$14.75 = (1110.11)_2 = 0.111011 \times 2^4$

$-2.4375 = (-10.0111)_2 = -0.0010011 \times 2^4$

⇒ 00.11101100

11.11010011

00.11000101

⇒ 舍去最后一个"1"，并末尾置1.

最终结果：0.1100011×2^4

5.

(1)

$$(0001\ 0010\ 0000)_{BCD} = 120$$

$$(0111\ 0101\ 1100)_{BCD} = 758$$

$$\begin{array}{r} 0111\ 0101\ 1100 \\ 0001\ 0010\ 0000 \\ \hline 0111\ 1111\ 1100 \end{array}$$

1 2 4

4 7 6

$$(0111\ 0110)_{BCD} = (76)_{10}$$

(2)

$$(0001\ 1000\ 0100\ 0101\ 0000)_{BCD} = 18450$$

$$(1000\ 0000\ 0001\ 0110\ 0101)_{BCD} = 80965$$

$$\begin{array}{r} 1000\ 0000\ 0001\ 0110\ 0101 \\ 0000\ 0101\ 0010\ 1000\ 0001 \\ \hline 1000\ 0101\ 0011\ 1110\ 0110 \\ 0110 \\ \hline 1000\ 0101\ 1001\ 0000\ 0111 \\ 0110 \\ \hline 1000\ 0101\ 0100\ 1010\ 1101 \\ 0110 \\ \hline 1000\ 0101\ 0100\ 0000\ 0111\ 0110 \end{array}$$

$$(1000\ 0101\ 0100\ 0000\ 0111\ 0110)_{BCD} = (85407\ 6)_{10}$$