Given: -26.05

$-26.05 = -11010.000011$

$0.05 \times 2 = 0.1$

$0.1 \times 2 = 0.2$

$0.2 \times 2 = 0.4$

$0.4 \times 2 = 0.8$

$0.8 \times 2 = 1.6$

$0.6 \times 2 = 1.2$

$0.2 \times 2 =$

Normalize:

-11010.000011

$= -1.1010\,000011 \times 2^{4}$

$1\ 10000011\ 10100000110000110011$

sign: negative

exponent: $4 + 127 = 131$

fraction

IEEE -754 → Normalized form

1) $(-1)^{0} * 1.011 \times 2^{131-127}$

sign — fraction — exponent

$= +1.011 \times 2^{4}$

2) $(-1)^{1} * 1.0 \times 2^{128-127}$

$= -1.0 \times 2^{1}$

3) $(-1)^{0} * 1.1001 \times 2^{1-127}$

$= +1.1001 \times 2^{-126}$

Assume 2's complement for all signed integers when performing arithmetic operations. 5-bit

$+5$
-3

$\Rightarrow$

$+5$
$+(-3)$
$+2$

$+5 = 00101$

-3: $+3 = 00011$

11100
$+\ 1$
11101

$-3 = 11101$

$$\begin{array}{r} 1\ 1\ 1 \\ 00101 \\ +\ 11101 \\ \hline 100010 \end{array}$$

throw out!

$+5 = 00101$

$-(-3) = 00011$

$+8 = 01000$

$-3 = 1101$

$\downarrow$

00010

$+1$

00011

$1011 = -5$

$\downarrow$

0100

$+1$

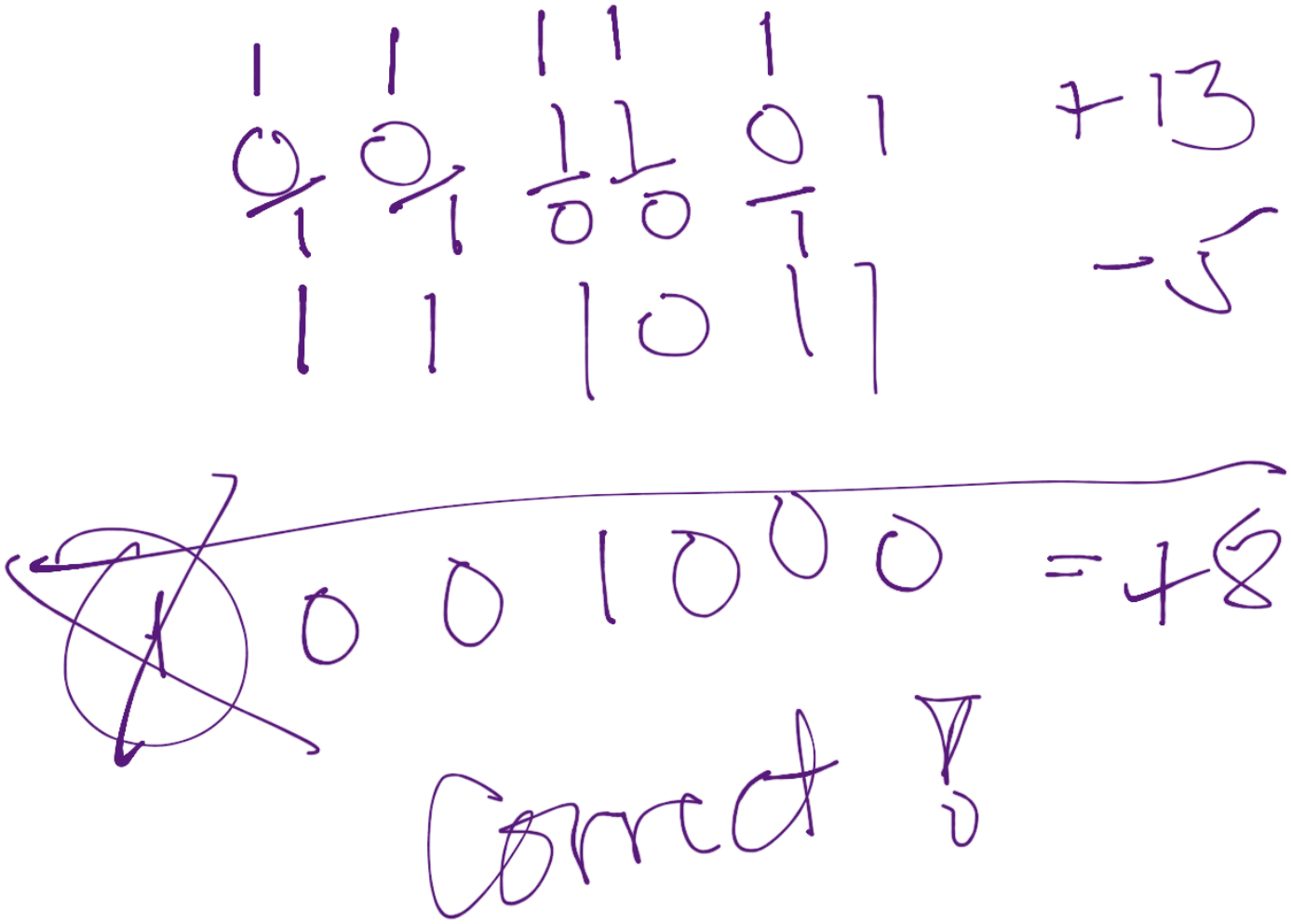
$0101 = 5$

$$\begin{array}{r} 1\ 1\ 1\ 1 \\ 0\ 0\ 1\ 1\ 0\ 1 = +13 \\ 0\ 0\ 1\ 0\ 1 \\ \hline 1\ 0\ 1\ 1 = -5 \end{array}$$

011000

WRONG!

Need sign extension


+13
-5
00010000 = +8
Correct !

5-bit 2's comp

Range: -16 to $+15$

$+15$: 0 1 1 1 1

$+1$: 0 0 0 0 1

$+16$: 1 0 0 0 0

1 ↑ Negative

overflow

-15 = 1 0 0 0 1

-2 = 1 1 1 1 0

-17 : 0 1 1 1 1 1

throw ✗

↑ positive