[199] Review [200] Examples

$$-2^{3-1} \leq d_2 d_1 d_0{}_S \leq 2^{3-1} - 1$$

Orange box (left):

$$\begin{array}{r} 011 \\ + 101 \\ \hline 1110 \\ \hline 1000 \end{array}$$

→ ALU

$$\boxed{3}$$

$+_{\mathbb{Z}}$ $\boxed{-3}$

$$0$$

Pink box (middle):

$$\begin{array}{r} 101 \\ + 111 \\ \hline 1110 \\ \hline 1100 \end{array}$$

→ ALU

$$\boxed{-3}$$

$+_{\mathbb{Z}}$ $\boxed{-1}$

$$-4$$

Orange box (right):

$$-2^{k-1} \leq 0 \leq 2^{k-1} - 1$$

$$0 \neq 1 \qquad T$$

$$\text{or} \qquad 0 = 1 \Rightarrow F$$

T

Pink box (right):

$$T$$

$$-4 \leq -4 \leq 3$$

$$1 \neq 1 \qquad F$$

$$\text{or} \qquad 1 = 1 = 1 \, T$$

T

Correct? Direct check:

$01000_s = +8d$

$-16 \leq z + z' \leq 15$

$-16 \leq -24 \leq 15$

$1 \neq 1$ F

$1 = 1 = 0$ F

ALU

$\begin{array}{|c|} \hline -12 \\ \hline -12 \\ \hline \end{array}$ $+_2$

-24

②

[202]-[204] Review $ow_d = af_s$

$\longleftarrow$ address field $\longrightarrow$

$a = 24$ | Branch | $\longleftrightarrow$ | op | #reg | #reg | 00000000000000000101 |

$a+4 = 28$ | I |

⋮   ⋮

$a' = 48$ | "L:I" |

$\leftarrow$ Given, compute
a, a'

af
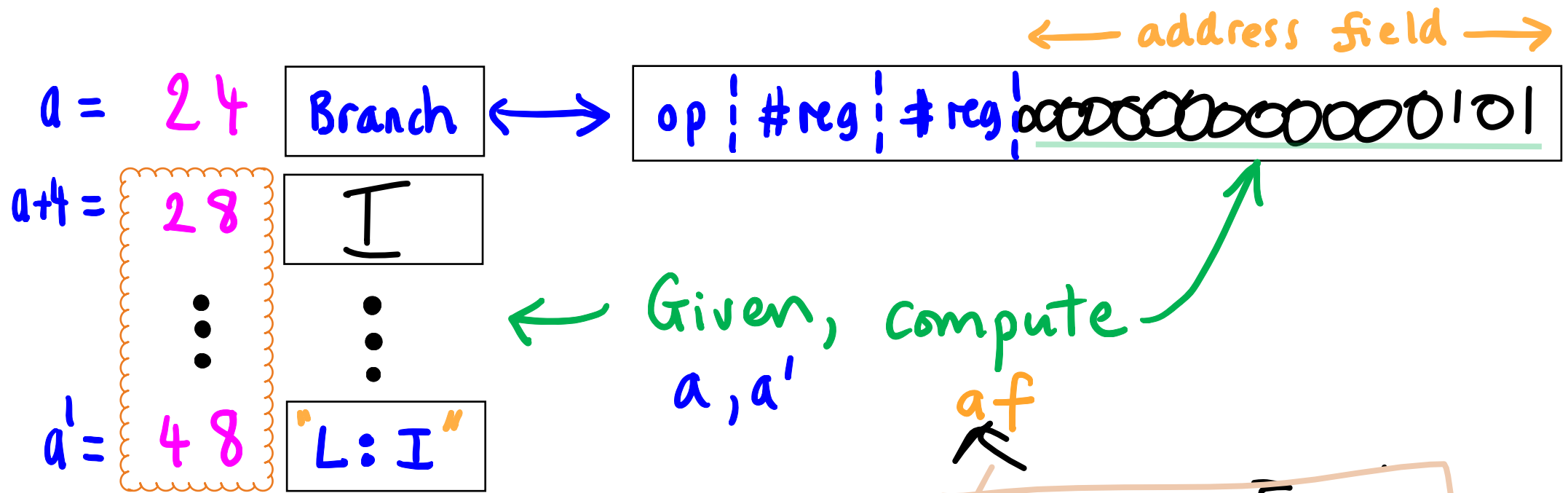
$\boxed{ow_d = 5_d}$

$a'_d = (a_d + 4) + 4 * ow_d$

∴ $48 = 28 + 4 * ow$

$\Rightarrow 4 * ow = 20 \Rightarrow ow = 5 \Rightarrow$

$a = 24$

af ⊕

$\vec{0}\ 0\ 1\ 1\ 0\ 1\ 0\ 0\ 0$

a' L : I

Given a, af

compute a'
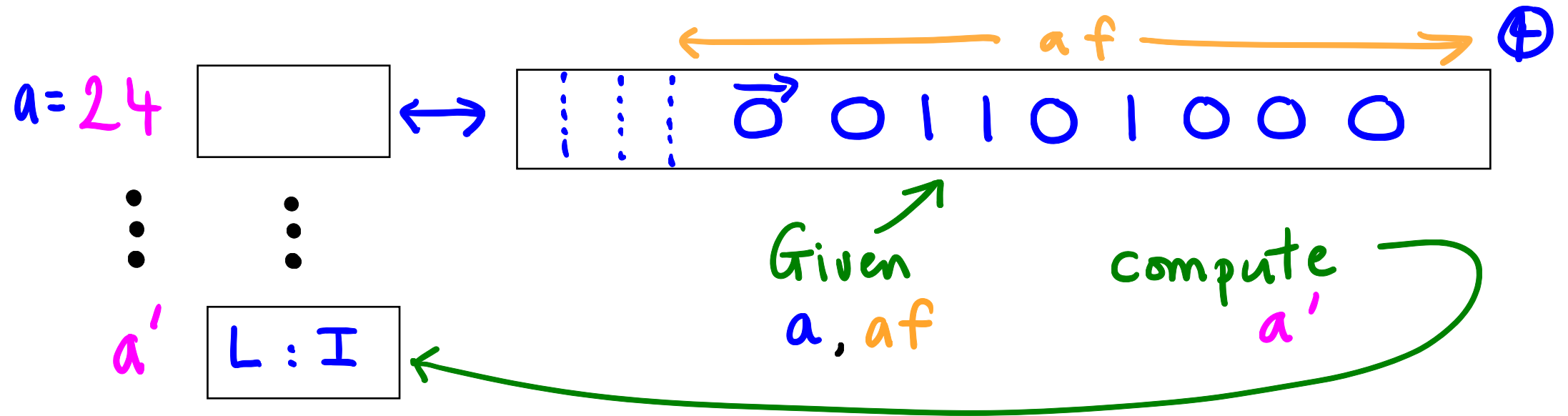
$$af_s = \underline{64 + 32 + 8}_d = 104_d = 0w_d$$

$$\therefore \quad a'_d = (a_d + 4) + 4 * 0w_d \quad \Rightarrow$$

$$a' = 28 + (4 * 104) = 28 + 416 = 444$$