TITLE

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lw/sw Eample:

```
add $4, $7, $0
addi $1, $0, 20
lw $3 0($4)
addi $1, $1, -1
sw $3, O($5)
addi $4, $4, 4
addi $5, $5, 4
bne $1, $0, -6
add $8, $3, 0
```

Binary Refresh:

$$101 = 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$$

Jump:
$28 \times 4 = 112$
PC $\leftarrow$ offset $\times$ 4
Overwrite PC. Example: j 28 sets the PC to 28 $\times$ 4

jump and branch are I-format

```
beq \$1, \$2, 100
```

branch if equal
if \$1 == \$2 go to offset relative to PC, else continue to next instruction

We don't multiple by 4 so that we can get more space for the 16 bits we have for the value 100, ie going from 400, if we multiply by 4, it goes to 1600

PC $\leftarrow 100 \times 4 +$ (PC + 4)

Slide 26:

$$\begin{aligned} PC \Leftarrow (-3) \times 4 + (PC + 4) \\ = -12 + 120 \\ = 108 \end{aligned}$$

Memory Access - I-Format
jump and branch are I-format

lw $s1 , 100($s2)

100($s2) is computing an address
$s1 $\Leftarrow$ [address]