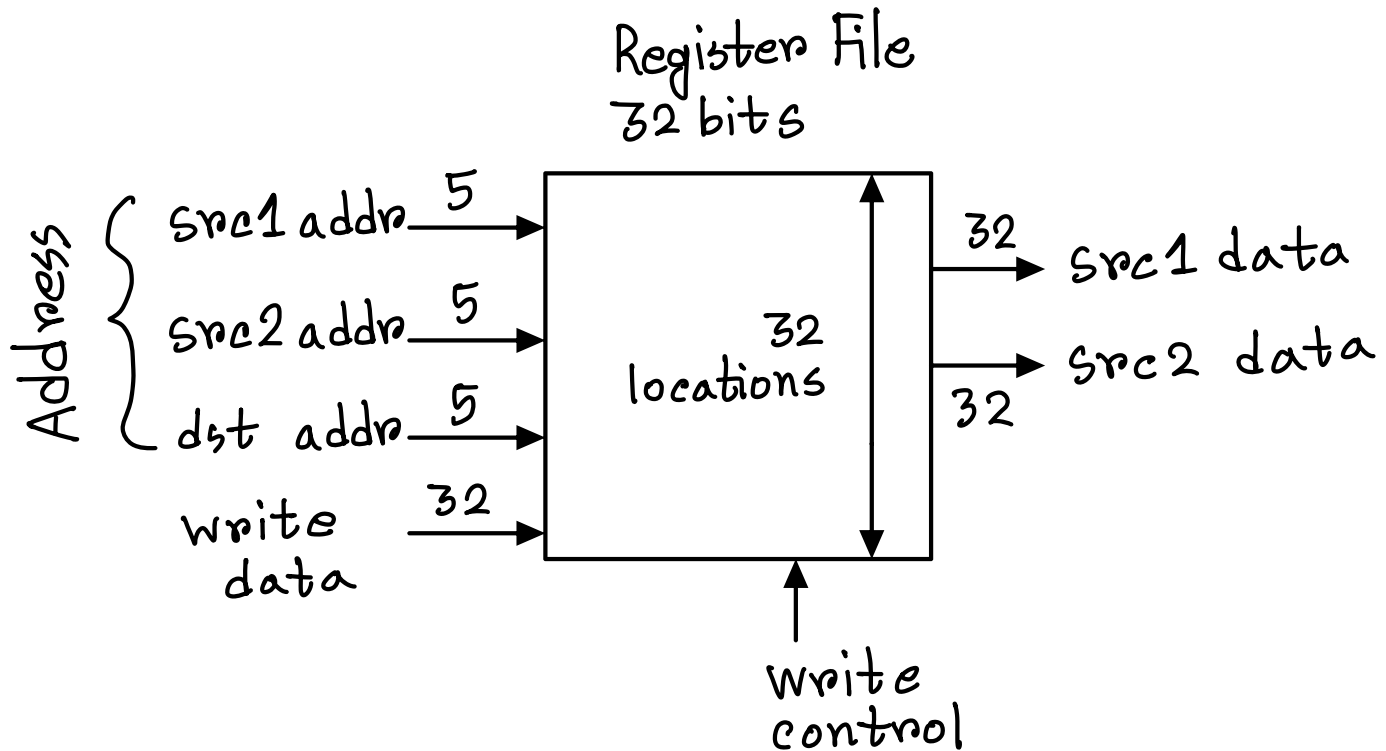


Quiz - Chapter

MIPS Register File

32 bits register
 $= 2^5$



add \$s1, ^{sr1} \$t0, ^{sr2} \$t1

Unsigned Binary Integers

0 to $2^n - 1$

0 to 255 if $n = 8$

$$x = x_{n-1}2^{n-1} + x_{n-2}2^{n-2} + \dots + x_12^1 + x_02^0$$

2's-Complement Signed Integers

$$+2 = 000010$$

inverse

$$111101$$

$$-2 = 111110$$

add +1

$$1111110$$

Sign Extension

8 bit to 16 bit

$$\$t0 - \$t7 \rightarrow 8-15 \rightarrow \$8 - \$15$$

$$\$t8 - \$t9 \rightarrow 24-25 \rightarrow \$24 - \$25$$

$$\$s0 - \$s7 \rightarrow 16-23 \rightarrow \$16 - \$23$$

MIPS R-format Instructions = 32 bits

i) R Type :

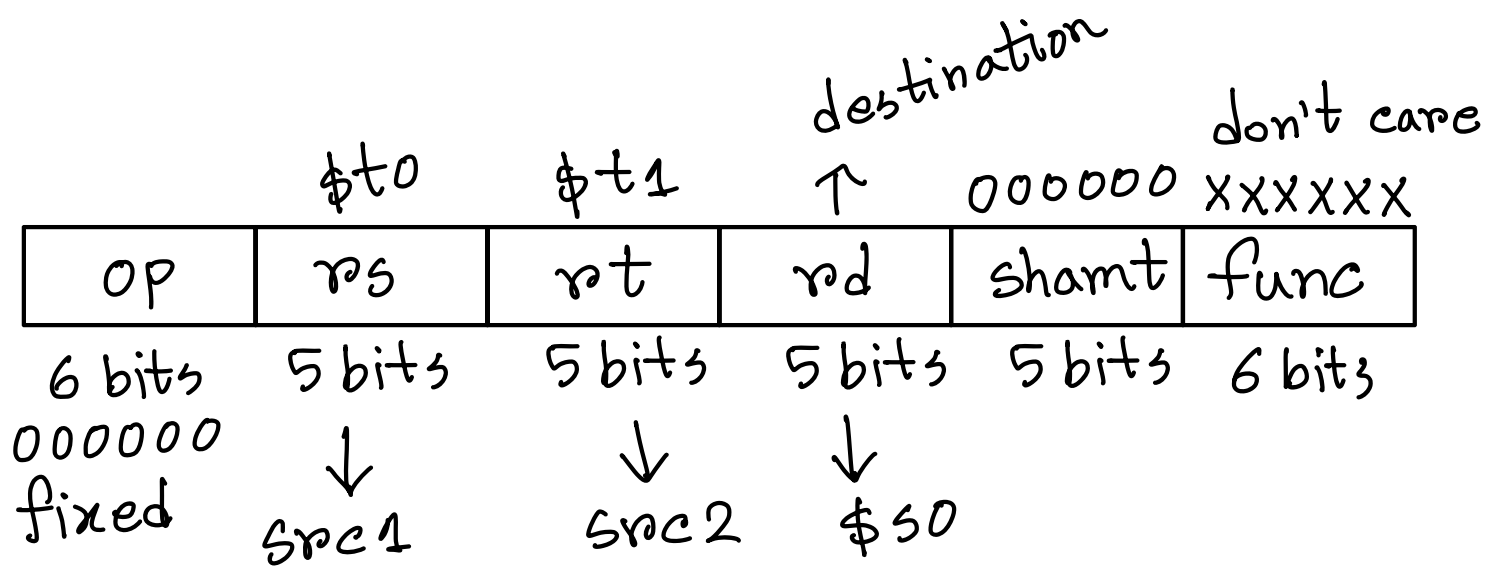
add, sub, and, or, sll, srl

ii) I Type:

lw, sw, add, beq, bne

iii) J Type:

j (Jump)



8 → 5 bit
9 → 5 bit
16 → 5 bit

add \$s0, \$t0, \$t1

↓
5 → 000101

shamt - 00000

[As its add operation]

sll, srl → that
shifts
it will remain 0.

For func: If question includes 5 bit suppose

$$5 = 000101$$

6 bits

If not →

XXXXXX → don't care

add: $\overset{rd}{\uparrow} \$t0, \overset{rs}{\uparrow} \$s1, \overset{rt}{\uparrow} \$s2$

Special	$\$s1$	$\$s2$	$\$t0$	0	add
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0	17	18	8	0	32
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000000	10001	10010	01000	000000	100000
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Bin → hex

I - format:

			address
op	rs	rt	constant
6	5	5	16

If question allows op = something
→ find 6 bit binary

else → XXXXXX

X - 0 or 1

lw \$t0, 12(\$s0)
 sw \$t1, 24(\$s1)

\downarrow \downarrow
 rt rs

$\begin{matrix} \text{rt} & \text{rs} \\ \uparrow & \uparrow \end{matrix}$
 add: \$s0, \$s1, 2
 \downarrow
 constant
 = 16 bit

→ Base Address \$s0

A[3]

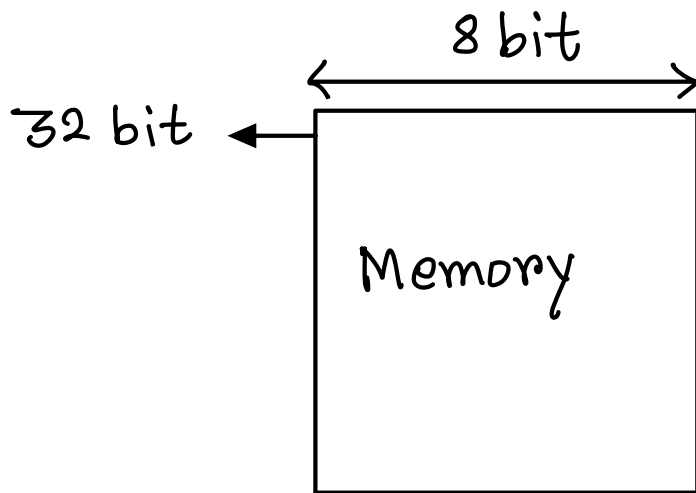
Memory Address
 $= (3 \times 4) + BA$
 $= 12(\$s0)$

	\$s0	\$t0	address
OP	rs	rt	constant

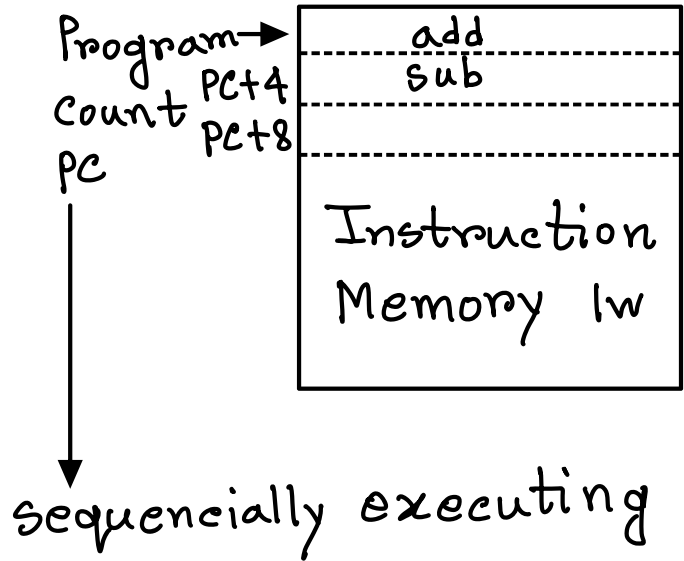
12 → 16 bits
 24 → 16 bits

A[6] = 6 × 4 + BA
 $= 24(\$s1)$

→ Conditional Operations and Branch
Address:



$$= 2^{32} \times 8$$



C Code →
Mips Code →
i) add
ii) sub
iii) lw

$$4 \text{ slots} = 4 \times 8 \text{ bits} \\ = 32 \text{ bits}$$

→ I-format:
beq \$a, \$b, L1
bne \$8, \$9, L1

