EGC442
Class Notes
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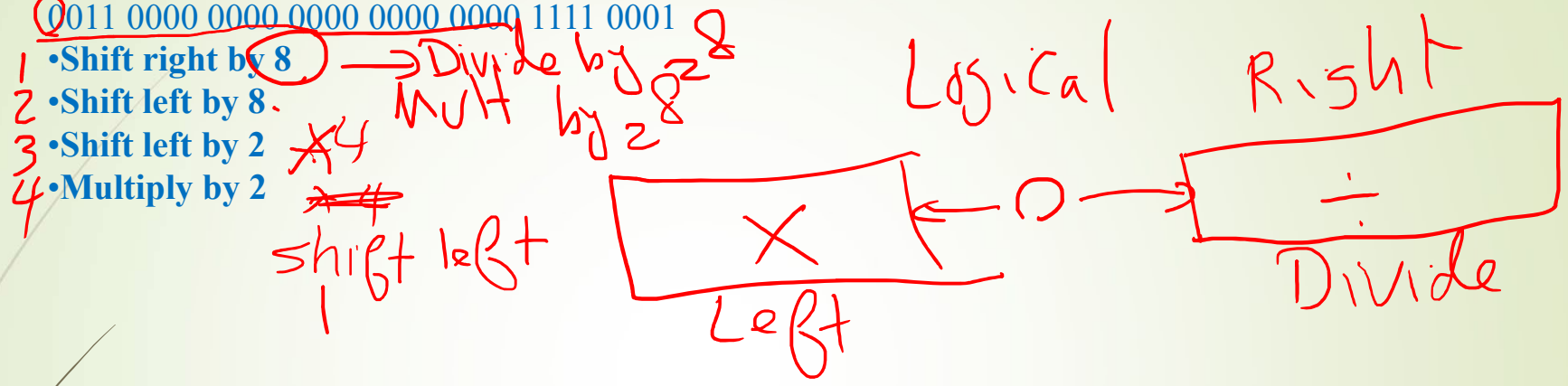
•Given the following initial value, determine the resulting value for the given operation.

0011 0000 0000 0000 0000 0000 1111 0001

1. •**Shift right by 8**
2. •**Shift left by 8**
3. •**Shift left by 2**
4. •**Multiply by 2**



0000 0000 0000 0000 1111 0001 0000 0000 2

0000 0000 0011 0000 0000 0000 0000 0000 1

1100 0000 0000 0000 0000 0011 1100 0100 3

0110 0000 0000 0000 0000 0001 1110 0010 4

- Given the following initial values, determine the resulting value for the given operation.

x: 0011 0000 0000 0000 0000 0000 1111 0001

y: 0000 0000 0000 0000 0000 0000 1111 1111

- **x AND y**
- **x OR y**
- **x NOR y**
- **NOT x**

$s1

$a2

0x000000F1

0x300000FF

0xCFFFFF00

0xCFFFFF0E

and $t2, $s1, $a2

$t2

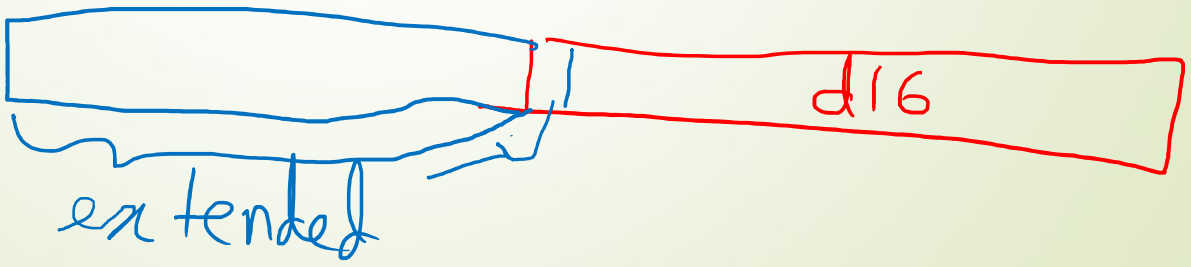
x AND y → 0000 0000 0000 0000 0000 0000 1111 0001

x OR y → 0011 0000 0000 0000 0000 0000 1111 1111

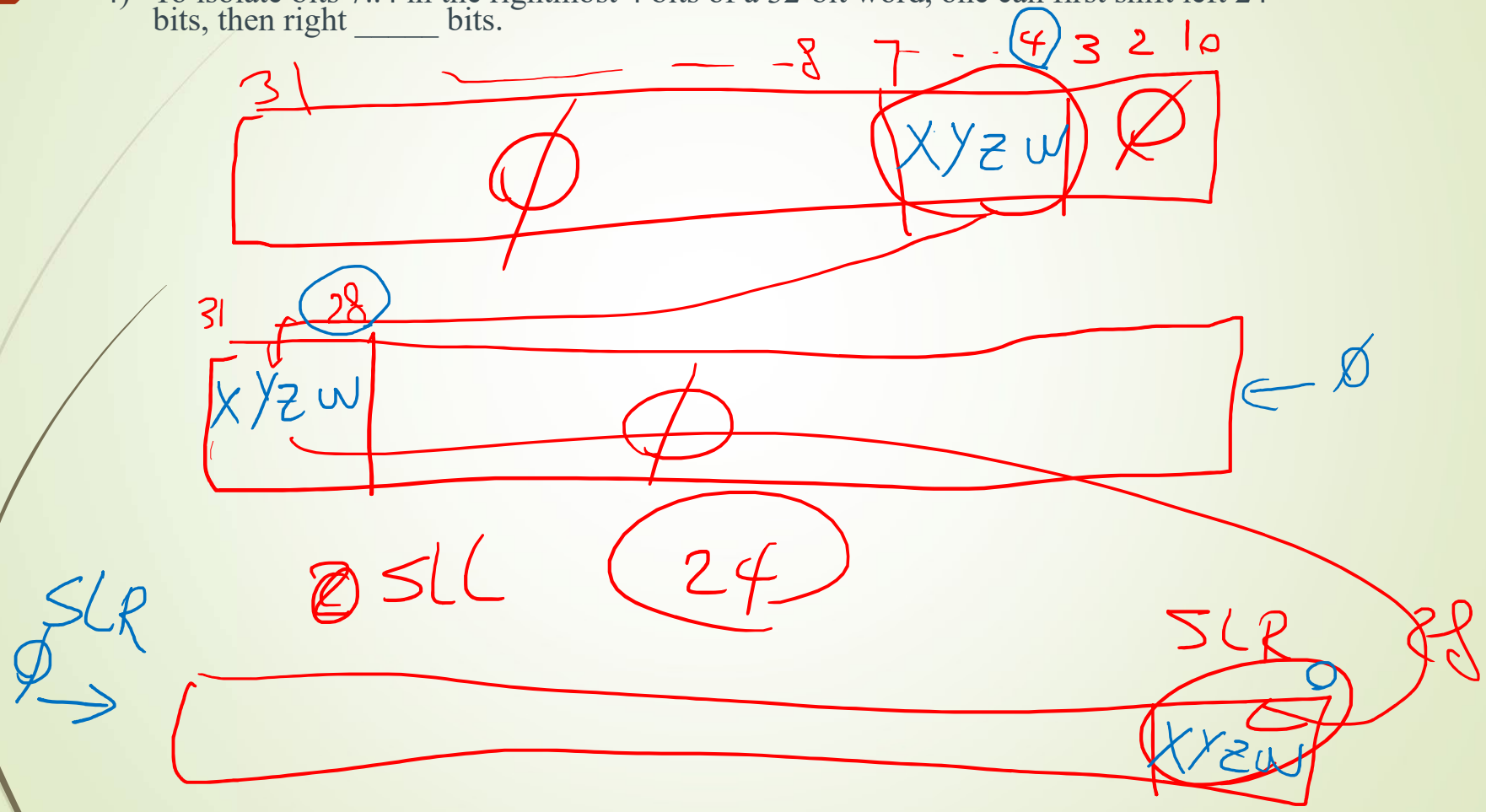
NOT x → 1100 1111 1111 1111 1111 1111 0000 1110

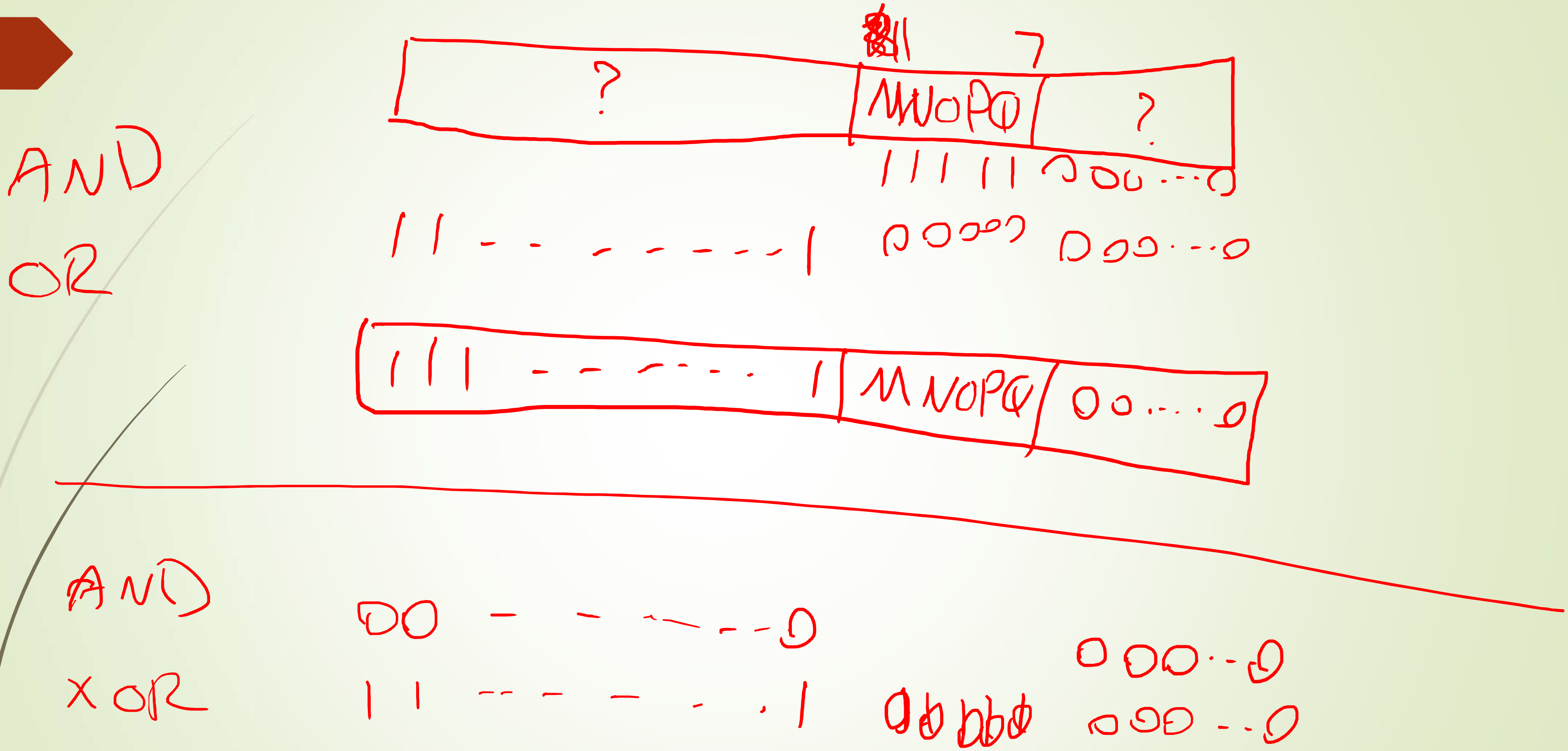
x NOR y → 1100 1111 1111 1111 1111 1111 0000 0000

andi $t2, $s1, d16



4) To isolate bits 7..4 in the rightmost 4 bits of a 32-bit word, one can first shift left 24 bits, then right _____ bits.




AND
OR
?
MNOPQ
?
MNOPQ
AND
XOR

Assume $s1 has 50 and $s2 has 30. Given this code:

```
        bne  $s3, $s4, Else
        add  $s0, $s1, $s2
        j    Exit
Else:   sub  $s0, $s1, $s2
Exit:
```

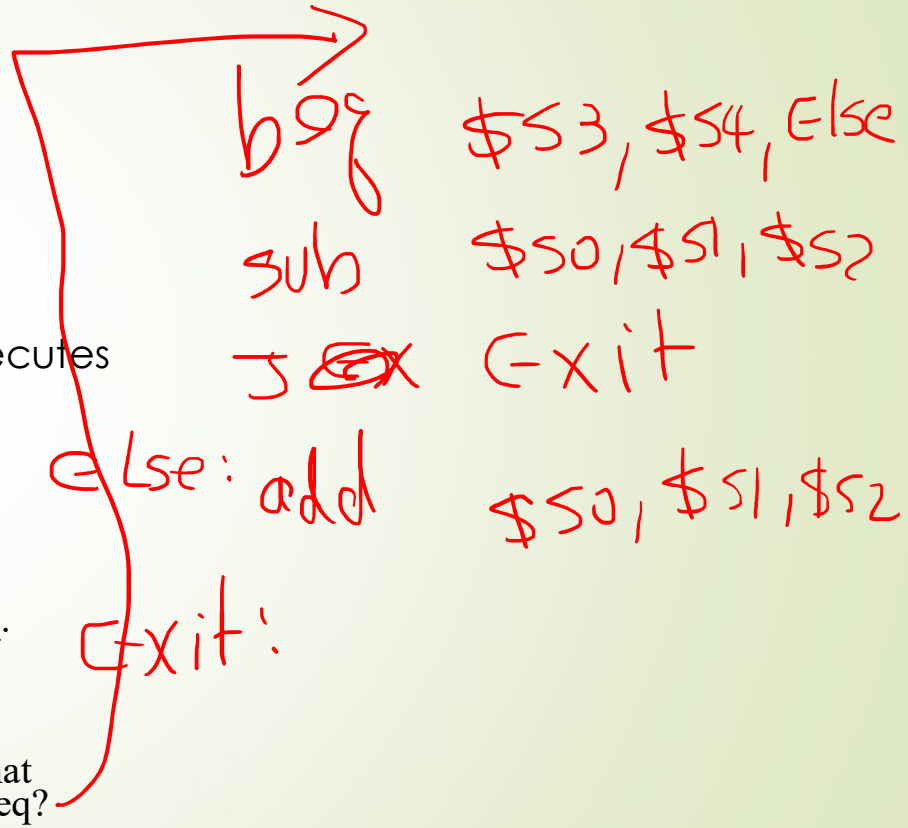
4) What is "bne" short for?

5) If $s3 is 9 and $s4 is 9, which instruction executes after bne?

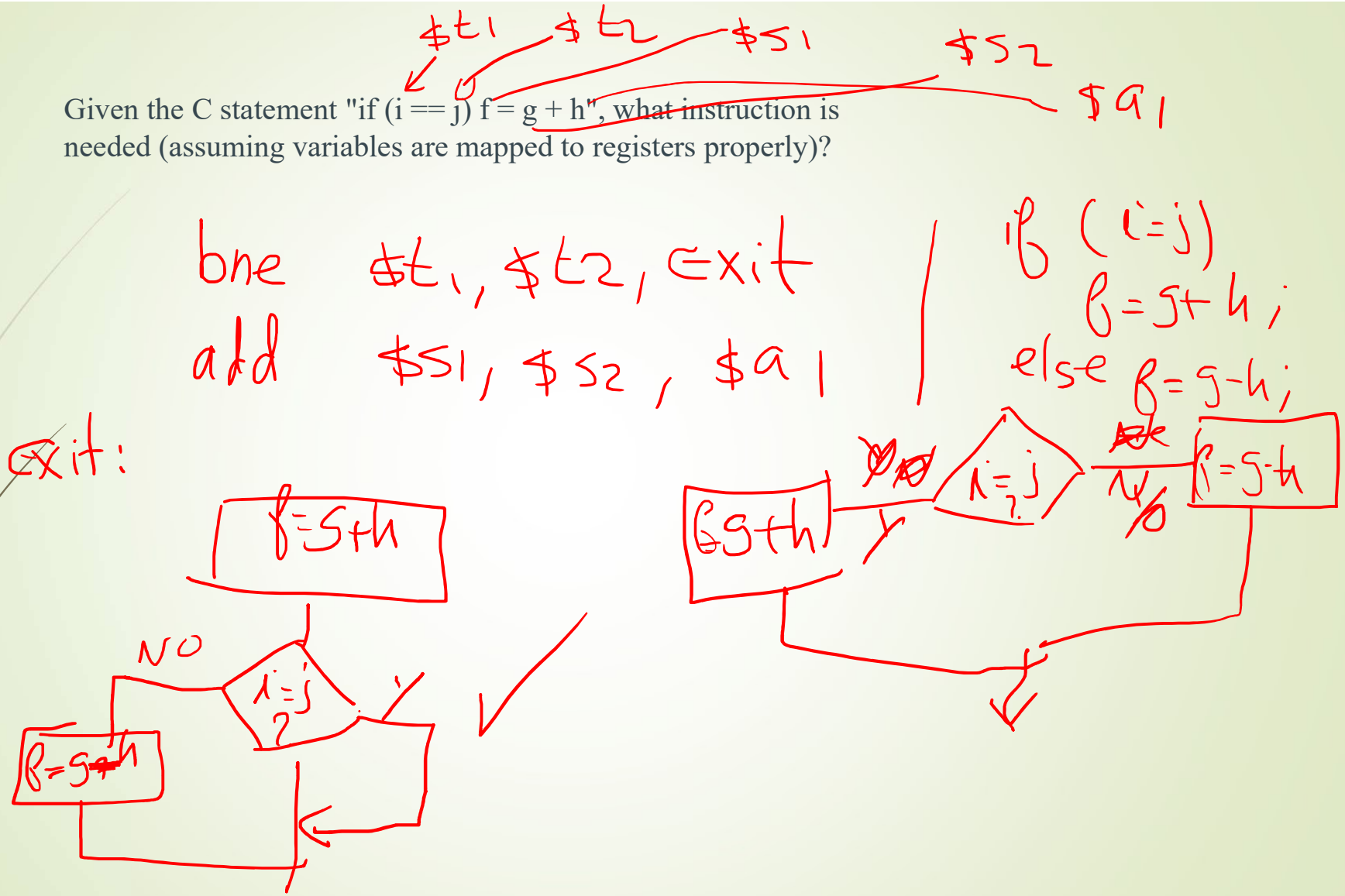
add

4) j Exit is executed when $s3 and $s4 values equal.

4) If the first instruction were beq rather than bne, what instruction should then appear immediately after beq?



Given the C statement "if (i == j) f = g + h", what instruction is needed (assuming variables are mapped to registers properly)?



4) A first part of a main program calls procedure Power to compute x^y, where x is in $s0, y is in $s1. Later, the program is to call Power again, but this time x is in $s3 and y is in $s7. How might the program pass the parameter values to Power?

Copy $s3 to $a0, and $s7 to $a1.

Not possible; x and y must be in $s0 and $s1.

we are stuck with what subroutine expects.

Assume $s0 has the binary number $1111\ 0000\ 0000\ 0000\ 0000\ 0000\ 0000\ 1111_{two}$ and $s1 has the binary number $0000\ 0000\ 0000\ 0000\ 0000\ 0000\ 0000\ 1111_{two}$.

4) What is the value of $t0 after the following instruction?

slt $t0, $s0, $s1

1_{ten}

0_{ten}

4) What is the value of $t0 after the following instruction?

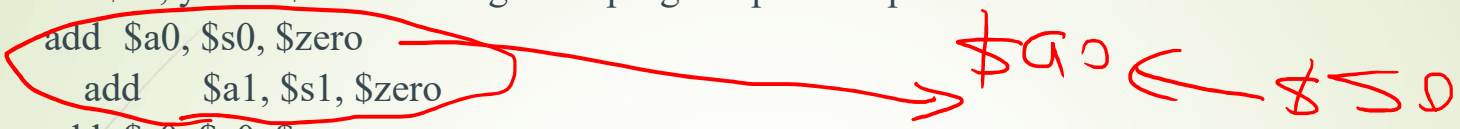
sltu $t0, $s0, $s1

1_{ten}

0_{ten}

4) A main program will call a procedure Power for computing x^y. Currently, x is in $s0, y is in $s1. How might the program pass the parameter values to Power?

```
add  $a0, $s0, $zero
   add      $a1, $s1, $zero
add  $s0, $a0, $zero
   add      $s1, $a1, $zero
add  $v0, $s0, $zero
   add      $v1, $s1, $zero
```



14) Given the C loop: while (x != y) { ... }. != means not equal, and assume $s0 is x and $s1 is y. Complete the compiled loop:

Loop: beq $s0 $s1 Exit
Loop body
j Loop
Exit:

- ✓ beq
- bne

slt rd, $s, rt

slti rt, rs, d16

rs - rt { < 0 rd = 1
≥ 0 rd = 0

rs - d16 { < 0 rt = 1
≥ 0 rd = 0

15) Given: for (i = 0; **i < 9**; ++i) { ... } where i is $s0. Which comparison instruction is most appropriate?

slt $t0, $s0, 9

slti $t0, $s0, 9

slti $t0, $s0, 0

17) Given: for (i = 1; i < j; ++i) { loop body } where i is $s0, j is $s1. Complete the indicated instruction:

```
    Loop: slt    $t3, $s0, $s1
          _____  $t3, $zero, Exit
# Loop body
          j      Loop
    Exit:
```

- beq
- bne
- slti

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