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Computer Architecture and Organization.  
Section 1.

2.9)  $\text{Sll } \$t0, \$s3, 2$   
 $\text{Sll } \$t1, \$s4, 2$   
 $\text{add } \$t0, \$t0, \$s6$   
 $\text{add } \$t1, \$t1, \$s6$   
 $\text{lw } \$t0, 0(\$t0)$   
 $\text{lw } \$t1, 0(\$t1)$   
 $\text{add } \$t2, \$t1, \$t0$   
 $\text{sw } \$t2, 32(\$s7)$

2.14)

0000 0010 0001 0000 1000  
 0000 0010 0000 two  
 $\text{op} = 6\text{bit}$   
 $\text{rs} = 5\text{bit}$   $\text{rt} = 5\text{bit}$   $\text{rd} = 5\text{bit}$   $\text{shamt} = 5\text{bit}$   
 000000 10000 10000 10000 00000  
 100000  
 $\text{funct} = 6\text{bit}$   
 using table

$\therefore \text{add } \$s0, \$s0, \$s0$

2.16)  $\text{op} = 0 \Rightarrow 000000$  (6bits)  
 $\text{rs} = 3 \Rightarrow 00011$  (5bits)  
 $\text{rt} = 2 \Rightarrow 00010$  (5bits)  
 $\text{rd} = 3 \Rightarrow 00011$  (5bits)  
 $\text{shamt} = 0 \Rightarrow 00000$  (5bits)  
 $\text{funct} = 34 \Rightarrow 100010$  (6bits)

$\therefore 000000 \cdot 00011 \cdot 00010 \cdot 00011 \cdot 00000 \cdot 100010$   
 $(0000 \cdot 0000 \cdot 0110 \cdot 0010 \cdot 0001 \cdot 1000 \cdot 0010 \cdot 0010)$

2.17)  $\text{op}$   $\text{rs}$   $\text{rt}$   $\text{constant}$   
 6bits 5bits 5bits 16bits

$\text{op} = 0 \times 23 \Rightarrow 35 \Rightarrow 100011$

$\text{rs} = 1 \Rightarrow 00001$

$\text{rt} = 2 \Rightarrow 00010$

$\text{const} = 0 \times 4 \Rightarrow 4 = 0000000000000100$

$\therefore 100011 \cdot 00001 \cdot 00010 \cdot 0000 \cdot 0000 \cdot 0000 \cdot 0100$

$(1000 \cdot 1100 \cdot 0010 \cdot 0010 \cdot 0000 \cdot 0000 \cdot 0000 \cdot 0100)$

2.23)  $\text{setd} = 0 \times 001001000$

$\hookrightarrow$  greater than 0  $\Rightarrow$   $\$t2$  will be 1

$\text{bne } \$t2, \$0, \text{ELSE}$

$\hookrightarrow$   $\$t2 \neq 0$  is true ( $\$t2 = 1$ ).

$\therefore$  Go to ELSE

ELSE:  $\text{addi } \$t2, \$t2, 2$

$\hookrightarrow$   $\$t2 = \$t2 + 2$   
 $= 1 + 2$   
 $= 3$

$\therefore \underline{\$t2 = 3}$

2.26).

LOOP: st \$t2, \$0, \$t1

↳ \$t2 = result of \$0 < \$t1

beq \$t2, \$0, DONE

↳ if \$t2 is 0 jump to DONE

subi \$t1, \$t1, 1

↳ \$t1 = \$t1 - 1

addi \$s2, \$s2, 2

↳ \$s2 = \$s2 + 2

j LOOP

↳ jump to LOOP

2.26.1) LOOP will be executed for 10 times

↳ \$s2 will be added 2 for 10 times

∴ 20

2.27)

FOR1:

beq \$t0, \$s0, DONE

move \$t1, \$zero

move \$t4, \$s2

FOR2:

beq \$t1, \$s1, FOR1

add \$t3, \$t0, \$t1

sw \$t3, 0(\$t4)

addi \$t4, \$t4, 4

addi \$t1, \$t1, 1

st \$t3, \$t1, \$s1

bne \$s3, \$zero, FOR2

addi \$t0, \$t0, 1

j FOR1

DONE:

while(i){

temp = 0 < i? 1:0;

if(temp == 0) break;

i -= 1;

B += 2;

}

2.26.3)

5N + 2

↳ 5 Instructions × N times

+ 2 Instructions for

checking