2a)

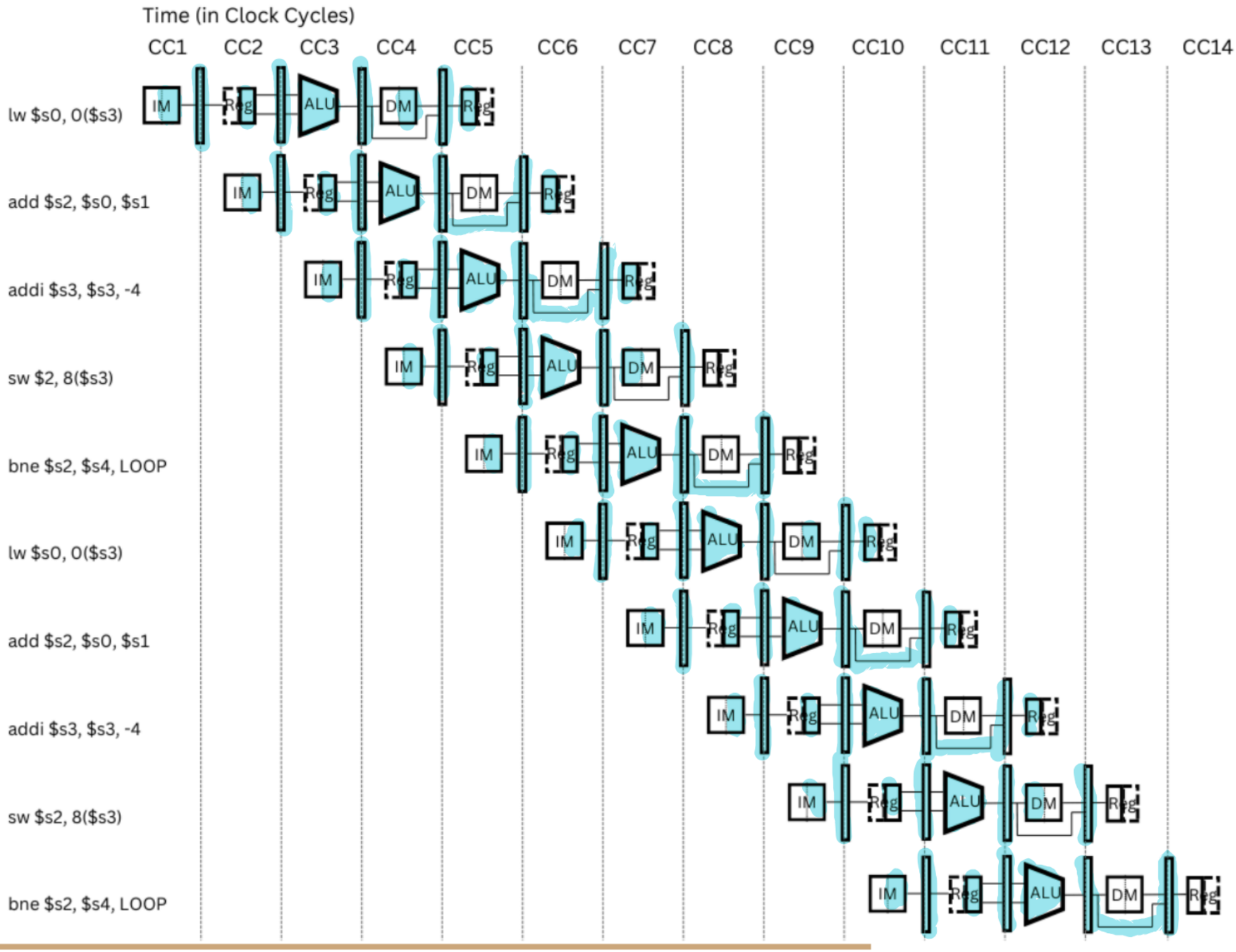
```
0b      0110_1001
      x 0000_1001
      ------------
        0110_1001
       ----------  0
      ----------  00
  0110_0100_1000
  --------------------
```

0b 0110_1011_0001

2b)

```
      0000_1011 R 110
    ------------------
1001 ) 0110_1001
       0110_1
       ------
       0x0   01 10
       ----------
          1001
          ----
          1111
          1001
          ----
           110
```

Write	Read


Time (in Clock Cycles)
CC1
CC2
CC3
CC4
CC5
CC6
CC7
CC8
CC9
CC10
CC11
CC12
CC13
CC14
lw $s0, 0($s3)
add $s2, $s0, $s1
addi $s3, $s3, -4
sw $2, 8($s3)
bne $s2, $s4, LOOP
lw $s0, 0($s3)
add $s2, $s0, $s1
addi $s3, $s3, -4
sw $s2, 8($s3)
bne $s2, $s4, LOOP
IM
Reg
ALU
DM
Reg

The values in the data segment represents the stack pointer's return point at various points in the program

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+c)	Value (+10)	Value (+14)	Value (+18)	Value (+1c)
0x7fffefe0	4194604	4194604	4194604	4194604	4194604	4194604	4194464	0
0x7ffff000	0	0	0	0	0	0	0	0
0x7ffff020	0	0	0	0	0	0	0	0
0x7ffff040	0	0	0	0	0	0	0	0
0x7ffff060	0	0	0	0	0	0	0	0
0x7ffff080	0	0	0	0	0	0	0	0
0x7ffff0a0	0	0	0	0	0	0	0	0
0x7ffff0c0	0	0	0	0	0	0	0	0
0x7ffff0e0	0	0	0	0	0	0	0	0
0x7ffff100	0	0	0	0	0	0	0	0
0x7ffff120	0	0	0	0	0	0	0	0
0x7ffff140	0	0	0	0	0	0	0	0
0x7ffff160	0	0	0	0	0	0	0	0
0x7ffff180	0	0	0	0	0	0	0	0

current $sp ☑ Hexadecimal Addresses ☐ Hexadecimal Values ☐ ASCII

Mars Messages | Run I/O

```
Give me a number between 1 and 100 (0 to stop): 2
Give me a second number between 2 and 100 (0 to stop): 8
Adding all integers from 2 to 8ITERATIVE: 5 9 14 20 27 35 RECURSIVE: 5 9 14 20 27 35 Give me a number between 1 and 100 (0 to stop): 3
Give me a second number between 2 and 100 (0 to stop): 9
Adding all integers from 3 to 9ITERATIVE: 7 12 18 25 33 42 RECURSIVE: 7 12 18 25 33 42 Give me a number between 1 and 100 (0 to stop):  25 33 42
```

Clear

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+c)	Value (+10)	Value (+14)	Value (+18)	Value (+1c)
0x7fffefe0	0	0	4194604	4194604	4194604	4194604	4194464	0
0x7ffff000	0	0	0	0	0	0	0	0
0x7ffff020	0	0	0	0	0	0	0	0
0x7ffff040	0	0	0	0	0	0	0	0
0x7ffff060	0	0	0	0	0	0	0	0
0x7ffff080	0	0	0	0	0	0	0	0
0x7ffff0a0	0	0	0	0	0	0	0	0
0x7ffff0c0	0	0	0	0	0	0	0	0
0x7ffff0e0	0	0	0	0	0	0	0	0
0x7ffff100	0	0	0	0	0	0	0	0
0x7ffff120	0	0	0	0	0	0	0	0
0x7ffff140	0	0	0	0	0	0	0	0
0x7ffff160	0	0	0	0	0	0	0	0
0x7ffff180	0	0	0	0	0	0	0	0

current $sp ☑ Hexadecimal Addresses ☐ Hexadecimal Values ☐ ASCII

Mars Messages | Run I/O

```
Give me a number between 1 and 100 (0 to stop): 3
Give me a second number between 2 and 100 (0 to stop): 7
Adding all integers from 3 to 7ITERATIVE: 7 12 18 25 RECURSIVE: 7 12 18 25 Give me a number between 1 and 100 (0 to stop): 25
```

Clear