►Solution◄

Question 1: (5 points)

Consider a 2 GHz processor that has the following CPIs for different instructions:

Instruction	Type	CPI
Arithmetic	addition and subtraction	3
Control	branches and jumps	4
Memory	loads and stores	5

If the initial value of `$a1 = 3`, what is the CPU time for the following fragment of MIPS assembly language code that will run on this processor?

```
bzero: beq $a1, $zero, end
loop:  sb $zero, 0($a0)
       addi $a0, $a0, 1
       addi $a1, $a1, -1
       bne $a1, $zero, loop
end:   jr $ra
```

Solution:

$53 \times (1/(2 \times 10^9)) = 26.5 \times 10^{-9}$ seconds.