Problem FC-5 (3 parts) Loops in MIPS and C

Part A Write a MIPS code fragment that corresponds to this C fragment. Assume $1 holds `N`, and $2 holds `Sum`. Feel free to use additional registers, but use a minimum number of instructions and registers.

```
Sum = 0;
while (N!=0){
   Sum += N&1;
   N = N >> 1;
}
```

Label	Instruction	Comment
	addi $2, $0, 0	# Sum = 0;
Loop:	beq $1, $0, Exit	# exit if N == 0
	andi $3, $1, 1	# $3: N&1
	add $2, $2, $3	# Sum +=N&1;
	srl $1, $1, 1	# N = N >>1
	j Loop	# continue looping
Exit:	....	

Part B Briefly describe what the code fragment in **Part A** computes.

It counts the number of "1"s in the binary string N.

Part C Write MIPS code that implements the following expression. The loop body is already listed. Use **$3** for **N** and additional registers as needed.

```
for (N = 0; N < 100; N++) { loop body }
```

Label	Instruction	Comment
	addi $3, $0, 0	# init N
Loop:	slti $4, $3, 100	# cmp N < 100
	beq $4, $0, Done	# exit if >= 100
	…	# loop body
	addi $3, $3, 1	# N++
	j Loop	# repeat
Done		