

Computer Architecture Lab – CS322

Name: M. Maheeth Reddy

Roll No.: 1801CS31

Date: 18 November 2020

Lab 10 – Study of MIPS, Single/Multi-Cycle/Pipelined Processor Architecture

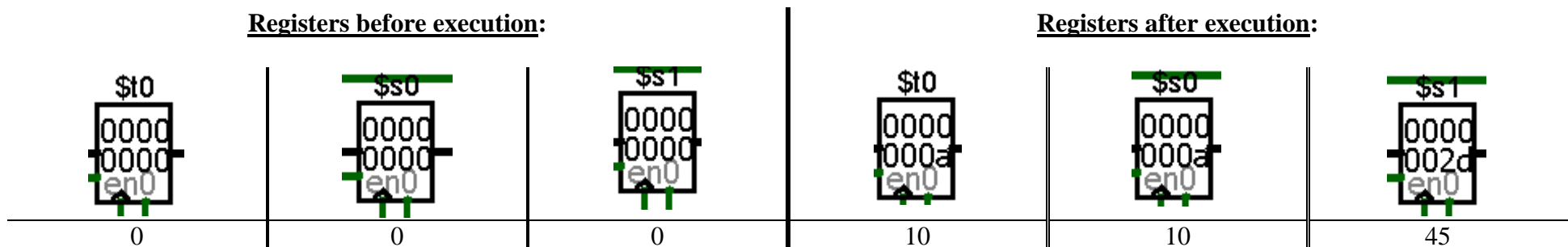
Task 1:

Given Program and its Machine Code

<u>Labels</u>	<u>Instruction</u>	<u>Machine Code</u>
	add \$s0, \$0, \$0	00008020
	add \$s1, \$0, \$0	00008820
	addi \$t0, \$0, 10	2008000A
loop:		
	slt \$t1, \$s0, \$t0	0208482A
	beq \$t1, \$0, done	11200003
	add \$s1, \$s1, \$s0	02308820
	addi \$s0, \$s0, 1	22100001
	j loop	08000003
done:		

Registers before execution:

Registers after execution:



Task 2:

Number of Cycles in Single Cycle Architecture = 55

Number of Cycles in Multi-Cycle Architecture = 199

Number of Cycles in Pipelined Architecture = 128

$$\text{Cycles per Instruction (CPI)} = \frac{\text{Total program execution cycles}}{\text{Number of Instructions executed}}$$

Total Number of instructions executed is 55.

$$\text{For Single Cycle Architecture, CPI} = \frac{55}{55} = 1$$

$$\text{For Multi-Cycle Architecture, CPI} = \frac{199}{55} = 3.62$$

$$\text{For Pipelined Architecture, CPI} = \frac{128}{55} = 2.33$$

Given Program and its Machine Code

<u>Labels</u>	<u>Instruction</u>	<u>Execution Count</u>
	add \$s0, \$0, \$0	1
	add \$s1, \$0, \$0	1
	addi \$t0, \$0, 10	1
loop:		
	slt \$t1, \$s0, \$t0	11
	beq \$t1, \$0, done	11
	add \$s1, \$s1, \$s0	10
	addi \$s0, \$s0, 1	10
	j loop	10
done:		
Total number of Instructions executed		55