

The Program:

Machine Code	Basic Code	Original Code
0x00000033	add x0 x0 x0	add x0, x0, x0
0x01100113	addi x2 x0 17	addi x2, x0, 17
0xff100093	addi x1 x0 -15	addi x1, x0, -15
0x0020d463	bge x1 x2 8	bge x1, x2, L1
0x002080b3	add x1 x1 x2	add x1, x1, x2
0x0020f463	bgeu x1 x2 8	L1: bgeu x1, x2, L2
0x002080b3	add x1 x1 x2	add x1, x1, x2
0xff30b193	sltiu x3 x1 -13	L2: sltiu x3, x1, -13
0xff30a213	slti x4 x1 -13	slti x4, x1, -13
0x01504293	xori x5 x0 21	xori x5, x0, 21
0x00229293	slli x5 x5 2	slli x5, x5, 2
0x00116263	bltu x2 x1 4	bltu x2, x1, L3
0x00429333	sll x6 x5 x4	L3: sll x6, x5, x4
0x0032d3b3	srl x7 x5 x3	srl x7, x5, x3
0x4032d433	sra x8 x5 x3	sra x8, x5, x3
0x0032e4b3	or x9 x5 x3	or x9, x5, x3

Register File from Venus Simulator:

	Registers	Memory
zero	0	
ra (x1)	19	
sp (x2)	17	
gp (x3)	1	
tp (x4)	0	
t0 (x5)	84	
t1 (x6)	84	
t2 (x7)	42	
s0 (x8)	42	
s1 (x9)	85	
a0 (x10)	0	
a1 (x11)	0	
a2 (x12)	0	
a3 (x13)	0	
a4 (x14)	0	

Register File Testing Results:

			17200 Hz	17400 Hz	17600 Hz	17800 Hz	18000 Hz	18200 Hz
22 [31:0]	0				0			
21 [31:0]	0				0			
20 [31:0]	0				0			
19 [31:0]	0				0			
18 [31:0]	0				0			
17 [31:0]	0				0			
16 [31:0]	0				0			
15 [31:0]	0				0			
14 [31:0]	0				0			
13 [31:0]	0				0			
12 [31:0]	0				0			
11 [31:0]	0				0			
10 [31:0]	0				0			
9 [31:0]	0		0	X		85		
8 [31:0]	0	0	X			42		
7 [31:0]	0	0	X			42		
6 [31:0]	0	0	X			84		
5 [31:0]	0				84			
4 [31:0]	0				0			
3 [31:0]	0				1			
2 [31:0]	0				17			
1 [31:0]	0				19			
0 [31:0]	0				0			

Initialization Code:

```
initial begin
{mem[3],mem[2],mem[1],mem[0]}=32'h00000033;
{mem[7],mem[6],mem[5],mem[4]}=32'h01100113;
{mem[11],mem[10],mem[9],mem[8]}=32'hff100093;
{mem[15],mem[14],mem[13],mem[12]}=32'h0020d463;
{mem[19],mem[18],mem[17],mem[16]}=32'h002080b3;
{mem[23],mem[22],mem[21],mem[20]}=32'h0020f463;
{mem[27],mem[26],mem[25],mem[24]}=32'h002080b3;
{mem[31],mem[30],mem[29],mem[28]}=32'hff30b193;
{mem[35],mem[34],mem[33],mem[32]}=32'hff30a213;
{mem[39],mem[38],mem[37],mem[36]}=32'h01504293;
{mem[43],mem[42],mem[41],mem[40]}=32'h00229293;
{mem[47],mem[46],mem[45],mem[44]}=32'h00116263;
{mem[51],mem[50],mem[49],mem[48]}=32'h00429333;
{mem[55],mem[54],mem[53],mem[52]}=32'h0032d3b3;
{mem[59],mem[58],mem[57],mem[56]}=32'h4032d433;
{mem[63],mem[62],mem[61],mem[60]}=32'h0032e4b3;

end
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