Lab 2

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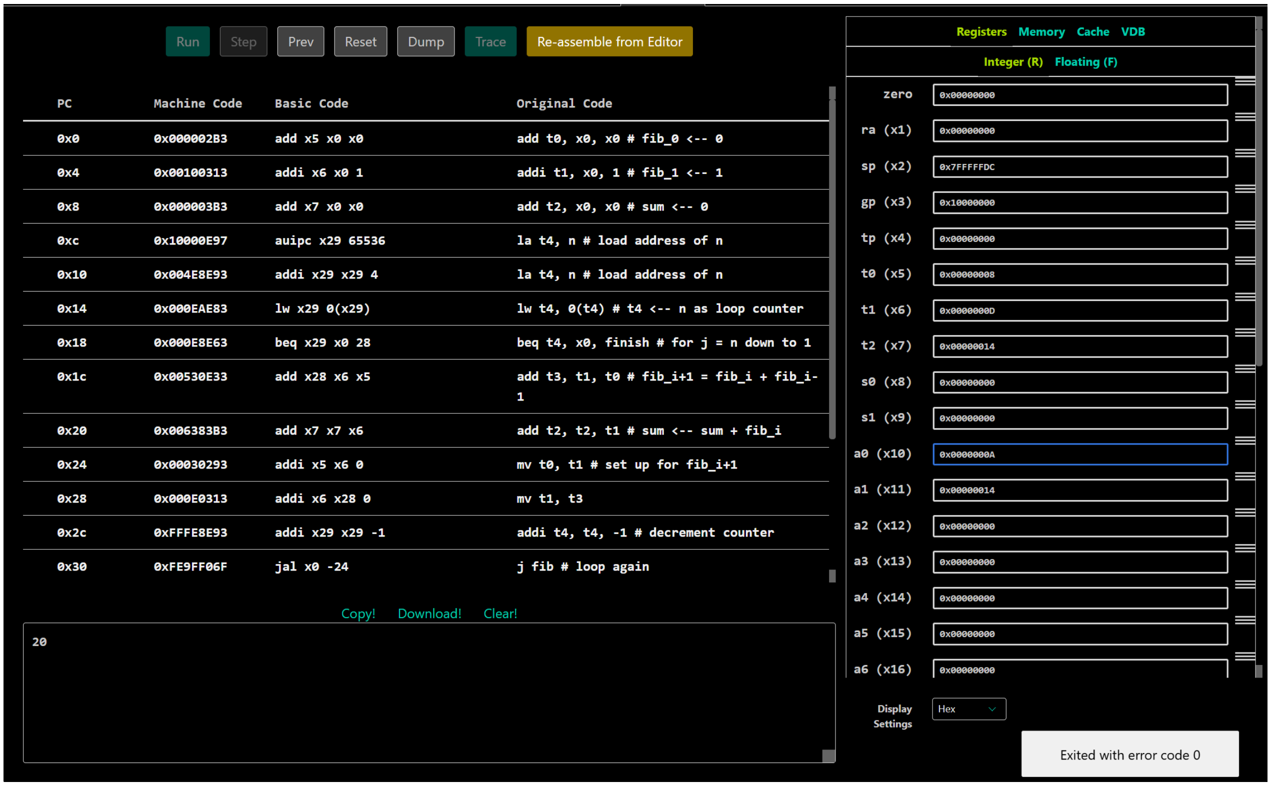
Task 1

Screenshot of run w/ `n=6` :



PC	Machine Code	Basic Code	Original Code
0x0	0x000002B3	add x5 x0 x0	add t0, x0, x0 # fib_0 <-- 0
0x4	0x00100313	addi x6 x0 1	addi t1, x0, 1 # fib_1 <-- 1
0x8	0x000003B3	add x7 x0 x0	add t2, x0, x0 # sum <-- 0
0xc	0x10000E97	auipc x29 65536	la t4, n # load address of n
0x10	0x004E8E93	addi x29 x29 4	la t4, n # load address of n
0x14	0x000EAE83	lw x29 0(x29)	lw t4, 0(t4) # t4 <-- n as loop counter
0x18	0x000E8E63	beq x29 x0 28	beq t4, x0, finish # for j = n down to 1
0x1c	0x00530E33	add x28 x6 x5	add t3, t1, t0 # fib_i+1 = fib_i + fib_i-1
0x20	0x006383B3	add x7 x7 x6	add t2, t2, t1 # sum <-- sum + fib_i
0x24	0x00030293	addi x5 x6 0	mv t0, t1 # set up for fib_i+1
0x28	0x000E0313	addi x6 x28 0	mv t1, t3
0x2c	0xFFFE8E93	addi x29 x29 -1	addi t4, t4, -1 # decrement counter
0x30	0xFE9FF06F	jal x0 -24	j fib # loop again

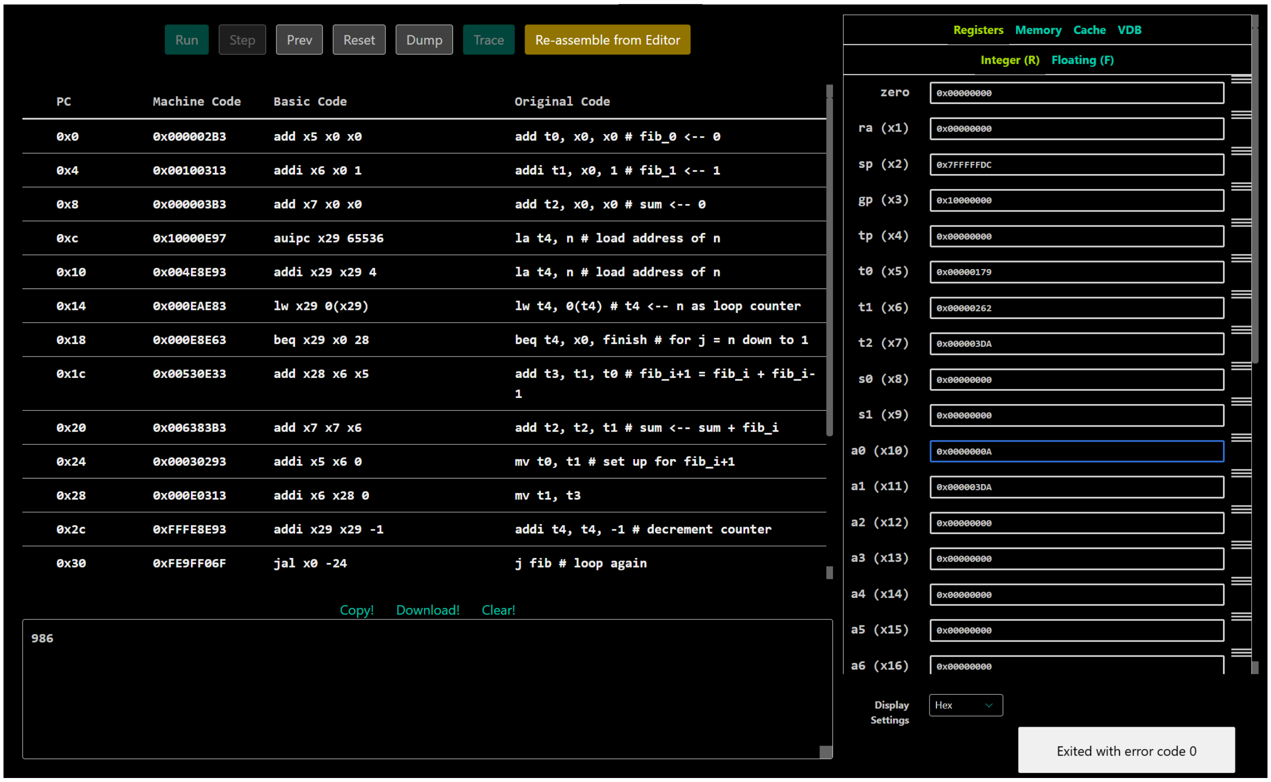
```
20
```

zero	0x00000000
ra (x1)	0x00000000
sp (x2)	0x7FFFFFDC
gp (x3)	0x10000000
tp (x4)	0x00000000
t0 (x5)	0x00000008
t1 (x6)	0x0000000D
t2 (x7)	0x00000014
s0 (x8)	0x00000000
s1 (x9)	0x00000000
a0 (x10)	0x0000000A
a1 (x11)	0x00000014
a2 (x12)	0x00000000
a3 (x13)	0x00000000
a4 (x14)	0x00000000
a5 (x15)	0x00000000
a6 (x16)	0x00000000

Display Settings: Hex

Exited with error code 0

Screenshot of run w/ `n=14` :



PC	Machine Code	Basic Code	Original Code
0x0	0x000002B3	add x5 x0 x0	add t0, x0, x0 # fib_0 <-- 0
0x4	0x00100313	addi x6 x0 1	addi t1, x0, 1 # fib_1 <-- 1
0x8	0x000003B3	add x7 x0 x0	add t2, x0, x0 # sum <-- 0
0xc	0x10000E97	auipc x29 65536	la t4, n # load address of n
0x10	0x004E8E93	addi x29 x29 4	la t4, n # load address of n
0x14	0x000EAE83	lw x29 0(x29)	lw t4, 0(t4) # t4 <-- n as loop counter
0x18	0x000E8E63	beq x29 x0 28	beq t4, x0, finish # for j = n down to 1
0x1c	0x00530E33	add x28 x6 x5	add t3, t1, t0 # fib_i+1 = fib_i + fib_i-1
0x20	0x006383B3	add x7 x7 x6	add t2, t2, t1 # sum <-- sum + fib_i
0x24	0x00030293	addi x5 x6 0	mv t0, t1 # set up for fib_i+1
0x28	0x000E0313	addi x6 x28 0	mv t1, t3
0x2c	0xFFFE8E93	addi x29 x29 -1	addi t4, t4, -1 # decrement counter
0x30	0xFE9FF06F	jal x0 -24	j fib # loop again

```
986
```

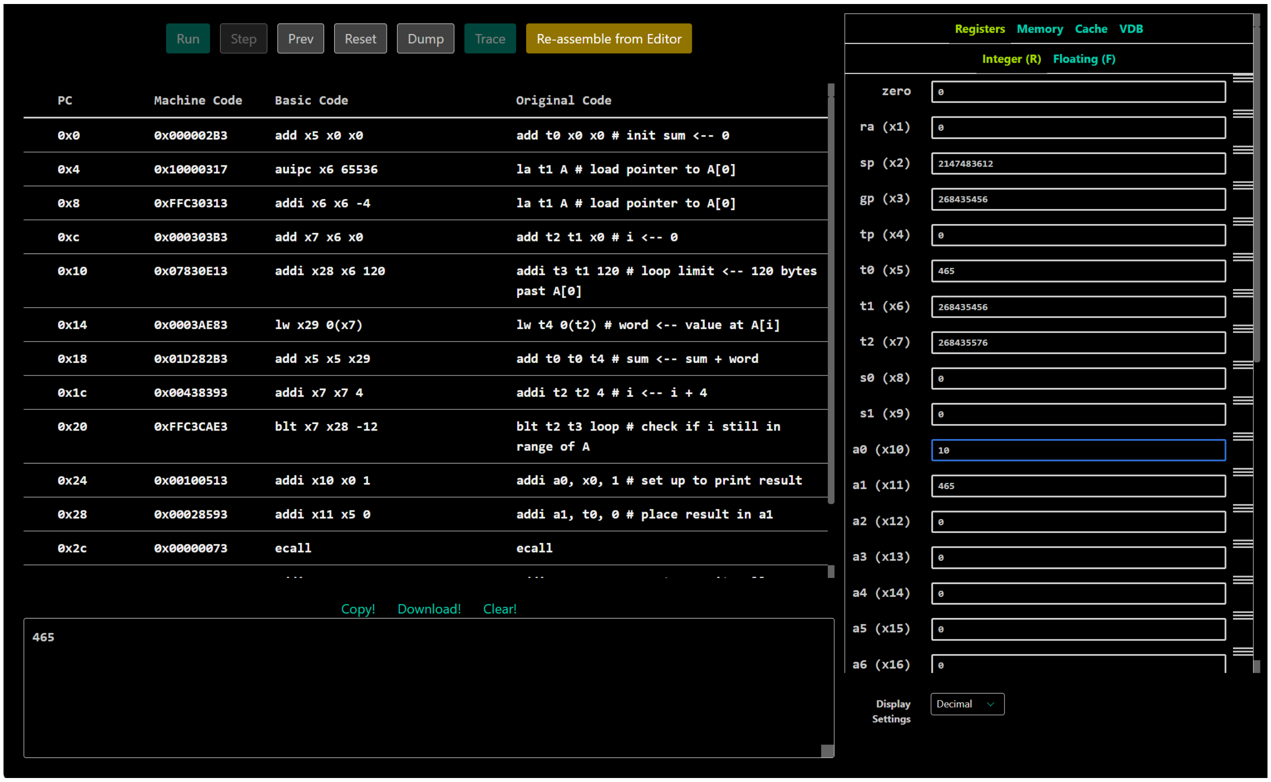
zero	0x00000000
ra (x1)	0x00000000
sp (x2)	0x7FFFFFDC
gp (x3)	0x10000000
tp (x4)	0x00000000
t0 (x5)	0x00000179
t1 (x6)	0x00000262
t2 (x7)	0x000003DA
s0 (x8)	0x00000000
s1 (x9)	0x00000000
a0 (x10)	0x0000000A
a1 (x11)	0x000003DA
a2 (x12)	0x00000000
a3 (x13)	0x00000000
a4 (x14)	0x00000000
a5 (x15)	0x00000000
a6 (x16)	0x00000000

Display Settings: Hex

Exited with error code 0

Task 2

Screenshot of run w/ `A=[1, 2, ... , 29, 30]`:



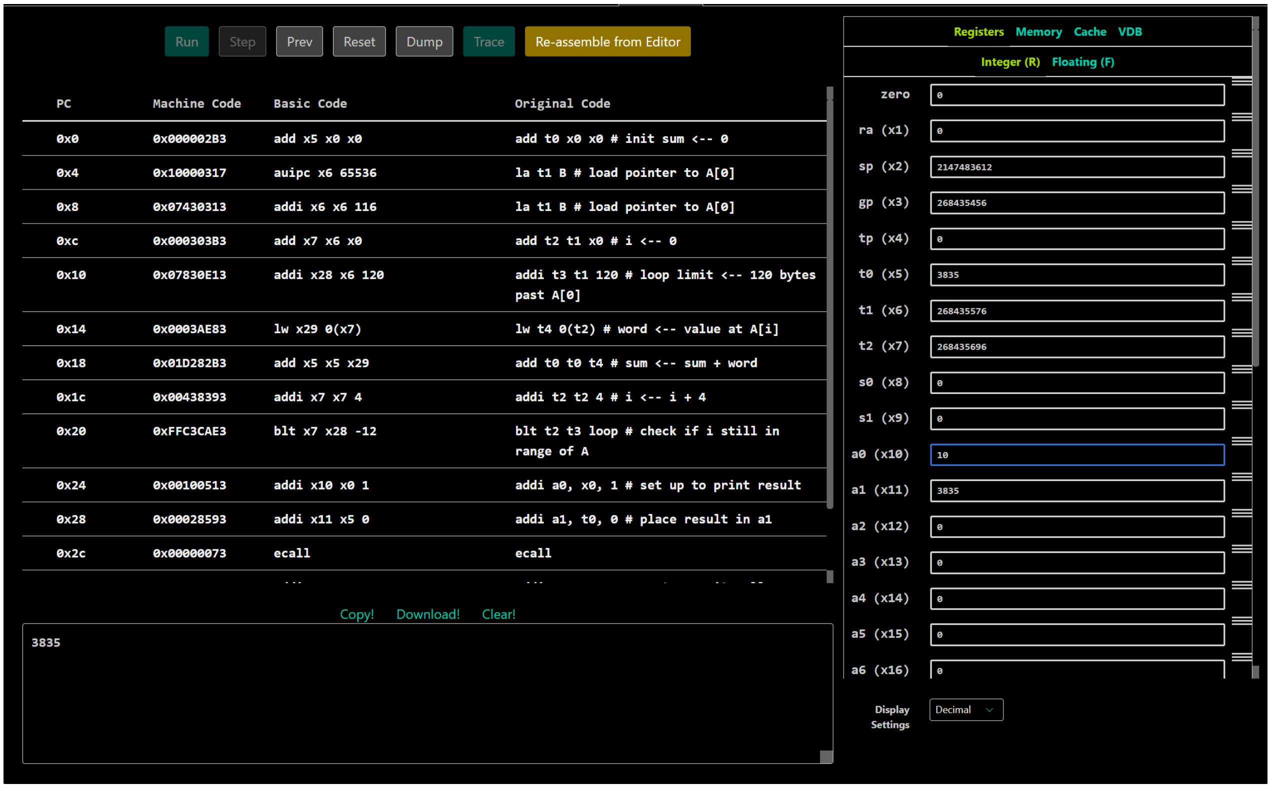
PC	Machine Code	Basic Code	Original Code
0x0	0x000002B3	add x5 x0 x0	add t0 x0 x0 # init sum <-- 0
0x4	0x10000317	auipc x6 65536	la t1 A # load pointer to A[0]
0x8	0xFFC30313	addi x6 x6 -4	la t1 A # load pointer to A[0]
0xc	0x000303B3	add x7 x6 x0	add t2 t1 x0 # i <-- 0
0x10	0x07830E13	addi x28 x6 120	addi t3 t1 120 # loop limit <-- 120 bytes past A[0]
0x14	0x0003AE83	lw x29 0(x7)	lw t4 0(t2) # word <-- value at A[i]
0x18	0x01D282B3	add x5 x5 x29	add t0 t0 t4 # sum <-- sum + word
0x1c	0x00438393	addi x7 x7 4	addi t2 t2 4 # i <-- i + 4
0x20	0xFFC3CAE3	blt x7 x28 -12	blt t2 t3 loop # check if i still in range of A
0x24	0x00100513	addi x10 x0 1	addi a0, x0, 1 # set up to print result
0x28	0x00028593	addi x11 x5 0	addi a1, t0, 0 # place result in a1
0x2c	0x00000073	ecall	ecall

```
465
```

zero	0
ra (x1)	0
sp (x2)	2147483612
gp (x3)	268435456
tp (x4)	0
t0 (x5)	465
t1 (x6)	268435456
t2 (x7)	268435576
s0 (x8)	0
s1 (x9)	0
a0 (x10)	10
a1 (x11)	465
a2 (x12)	0
a3 (x13)	0
a4 (x14)	0
a5 (x15)	0
a6 (x16)	0

Display Settings: Decimal

Screenshot of run w/ `A=[10, 20, ... , 290, 300]`:



PC	Machine Code	Basic Code	Original Code
0x0	0x000002B3	add x5 x0 x0	add t0 x0 x0 # init sum <-- 0
0x4	0x10000317	auipc x6 65536	la t1 B # load pointer to A[0]
0x8	0x07430313	addi x6 x6 116	la t1 B # load pointer to A[0]
0xc	0x000303B3	add x7 x6 x0	add t2 t1 x0 # i <-- 0
0x10	0x07830E13	addi x28 x6 120	addi t3 t1 120 # loop limit <-- 120 bytes past A[0]
0x14	0x0003AE83	lw x29 0(x7)	lw t4 0(t2) # word <-- value at A[i]
0x18	0x01D282B3	add x5 x5 x29	add t0 t0 t4 # sum <-- sum + word
0x1c	0x00438393	addi x7 x7 4	addi t2 t2 4 # i <-- i + 4
0x20	0xFFC3CAE3	blt x7 x28 -12	blt t2 t3 loop # check if i still in range of A
0x24	0x00100513	addi x10 x0 1	addi a0, x0, 1 # set up to print result
0x28	0x00028593	addi x11 x5 0	addi a1, t0, 0 # place result in a1
0x2c	0x00000073	ecall	ecall

```
3835
```

zero	0
ra (x1)	0
sp (x2)	2147483612
gp (x3)	268435456
tp (x4)	0
t0 (x5)	3835
t1 (x6)	268435576
t2 (x7)	268435696
s0 (x8)	0
s1 (x9)	0
a0 (x10)	10
a1 (x11)	3835
a2 (x12)	0
a3 (x13)	0
a4 (x14)	0
a5 (x15)	0
a6 (x16)	0

Display Settings: Decimal