```cpp
#include <iostream>
using namespace std;

int main(void) {
        int courses[5] = {99, 94, 86, 84, 59};
        int lab = 89;
        int sum = 0;
        int n = 5;

        for(int i = 0; i < n; i++) {
                sum += courses[i];
        }
        sum *= 3;
        sum += lab;

        int avg = sum/16;
}
```

Figure 1: Calculate GPA in C++

```
riscv1.asm   prefix_sum_array.txt   calculate_gpa.txt*

1    addi s1 x0 89           #lab = 89
2    add s0 x0 x0            #sum = 0
3    addi t0 x0 5            #n = 5
4    addi t1 x0 0            #i = 0
5
6    loop:   beq t1 t0 exit  #while (i != n)
7            slli t2 t0 2    #t2 <= t0 <<2
8            lw t3 0(t2)     #t3 <= Mem[t2 + 0]
9            add s0 s0 t3    #s0 += Mem[i]
10           addi t1 t1 1    #i++
11           beq x0 x0 loop
12   exit:
13   add s4 x0 s0            #tem = sum
14   add s0 s0 s0            #sum = 2*sum
15   add s0 s0 s4            #sum += tem
16   add s0 s0 s1            #sum += lab
17   srli s2 s0 4            #avg = sum/16
```

Figure 2: Calculate GPA in RISC-V

Figure 3: Expected Result

0	0
1	0
2	0
3	0
4	0
5	5
6	5
7	16
8	1355
9	89
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	84
19	0
20	422
21	0
22	0
23	0
24	0
25	0
26	0
27	0
28	59
29	0
30	0
31	0

Figure 4: Actual Result
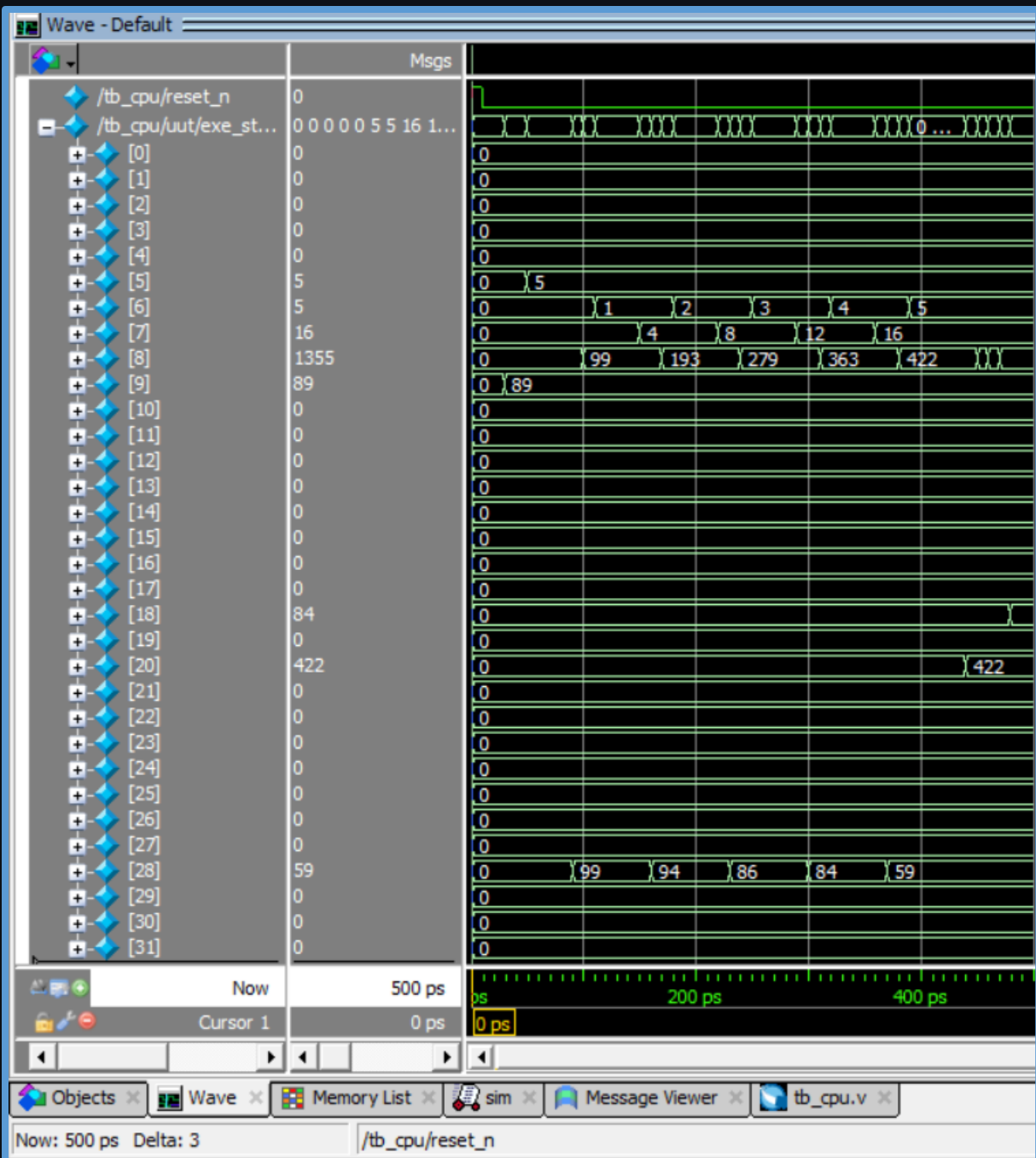
Figure 5: Register File

0	13	64	01	48
4	33	00	00	40
8	13	14	00	28
12	13	00	00	30
16	63	28	8a	01
20	93	08	80	39
24	03	01	c0	e1
28	33	00	38	42
32	13	04	80	31
36	63	d0	01	f8
40	33	00	10	a0
44	33	00	10	42
48	33	00	28	42
52	33	00	12	42
56	93	12	00	92

Figure 6: Instruction Memory