

```

1  #include <iostream>
2  using namespace std;
3
4  int main(void) {
5      int arr[10] = {0,1,2,3,4,5,6,7,8,9};
6      for(int i = 0; i < 9; i++)
7          arr[i+1] = arr[i] + arr[i+1];
8  }

```

Figure 1: Prefix Sum in C++

| Edit | | Execute | |
|------------|----------------|-----------------------|--|
| riscv1.asm | | prefix_sum_array.txt* | |
| 1 | addi s0 x0 10 | | |
| 2 | add t0 x0 x0 | | |
| 3 | slli t1 t0 2 | | |
| 4 | sw t0 0(t1) | | |
| 5 | addi t0 t0 1 | | |
| 6 | bne t0 s0 -8 | | |
| 7 | addi t6 x0 122 | | |
| 8 | addi s0 x0 9 | | |
| 9 | add t0 x0 x0 | | |
| 10 | slli t1 t0 2 | | |
| 11 | lw t2 0(t1) | | |
| 12 | lw t3 4(t1) | | |
| 13 | add t2 t2 t3 | | |
| 14 | sw t2 4(t1) | | |
| 15 | addi t0 t0 1 | | |
| 16 | bne t0 s0 -14 | | |
| 17 | addi t2 x0 122 | | |

Figure 2: Prefix Sum in RISC-V

| | | | | | | | | | |
|---|---|---|---|----|----|----|----|----|----|
| 0 | 1 | 3 | 6 | 10 | 15 | 21 | 28 | 36 | 45 |
|---|---|---|---|----|----|----|----|----|----|

Figure 3: Expected Results

| | | | | |
|----|----|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 4 | 1 | 0 | 0 | 0 |
| 8 | 3 | 0 | 0 | 0 |
| 12 | 6 | 0 | 0 | 0 |
| 16 | 10 | 0 | 0 | 0 |
| 20 | 15 | 0 | 0 | 0 |
| 24 | 21 | 0 | 0 | 0 |
| 28 | 28 | 0 | 0 | 0 |
| 32 | 36 | 0 | 0 | 0 |
| 36 | 45 | 0 | 0 | 0 |

Figure 4: Actual Results

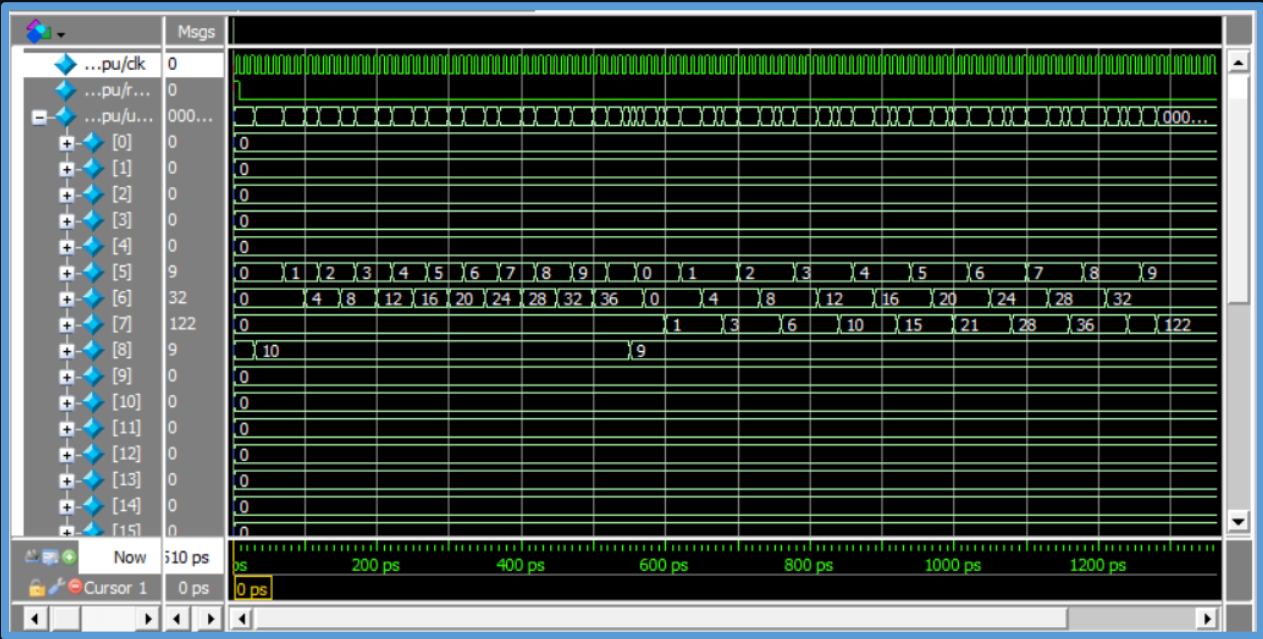


Figure 5: Register File

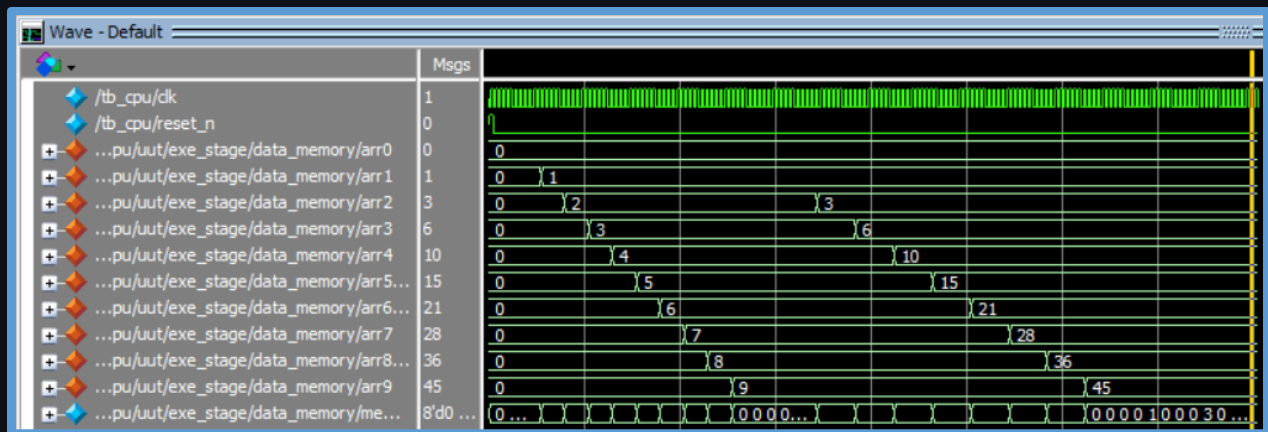


Figure 6: Data Memory

| | | | | |
|----|----|----|----|----|
| 0 | 13 | 28 | 00 | 40 |
| 4 | 33 | 00 | 00 | 28 |
| 8 | 93 | 08 | 40 | 31 |
| 12 | 23 | 01 | 8a | 01 |
| 16 | 13 | 04 | 40 | 29 |
| 20 | e3 | e0 | 51 | f9 |
| 24 | 13 | e8 | 01 | f8 |
| 28 | 13 | 24 | 00 | 40 |
| 32 | 33 | 00 | 00 | 28 |
| 36 | 93 | 08 | 40 | 31 |
| 40 | 03 | 01 | 80 | 39 |
| 44 | 03 | 11 | 80 | e1 |
| 48 | 33 | 00 | f8 | 39 |
| 52 | 23 | 11 | 8e | 01 |
| 56 | 13 | 04 | 40 | 29 |
| 60 | e3 | c8 | 51 | f9 |
| 64 | 13 | e8 | 01 | 38 |

Figure 7: Instruction Memory

