

# COL216 Assignment 1-B: Report

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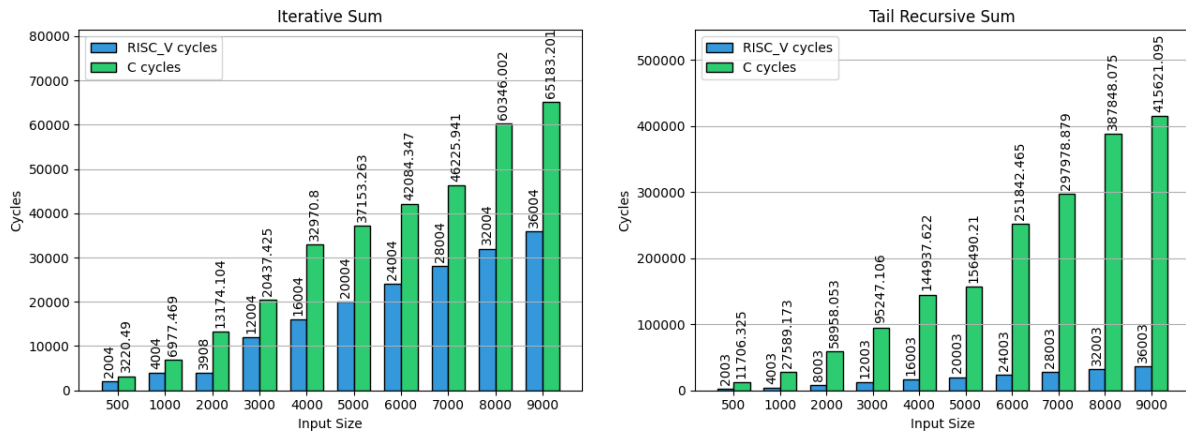
## 1 Observations for Q.2

The number of clock cycles taken for evaluating the sum of first  $n$  natural numbers were calculated for the C-program and equivalent RISC-V program for the following two schemes:

- Iteration
- Tail Recursion

Since most processors are based on 64-bit X86 architecture `rdtsc()` (Read Time Stamp Counter) instruction was used to measure the clock cycles taken by C-programs. However, the number of clock cycles taken were measured to be different for each run of the program. Therefore the program was run 1000 times and the mean value of the clock cycles were taken. RISC-V programs on the other hand took the same number of clock cycles for each run of the program.

Value of  $n$  was taken for the list `inputs = [500, 1000, 2000, 3000, 4000, 5000, 6000, 7000, 8000, 9000]`. The data recorded has been plotted in the following double bar graphs: On average, RISC-V program is



faster than corresponding C-program by a factor of:

- 1.842 for iteration
- 10.153 for tail recursive sum

Although the time taken for both RISC-V programs is essentially the same, the difference arises because the tail-recursive C program is 5.512 times slower than the iterative C program on average.