

CSc 30100

Assignment due February 20, 2020

Calculate $S_N = \sum_{i=1}^N [\sqrt{3}]$.

You should use `math.sqrt(3.0)` for the value of $\sqrt{3}$.

Calculate S_N using the two methods we discussed in class, naive summation and compensated summation. Perform the summations for $N = 10^5, 10^6, 10^7, 10^8$, and 10^9 .

Calculate the time of each summation using code such as

```
start_time = time.time()
```

```
end_time = time.time()
```

```
elapsed time = end_time – start_time
```

Calculate the "exact" value of the sum using the expression

$$\tilde{S}_N = N * \text{math.sqrt}(3.0)$$

For each of the S_N that you calculate, determine the absolute and relative errors of the results. Present your results (including the timing of your calculations) in a table.

Discuss your results. Are these errors consistent with the expressions for errors that we discussed in class and that are in the posted classroom presentations? How do the speeds of the two methods compare?

Include all of your analysis and discussion in your .ipynb file and submit the file thorough Blackboard. The name of the file you submit should be
lastname_firstname_AS03.ipynb.

Do not clear your results after your last run so that I will be able to see your results without rerunning your file.

If you collaborate with anyone on this assignment, be sure to follow the collaboration guidelines in the syllabus.