COMP 4901Q: High Performance Computing (HPC)

Homework 1: Describe a Parallel Application

Due date: **20 Feb 2022 23:59**

First, include a brief bio of you including which year of your study, you major, your favorite areas from scientific and engineering.

Examine an application problem where parallel computing has been used. You may pick a problem from your own major, somewhere on the web, or elsewhere (so long as it is verifiable). Briefly describe the application, the use of parallelism, and a frank assessment of its success, weaknesses, and challenges.

Some specific details to consider include the following:

- What is the scientific or engineering problem being solved?
- What is the workload of the problem in its computing-intensive part?
- How well did the application achieve its scientific/engineering objective? Are simulation results compared to physical results?
- What parallel platform has the application targeted? (distributed vs. shared memory, etc.) What tools were used to build the application? (languages, libraries, frameworks, etc.)
- If the application is run on a major supercomputer, where does that computer rank on the Top500 list?
- How well did the application perform? How does this compare to the platform's best possible performance?
- Does the application "scale" to large problems on many processors? If you believe it has not, what bottlenecks may have limited its performance?
- How is the development of the application from the old-computer age to the nowadays supercomputer age? Is well addressed by parallel computing with much powerful computers compared to the old age with limited computing power?

Not all of these details will be available for all applications. You ought to explain what you find noteworthy about the application.

Page limit: no more than two A4 pages in the normal A4 page layout of Microsoft word (i.e., 2.54cm margin), single column, 11pt font size, and single line spacing.