Using Parallel Computing Hardware

Homework 2

By

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CS 432 Parallel Computing

February 18, 2021

Problem Specification:

Use the DMC cluster for the first time as practice for the next three assignments. Observe its performance differences from Vulcan.

Program Design:

No changes from the previous Conway game.

Testing Plan:

Same as the last, but this time with bash scripts; on either system, I used scripts to get each run time three times; they roughly resembled this:

*#!/bin/bash*

*echo "1"*

*./hw1 1000 1000*

*./hw1 1000 1000*

*./hw1 1000 1000*

*echo "2"*

*…*

Test Cases:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Test Case #** | **Problem Size** | **Max. Generations** | **Time Taken Vulcan** | **Time Taken DMC Cluster** |
| 1 | 1000x1000 | 1000 | 43.5 | 1.43 |
| 2 | 5000x5000 | 1000 | 1079 | 45.1 |
| 3 | 5000x5000 | 5000 | 5240.3 | 210.9 |
| 4 | 10000x10000 | 1000 | 4305 | 167.2 |
| 5 | 10000x10000 | 5000 | 20920.768615 (not averaged, too long) | 861.38 |

Analysis and Conclusions:

Concerning the 10000x10000 and 5000 run on Vulcan, I learned of tmux and nohup, as I could not stay connected for the amount of time necessary to run hw1 on that. Nevertheless, this project was meant for testing DMC and not about Vulcan, so I will comment on this: Because the code itself wasn't written to take advantage of the hardware, the difference in speed likely lies in the fact that the Intel compiler rather than gcc was used. According to the below-linked benchmark test between the Intel compiler and gcc, "Intel won for out of the box, number crunching on huge data sets."

Using the DMC cluster presented no difficulty and I'm ready to use it for the next assignment.

References:

https://stackoverflow.com/a/1830639/9295513