

Parallel Computer Systems, Fall 2022

Instructions for Databar Exercise 8: Performance models

November 1, 2022

1 Introduction

You will this week explore performance models.

You report on this exercise with up to a page in the third report.

2 Reports and rules

DTU has a zero tolerance policy on cheating and plagiarism. This also extends to the reports and indeed all your work. For example, to copy text passages from someone else without clearly and properly citing your source is considered plagiarism. You are assumed to stay informed of and follow DTU's rules.

3 Setting up the system

You will have to use the HPC machines for these exercises just like the previous exercises. Do not forget to use `linuxsh` to get an actual HPC node to work on.

4 Working on the exercises

We will explore code balance and machine balance using the OpenCL examples for databar exercise 6. We will use the CPU OpenCL target implementations and compare them to theoretical code balance calculations.

First we focus on the machine. Download STREAM, <https://www.cs.virginia.edu/stream/ref.html>, to the HPC machines, compile and run it. Use the results to calculate the machine balance on the node you have. Put all your calculations into your report.

Study the OpenCL kernels you used in databar exercise 6, ignoring the `calc` program. What is the code balance for each?

Relate the machine balance to the code balance of each kernel. Also relate the performance of the kernels you saw during databar exercise 6. Rerun the OpenCL kernels or the STREAM benchmark if you get strange results. You may have run on a contended machine or on another type of node than when working on databar exercise 6. How far from the optimum are the kernels? What could be done to improve performance?

5 Reporting

You report on this exercise with up to a page in the third report. There, you provide answers to the questions in the “Working on the exercises” section.

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