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Exercise 1:

Paper 1:

The paper “A Bridging Model for Parallel Computing” by Leslie G. Valiant, published in 1990, introduces the bulk-synchronous parallel model for parallel computing. It presents principles for enabling parallel computation with current programming methods while still retaining the option of serial processing.

The paper's key insights detail the necessary technology for parallel computing and how computation using multiple processors can be done efficiently using the BSP model. It goes to length to show that such a model presents a good solution for parallel processing. The author shows through calculations how to best utilize this model and presents the methods by which an optimal utilization of the resources can be realized.

In my opinion, the paper gives the reader a good understanding of the BSP model and parallel processing using it. I think that this paper was ahead of its time, as the first multicore processor was released in 2001. The author recognized the problems that need to be addressed when using parallel processing. They were already aware of the need for high-speed communication to keep the processes in sync, as well as the need for a high memory bandwidth to keep up with the calculations.

I would give this paper a rating of "accept".

Paper 2:

The paper “The GeForce 6800” by John Montrym and Henry Moreton published in 2005, describes the design of the GeForce 6800 graphics processing unit. It presents the mathematical and geometric problems that the GPU needs to solve to render 3D scenes. The authors go over the architecture of the GPU as well as the methods that are used by GPUs to render images.

Key insights of the paper include the three major architectural drivers of the GeForce 6800 (programmability, parallelism and memory), as well as the explanation of the steps that a GPU goes through to produce a rendered image while correlating those calculations to certain parts of the GeForce 6800 architecture. The authors go into detail on each step, giving the reader an overview of which part of the GPU does what.

In my opinion, the paper gives a good insight into how a GPU works, with detailed explanations of the specific operations that are performed by different parts of the GPU. The paper shows well why the operations of rendering a 3D scene can make good use of the high parallelization that a GPU offers.

I would give this paper a rating of "accept".

Exercise 1.2.1:

The speed up of Amdahls law is the proportion between the time of execution and the time of execution with an increased cove count

$$T_{old} = (1-p)T + p \cdot T$$

$$T_{new} = (1-p)T + \frac{p}{n} \cdot T$$

$$S = \frac{T_{old}}{T_{new}} = \frac{(1-p)\cancel{T} + p \cdot \cancel{T}}{(1-p)\cancel{T} + \frac{p}{n} \cdot \cancel{T}} = \frac{1 - p + p}{1 - p + \frac{p}{n}} = \boxed{\frac{1}{1 - p + \frac{p}{n}}}$$

p = parallelizable portion of the workload

n = speedup of the job that benefits from move ressources

S = speedup of the overall execution

Exercise 1.2.2:

Amdahl's law is a good approximation and a key rule for calculating the acceleration of a parallelizable task. The rule shows how a parallelizable task can be accelerated with a certain number of serial and parallel tasks. A disadvantage of this approximation is that it does not take into account that there is an optimal degree of parallelization. After the inflection point, over-parallelization occurs, which leads to higher computational effort and leads to a reduction in computational speed.

Willingness to present:

Exercise 1:
Paper 1: Yes
Paper 2: Yes

Exercise 2:
Exercise 1.2.1: Yes
Exercise 1.2.2: Yes