<<大规模并行处理器程序设计>>

图书基本信息

书名：<<大规模并行处理器程序设计>>

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前言

Mass-market computing systems that combine multicore CPUs and many-core GPUs have brought terascale computing to the laptop and petascalecomputing to clusters. Armed with such computing power, we are at thedawn of pervasive use of computational experiments for science, engineer-ing, health, and business disciplines. Many will be able to achieve break-throughs in their disciplines using computational experiments that are ofunprecedented level of scale, controllability, and observability. This bookprovides a critical ingredient for the vision: teaching parallel programmingto millions of graduate and undergraduate students so that computationalthinking and parallel programming skills will be as pervasive as calculus. We started with a course now known as ECE498AL. During the Christ-mas holiday of 2006, we were frantically working on the lecture slides andlab assignments. David was working the system trying to pull the earlyGeForce 8800 GTX GPU cards from customer shipments to Illinois, whichwould not succeed until a few weeks after the semester began. It alsobecame clear that CUDA would not become public until a few weeks afterthe start of the semester. We had to work out the legal agreements so thatwe can offer the course to students under NDA for the first few weeks.We also needed to get the words out so that students would sign up sincethe course was not announced until after the preenrollment period.

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内容概要

本书介绍了并行程序设计与GPU体系结构的基本概念，并详细探讨了用于构建并行程序的各种技术，用案例演示了并行程序设计的整个开发过程，即从并行计算的思想开始，直到最终实现实际且高效的并行程序。

本书特点　　介绍了并行计算的思想，使得读者可以把这种问题的思考方式渗透到高性能并行计算中去。

介绍了CUDA的使用，CUDA是NVIDIA公司专门为大规模并行环境创建的一种软件开发工具。

介绍如何使用CUDA编程模式和OpenCL来获得高性能和高可靠性。

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插图：The raster operation （ROP） stage in Figure 2.2 performs the final rasteroperations on the pixels. It performs color raster operations that blend thecolor of overlapping/adjacent objects for transparency and antialiasingeffects. It also determines the visible objects for a given viewpoint anddiscards the occluded pixels. A pixel becomes occluded when it is blockedby pixels from other objects according to the given view point. Figure 2.3 illustrates antialiasing, one of the ROP stage operations.Notice the three adjacent triangles with a black background. In the aliasedoutput, each pixel assumes the color of one of the objects or the back-ground. The limited resolution makes the edges look crooked and theshapes of the objects distorted. The problem is that many pixels are partlyin one object and partly in another object or the background. Forcing thesepixels to assume the color of one of the objects introduces distortion intothe edges of the objects. The antialiasing operation gives each pixel a colorthat is blended, or linearly combined, from the colors of all the objects andbackground that partially overlap the pixel. The contribution of each objectt the color of the pixel is the amount of the pixel that the object overlaps. Finally, the frame buffer interface （FBI） stage in Figure 2.1 managesmemory reads from and writes to the display frame buffer memory.

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