Introduction to GPU Programming

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Documentation

• NVIDIA’s documentation
  • http://developer.nvidia.com/object/gpucomputing.html
    – Programming Guide ver. 3.0
    – Best Practices Guide ver. 3.0
    – Reference Manual ver. 3.0
• CUDA C SDK Code Samples
  • http://developer.nvidia.com/object/cuda_3_0_downloads.html
• Books
  – Jason Sanders, Edward Kandrot, CUDA by Example: An Introduction to General-Purpose GPU Programming, Addison-Wesley, 2010
Lab Examples

• Exercise 1: Modify fractal code to improve efficiency
  – hint: launch multiple threads per block
• Exercise 2: Modify reduction example to eliminate multiple calls to the kernel
  – hint: use atomic add
• Exercise 3: Modify reduction example to use zero copy
• Exercise 4: Port code in src6 to GPU
  – the code computes volume of a sphere of radius \( r \) using Monte Carlo integration
  – hint: there is not random number generator function implemented on GPU 😐
• Exercise 5: Port tridiagonalization subroutine (tridiag) in src7/eigen.c
  – symmetric matrix reduction to tridiagonal form using Givens method