Introduction to Cuda Parallel Programming Homework Assignment 5

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Disscusion

In this homework, we used GPU to solve the thremal equilibrium temperature distribution on a 1024 x 1024 square plate. And the boundary conditions are 400 along the top, while the remainder of the circumference is at 273K. We solve this problem in single and multiple GPU, and the results are

```
- 1 GPU: 328687.8725 (ms)
- 2 GPU: 186254.4687 (ms)
```

the running time using multi-gpu is only one-half of using single GPU. Also we determine different the block sizes for this problems shown in Table 1. In figure 1, We can see that the running time drop with the block sizes increasing. The only problem comes to when the we used the maximum block size 32. So in this cases, block size=16 might be the optimal solution.

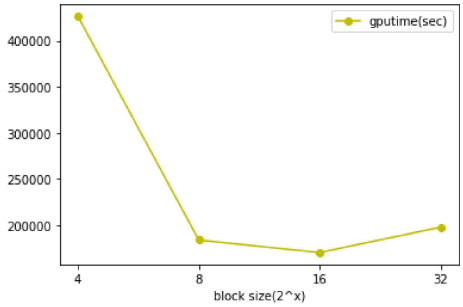

figure 1: gpu time with block size increase

lattice_sizes	block sizes	gputime	gputime_tot
1024x1024	4x4	426341	426367
1024x1024	8x8	183607	183635
1024x1024	16x16	170065	170092
1024x1024	32x32	197570	197596

table 1: gpu time with different block sizes

tags: `NTU` `Homework` `cuda`