

EE217: GPU Architecture and Parallel Programming

Lab #0

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Questions

How many total thread blocks do we use?

$\text{ceil}(1000/256) = 4$

Are all thread blocks full? That is, do all threads in the thread block have data to operate on?

No, the last block is partially empty. 24/256 threads in last block are unused.

How can this basic vector add program be improved?

24 out of 256 threads in the last block do nothing causing a reduction in performance. Pad the array with 24 additional elements to ensure each thread has the same set of instructions to perform, i.e. threads in each warp will do the same job. This memory allocation should take place at device level and last 24 elements of array should be ignored when the data is read back to the host.

1 Result

Setting up the problem...0.000033 s
size Of vector: 1000 x 0
Allocating device variables...0.473822 s
Copying data from host to device...0.000038 s
Launching kernel...0.000045 s
Copying data from device to host...0.000024 s
Verifying results... 0.990000/0.990000 1.160000/1.160000 0.510000/0.510000
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0.520000/0.520000 0.620000/0.620000 1.230000/1.230000 0.560000/0.560000 0.240000/0.240000
1.100000/1.100000 0.430000/0.430000 1.500000/1.500000 1.010000/1.010000 0.980000/0.980000
0.610000/0.610000 0.200000/0.200000 1.220000/1.220000 1.420000/1.420000 1.230000/1.230000
1.480000/1.480000 0.880000/0.880000 0.770000/0.770000 1.300000/1.300000 0.910000/0.910000
1.120000/1.120000 1.550000/1.550000 1.290000/1.290000 1.380000/1.380000 0.650000/0.650000
1.010000/1.010000 1.130000/1.130000 0.900000/0.900000 1.470000/1.470000 0.620000/0.620000
0.890000/0.890000 0.990000/0.990000 1.280000/1.280000 1.120000/1.120000 1.080000/1.080000
1.040000/1.040000 1.260000/1.260000 1.030000/1.030000 0.580000/0.580000 1.790000/1.790000
1.050000/1.050000 1.190000/1.190000 1.000000/1.000000 1.800000/1.800000 1.140000/1.140000
1.760000/1.760000 0.810000/0.810000 1.020000/1.020000 1.540000/1.540000 1.150000/1.150000
0.980000/0.980000 1.180000/1.180000 1.700000/1.700000 0.270000/0.270000 0.600000/0.600000
1.390000/1.390000 1.280000/1.280000 1.260000/1.260000 0.330000/0.330000 0.800000/0.800000
0.920000/0.920000 0.220000/0.220000 0.790000/0.790000 1.220000/1.220000 1.380000/1.380000
1.400000/1.400000 0.300000/0.300000 1.170000/1.170000 1.470000/1.470000 0.900000/0.900000
0.960000/0.960000 1.050000/1.050000 1.610000/1.610000 1.010000/1.010000 1.380000/1.380000
1.800000/1.800000 0.780000/0.780000 0.710000/0.710000 1.350000/1.350000 0.840000/0.840000
0.860000/0.860000 0.860000/0.860000 0.550000/0.550000 0.610000/0.610000 0.650000/0.650000

0.670000/0.670000 1.000000/1.000000 0.990000/0.990000 0.450000/0.450000 1.340000/1.340000
1.310000/1.310000 1.380000/1.380000 0.610000/0.610000 0.630000/0.630000 1.640000/1.640000
1.520000/1.520000 1.560000/1.560000 0.950000/0.950000 1.730000/1.730000 0.550000/0.550000
0.370000/0.370000 0.230000/0.230000 1.130000/1.130000 0.990000/0.990000 0.760000/0.760000
1.030000/1.030000 1.310000/1.310000 1.060000/1.060000 1.260000/1.260000 0.670000/0.670000
1.420000/1.420000 0.640000/0.640000 0.570000/0.570000 1.010000/1.010000 0.770000/0.770000
1.270000/1.270000 1.730000/1.730000 0.820000/0.820000 0.260000/0.260000 1.220000/1.220000
1.690000/1.690000 1.580000/1.580000 0.650000/0.650000 1.820000/1.820000 0.730000/0.730000
1.290000/1.290000 0.380000/0.380000 0.810000/0.810000 0.770000/0.770000 0.130000/0.130000
0.890000/0.890000 0.660000/0.660000 0.880000/0.880000 1.550000/1.550000 1.180000/1.180000
0.160000/0.160000 1.100000/1.100000 1.020000/1.020000 0.750000/0.750000 0.890000/0.890000
0.730000/0.730000 1.210000/1.210000 0.570000/0.570000 0.830000/0.830000 1.280000/1.280000
0.880000/0.880000 1.110000/1.110000 0.530000/0.530000 0.220000/0.220000 1.890000/1.890000
0.760000/0.760000 0.950000/0.950000 0.510000/0.510000 0.940000/0.940000 0.290000/0.290000
0.760000/0.760000 0.230000/0.230000 TEST PASSED