

Instruções de uso:

Basta executar o script `script.sh`, que sera feita diversas analises para vetores de tamanho 32M, 64M, 128M, 256M usando o vetor randomico e o iterativo.

O arquivo sumArrayGPU.cu foi compilado com os seguintes parametros:

```
nvcc -arch=sm_35 sumArrayGPU.cu
```

O programa sum.out, tem os seguintes parametros:

```
./sum.out SIZE BLOCK UNROLL VET
```

onde VET é se vai usar o vetor randomico(0) ou iterativo(1)

Informações da CPU:

CPU Intel Core i5 750

Clock: 2.667GHz

Largura de banda: 64 bit

Número de cores da CPU: 4

Número de threads: 4

Cache L1:

4 x 32 KB 4-way set associative instruction caches

4 x 32 KB 8-way set associative data caches

Cache L2:

4 x 256 KB 8-way set associative caches

Cache L3:

8 MB 16-way set associative shared cache

16GB de RAM, Sistema Operacional Linux Ubuntu 14.04.

Informações da GPU:

```

+-----+
| NVIDIA-SMI 352.39          Driver Version: 352.39          |
+-----+-----+-----+-----+-----+-----+
| GPU  Name                Persistence-M| Bus-Id        Disp.A | Volatile Uncorr. ECC |
| Fan  Temp  Perf  Pwr:Usage/Cap|      Memory-Usage | GPU-Util  Compute M. |
+-----+-----+-----+-----+-----+-----+
|    0  GeForce GTX TIT... Off      | 0000:01:00.0      On |          N/A         |
| 22%  47C   P8   15W / 250W | 61MiB / 12282MiB |    0%      Default   |
+-----+-----+-----+-----+-----+-----+

+-----+
| Processes:                                     GPU Memory |
|  GPU           PID    Type    Process name                     Usage |
+-----+-----+-----+-----+-----+-----+
|      0             2596    G      /usr/bin/X                               36MiB |
+-----+

```

Dados gerados com vetor Iterativo:

Vetor 32M:

==2996== Profiling result:

Time(%)	Time	Calls	Avg	Min	Max	Name
73.30%	18.787ms	3	6.2622ms	6.0788ms	6.6272ms	[CUDA memcpy HtoD]
25.23%	6.4656ms	1	6.4656ms	6.4656ms	6.4656ms	[CUDA memcpy DtoH]
1.47%	377.06us	1	377.06us	377.06us	377.06us	sumArrayGPU(int, float*, float*, float*, int)

==2996== API calls:

Time(%)	Time	Calls	Avg	Min	Max	Name
81.67%	119.69ms	3	39.896ms	141.62us	119.40ms	cudaMalloc
18.06%	26.464ms	4	6.6160ms	6.2452ms	7.2389ms	cudaMemcpy
0.19%	274.59us	83	3.3080us	166ns	118.33us	cuDeviceGetAttribute
0.03%	41.580us	1	41.580us	41.580us	41.580us	cudaLaunch
0.03%	37.051us	1	37.051us	37.051us	37.051us	cuDeviceTotalMem
0.02%	30.060us	1	30.060us	30.060us	30.060us	cuDeviceGetName
0.01%	7.3430us	5	1.4680us	186ns	5.7770us	cudaSetupArgument
0.00%	3.1080us	1	3.1080us	3.1080us	3.1080us	cudaConfigureCall
0.00%	1.1310us	2	565ns	300ns	831ns	cuDeviceGetCount
0.00%	577ns	2	288ns	203ns	374ns	cuDeviceGet

Vetor 64M:

==3005== Profiling result:

Time(%)	Time	Calls	Avg	Min	Max	Name
72.74%	36.975ms	3	12.325ms	12.121ms	12.665ms	[CUDA memcpy HtoD]
25.78%	13.104ms	1	13.104ms	13.104ms	13.104ms	[CUDA memcpy DtoH]
1.48%	750.94us	1	750.94us	750.94us	750.94us	sumArrayGPU(int, float*, float*, float*, int)

==3005== API calls:

Time(%)	Time	Calls	Avg	Min	Max	Name
69.83%	120.40ms	3	40.133ms	161.46us	120.05ms	cudaMalloc
29.94%	51.624ms	4	12.906ms	12.289ms	14.215ms	cudaMemcpy
0.16%	274.09us	83	3.3020us	162ns	117.96us	cuDeviceGetAttribute
0.02%	41.516us	1	41.516us	41.516us	41.516us	cudaLaunch
0.02%	36.930us	1	36.930us	36.930us	36.930us	cuDeviceTotalMem
0.02%	29.750us	1	29.750us	29.750us	29.750us	cuDeviceGetName
0.00%	6.4820us	5	1.2960us	184ns	4.9710us	cudaSetupArgument
0.00%	2.6280us	1	2.6280us	2.6280us	2.6280us	cudaConfigureCall
0.00%	1.0660us	2	533ns	305ns	761ns	cuDeviceGetCount
0.00%	585ns	2	292ns	195ns	390ns	cuDeviceGet

Vetor 128M:

==3014== Profiling result:

Time(%)	Time	Calls	Avg	Min	Max	Name
72.53%	74.763ms	3	24.921ms	24.438ms	25.680ms	[CUDA memcpy HtoD]
25.98%	26.777ms	1	26.777ms	26.777ms	26.777ms	[CUDA memcpy DtoH]
1.49%	1.5405ms	1	1.5405ms	1.5405ms	1.5405ms	sumArrayGPU(int, float*, float*, float*, int)

==3014== API calls:

Time(%)	Time	Calls	Avg	Min	Max	Name
53.53%	120.11ms	3	40.036ms	226.39us	119.65ms	cudaMalloc
46.29%	103.87ms	4	25.969ms	24.602ms	28.677ms	cudaMemcpy
0.12%	276.06us	83	3.3250us	187ns	118.13us	cuDeviceGetAttribute
0.02%	40.882us	1	40.882us	40.882us	40.882us	cudaLaunch
0.02%	37.321us	1	37.321us	37.321us	37.321us	cuDeviceTotalMem
0.01%	29.887us	1	29.887us	29.887us	29.887us	cuDeviceGetName
0.00%	7.1580us	5	1.4310us	209ns	5.5190us	cudaSetupArgument
0.00%	2.6080us	1	2.6080us	2.6080us	2.6080us	cudaConfigureCall
0.00%	1.2830us	2	641ns	293ns	990ns	cuDeviceGetCount
0.00%	549ns	2	274ns	196ns	353ns	cuDeviceGet

Vetor 256M:

==3104== Profiling result:

Time(%)	Time	Calls	Avg	Min	Max	Name
73.05%	150.41ms	3	50.137ms	48.994ms	51.325ms	[CUDA memcpy HtoD]
25.48%	52.467ms	1	52.467ms	52.467ms	52.467ms	[CUDA memcpy DtoH]
1.47%	3.0344ms	1	3.0344ms	3.0344ms	3.0344ms	sumArrayGPU(int, float*, float*, float*, int)

==3104== API calls:

Time(%)	Time	Calls	Avg	Min	Max	Name
63.05%	206.77ms	4	51.692ms	49.163ms	55.866ms	cudaMemcpy
36.83%	120.78ms	3	40.259ms	326.19us	120.12ms	cudaMalloc
0.08%	274.11us	83	3.3020us	164ns	118.23us	cuDeviceGetAttribute
0.01%	41.855us	1	41.855us	41.855us	41.855us	cudaLaunch
0.01%	37.353us	1	37.353us	37.353us	37.353us	cuDeviceTotalMem
0.01%	29.871us	1	29.871us	29.871us	29.871us	cuDeviceGetName
0.00%	6.3950us	5	1.2790us	185ns	4.9320us	cudaSetupArgument
0.00%	2.8060us	1	2.8060us	2.8060us	2.8060us	cudaConfigureCall
0.00%	1.1740us	2	587ns	302ns	872ns	cuDeviceGetCount
0.00%	584ns	2	292ns	192ns	392ns	cuDeviceGet

Dados gerados com vetor Randomico:

Vetor 32M:

==2958== Profiling result:

Time(%)	Time	Calls	Avg	Min	Max	Name
70.03%	19.050ms	3	6.3500ms	6.1906ms	6.6384ms	[CUDA memcpy HtoD]
24.59%	6.6886ms	1	6.6886ms	6.6886ms	6.6886ms	[CUDA memcpy DtoH]
5.38%	1.4623ms	1	1.4623ms	1.4623ms	1.4623ms	sumArrayGPU(int, float*, float*, float*, int)

==2958== API calls:

Time(%)	Time	Calls	Avg	Min	Max	Name
82.87%	138.80ms	3	46.265ms	141.16us	138.51ms	cudaMalloc
16.72%	28.008ms	4	7.0020ms	6.3608ms	8.5133ms	cudaMemcpy
0.33%	554.65us	83	6.6820us	175ns	283.76us	cuDeviceGetAttribute
0.02%	41.145us	1	41.145us	41.145us	41.145us	cuDeviceTotalMem
0.02%	40.838us	1	40.838us	40.838us	40.838us	cudaLaunch
0.02%	32.911us	1	32.911us	32.911us	32.911us	cuDeviceGetName
0.00%	6.5820us	5	1.3160us	184ns	5.0930us	cudaSetupArgument
0.00%	2.7670us	1	2.7670us	2.7670us	2.7670us	cudaConfigureCall
0.00%	1.2450us	2	622ns	307ns	938ns	cuDeviceGetCount
0.00%	638ns	2	319ns	210ns	428ns	cuDeviceGet

Vetor 64M:

==2958== Profiling result:

Time(%)	Time	Calls	Avg	Min	Max	Name
70.03%	19.050ms	3	6.3500ms	6.1906ms	6.6384ms	[CUDA memcpy HtoD]
24.59%	6.6886ms	1	6.6886ms	6.6886ms	6.6886ms	[CUDA memcpy DtoH]
5.38%	1.4623ms	1	1.4623ms	1.4623ms	1.4623ms	sumArrayGPU(int, float*, float*, float*, int)

==2958== API calls:

Time(%)	Time	Calls	Avg	Min	Max	Name
82.87%	138.80ms	3	46.265ms	141.16us	138.51ms	cudaMalloc
16.72%	28.008ms	4	7.0020ms	6.3608ms	8.5133ms	cudaMemcpy
0.33%	554.65us	83	6.6820us	175ns	283.76us	cuDeviceGetAttribute
0.02%	41.145us	1	41.145us	41.145us	41.145us	cuDeviceTotalMem
0.02%	40.838us	1	40.838us	40.838us	40.838us	cudaLaunch
0.02%	32.911us	1	32.911us	32.911us	32.911us	cuDeviceGetName
0.00%	6.5820us	5	1.3160us	184ns	5.0930us	cudaSetupArgument
0.00%	2.7670us	1	2.7670us	2.7670us	2.7670us	cudaConfigureCall
0.00%	1.2450us	2	622ns	307ns	938ns	cuDeviceGetCount
0.00%	638ns	2	319ns	210ns	428ns	cuDeviceGet

Vetor 128M:

==2977== Profiling result:

Time(%)	Time	Calls	Avg	Min	Max	Name
69.96%	75.220ms	3	25.073ms	24.846ms	25.450ms	[CUDA memcpy HtoD]
24.60%	26.451ms	1	26.451ms	26.451ms	26.451ms	[CUDA memcpy DtoH]
5.43%	5.8402ms	1	5.8402ms	5.8402ms	5.8402ms	sumArrayGPU(int, float*, float*, float*, int)

==2977== API calls:

Time(%)	Time	Calls	Avg	Min	Max	Name
52.71%	121.18ms	3	40.392ms	226.38us	120.72ms	cudaMalloc
47.12%	108.32ms	4	27.080ms	25.011ms	32.639ms	cudaMemcpy
0.12%	274.78us	83	3.3100us	163ns	118.73us	cuDeviceGetAttribute
0.02%	53.010us	1	53.010us	53.010us	53.010us	cudaLaunch
0.02%	37.095us	1	37.095us	37.095us	37.095us	cuDeviceTotalMem
0.01%	29.997us	1	29.997us	29.997us	29.997us	cuDeviceGetName
0.00%	6.6960us	5	1.3390us	187ns	5.4120us	cudaSetupArgument
0.00%	2.5310us	1	2.5310us	2.5310us	2.5310us	cudaConfigureCall
0.00%	1.1140us	2	557ns	287ns	827ns	cuDeviceGetCount
0.00%	595ns	2	297ns	209ns	386ns	cuDeviceGet

Vetor 256M:

==2987== Profiling result:

Time(%)	Time	Calls	Avg	Min	Max	Name
69.39%	148.48ms	3	49.495ms	49.093ms	49.843ms	[CUDA memcpy HtoD]
25.70%	55.003ms	1	55.003ms	55.003ms	55.003ms	[CUDA memcpy DtoH]
4.90%	10.493ms	1	10.493ms	10.493ms	10.493ms	sumArrayGPU(int, float*, float*, float*, int)

==2987== API calls:

Time(%)	Time	Calls	Avg	Min	Max	Name
64.24%	214.76ms	4	53.690ms	49.261ms	65.830ms	cudaMemcpy
35.64%	119.15ms	3	39.717ms	324.43us	118.50ms	cudaMalloc
0.08%	274.65us	83	3.3090us	163ns	118.24us	cuDeviceGetAttribute
0.01%	40.886us	1	40.886us	40.886us	40.886us	cudaLaunch
0.01%	37.060us	1	37.060us	37.060us	37.060us	cuDeviceTotalMem
0.01%	30.416us	1	30.416us	30.416us	30.416us	cuDeviceGetName
0.00%	7.1740us	5	1.4340us	229ns	5.4570us	cudaSetupArgument
0.00%	3.1390us	1	3.1390us	3.1390us	3.1390us	cudaConfigureCall
0.00%	1.1430us	2	571ns	303ns	840ns	cuDeviceGetCount
0.00%	595ns	2	297ns	193ns	402ns	cuDeviceGet