

What's new?

Friday, May 29, 2020 3:46 PM

Add line number to the output, so can distinguish different instruction with the same assembly code.

Example:

```
Warning! There may be an intra block global memory data race involving following instructions:  
at count(int*), line 3, LDG.E R0, [R2]  
at count(int*), line 5, STG.E [R2], R0
```

25 runs on programs with data races

Monday, May 25, 2020 1:40 PM

bfs: no difference among 25 runs

```
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_helper.py ./bfs/graph4096.txt | /home/yinengy/CUDA-Data-Race-Detector/scripts/race_check_helper.py > 18.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_helper.py ./bfs/graph4096.txt | /home/yinengy/CUDA-Data-Race-Detector/scripts/race_check_helper.py > 19.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_helper.py ./bfs/graph4096.txt | /home/yinengy/CUDA-Data-Race-Detector/scripts/race_check_helper.py > 20.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_helper.py ./bfs/graph4096.txt | /home/yinengy/CUDA-Data-Race-Detector/scripts/race_check_helper.py > 21.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_helper.py ./bfs/graph4096.txt | /home/yinengy/CUDA-Data-Race-Detector/scripts/race_check_helper.py > 22.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_helper.py ./bfs/graph4096.txt | /home/yinengy/CUDA-Data-Race-Detector/scripts/race_check_helper.py > 23.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_helper.py ./bfs/graph4096.txt | /home/yinengy/CUDA-Data-Race-Detector/scripts/race_check_helper.py > 24.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_helper.py ./bfs/graph4096.txt | /home/yinengy/CUDA-Data-Race-Detector/scripts/race_check_helper.py > 25.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt
after '1.txt'
for more information.
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 2.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 3.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 4.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 5.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 6.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 7.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 8.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 9.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 10.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 11.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 12.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 13.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 14.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 15.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 16.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 17.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 18.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 19.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 20.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 21.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 22.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 23.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 24.txt
~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ diff 1.txt 25.txt
```

particlefilter_naive: no difference among 25 runs

```

yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so ./particlefilter_naive -x 128 -y 128 -z 10 -np 1000| /home/yinengy/CUDA-Data-Race-Detector/scripts/race_check_helper.py > 19.txt
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so ./particlefilter_naive -x 128 -y 128 -z 10 -np 1000| /home/yinengy/CUDA-Data-Race-Detector/scripts/race_check_helper.py > 20.txt
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so ./particlefilter_naive -x 128 -y 128 -z 10 -np 1000| /home/yinengy/CUDA-Data-Race-Detector/scripts/race_check_helper.py > 21.txt
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so ./particlefilter_naive -x 128 -y 128 -z 10 -np 1000| /home/yinengy/CUDA-Data-Race-Detector/scripts/race_check_helper.py > 22.txt
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so ./particlefilter_naive -x 128 -y 128 -z 10 -np 1000| /home/yinengy/CUDA-Data-Race-Detector/scripts/race_check_helper.py > 23.txt
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so ./particlefilter_naive -x 128 -y 128 -z 10 -np 1000| /home/yinengy/CUDA-Data-Race-Detector/scripts/race_check_helper.py > 24.txt
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so ./particlefilter_naive -x 128 -y 128 -z 10 -np 1000| /home/yinengy/CUDA-Data-Race-Detector/scripts/race_check_helper.py > 25.txt

```

```

:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 2.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 3.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 4.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 5.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 6.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 7.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 8.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 9.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 10.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 11.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 12.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 13.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 14.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 15.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 16.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 17.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 18.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 19.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 20.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 21.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 22.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 23.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 24.txt
:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/particlefilter$ diff 1.txt 25.txt

```

myocyte: output are slightly different on the order of showing up of data race (because the data structured I used in python script is unordered set). All data races showed up in 25 runs.

Overhead of getting raw load store information needed for checking
data races

Friday, May 29, 2020 2:59 PM

Note: in this experiment, output are not passed to python
script to check data race

bfs:

on input [graph4096.txt](#):

instrumented:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ time LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so ./bfs ../../data/bfs/graph4096.txt > /dev/null

real    0m1.523s
user    0m0.731s
sys     0m0.655s
```

native run:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ time ./bfs ../../data/bfs/graph4096.txt
Reading File
Read File
Copied Everything to GPU memory
Start traversing the tree
Kernel Executed 8 times
Result stored in result.txt

real    0m0.748s
user    0m0.012s
sys     0m0.603s
```

2x

instrumented without printf:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ time LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so ./bfs ../../data/bfs/graph4096.txt > /dev/null

real    0m1.428s
user    0m0.633s
sys     0m0.655s
```

2x

on input [graph1MW_6.txt](#)

instrumented:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ time LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so ./bfs ../../data/bfs/graph1MW_6.txt > /dev/null

real    0m51.979s
user    0m44.104s
sys     0m7.418s
```

native run:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ time ./bfs ../../data/bfs/graph1MW_6.txt
Reading File
Read File
Copied Everything to GPU memory
Start traversing the tree
Kernel Executed 12 times
Result stored in result.txt

real    0m2.569s
user    0m1.425s
sys     0m0.652s
```

20x

instrumented without printf:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/bfs$ time LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so ./bfs ../../data/bfs/graph1MW_6.txt > /dev/null

real    0m9.189s
user    0m7.350s
sys     0m1.476s
```

3.5x

Heartwall:

on input `test.avi` 2:

instrumented:
timeout

instrumented without printf:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/heartwall$ time LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so ./heartwall ../../data/heartwall/test.avi 2 > /dev/null

real    0m58.449s
user    0m49.406s
sys     0m8.765s
```

native run:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/heartwall$ time ./heartwall .
./../data/heartwall/test.avi 2
WG size of kernel = 256
frame progress: 0 1

real    0m0.748s
user    0m0.038s
sys     0m0.594s
```

78x

B+tree:

on input file mil.txt command command.txt

native run:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/b+tree$ time ./b+tree.out file ../../data/b+tree/mil.txt command ../../data/b+tree/command.txt > /dev/null

real    0m2.065s
user    0m1.252s
sys     0m0.650s
```

instrumented:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/b+tree$ time LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so ./b+tree.out file ../../data/b+tree/mil.txt command ../../data/b+tree/command.txt > /dev/null

real    0m49.453s
user    0m42.200s
sys     0m6.931s
```

25x

instrumented without printf:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/b+tree$ time LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so ./b+tree.out file ../../data/b+tree/mil.txt command ../../data/b+tree/command.txt > /dev/null

real    0m4.178s
user    0m3.112s
sys     0m0.861s
```

2x

on input file small.txt command command_small.txt:

instrumented:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/b+tree$ time LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so ./b+tree.out file ../../data/b+tree/small.txt command ../../data/b+tree/command_small.txt > /dev/null

real    0m4.480s
user    0m3.244s
sys     0m1.034s
```

native run:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/b+tree$ time ./b+tree.out file ../../data/b+tree/small.txt command ../../data/b+tree/command_small.txt > /dev/null

real    0m0.735s
user    0m0.023s
sys     0m0.589s
```

6x

instrumented without printf:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/b+tree$ time LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so ./b+tree.out file ../../data/b+tree/small.txt command ../../data/b+tree/command_small.txt > /dev/null

real    0m1.113s
user    0m0.349s
sys     0m0.630s
```

1.5x

huffman:

on input `test1024_H2.206587175259.in`:

instrumented:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/huffman$ time LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so ./pavle ../../data/huffman/test1024_H2.206587175259.in > /dev/null

real    1m8.975s
user    0m59.141s
sys     0m9.475s
```

native run:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/huffman$ time ./pavle ../../data/huffman/test1024_H2.206587175259.in > /dev/null

real    0m0.755s
user    0m0.030s
sys     0m0.607s
```

91x

instrumented without printf:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/huffman$ time LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so ./pavle ../../data/huffman/test1024_H2.206587175259.in > /dev/null

real    0m7.825s
user    0m6.604s
sys     0m1.060s
```

10x

lavaMD:

on input -boxes1d 10:

instrumented:
timeout

native run:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/lavaMD$ time ./lavaMD -boxes1d 10 > /dev/null

real    0m0.878s
user    0m0.100s
sys     0m0.663s
```

instrumented without printf:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/lavaMD$ time LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so ./lavaMD -boxes1d 10 > /dev/null

real    0m18.936s
user    0m15.783s
sys     0m2.963s
```

21x

lud:

on input -s 256 -v:

instrumented:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/lud$ time LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so cuda/lud_cuda -s 256 -v > /dev/null

real    0m10.847s
user    0m8.745s
sys     0m1.944s
```

native run:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/lud$ time cuda/lud_cuda -s 256 -v > /dev/null
real    0m0.726s
user    0m0.015s
sys     0m0.603s
```

15x

instrumented without printf:

```
yinengy@efeslab-gpu-rr:~/CUDA-Data-Race-Detector/test-apps/rodinia/cuda/lud$ time LD_PRELOAD=/home/yinengy/CUDA-Data-Race-Detector/tools/race_check_trace/race_check_trace.so cuda/lud_cuda -s 256 -v > /dev/null
real    0m2.705s
user    0m1.814s
sys     0m0.746s
```

3.7x