

Swiss Confederation

Performance exercise

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Prerequisites

- Linux (virtual or physical) machine with GPU (CUDA compute capability >=5.2)
- Docker (<u>https://www.docker.com/</u>)
- (All the software and the dependencies, for example ECMWF's Atlas <u>https://github.com/ecmwf/atlas</u> are already contained in a docker image)



Pulling the image

With docker:

\$ sudo docker pull dawnico/performance_exercise

If you are curious about how the software has been built in the image, here is the Dockerfile:

https://github.com/dawn-ico/performance_exercise/blob/homework/Dockerfile



Using the image

The exercise can be performed from within the container:

\$ sudo docker run -it dawnico/performance_exercise

The working directory is set to /root/performance_exercise. Here you will find exercise.py (dusk script), exercise_cuda.cu (readable generated code to be optimized), exercise_driver.cpp (calling the stencil).

You can use vim to edit files.



Using the image (alternative)

If you don't want to edit files from the command line, you could sync a local folder with the container's exercise folder:

```
$ git clone -b homework
https://github.com/dawn-ico/performance_exercise.git
$ sudo docker run -it -v
./performance_exercise:/root/performance_exercise
dawnico/performance_exercise
```

Then you can edit files outside of the container (./performance_exercise folder) and changes will be reflected inside.



Setup environment

From within the container, you should first load the prepared environment before you can compile/run:

\$ source load-env.sh

Each time you want to work on the exercise you have to load this environment in the container's shell.

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CLI test

You should now try if you have a working installation of dusk and dawn

- \$ dusk-front --help
- \$ dawn-opt --help
- \$ dawn-codegen --help

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Exercise

```
To compile
$ ./compile.sh
To run
$ ./exercise
```

(as shown during the demo)

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Exercise

To obtain the baseline (code generation):

```
$ dusk-front exercise.py | dawn-opt | dawn-codegen -b
cuda-ico -o exercise_cuda.cu
```

... you can try optimizations on exercise_cuda.cu by hand or you can get an optimized one from dawn:

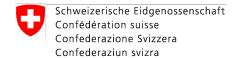
```
$ dusk-front exercise.py | dawn-opt --default-opt |
dawn-codegen -b cuda-ico -o exercise_cuda.cu
```

Have fun :)



Questions?

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Swiss Confederation

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