DDLab Project 12

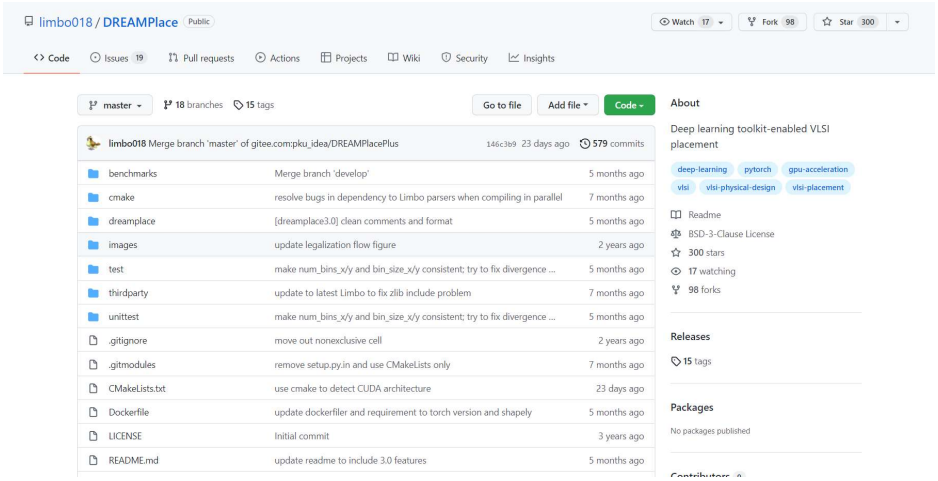
A. Group ID, EDA tool name, group member names, and student IDs

- Group ID: 22
- EDA tool name: DREAMPlace
- Group members' names & student ID
  - 蔡湘瑩 B10930002
  - 李喬安 B10915019
  - 詹宗叡 B10915061
  - 廖祥喻 B10915055

B. Detailed description about the tool with at least five screenshots.

Deep learning toolkit-enabled VLSI placement. With the analogy between nonlinear VLSI placement and deep learning training problem, this tool is developed with deep learning toolkit for flexibility and efficiency. The tool runs on both CPU and GPU. Over 30X speedup over the CPU implementation (RePlAce) is achieved in global placement and legalization on ISPD 2005 contest benchmarks with a Nvidia Tesla V100 GPU. DREAMPlace also integrates a GPU-accelerated detailed placer, ABCDPlace, which can achieve around 16X speedup on million-size benchmarks over the widely-adopted sequential placer NTUPlace3 on CPU.
DREAMPlace runs on both CPU and GPU. If it is installed on a machine without GPU, only CPU support will be enabled with multi-threading.

- GitHub Page



- Part of `README.md`

README.md

How to Build

Two options are provided for building: with and without Docker.

Build with Docker

You can use the Docker container to avoid building all the dependencies yourself.

1. Install Docker on Windows, Mac or Linux.
2. To enable the GPU features, install NVIDIA-docker; otherwise, skip this step.
3. Navigate to the repository.
4. Get the docker container with either of the following options.
   - Option 1: pull from the cloud limbo018/dreamplace.

```
docker pull limbo018/dreamplace:cuda
```

   - Option 2: build the container.

```
docker build . --file Dockerfile --tag your_name/dreamplace:cuda
```

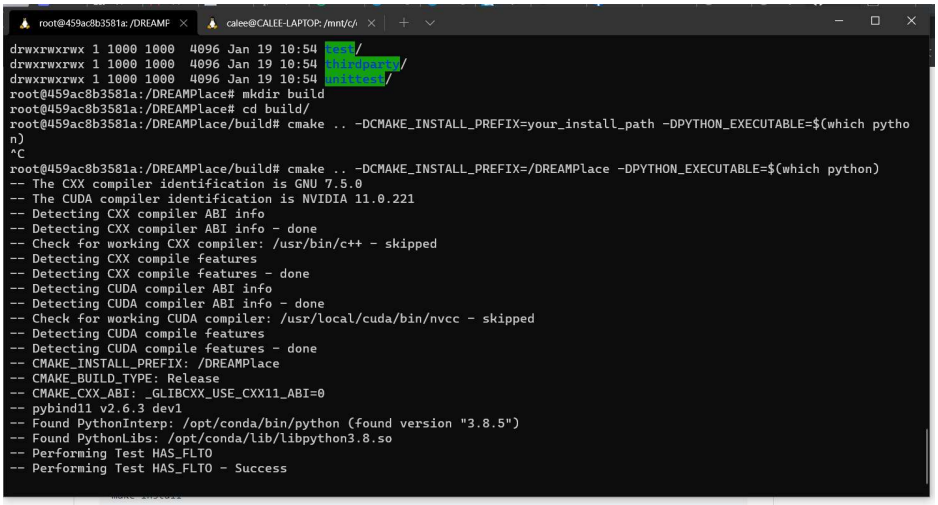
5. Enter bash environment of the container. Replace `limbo018` with your name if option 2 is chosen in the previous step.

Run with GPU on Linux.

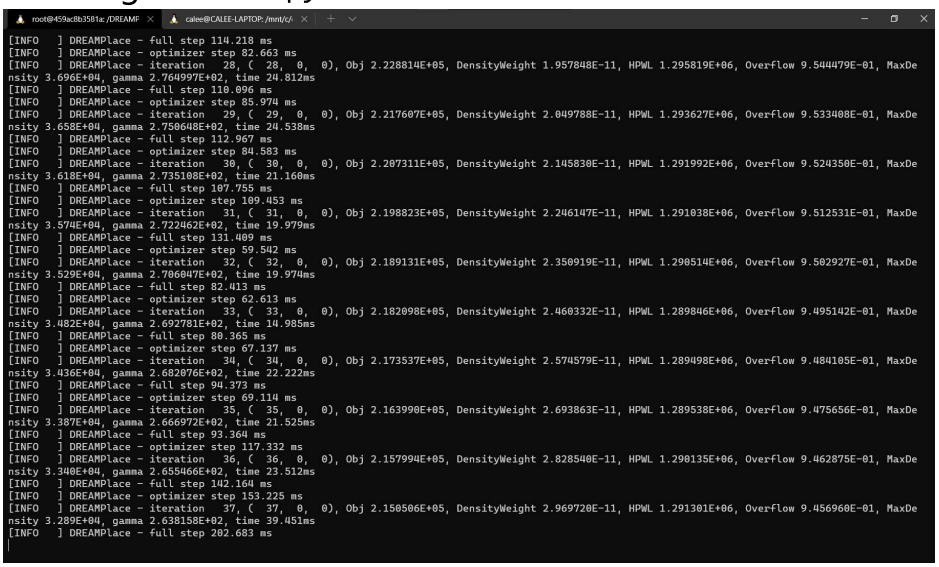
```
docker run --gpus 1 -it -v $(pwd):/DREAMPlace limbo018/dreamplace:cuda bash
```

Run with GPU on Windows.

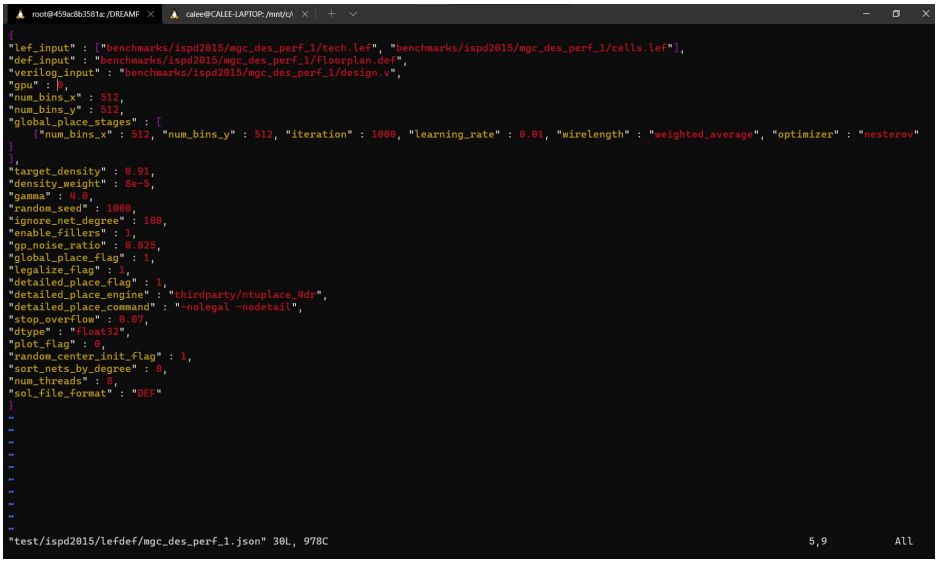
- Building DREAMPlace



- Running `Placer.py`



- Config file



C. Overall discussion and comments about the EDA tool.

使用 Deep Learning 做 placement 是一個很有趣的解決方案。整個工具設計上對使用者十分友善，在 README 內有詳盡的建置及使用教學，也附有多個測試用專案。官方有提供建置好環境的 docker image，使用者不用自己建立環境，十分方便。

D. A list of references if applicable.

- **https://github.com/limbo018/DREAMPlace**

  (https://github.com/limbo018/DREAMPlace)

E. Suggestions to this course.

No.