CS6135 VLSI Physical Design Automation

Final Project: Routing with Cell Movement Advanced

Due: 23:59, January 16 2022

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1. Introduction

In this homework, you are asked to solve 2021 ICCAD CAD Contest Problem B and finish a report to explain how you do.

2. Problem Description

More details are in **Problem_B_spec.pdf**.

If you have any questions, please look them up in **Problem_B_QA.pdf**.

3. Language/Platform

(1) Language: C/C++

(2) Platform: Unix/Linux

4. Report

Your report must contain the following contents, and you can add more as you wish.

(1) The name and student ID of each team member

(2) How to compile and execute your program and give an execution example.

(3) The final score and the runtime of each testcase.
Notice that the runtime contains I/O, constructing data structures, computing parts, etc. The more details your experiments have, the more clearly you will know where the runtime bottlenecks are.

(4) The details of your implementation and algorithm. You must use flow chart(s) to help elaborate your algorithm, and please follow the symbols usually used in flow charts. (If you are not familiar with the symbols, please refer to this reference: https://www.programiz.com/article/flowchart-programming)
If your method is similar to some previous works/papers, please cite the papers and reveal the difference(s).

(5) What tricks did you do to speed up your program or to enhance your solution quality?

(6) What have you learned from this project? What problem(s) have you encountered in this project?

5. Required Items

Please compress `Final_Project/` (using tar) into one with the name `CS6135_Final_Project.tar.gz` before uploading it to eeclass.

(1) `src/` contains all your source code, your `Makefile` and `README`.

- `README` must contain how to compile and execute your program. An example is like the one shown in HW2.

(2) `bin/` contains your executable file.

(3) `CS6135_Final_Project_report.pdf` contains your report.

You can use the following command to compress your directory on a workstation:

```
$ tar -zcvf CS6135_Final_Project.tar.gz Final_Project/
```

6. Grading

✓ 80%: The solution quality (total score) of all testcases

If your total score is greater than 3,700,936:

$$\text{program score} = 70 + 30 \times \frac{\text{total\_score} - 3{,}700{,}936}{5{,}914{,}291 - 3{,}700{,}936}$$

Otherwise:

$$\text{program score} = 70 \times \frac{\text{total\_score}}{3{,}700{,}936}$$

✓ 20%: The completeness of your report

Notes:

- Make sure the following commands can be executed.
  - Go into directory "`src/`", enter "`make`" to compile your program and generate the executable file, called "`cell_move_router`", which will be in directory "`bin/`".
  - Go into directory "`src/`", enter "`make clean`" to delete your executable file.
- Please use the following command format to run your program.

  ```
  $ ./cell_move_router <input.txt> <output.txt>
  ```

  E.g.:

  ```
  $ ./cell_move_router ../testcases/case1.txt ../output/case1.txt
  ```
- Use arguments to read the file path. Do not write file path in your code.
- Program must be terminated within 60 minutes for each testcase.
- We will test your program by shell script with GCC 9.3.0 on ic51. Please make sure your program can be executed by **Final_Project_grading.sh**.