

(1) Your name and student ID

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(2) The wirelength and the runtime of each testcase

Testcase1:

```
Benchmark: ibm01-cu85
Global HPWL: 659934205   Time: 35.0 sec (0.6 min)
Legal HPWL: 674120726   Time: 2.0 sec (0.0 min)
Detail HPWL: 321057205   Time: 6.0 sec (0.1 min)
=====
HPWL: 321057205   Time: 43.0 sec (0.7 min)
```

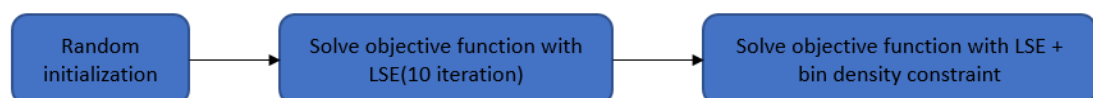
Testcase2:

```
Benchmark: ibm05
Global HPWL: 46558446   Time: 200.0 sec (3.3 min)
Legal HPWL: 52955793   Time: 6.0 sec (0.1 min)
Detail HPWL: 28083706   Time: 32.0 sec (0.5 min)
=====
HPWL: 28083706   Time: 238.0 sec (4.0 min)
```

Testcase3:

```
Benchmark: ibm09-cu90
Global HPWL: 5671466848   Time: 586.0 sec (9.8 min)
Legal HPWL: 5517824692   Time: 7.0 sec (0.1 min)
Detail HPWL: 2639050267   Time: 51.0 sec (0.8 min)
=====
HPWL: 2639050267   Time: 644.0 sec (10.7 min)
```

(3) The details of your algorithm. You could use flow chart(s) and/or pseudo code to help elaborate your algorithm. If your method is similar to some previous work/papers, please cite the papers and reveal your difference(s).



我會先用 random 把每個 cell 先隨機排一個位置，然後使用 LSE 跑幾個 iteration 優化 wirelength，最後再用 LSE 和 bin density 的 constraint 讓 cell 散開。

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

我先只使用 LSE 跑幾個 iteration 希望先優化 wirelength 讓他先初步有個比較好的 wirelength 的 solution，最後再加上 bin density 的 constraint 讓 cell 可以散開。

(5) Please compare your results with the previous top 5 students' results and show your advantage either in runtime or in solution quality. Are your results better than theirs?

If so, please express your advantages to beat them.

If not, it's fine. If your program is too slow, then what could be the bottleneck of your program? If your solution quality is inferior, what do you think that you could do to improve the result in the future?

我的結果比第五名的好了一點點，只有 case 1 差了一點點，wavelength 改進的地方可能就是讓他多跑幾個 iteration，因為我現在 iteration 的次數大概是 30-40 次，速度才可以跟 top5 的差不多，可是要更好的 quality 就得犧牲一些速度，或者加入講義的 multi level 的方法來加速。