

CS6135 HW3 Report

姓名：鄭謝廷揚 學號：106062632

1. How to compile and execute your program, and give an execution example.

Compile command : “\$ make all” (under the directory of Makefile)

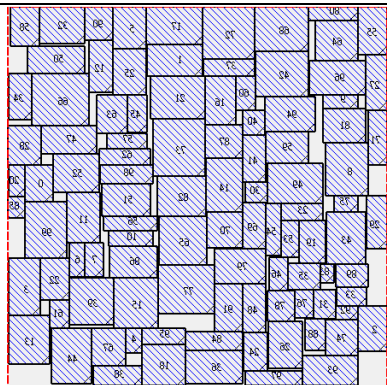
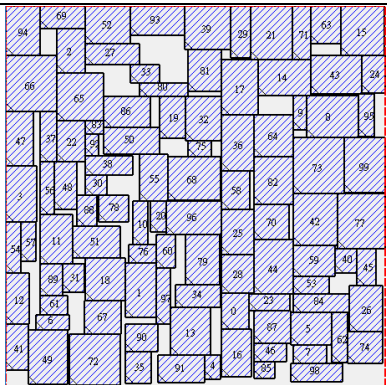
Execute command : “\$./fp *.blocks *.nets *.pl *.floorplan *white_space_ratio*”

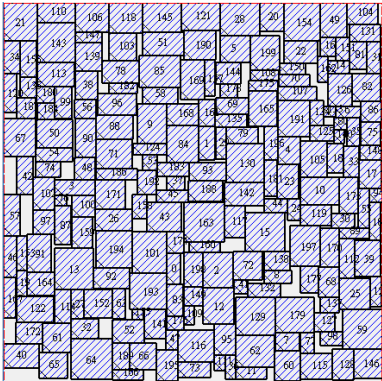
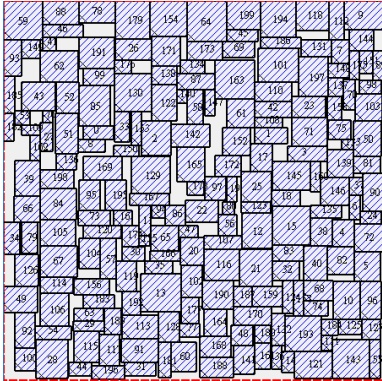
E.g.: \$./fp n100.blocks n100.nets n100.pl n100.floorplan 0.1


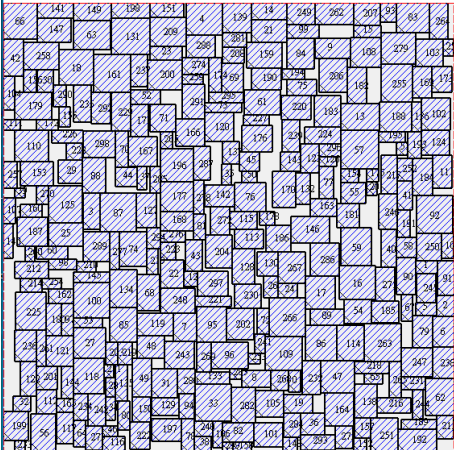
Or you can use command setting by Makefile

```
all:
    $(comp)
n100_0.1:
    $(exe) $(block1) $(nets1) $(p11) $(out1) 1.1
n100_0.15:
    $(exe) $(block1) $(nets1) $(p11) $(out1) 1.15
n200_0.1:
    $(exe) $(block2) $(nets2) $(p12) $(out2) 1.1
n200_0.15:
    $(exe) $(block2) $(nets2) $(p12) $(out2) 1.15
n300_0.1:
    $(exe) $(block3) $(nets3) $(p13) $(out3) 1.1
n300_0.15:
    $(exe) $(block3) $(nets3) $(p13) $(out3) 1.15
```

2. The wirelength and the runtime of each testcase

	N100 (ratio 0.1)	N100 (ratio 0.15)
Runtime	6.28sec	3.9sec
Wirelength	293425	305321
Floor plan pic.		

	N200 (ratio 0.1)	N200 (ratio 0.15)
Runtime	36.61sec	58.00sec
Wirelength	575283	569262
Floor plan pic.		

	N300 (ratio 0.1)	N300 (ratio 0.15)
Runtime	283	156.23sec
Wirelength	830667	832479
Floor plan pic.		

3. Smallest the white space ratio in 10 minutes.

	N100	N200	N300
Ratio	1.1	1.1	1.1

4. Algorithm

My algorithm use similar idea to FAST-SA algorithm.

Input : ratio , information of block

Output : floor plan

While (Both max X of blocks and max Y of blocks are in the boundary){

Random choose operation(Swap,Rotate,Insert and Delete) and block to disturb.

```

//the opportunity of choosing operation is changed in different stage
costnow = cost function(); //the cost function is decided by the stage now

if costnow <= cost
    cost = costnow
    store this good floor plan
else if (costnow > cost*range) //the range is decided by the stage now
    restore floor plan from good floor plan

If ( maxX <boundary*2+   maxY<boundary*2 )
    Set stage to 1
Else if ( maxX + maxY <= boundary *2*1.4 )
    Set stage to 2
Else if ( maxX + maxY <= boundary *2*1.15 )
    Set stage to 3
If ( maxX <boundary*1.105+   maxY<boundary*1.05 )
    Set stage to 4
}

```

5. The details of your implementation. What tricks did you do to speed up your program or to enhance your solution quality?

Data structure :

Use binary tree to store information and implement different function.

//Basic function of binary tree

void InsertLevelorder(int data, int x, int y);

void DeleteNode(int data);

void RenewXY();

TreeNode* FindBlock(int data);

TreeNode* GetInfo(int data, int &x, int &y, int &r, int &lc, int &ly);

//Three operation

void Disturb(int data);

void Swap(int data1, int data2);

void Rotate(int data);

//Output function

void Levelorder();

void Outputfile();

void Inorder(TreeNode *current);

// Copy or delete entire tree

```
void Copy(TreeNode *Root, TreeNode* Back);
```

```
void DeleteTree();
```

Cost function :

```
cost = alpha * 35 * pow(((Maxx / Maxy) - 1) * 10, 2)
      + beta * (Maxx + Maxy) * 10
      + ((Maxx - boundary)<0)*( boundary - Maxx) * 100 * (gama == 0)
      + gama * ((Maxy - boundary)<0)*( boundary - Maxy)*pow(10, (boundary - Maxy));
```

Stage 0 :

Alpha = 0 , Beta = 1,Gama =0

Stage 1 :

Alpha = 0 , Beta = 1,Gama =0

Stage 2 :

Alpha = boundary*0.05 , Beta = 1,Gama =0

Stage 3 :

Alpha = boundary*0.03 , Beta = 1,Gama =0

Stage 4 :

Alpha = boundary*0.05 , Beta = 1,Gama =1

6. Please compare your results with the top 3 students' results from last year

None of my result is better than last year's data. I think if I design a good cost function with better parameter, the result will be better.

7. What have you learned from this homework? What problem(s) have you encountered in this homework?

在這次作業中我學到了 SA 退火演算法實際上如何運行，並通過我自己的想法去實現類似的效果，讓我可以很多的選擇中能夠慢慢朝解答逼近，也透過調整參數了解到不同操作對於 floor plan 會有甚麼影響，在這次作業中遇到的最大問題，我想也是我參數調得不夠好，以及在建造整個資料結構的時間花了很多。