VLSI HW1

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(2)比較表格

設 period：20, waveform：10 , core utilization：0.7

	(congestion-driven, timing-driven)					
	(L, off)	(L, on)	(M, off)	(M, on)	(H, off)	(H, on)
Slack(ns)	16.379	16.511	16.346	16.496	16.346	16.496
total wirelength(um)	311835.948	309829.965	312612.562	310789.010	312612.562	310789.010

設 period：3.5 , waveform：1.0 , core utilization：0.96

	(congestion-driven, timing-driven)					
	(L, off)	(L, on)	(M, off)	(M, on)	(H, off)	(H, on)
Slack(ns)	0.111	0.097	0.138	0.154	0.138	0.154
total wirelength(um)	271019.872	273476.395	271526.590	271747.555	271526.590	271747.555

(3)於我的實驗中，

●congestion-driven 調高強度時傾向多拉 wire 來解決 congestion

●timing-driven 則是透過減少 wire 長度使 arrive time 提早

但在我的 best result 的設置下，情況如第二個表格，(L,on)的情況下反而出現加長了長度而且 slack 還變小，根據其 timing report 中在同一條 path 上在前面幾個 Instance 時 arrive time 會比較快，但在最後卻變慢了，應該是有一些 greedy 的方法在裡面所導致

(4) 為了填充 cell 中間的空隙，把擴散層連接起來，以滿足 DRC 規則和設計需求。

(5) My best result

Clock period：3.5　1.0

```
create_clock [get_ports {clk}] -name VCLK -period 3.5 -waveform {0.0 1.0}
```

Core Utilization：0.96

```
floorPlan -coreMarginsBy die -site FreePDK45_38x28_10R_NP_162NW_34O -r 1.0 0.96 4.0 4.0 4.0 4.0
```

Congestion Effort：low , Run Timing Driven Placement：off

```
setPlaceMode -congEffort low -timingDriven 0 -clkGateAware 1 -powerDriven 0 -ignoreScan 1 -reorderScan 1 -ignoreSpare 0
```

Total area of chip：40377.842 um^2

```
Total area of Standard cells: 37134.398 um^2
Total area of Standard cells(Subtracting Physical Cells): 34631.072 um^2
Total area of Macros: 0.000 um^2
Total area of Blockages: 0.000 um^2
Total area of Pad cells: 0.000 um^2
Total area of Core: 37134.398 um^2
Total area of Chip: 40377.842 um^2
```

Total wire length：271019.8725um

```
Total metal1 wire length: 2013.6650 um
Total metal2 wire length: 70258.2250 um
Total metal3 wire length: 95926.7175 um
Total metal4 wire length: 50455.3000 um
Total metal5 wire length: 31951.1050 um
Total metal6 wire length: 14081.0600 um
Total metal7 wire length: 1481.2000 um
Total metal8 wire length: 3386.9200 um
Total metal9 wire length: 812.1600 um
Total metal10 wire length: 653.5200 um
Total wire length: 271019.8725 um
Average wire length/net: 14.3739 um
```

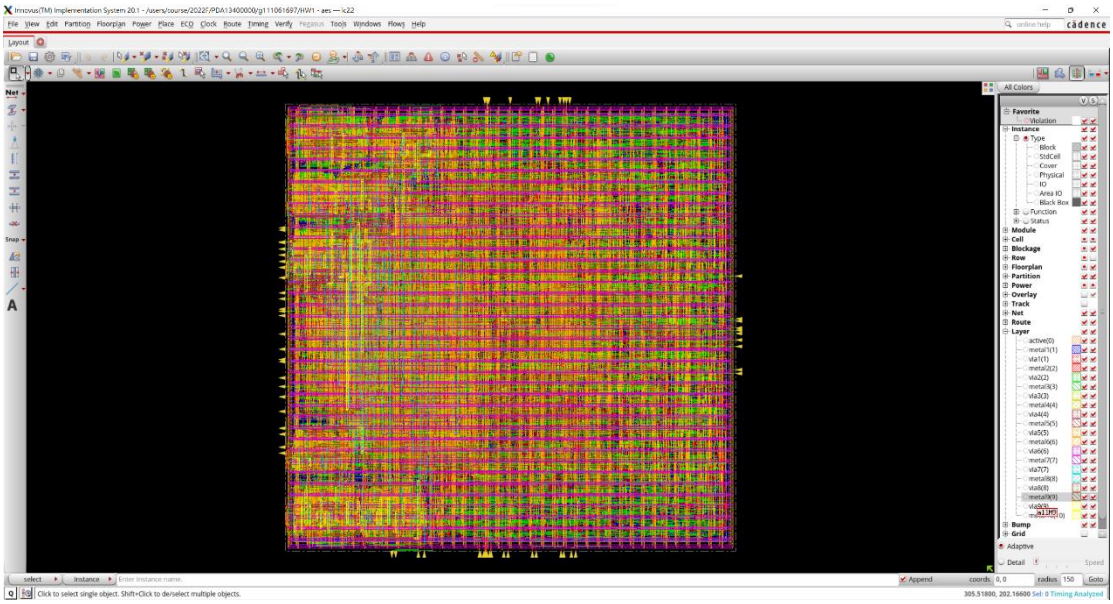
Slack Time：0.111ns

```
Other End Arrival Time          0.000
- Setup                         0.044
+ Phase Shift                   3.500
= Required Time                 3.456
- Arrival Time                  3.345
= Slack Time                    0.111
```

DRC：0 Viols

```
 VERIFY DRC ..... Starting Verification
 VERIFY DRC ..... Initializing
 VERIFY DRC ..... Deleting Existing Violations
 VERIFY DRC ..... Creating Sub-Areas
 VERIFY DRC ..... Using new threading
VERIFY DRC ..... Sub-Area: {136.080 133.920 201.970 199.920} 9 of 9  Thread : 7
VERIFY DRC ..... Sub-Area: {136.080 0.000 201.970 66.960} 3 of 9  Thread : 0
VERIFY DRC ..... Sub-Area: {0.000 0.000 68.040 66.960} 1 of 9  Thread : 3
VERIFY DRC ..... Sub-Area: {0.000 133.920 68.040 199.920} 7 of 9  Thread : 4
VERIFY DRC ..... Sub-Area: {136.080 66.960 201.970 133.920} 6 of 9  Thread : 0
VERIFY DRC ..... Sub-Area: {0.000 66.960 68.040 133.920} 4 of 9  Thread : 4
VERIFY DRC ..... Sub-Area: {68.040 0.000 136.080 66.960} 2 of 9  Thread : 4
VERIFY DRC ..... Sub-Area: {68.040 133.920 136.080 199.920} 8 of 9  Thread : 0
VERIFY DRC ..... Thread : 4 finished.
VERIFY DRC ..... Sub-Area: {68.040 66.960 136.080 133.920} 5 of 9  Thread : 0
VERIFY DRC ..... Thread : 0 finished.

 Verification Complete : 0 Viols.
```


Innovus(TM) Implementation System 20.1 - /users/course/2022F/PDA13400000/g11061697/HW1 - aes — k22
File View Edit Partition Floorplan Power Place ECO Clock Route Timing Verify Pegasus Tools Windows Flows Help
cadence
Layout
All Colors
Favorite
Violation
Instance
Type
Block
StdCell
Cover
Physical
IO
Area IO
Black Box
Function
Status
Module
Cell
Blockage
Row
Floorplan
Partition
Power
Overlay
Track
Net
Route
Layer
active(0)
metal1(1)
via1(1)
metal2(2)
via2(2)
metal3(3)
via3(3)
metal4(4)
via4(4)
metal5(5)
via5(5)
metal6(6)
via6(6)
metal7(7)
via7(7)
metal8(8)
via8(8)
metal9(9)
via9(9)
Bump
Grid
Adaptive
Detail
Speed
select
instance
Enter instance name...
Append
coords 0, 0
radius 150
Goto
Click to select single object. Shift+Click to de/select multiple objects.
305.51800, 202.16600 Sel: 0 Timing Analyzed