Partitioning of a matrix

Yang Zhang
ECE 641

Content

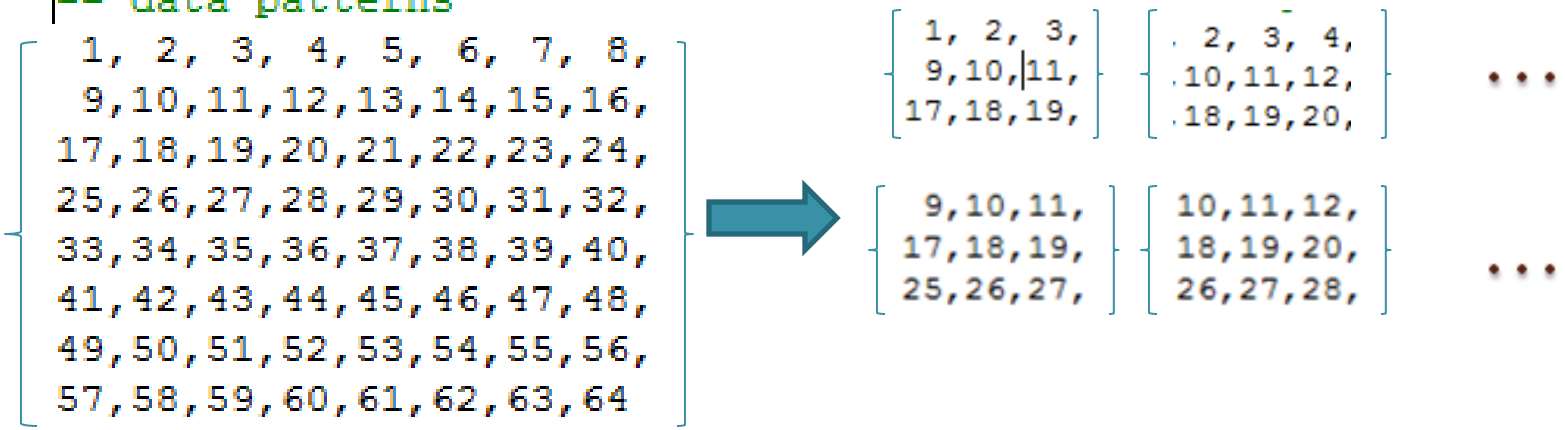
- Design Idea
- Block Diagram
- Simulation
- Demo

Design Idea

- Generate a matrix (eg. 8*8)
- Cut the generated matrix into several small block. (eg. Small block is 3 by 3)
- Calculate each small block and get its arithmetic mean
- Output the arithmetic mean

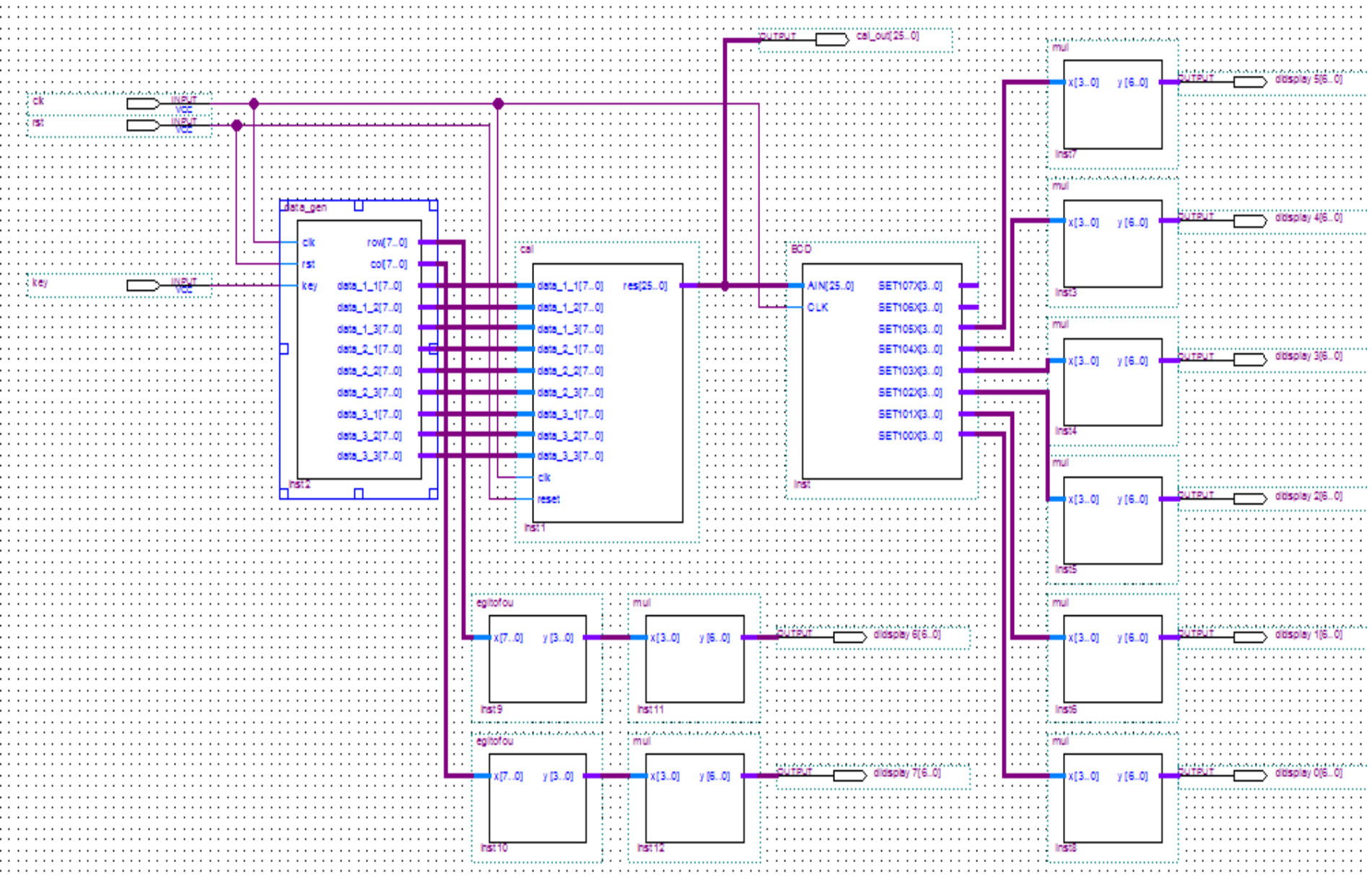
Matrix Partition

```
-- data patterns
 1, 2, 3, 4, 5, 6, 7, 8,
 9,10,11,12,13,14,15,16,
17,18,19,20,21,22,23,24,
25,26,27,28,29,30,31,32,
33,34,35,36,37,38,39,40,
41,42,43,44,45,46,47,48,
49,50,51,52,53,54,55,56,
57,58,59,60,61,62,63,64
```

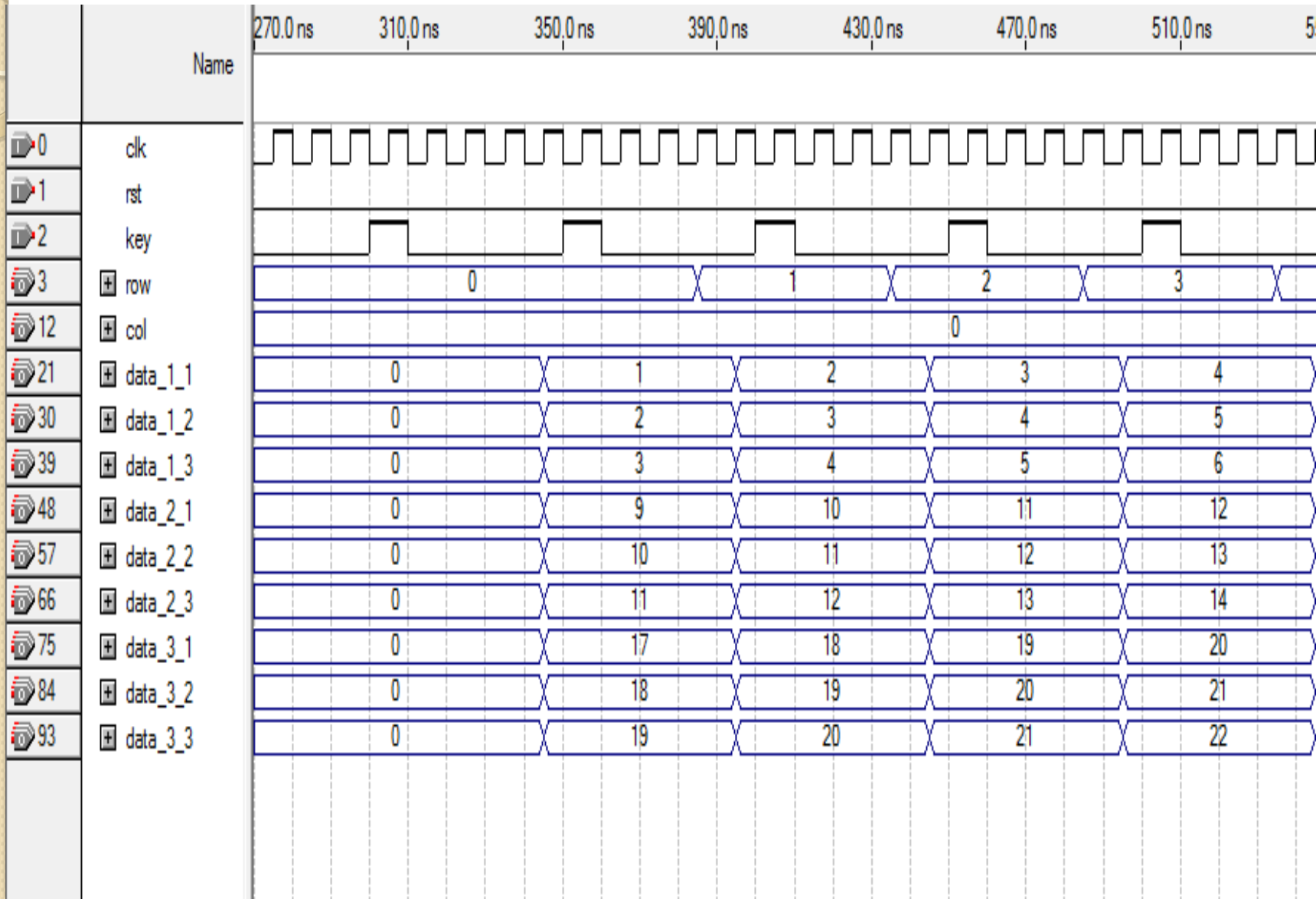


Then, calculate arithmetic mean of each 3*3 block

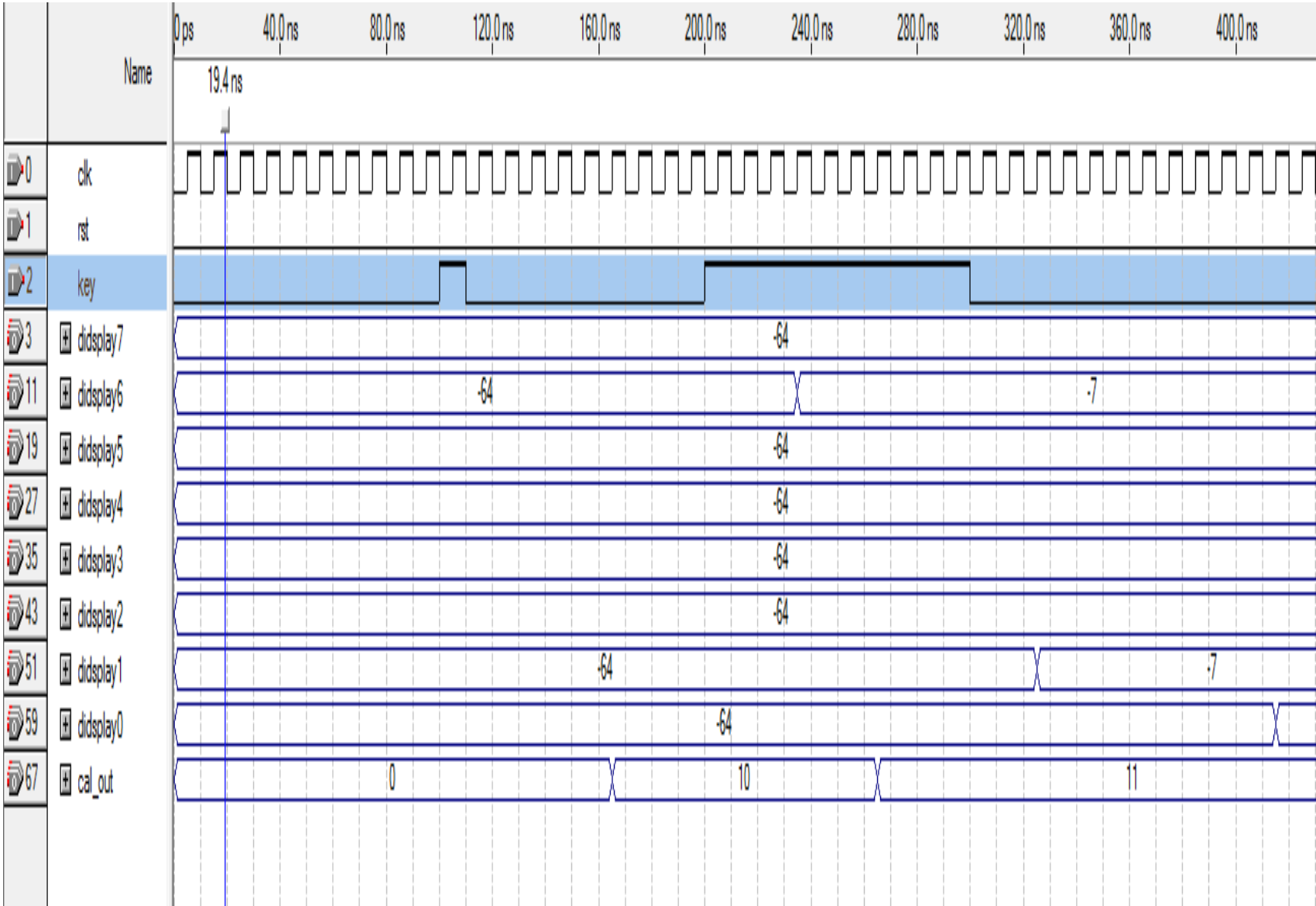
Block Diagram



Simulation


Name
270.0 ns
310.0 ns
350.0 ns
390.0 ns
430.0 ns
470.0 ns
510.0 ns
0 clk
1 rst
2 key
3 row
12 col
21 data_1_1
30 data_1_2
39 data_1_3
48 data_2_1
57 data_2_2
66 data_2_3
75 data_3_1
84 data_3_2
93 data_3_3

Simulation


Name
0 ps
40.0 ns
80.0 ns
120.0 ns
160.0 ns
200.0 ns
240.0 ns
280.0 ns
320.0 ns
360.0 ns
400.0 ns
19.4 ns
0 clk
1 rst
2 key
3 didsplay7
11 didsplay6
19 didsplay5
27 didsplay4
35 didsplay3
43 didsplay2
51 didsplay1
59 didsplay0
67 cal_out
-64
-64
-7
-64
-64
-64
-64
-64
-7
-64
0
10
11

Demo

- Expecting output value

```
10,11,12,13,14,15,
18,19,20,21,22,23,
26,27,28,29,30,31,
34,35,36,37,38,39,
42,43,44,45,46,47,
50,51,52,53,54,55,
```

Thank You