EECS 427 W09
Discussion 3

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Today

- Bit Slice
- CAD1, CAD2 Comments
- Presentation : 3 Groups from last semester

Before we start

- *.cdslck in your cadx folder
- It is a lock file; means you are editing something.
- So, after you finish editing, be sure there is no such file. Usually, icfb will delete it after you close it; however, if not, please delete it.

Metal Usage in Design Hierarchy

- Large designs are usually partitioned into levels of hierarchy: chip, island, partition, unit, macro, cell
- In lower levels, only a small number of layer are allocated for routing
- Metal Layer Usage
  - Chip: all 8
  - Processor (datapath+control): up to 6
  - Datapath: up to 4
  - Macro (ALU, shifter, and RF): up to 3
- Direction (Please follow this in CAD3)
  - Vertical connection M2, M4, M6
  - Horizontal connection M3, M5

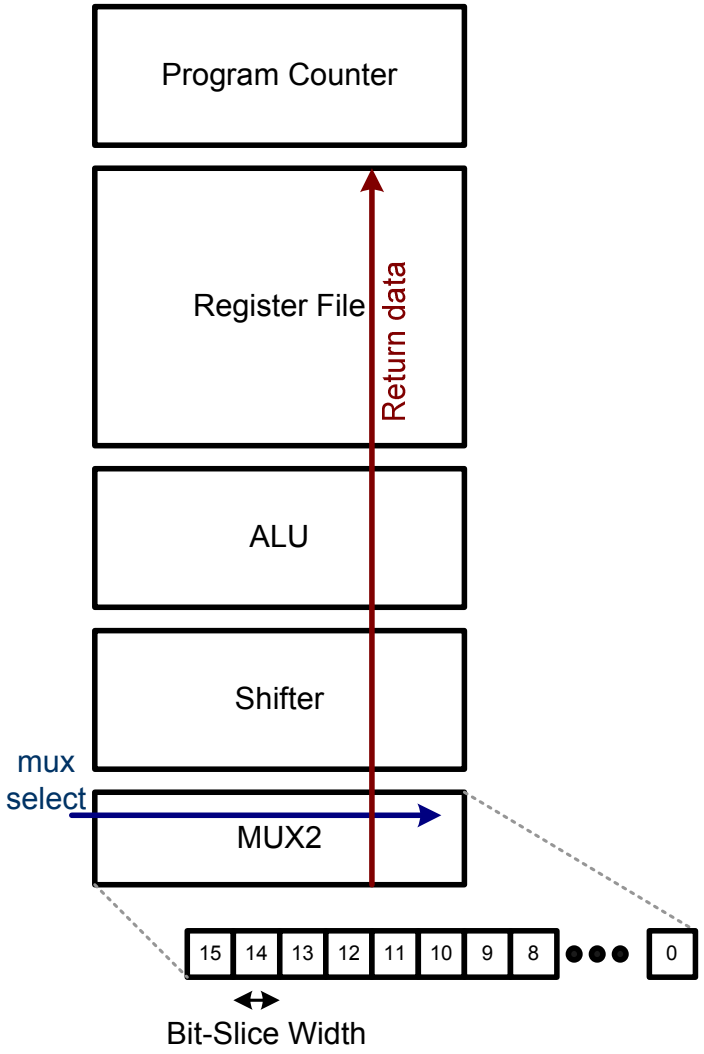
Bit Slice Width

- Bit-slice width is layout width that is allocated for one bit of computation
- It controls the aspect ratio of your final design
- It helps to establish regularity
- Width matching avoids having the data busses over the datapath turn corners
- Easier to visualize the wiring track, and estimate the wire load

Effect of the Bit-Slice Width

- A row of mux2's in the pipeline
- Large bit-slice width → long select line (blue wire)
- Small bit-slice width → long data line (red wire)

- Analyze your design to see how many wiring tracks are needed before deciding on a bit pitch

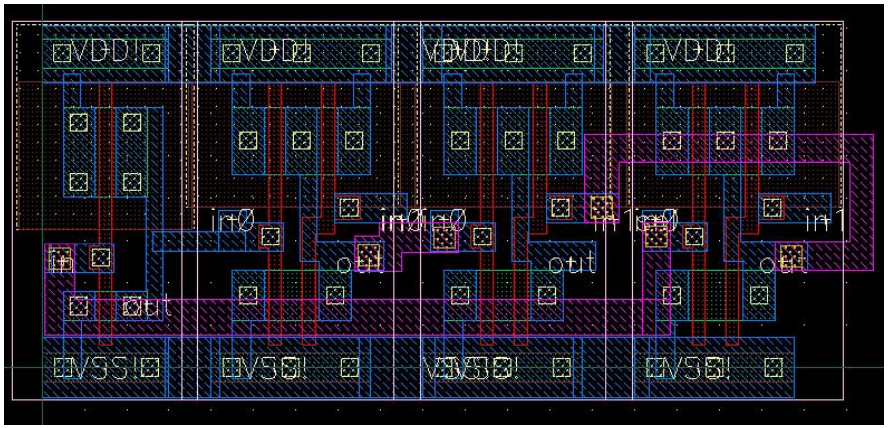


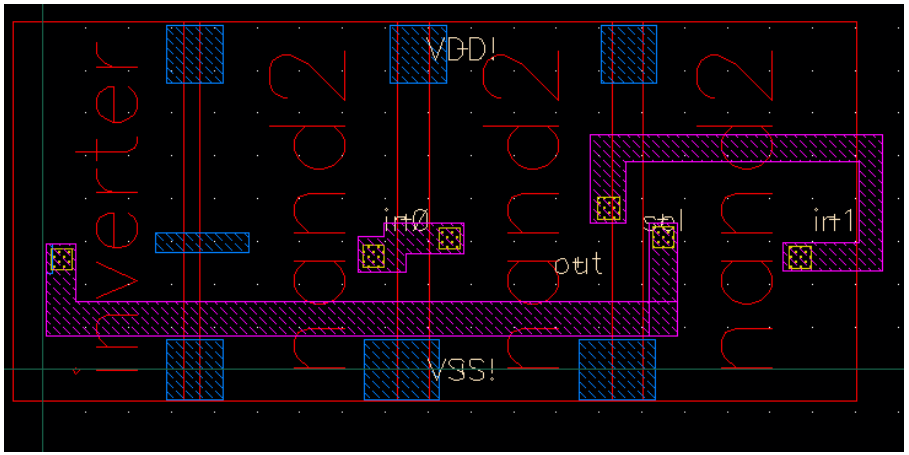
CAD1 Comments

- Did not use hierarchical design
  - You need Design Hierarchy for large scale design.
- Did not extend RX/BP for Power rails
  - Avoid DRC violations in the higher level
- Did not use minimum width for M2 routing
  - Give you more tracks for routing
- Density can be improved

Example

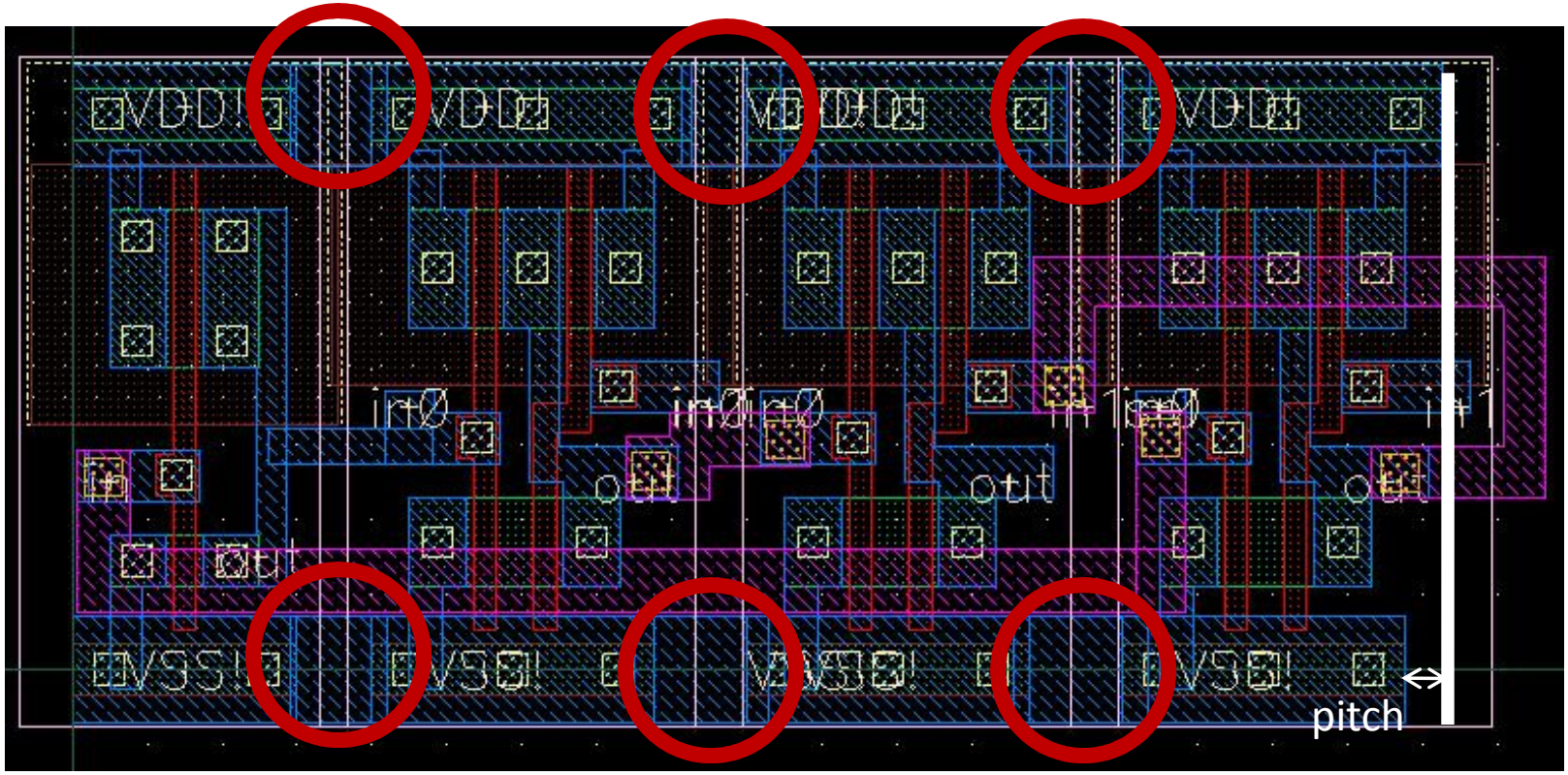
- Hierarchical design





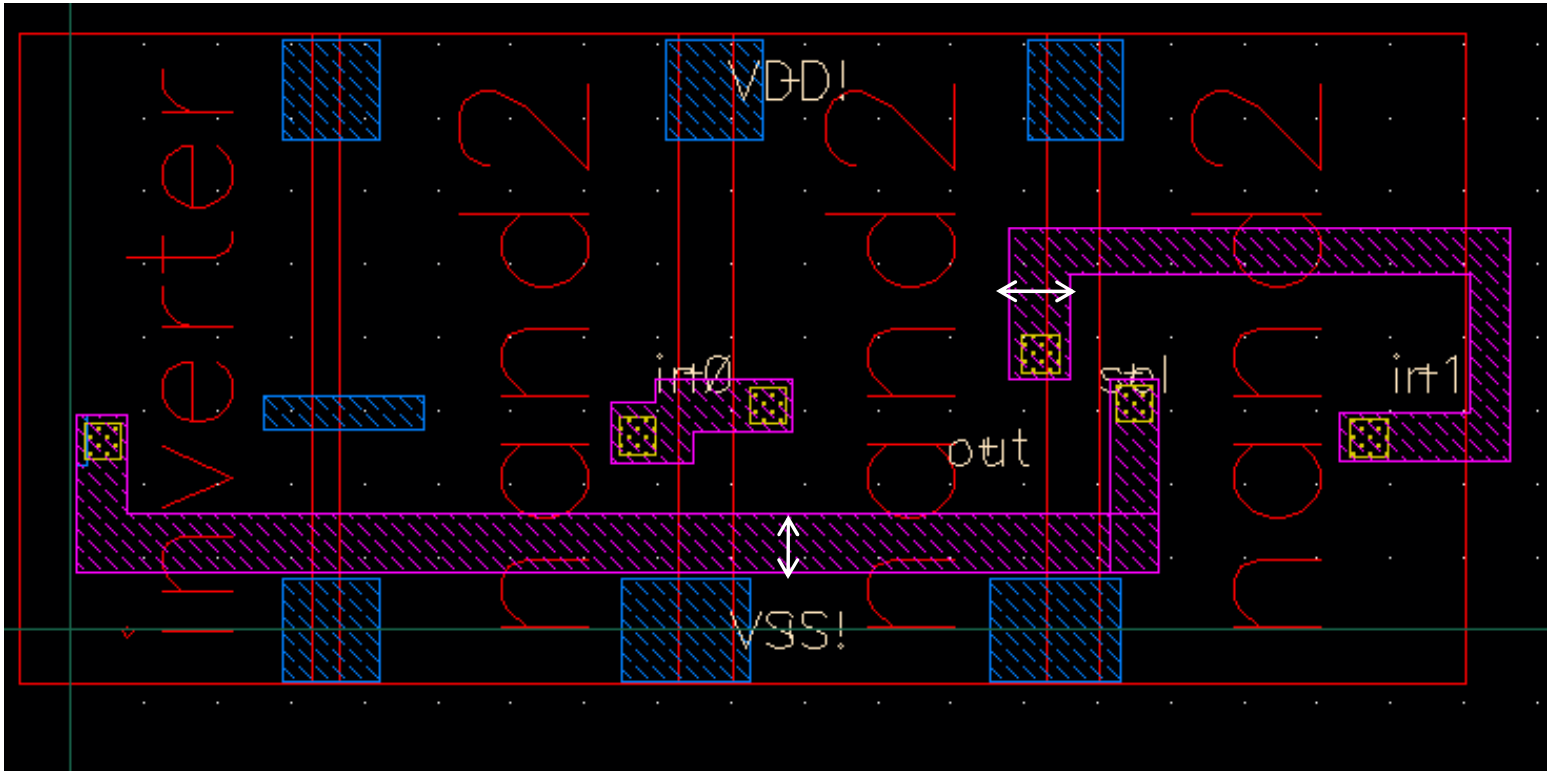
Example

- Extend RX/BP for Power rails in cells.



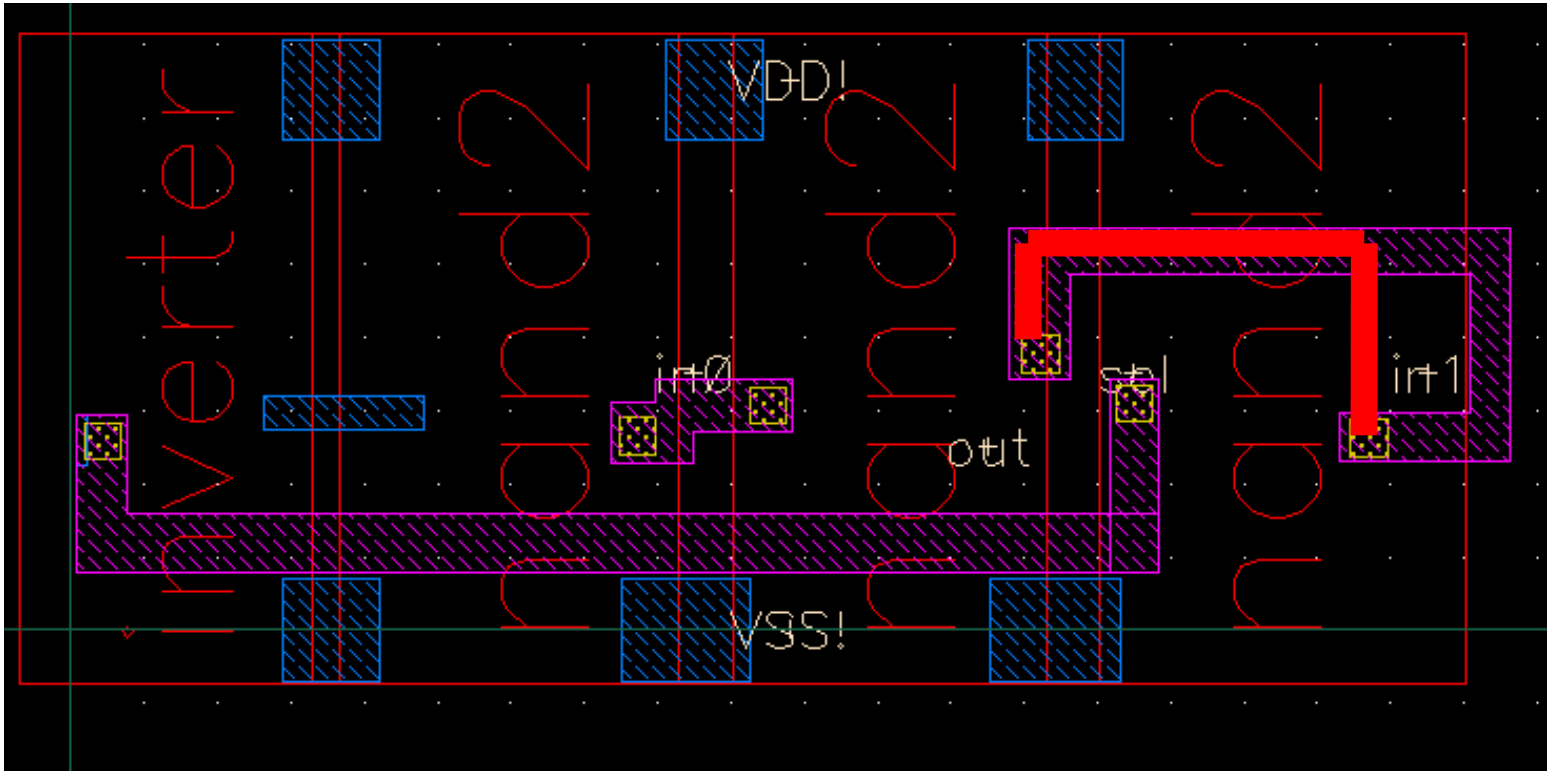
Example

- Minimum width for M2 routing



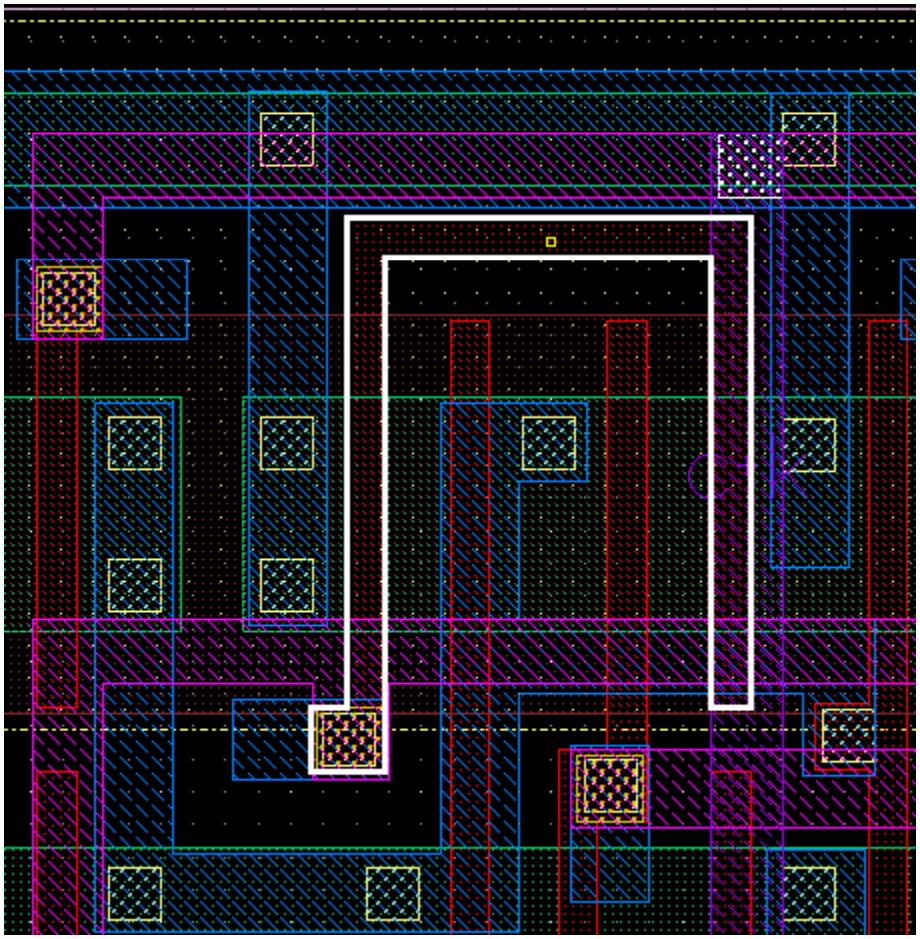
Example

- Density can be improved



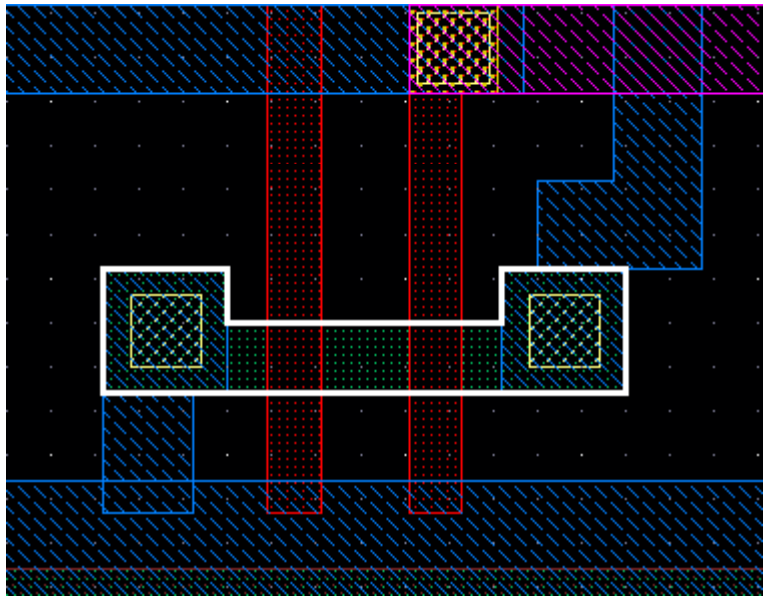
CAD2 Comments

- Avoid long PC connection



CAD2 Comments

- Avoid dumbbell shape RX



CAD2 Comments

- Avoid sending me last minute emails.