International Institute of Information Technology Bangalore

Micron – IIITB Presentation

Date: April 2nd, 2024

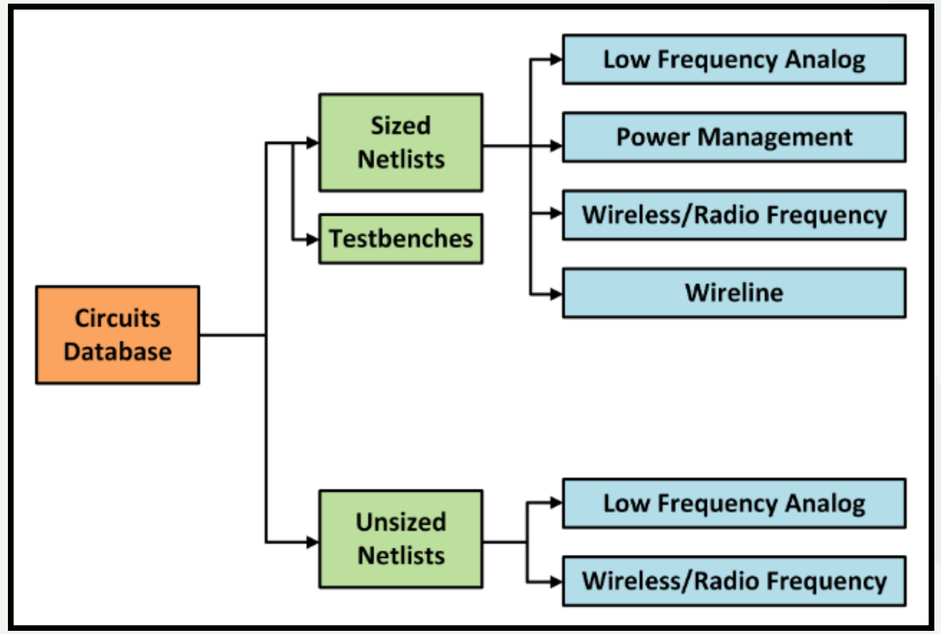
By:
- Prof. Madhav Rao
- Saket Gurjar (iMTech)
- Anshul M (iMTech)

Agenda

- New Parser Design
- Multi-Layer Routing
- Example flow with 20 Macros

ALIGN Dataset Exploration

- A rough design of different analog designs was chosen from the ALIGN dataset and was passed through a parser to obtain the connectivity.
- On further study on the ALIGN tool we observed that the ALIGN tool parser is capable of capturing design constraints through the Spice netlist.
- This dataset consists examples from major domains of analog cmos and this can be added to a spice netlists to form multiple dummy macros during placement



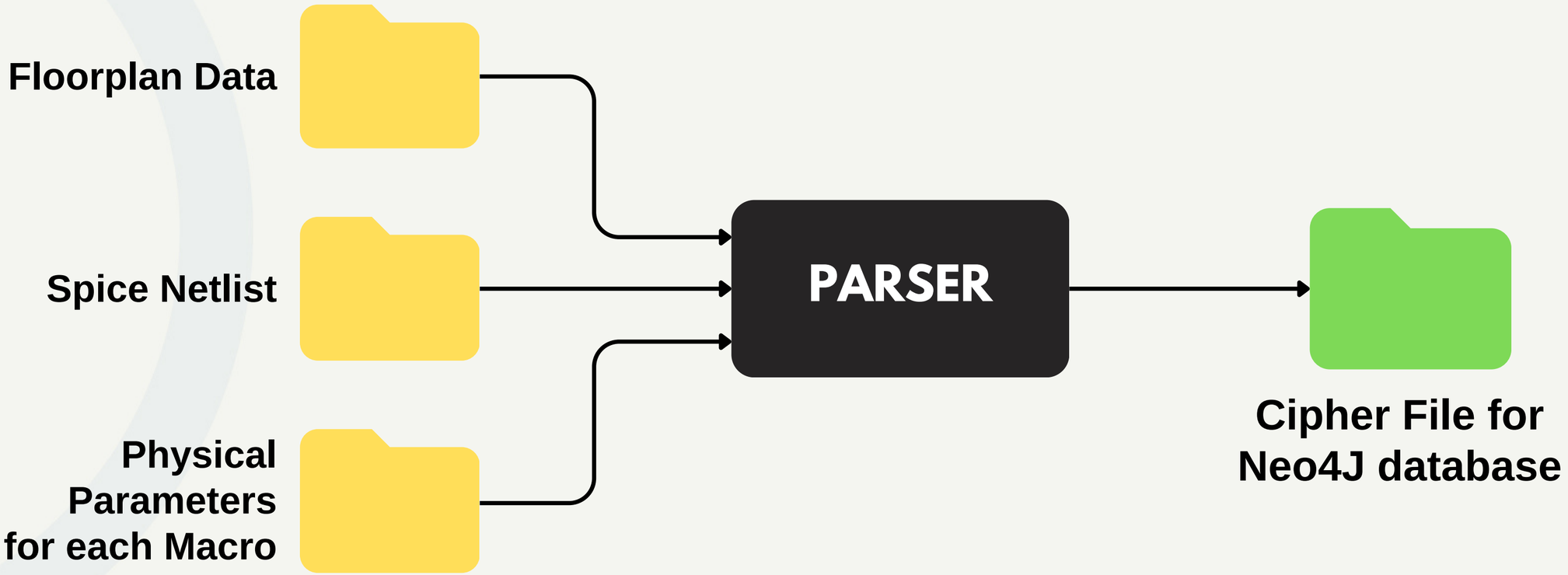
New Parser Design

- The existing parser works at converting the spice netlist to a suitable cipher script for the Neo4J database.
- We wish to automate this process and include the process of including a separate input file for storing the Widths and Lengths of each dummy Macro, along with the floorplan details that is dynamically adjusted based on number of Macros to be placed and routed

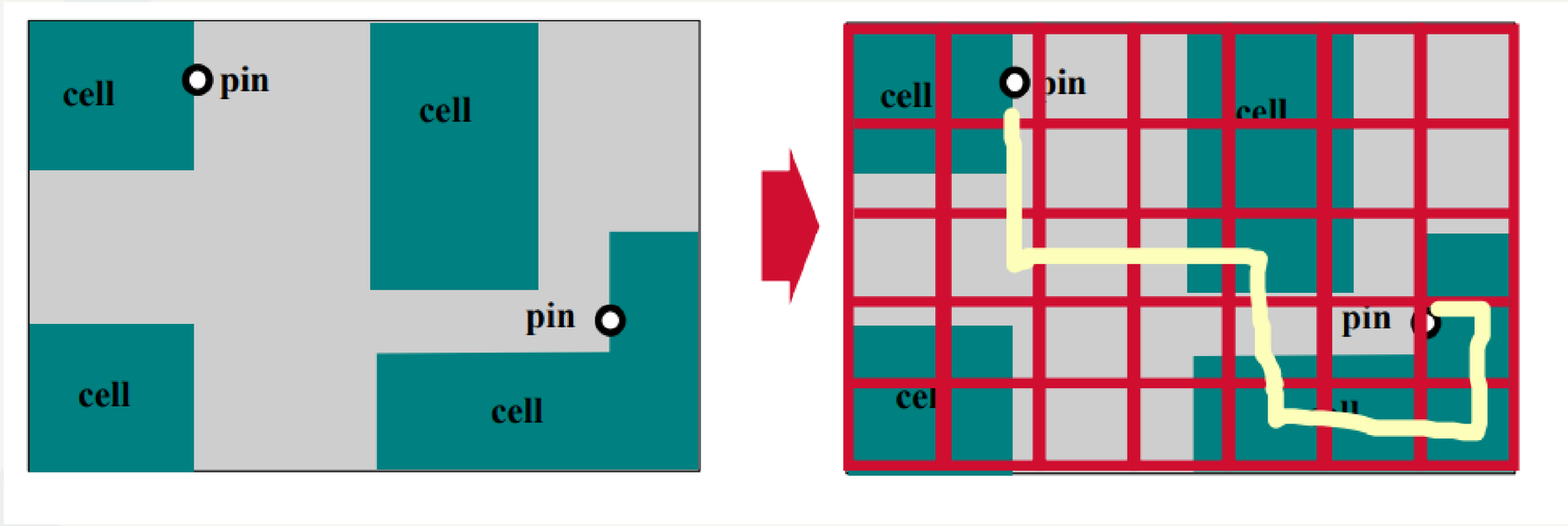
New Parser Design

- Generally, the physical dimensions of a macro are stored in its .lef files. Since we are working with dummy macros, we have to separately provide this information during parsing so that the placement process is carried out without any flaws.
- To implement this new change, we wish to maintain a dictionary with Macro IDs and corresponding parameters, including the Macro Ranks for placement. these parameters would be the intrinsic parameters to each Dummy Macro that a human cannot change once the loop has started.

New Parser Design

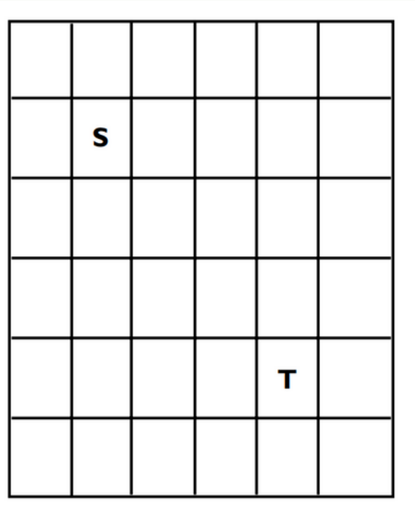


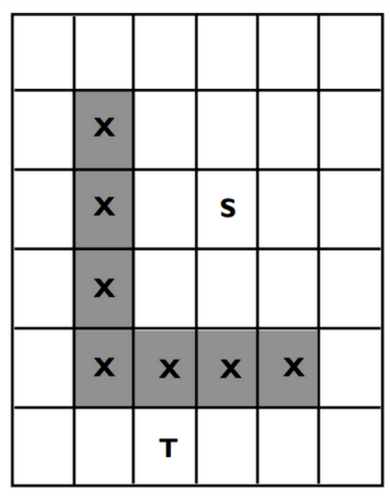
Routing Algorithms



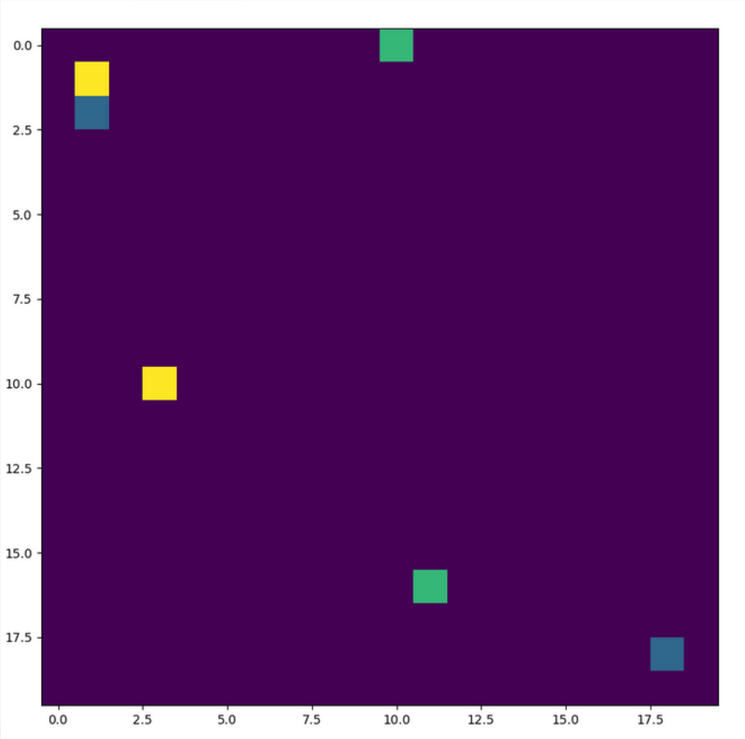
Routing Algorithms

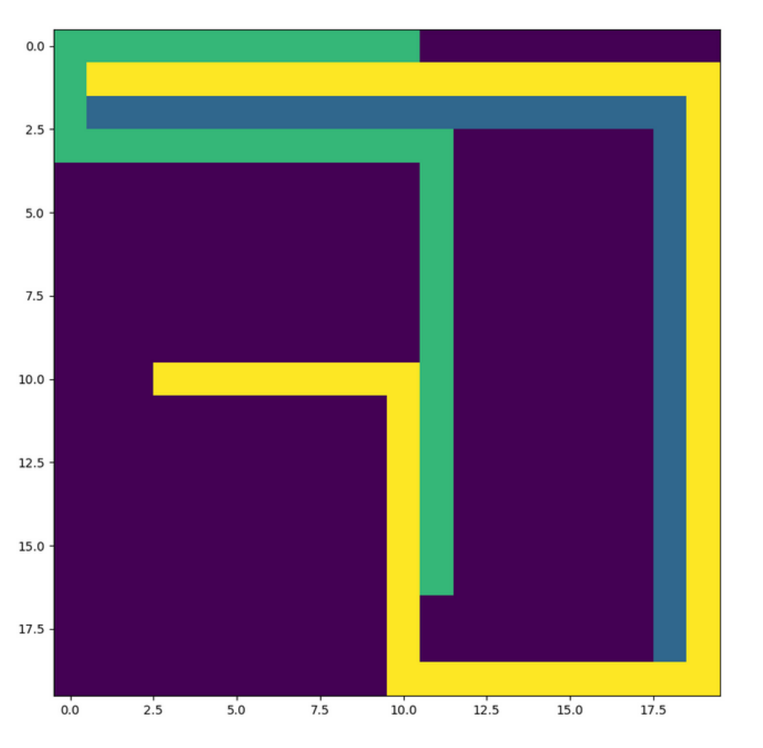
- Maze Routing for solving:
  - Uses Lee’s Algorithm for finding shortest paths between two points in grid.



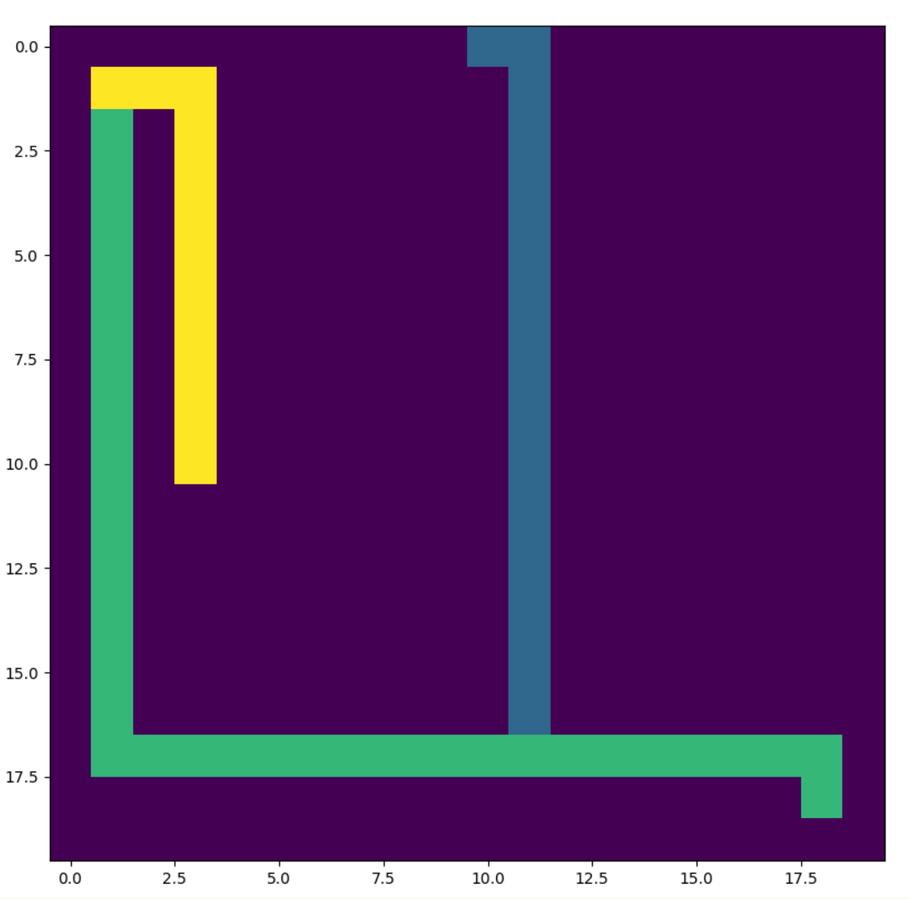


Routing Algorithms



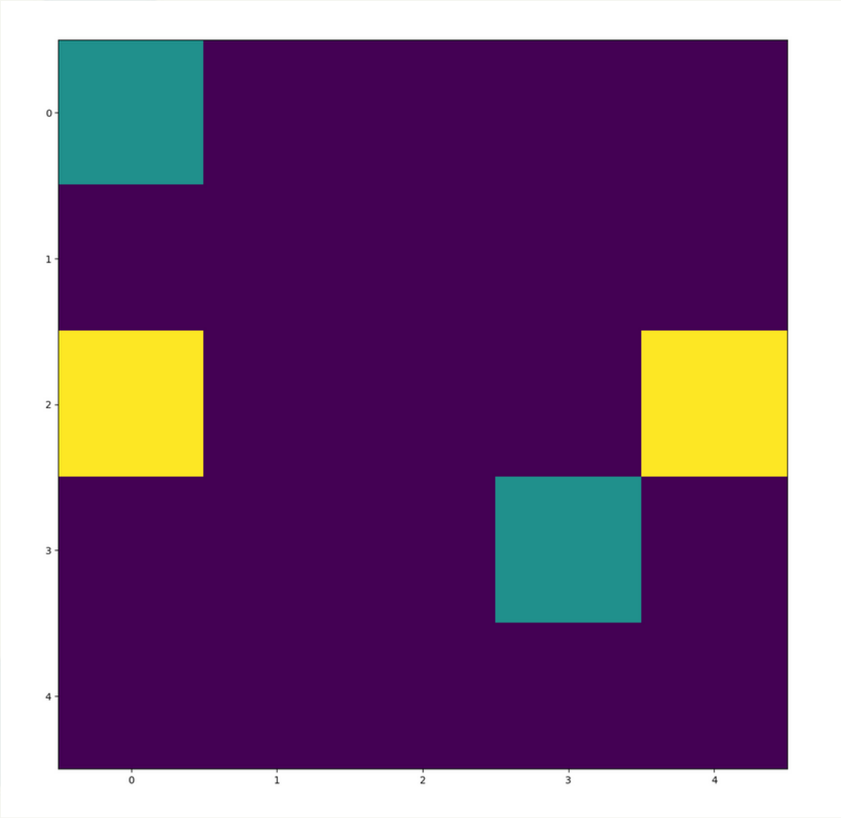


Routing Algorithms

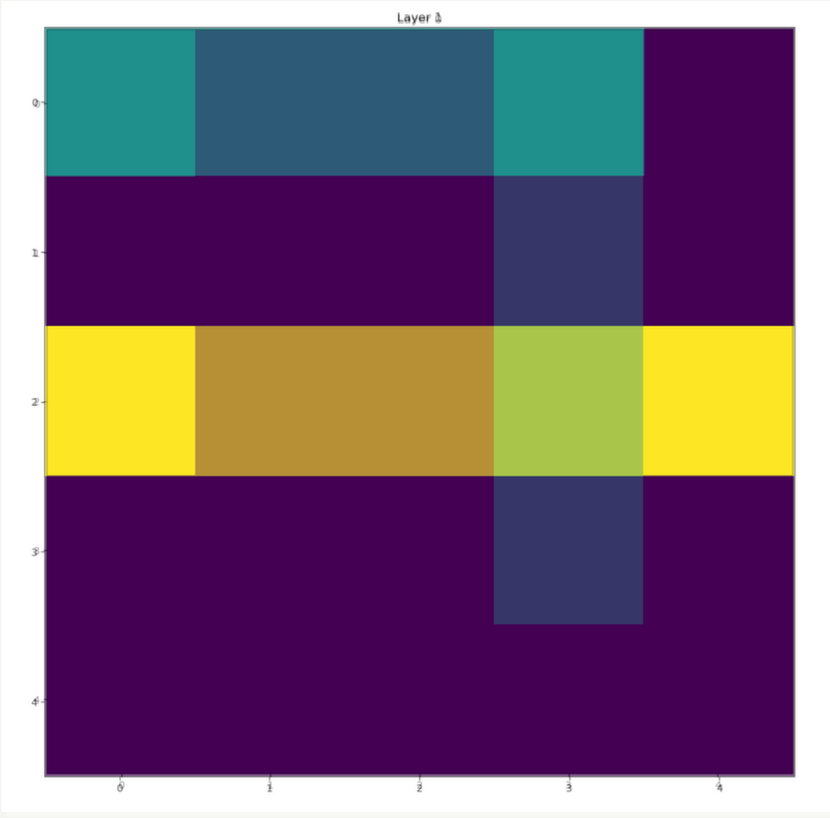


Routing Algorithms

Pin Placement

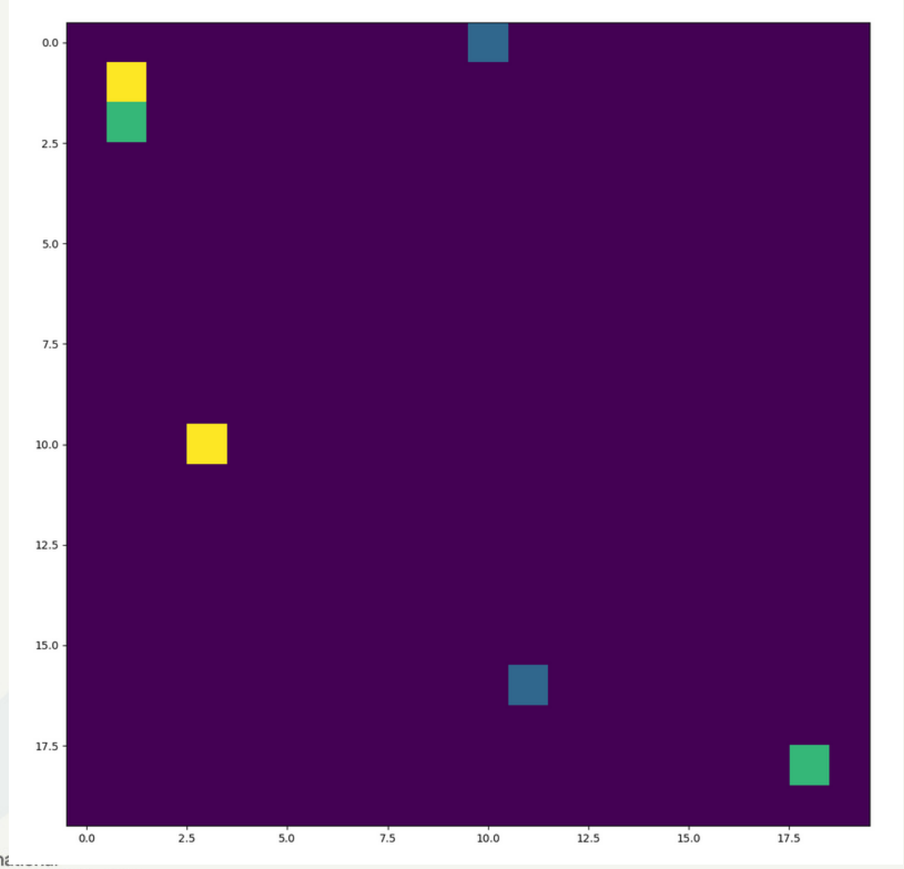


Multi-Layer Routing

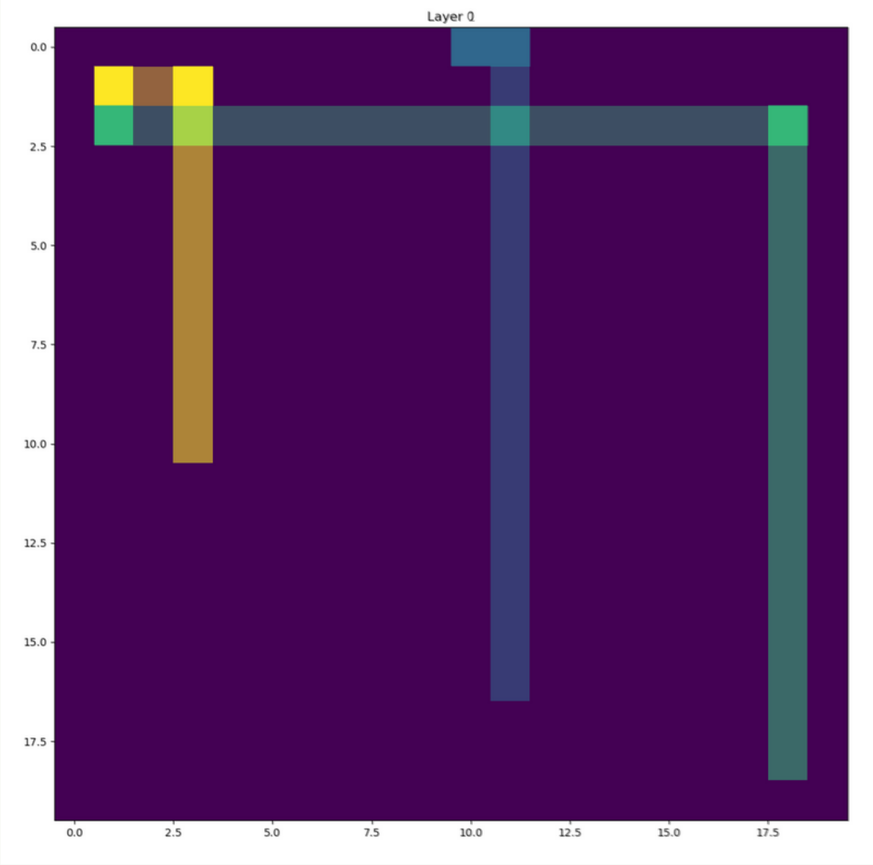


Routing Algorithms

Pin Placement

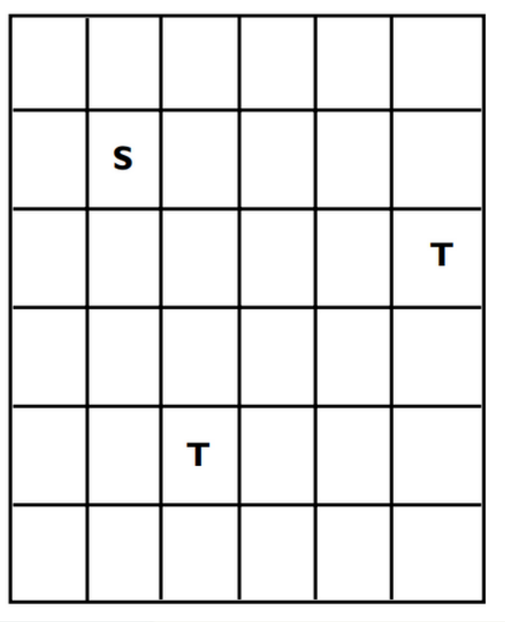


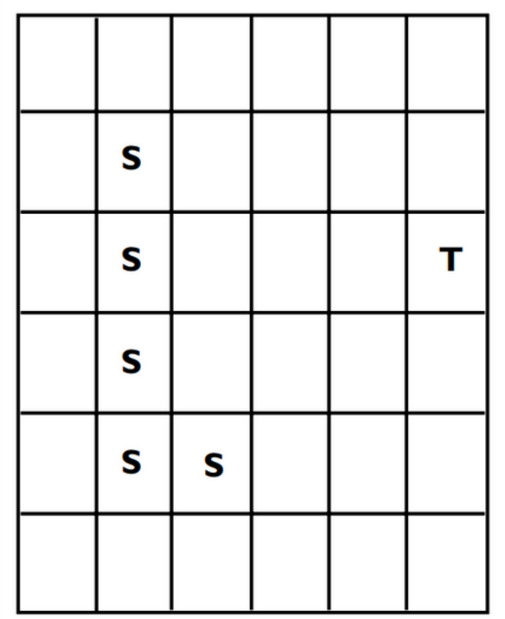
Multi-Layer Routing

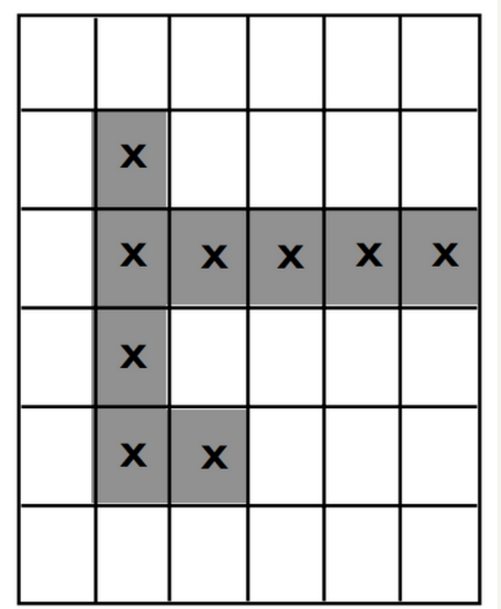


Routing Algorithms

- Expand -> Backtrace -> Cleanup







Example flow with 20 Macros

- Video Demonstration

Summary of overall Progress

- Working on a new parser design for including Physical Parameters for the new dataset
- We implemented the multi-layer routing.

Any specific request to Micron

None for now