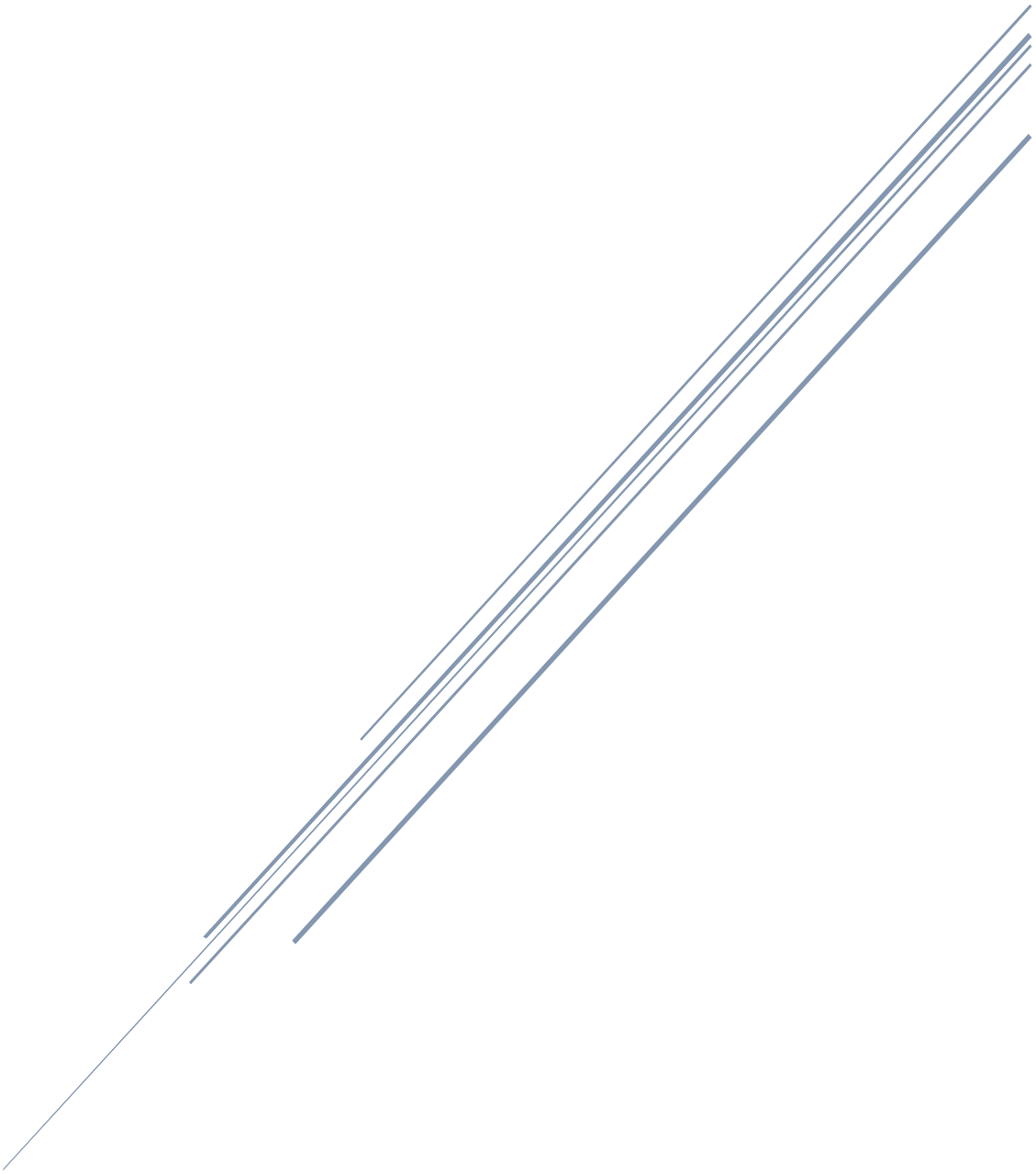
(32 * 4) RAM BUILDING

USING LOGISIM SOFTWARE



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COURSE: DIGITAL DESIGN

Overview:

Ram circuit/Component is basically one of the most complex circuit to build on Logisim Software. We are supposed to make 32*4 Ram which can do read operation and write operation for the data which is normally inputted by the user. In this particular assignment I used d-flip flop to store the each 1 bit of data inputted.

Input:

- 4-Bit input which user wants to read/ write.
- Selection point by which user can select if he/she wants to go for read operation or write operation.
- Input for row selection out of 32 rows present.
- Clock input.

Steps followed for making desired RAM:

- First task is to make D-flip flop which is the most essential part in the whole circuit. D flip flop has one bit input line, one selection line, clock input, and option selection for read operation or write operation and lastly has output lines. This flip flop is not same as the simple D flip flop it has something more like selection line for read/ write operation and also selection line to activate this flip flop.
- Next task is to combine all this flip flops in such a manner that it has 32 rows and each rows has 4 flip flops. With the help of decoder we can select which row (4 flip flop) has to be selected out of this 32 rows.
- Final task is to be done with the help of or gates. 4 bit input is transferred parallelly to each of the column (1 bit each) and the row we have selected using decoder intersects. One column which contains 32 flip flop and out of these 1 flip flop will give output. All 32 output lines of a particular column is passed to or gate and output form that gate is the final output of that particular column.

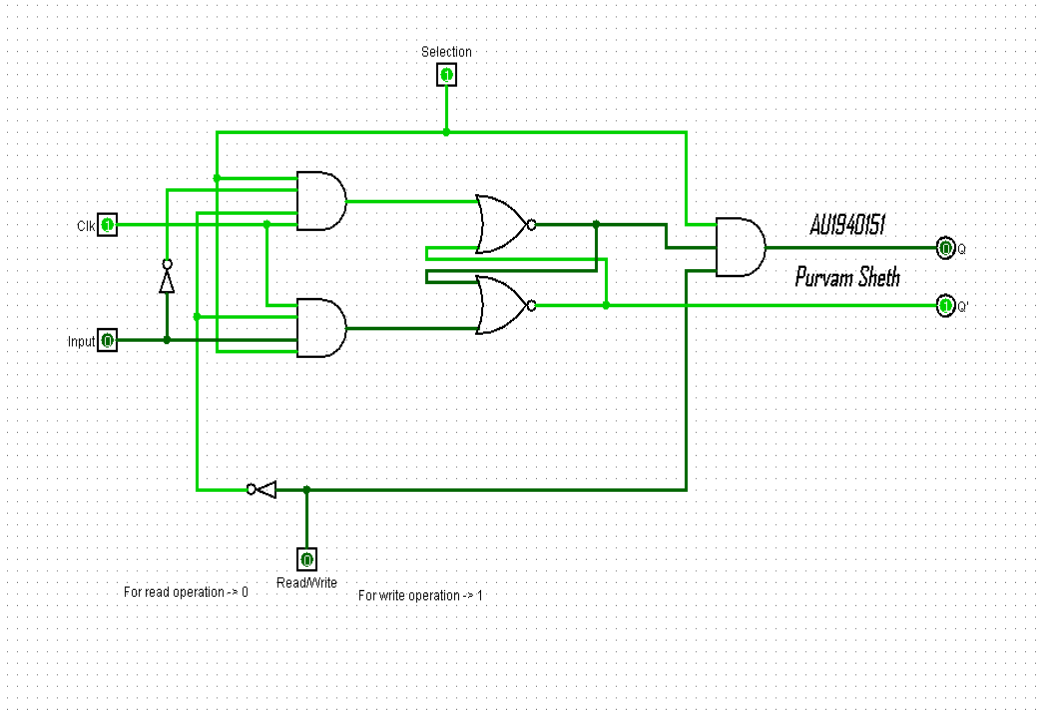
  **Understanding of last point: if input is 1001; msb is passed to 1^{st} column and lsb is passed to 4^{th} column. One column contains 32 flip flops now out of these 32 flip flop which 1 flip flop to select? That would be decided with the help of row we have selected using decoder for example 12^{th} row. Now then for msb, flip flop activated is in 1^{st} column and 12^{th} row. We used or gates which has 32 input lines. This input lines of or gates are the output lines of a particular column which has 32 flip flops.

Output:

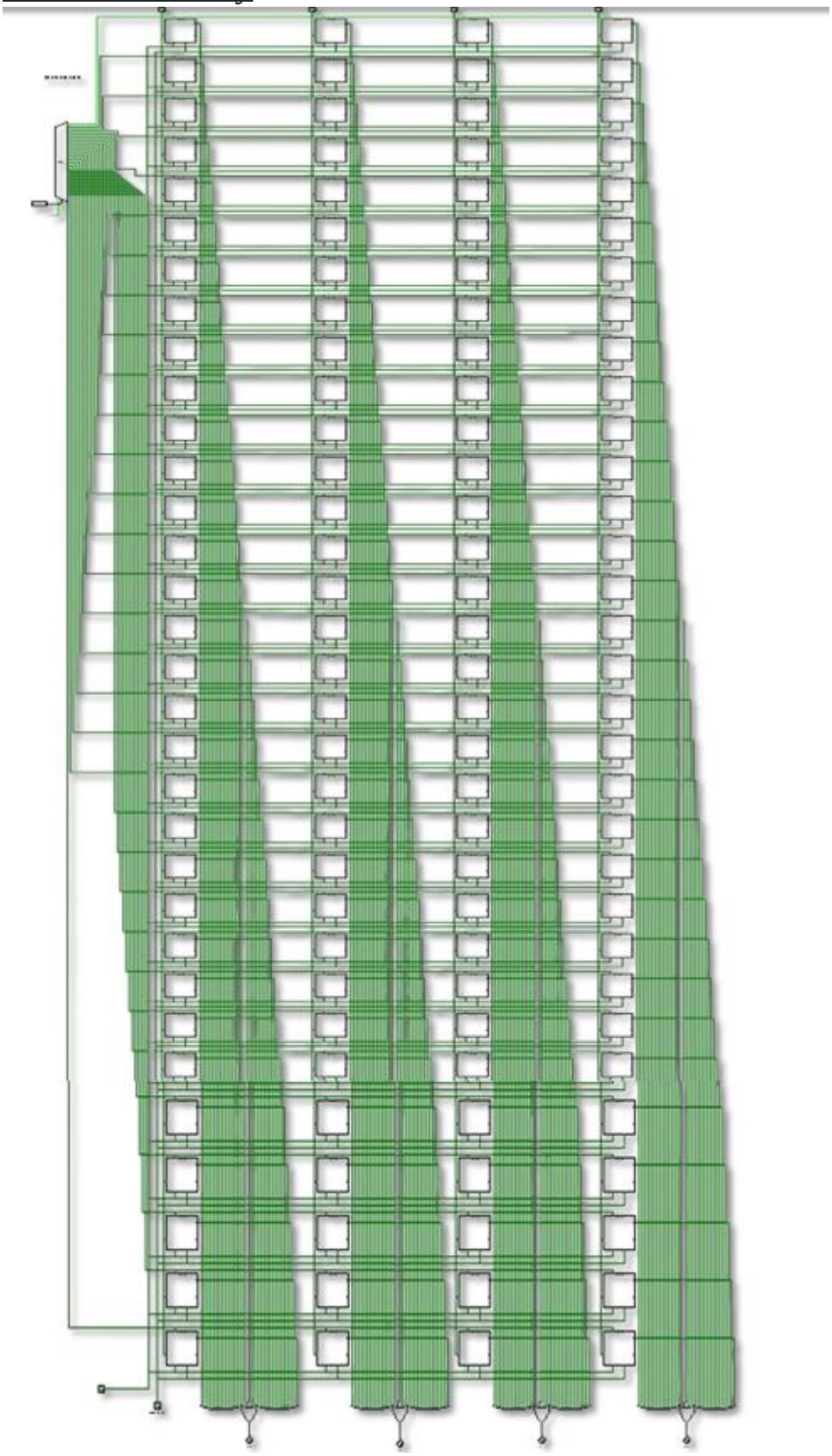
For the 4 bit input and the operation (read/ write) provided by the user, it will give 4 bit output.

Screenshot's of the circuit for better clarification

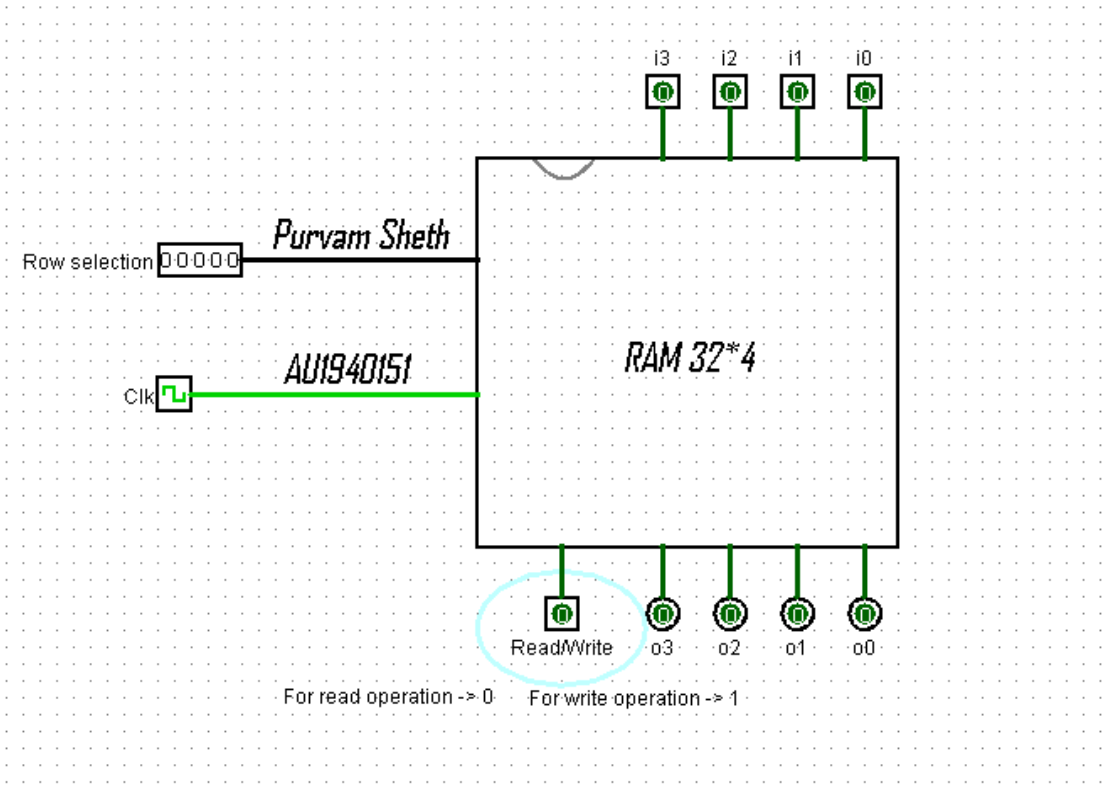
1. D - FLIP FLOP



2. Internal Circuitry



3. Main Circuitry



4. Some glimpse of an output