Lab 02 Logic Components

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Purpose:

The purpose of this lab is to create a 4-bit shifter which can handle no shift, left shit, and right shift. For the purpose of this lab we do not implement rotate right, instead we make it a no shift. Shifters are used in multiplication and dividing binary numbers.

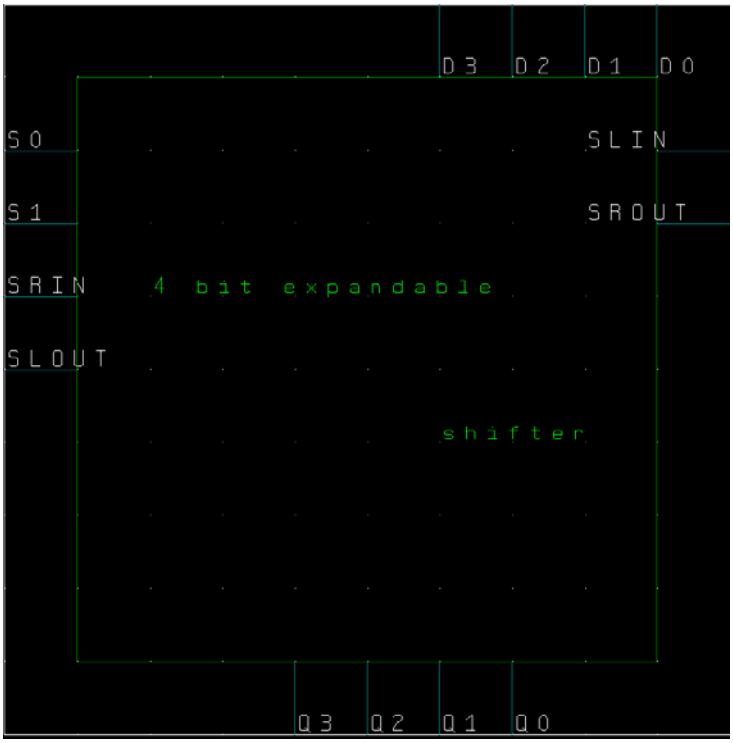
Analysis:

The building blocks for the shifter we must implement are the one variable and two variable mux we implemented in the last lab period.

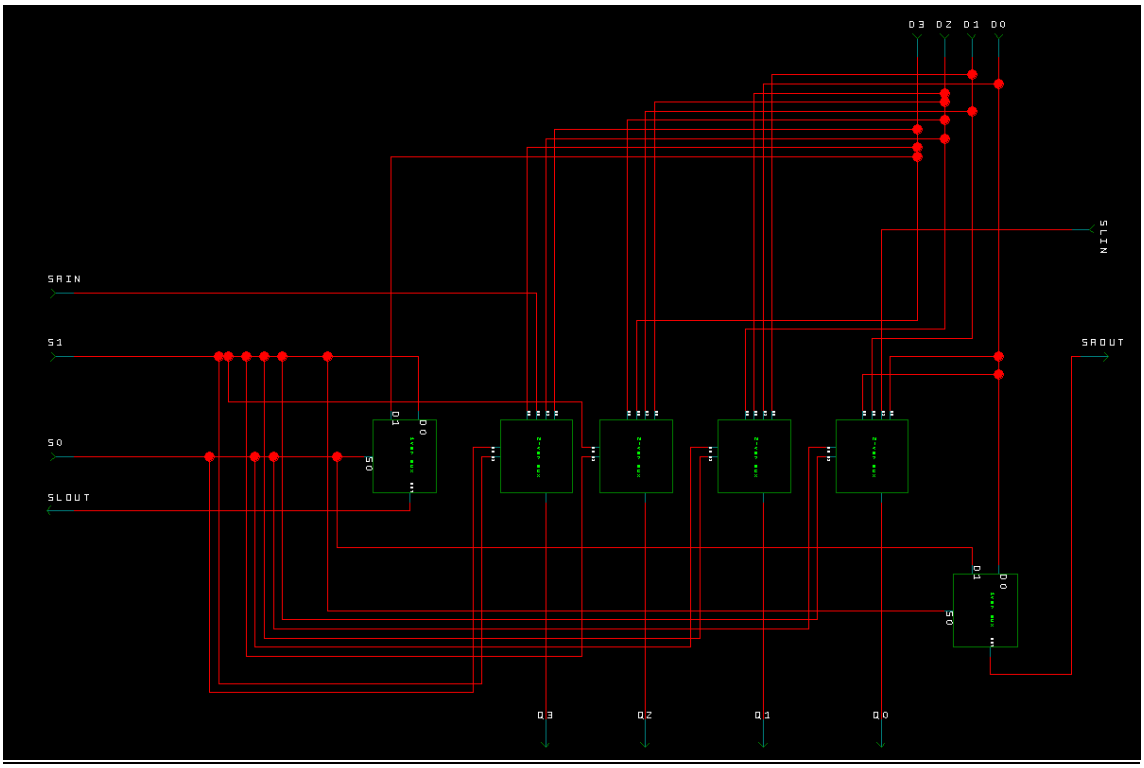
S0 & S1 represent the different cases we must perform: NO SHIFT (00/11), SHIFT LEFT (01), and SHIFT RIGHT(10). SRIN is when the input if shifting right and SLIN is for when the input is shifting left. Likewise with SLOUT meaning output when shifting left and SROUT meaning output when shifting right.

Now I am running out of time to finish the analysis completely! I had some computer problems and got behind.

4-bit expandable shifter Symbol



4-bit expandable shifter Schematic



4-bit expandable shifter Command File

```
restart
wave 4-inputExpandableShifter.wfm D0 D1 D2 D3 S0 S1 SLIN SRIN Q0 Q1 Q2 Q3 SLOUT SROUT
pattern D0 1 1 1 1
pattern D1 0 0 1 1
pattern D2 0 0 0 0
pattern D3 1 1 0 0
pattern S0 0 1 0 1
pattern S1 1 0 0 1
pattern SLIN 1 1 0 0
pattern SRIN 1 1 1 1
run
```

Expected Resullts

D0	D1	D2	D3	S0	S1	SLIN	SRIN	Q0	Q1	Q2	Q3	SLOUT	SROUT
1	0	0	1	0	1	1	1	1	1	0	0	1	0
1	0	0	1	1	0	1	1	0	0	1	1	1	1
1	1	0	0	0	0	0	1	1	1	0	0	0	1
1	1	0	0	1	1	0	1	1	1	0	0	0	1

Simulation Screenshot with Motorola(real) components