Realizing a Given Boolean Function and Constructing the Optimum Layout

ELE504E - Homework 6, Spring 2025

In this session, you are supposed to lay out a complex gate for a given Boolean function. Draw the fitting schematic that realizes the regarding function. After this step, form a Euler's Path to determine the optimum order of inputs. Construct a Stick Diagram which is a simpler layout diagram showing only the active, poly, contact and metal parts of your final layout. This will be quite helpful in placing the transistors of pull-down and pull-up networks in an order that is optimizing the layout area. The Boolean function you will be realizing is given as:

$$Y = \overline{[(X1.X2.X3 + X4 + X5.X6).X7]}$$

Schematic:	**Euler's Path:**

Stick Diagram:

Finally, you are expected to lay your circuit out with devices each having a channel dimension of W=5λ,L=2λ based on your stick diagram for TSMC-0.18μm process of design technology SCN6M-SUBM.

Spacing between the gates must be **8 λ.** In your design, use only metal-1 layer for interconnections, V_{DD} and GND rails. Make sure that, you have labeled all the inputs and the output port as well as power and ground levels.