

1. Use K-maps to derive the Boolean equations for S_b , S_f and S_g . Show your K-map groupings and the Boolean equations clearly in your homework submission. (2 points)

Handwritten K-map for S_b with variables D_3, D_2, D_1, D_0 .

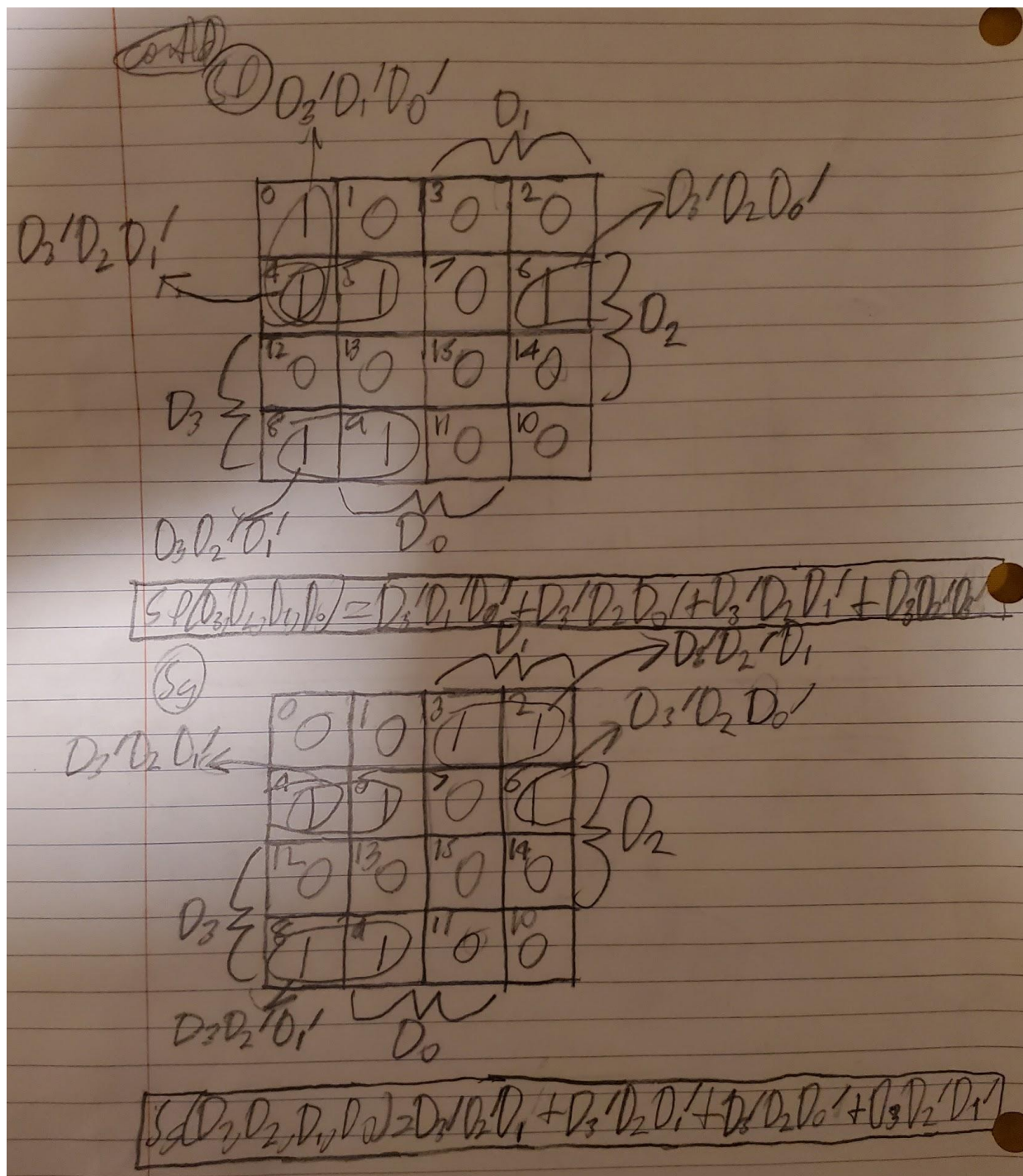
0	1	3	2
4	5	7	6
12	13	15	14
8	9	11	10

Groupings and resulting Boolean terms:

- Group 1 (Top-left 2x2): $D_3'D_1D_0$
- Group 2 (Top-right 2x2): $D_3'D_1D_0$
- Group 3 (Top row, columns 1 and 2): $D_3'D_2'$
- Group 4 (Bottom row, columns 1 and 2): $D_3D_2'D_1$

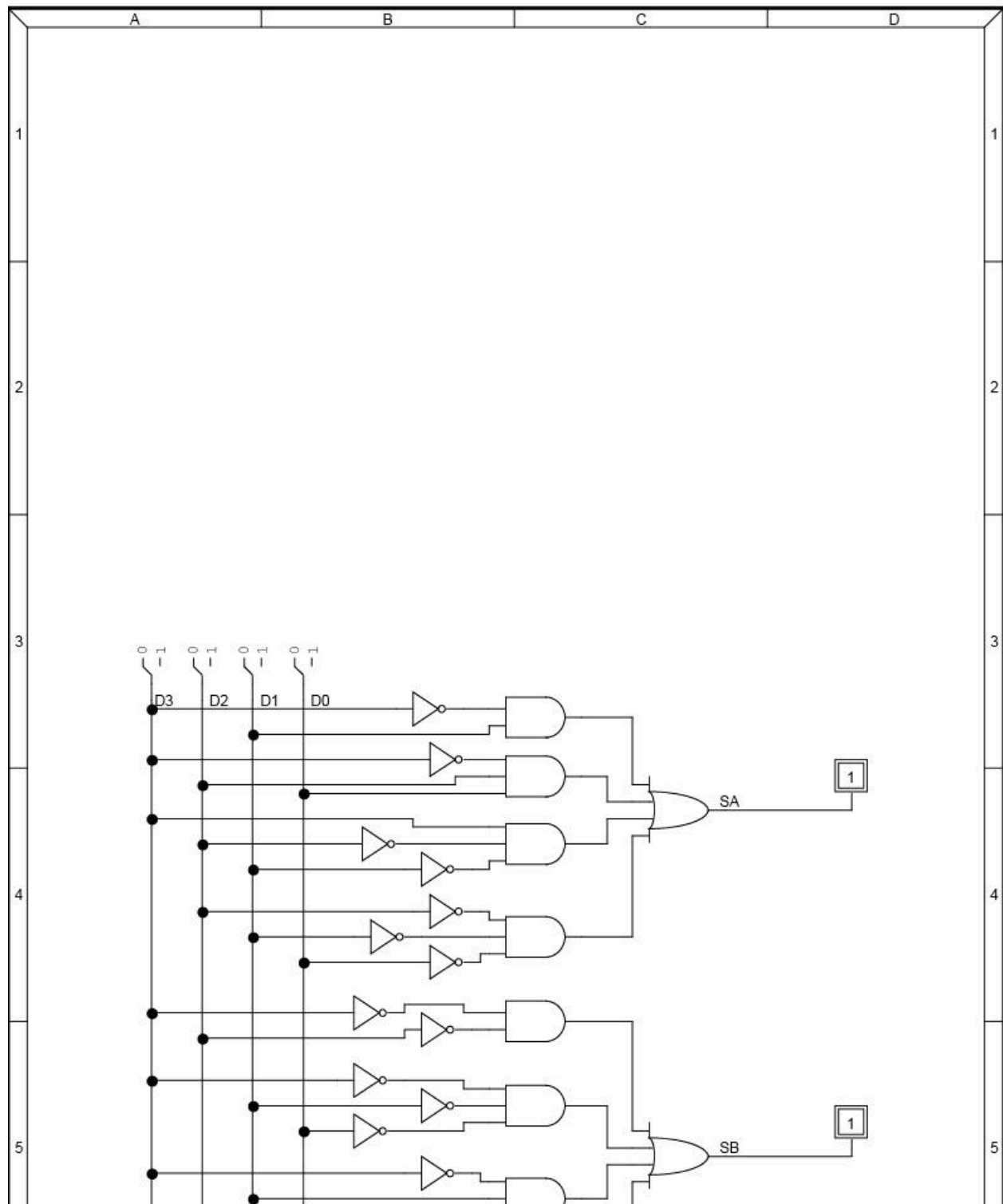
Final Boolean equation for S_b :

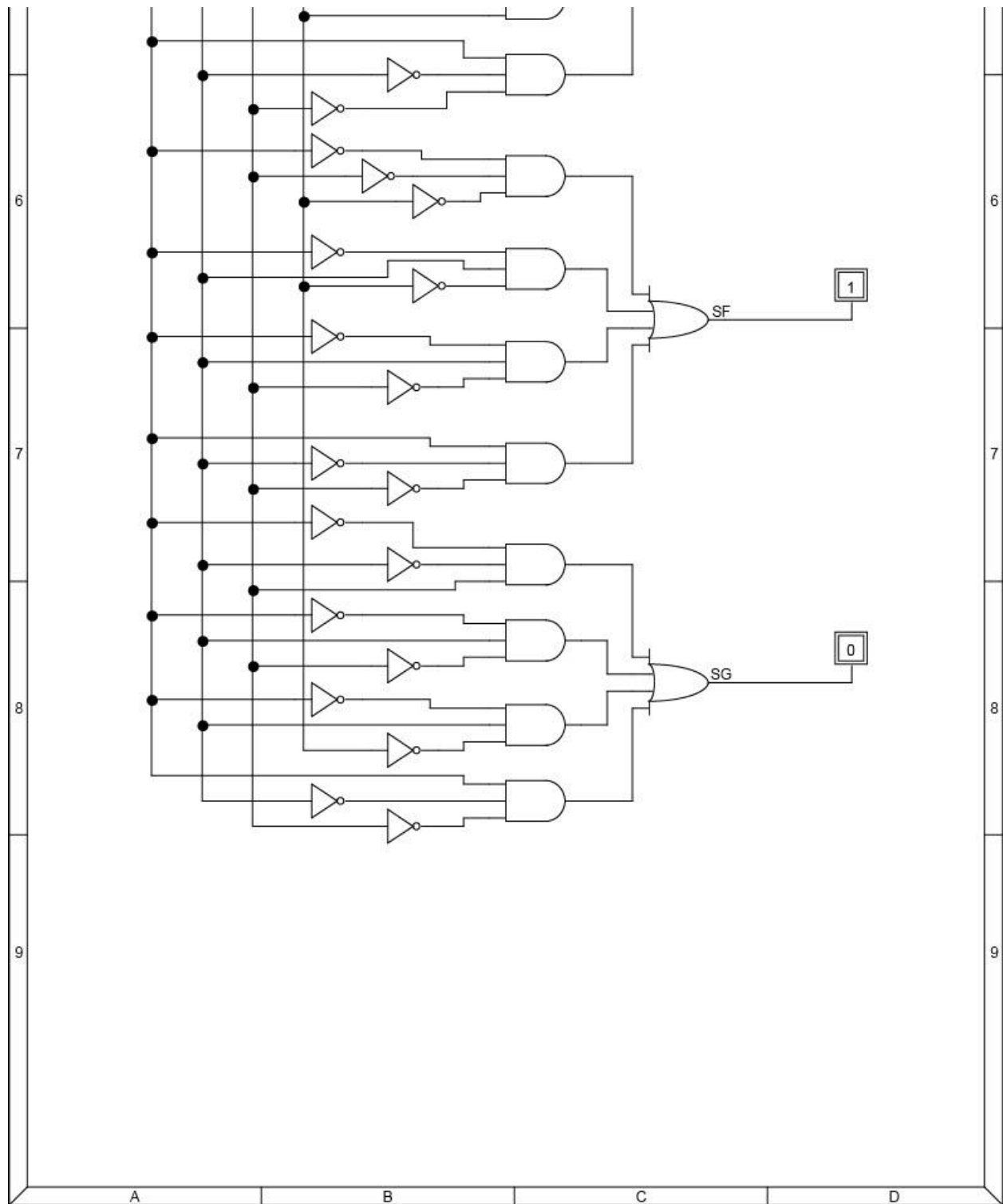
$$S_b(D_3, D_2, D_1, D_0) = D_3'D_2' + D_3D_1'D_0' + D_3'D_1D_0 + D_3D_2'D_1$$



- Implement the logic circuits for S_a , S_b , S_f and S_g in LogicWorks. Submit the screenshot of your LogicWorks circuit in your homework submission. Make sure the circuit is clear and legible. (2 points)

*My screenshot is large so it is posted below in two parts!

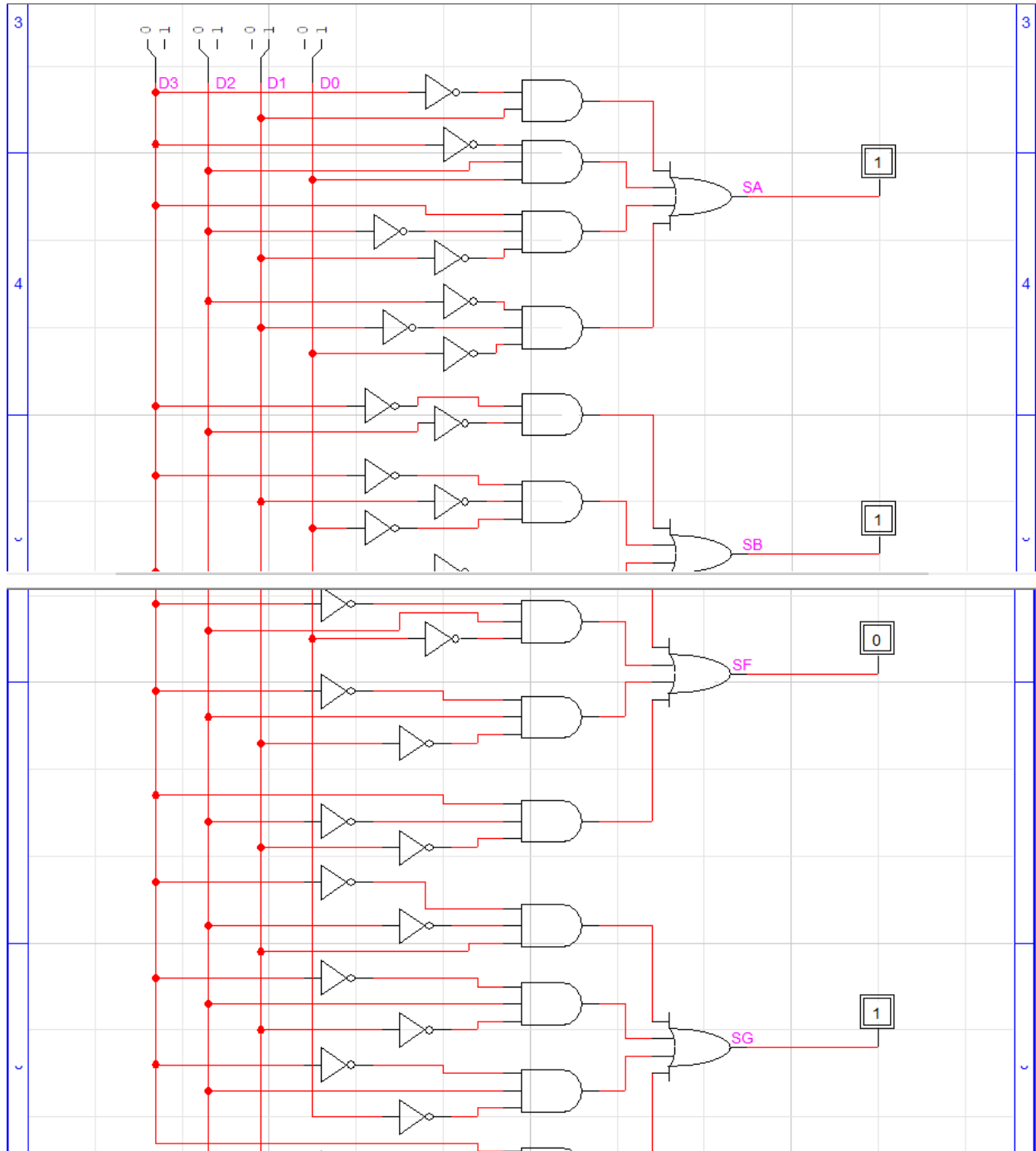




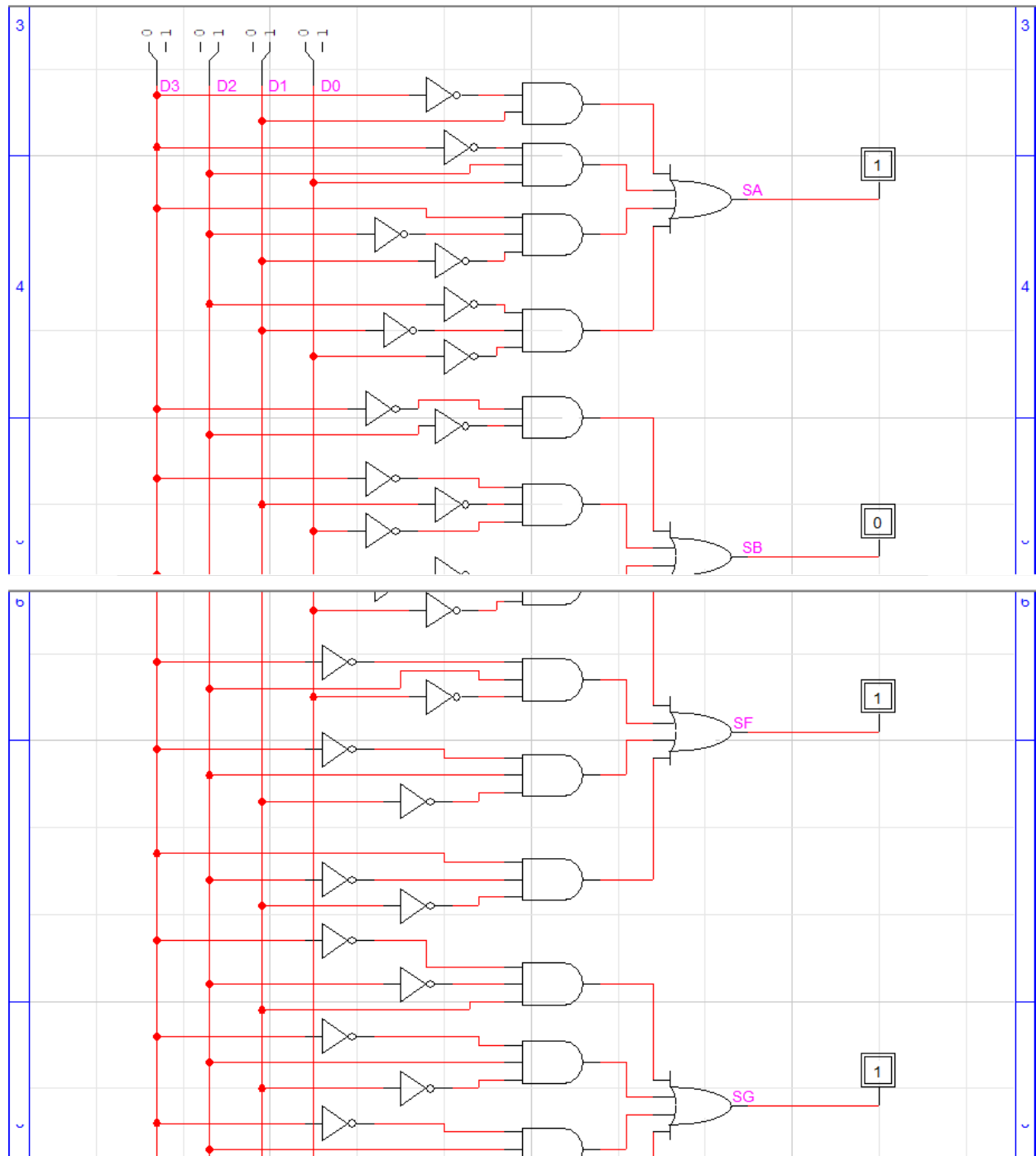
3. Simulate your LogicWorks circuit using binary switches on the inputs and binary probes for each output Sa, Sb, Sf and Sg. Set the switches so that you input 3. Take a screenshot

of the outputs. Set your switches to input 6. Take a screenshot of the outputs. Set your switches to input 8. Take a screenshot of the outputs. Submit your screenshots.
(1 point)

*Screenshots of the output for an input of 3:



*Screenshots of the output for an input of 6:



*Screenshots of the output for an input of 8:

