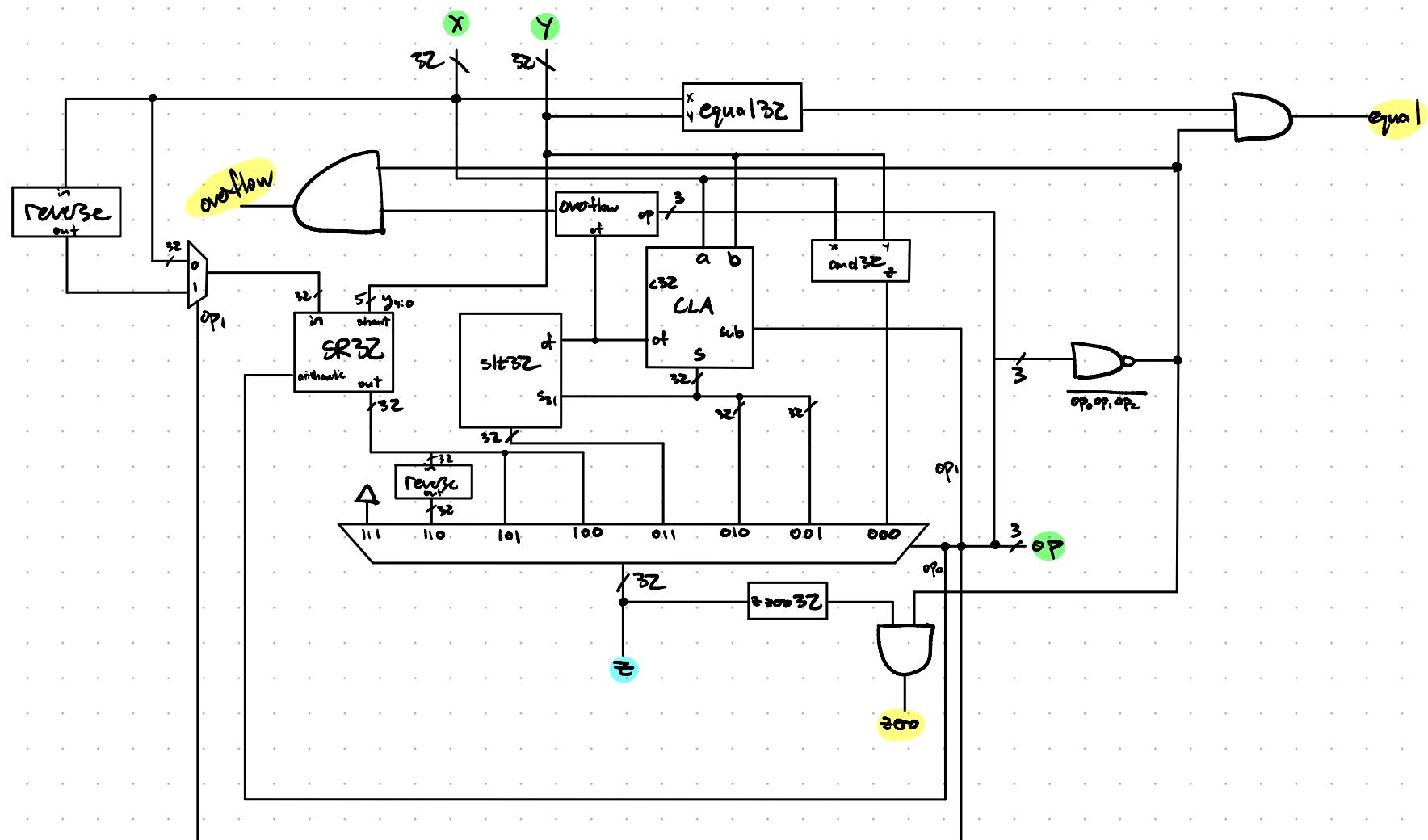
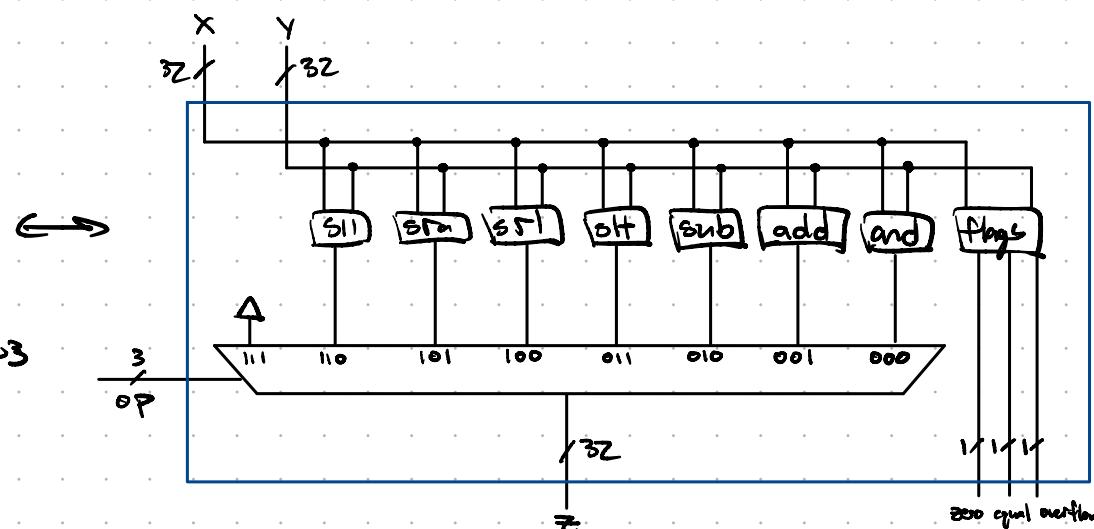
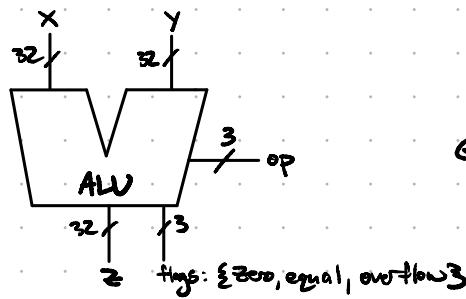


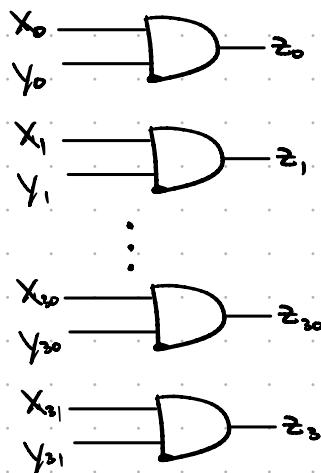
ALU:



ALU:

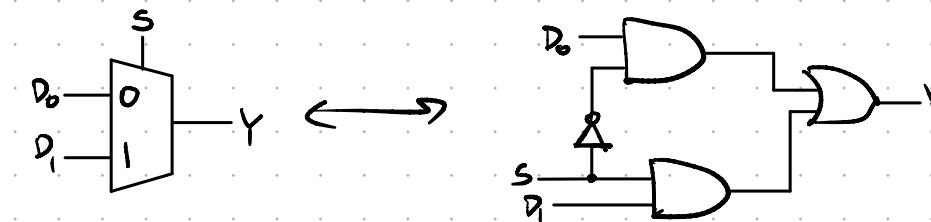


$$\text{and } Z_i = x_i + y_i$$

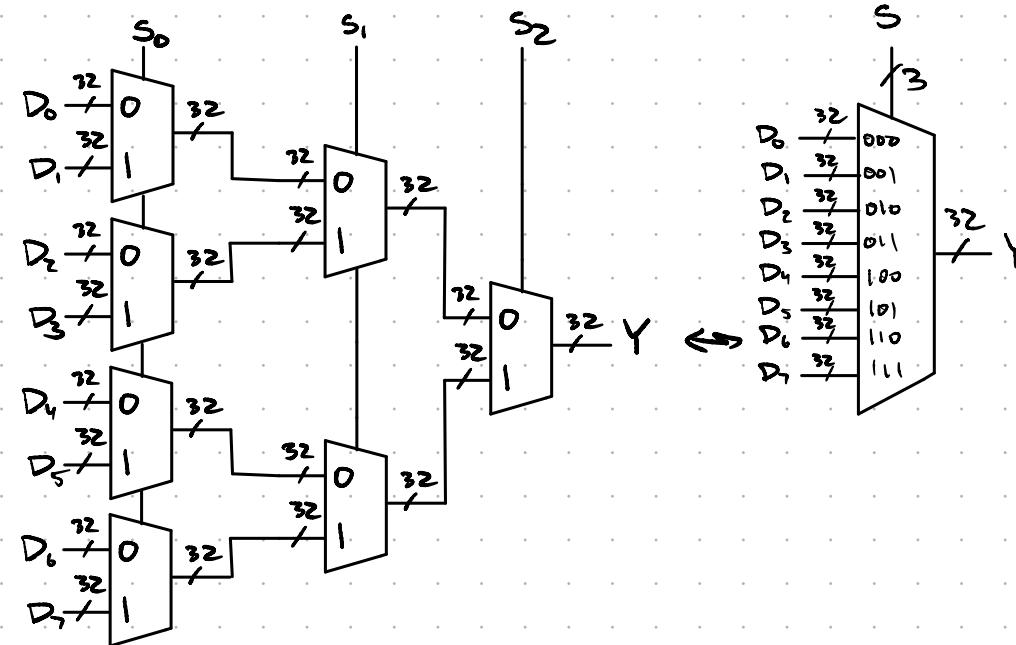


Z:1 1-bit mux:

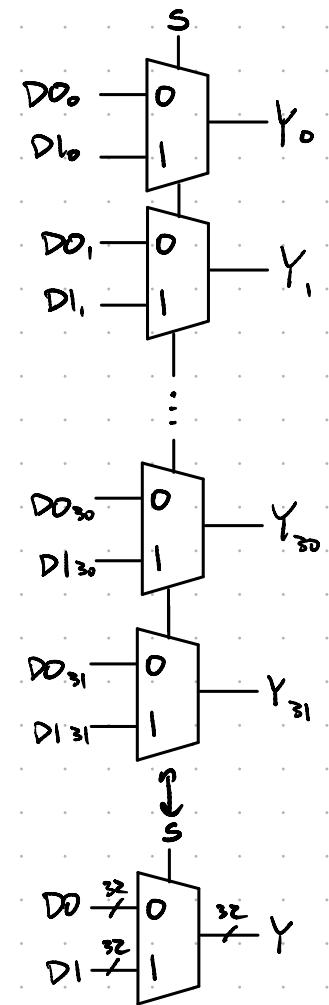
$$Y = \bar{S}D_0 + SD_1$$



8:1 32-bit mux:

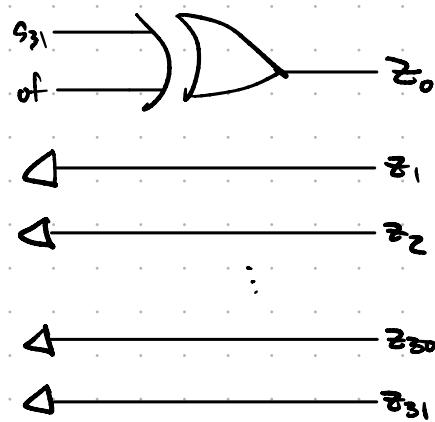


Z:1 32-bit mux:



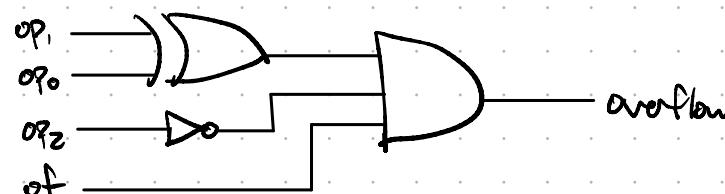
Q17: "Check if A-B is positive"

$$z = s_{31} \oplus of$$

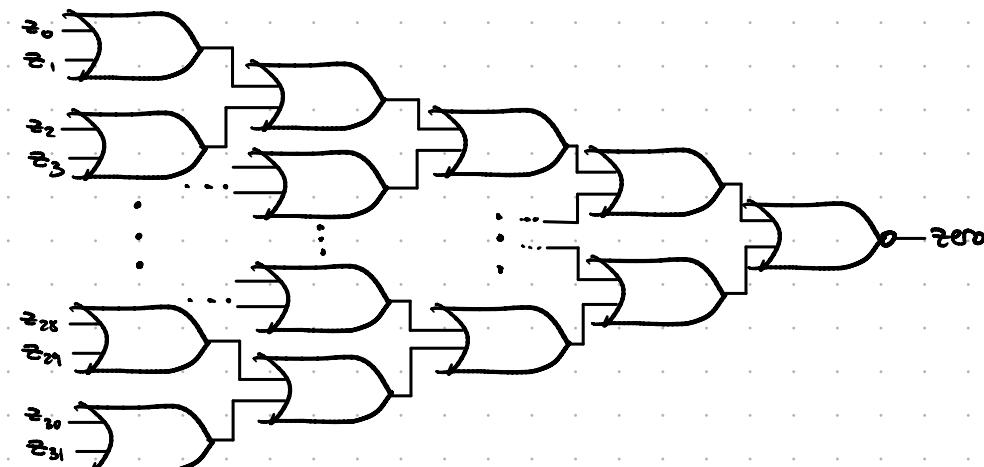


Q18: "only set if ADD or SUB"

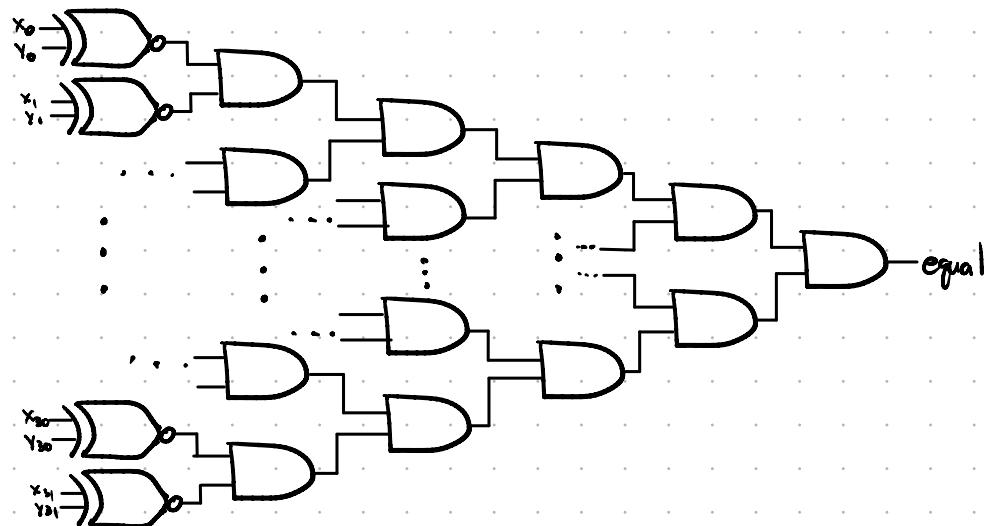
$$\begin{aligned} & \text{ADD} & \text{SUB} \\ \text{overflow} &= (c_{32} \oplus c_{31}) (\overline{op_2} \overline{op_1} op_0 + \overline{op_2} op_1 \overline{op_0}) \\ &= (c_{32} \oplus c_{31}) (\overline{op_2} (op_1 \oplus op_0)) \\ &= (of) (\overline{op_2}) (op_1 \oplus op_0) \end{aligned}$$



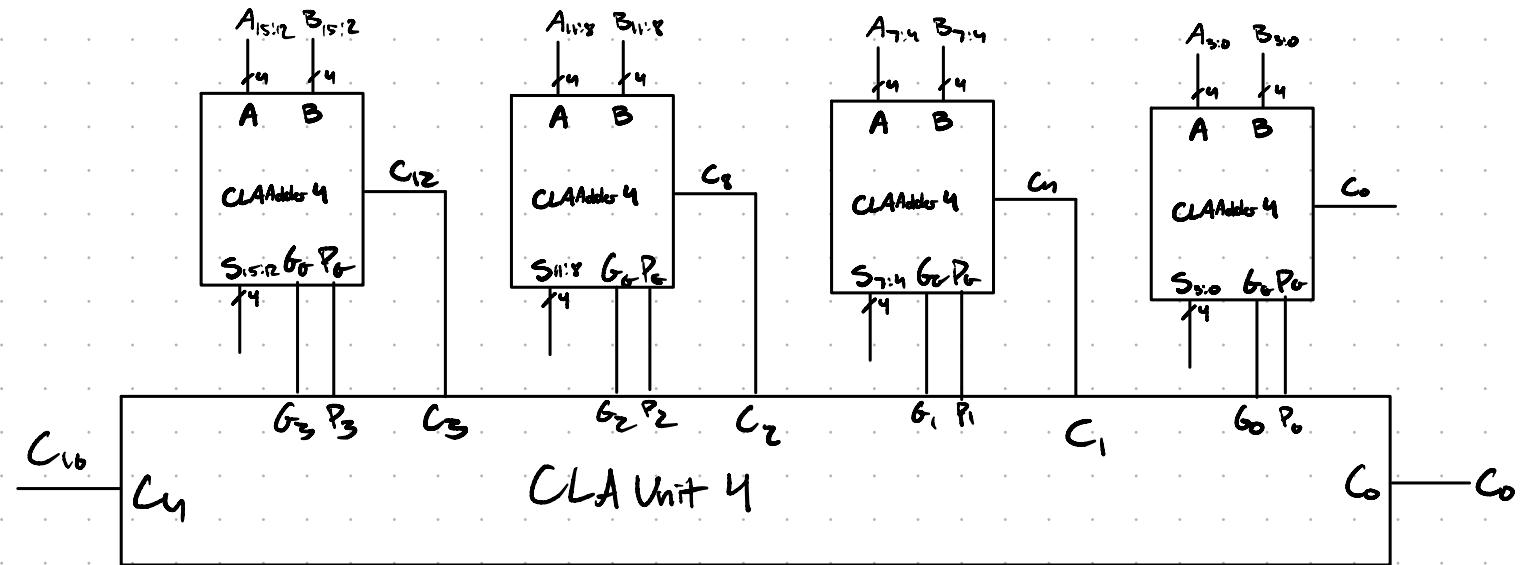
Q19: $\bar{z}_0 + \bar{z}_1 + \dots + \bar{z}_{30} + \bar{z}_{31}$



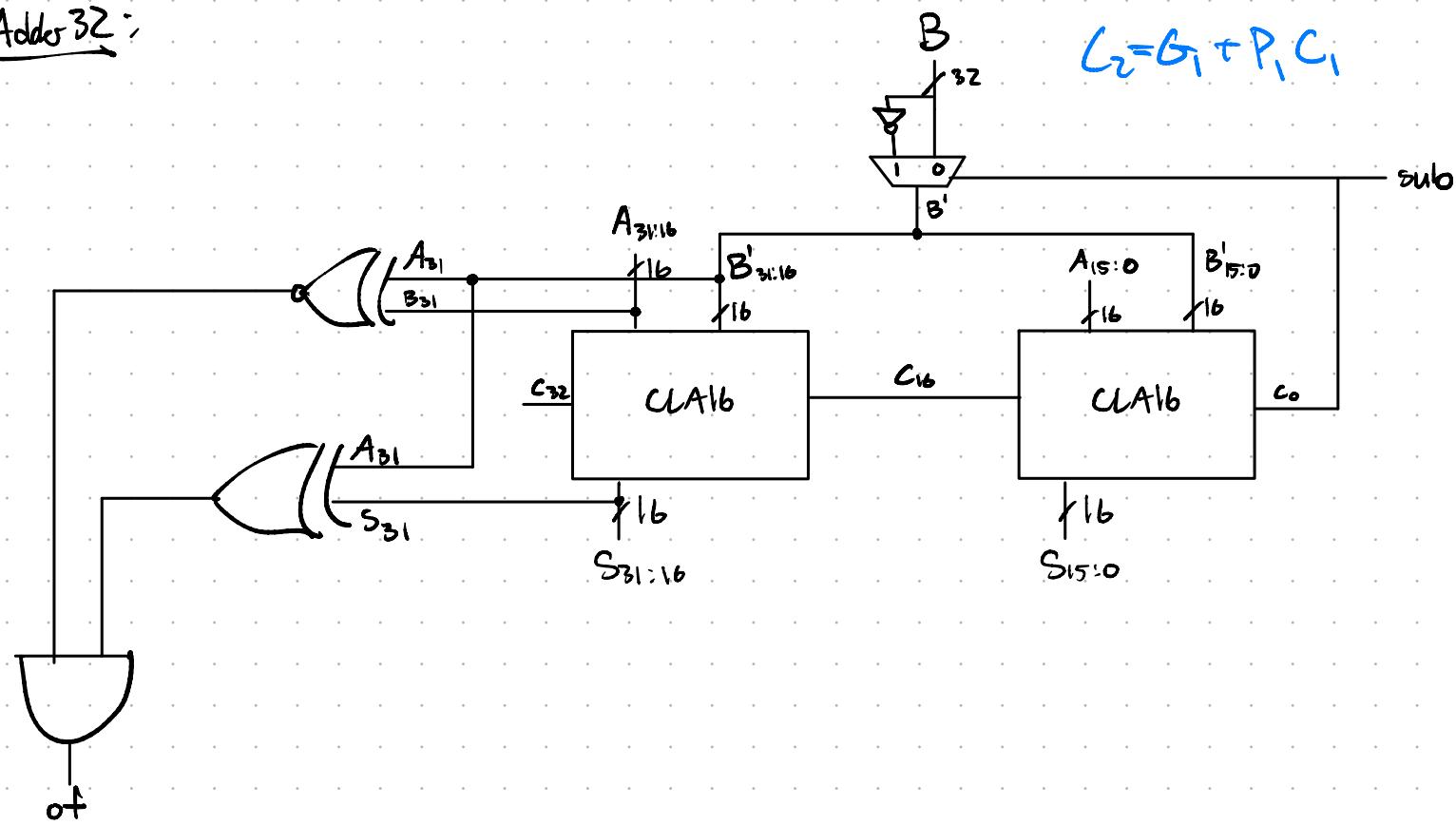
Q20: $(a_0 \oplus b_0)(a_1 \oplus b_1) \dots (a_{31} \oplus b_{31})$

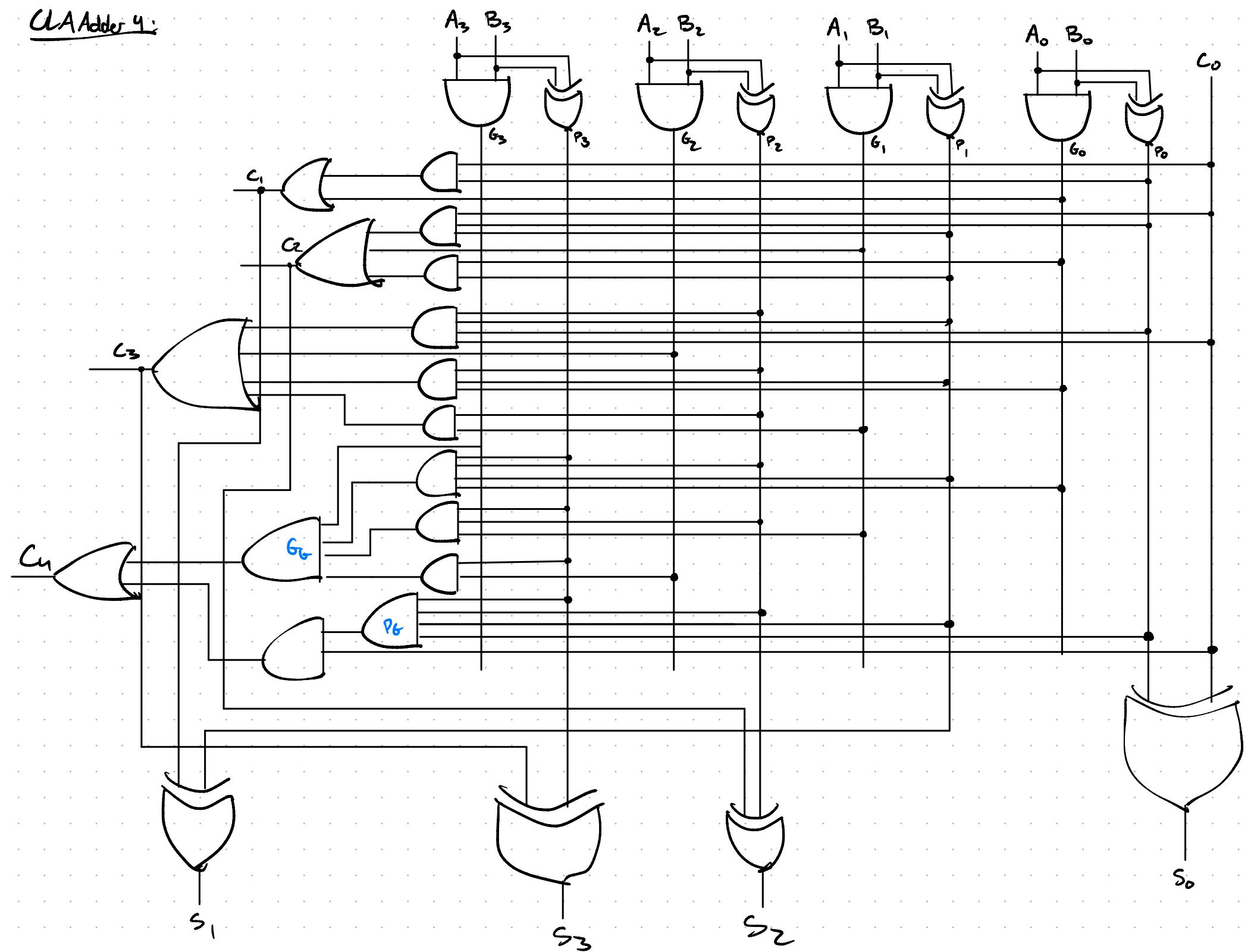


CLA Adder 16:

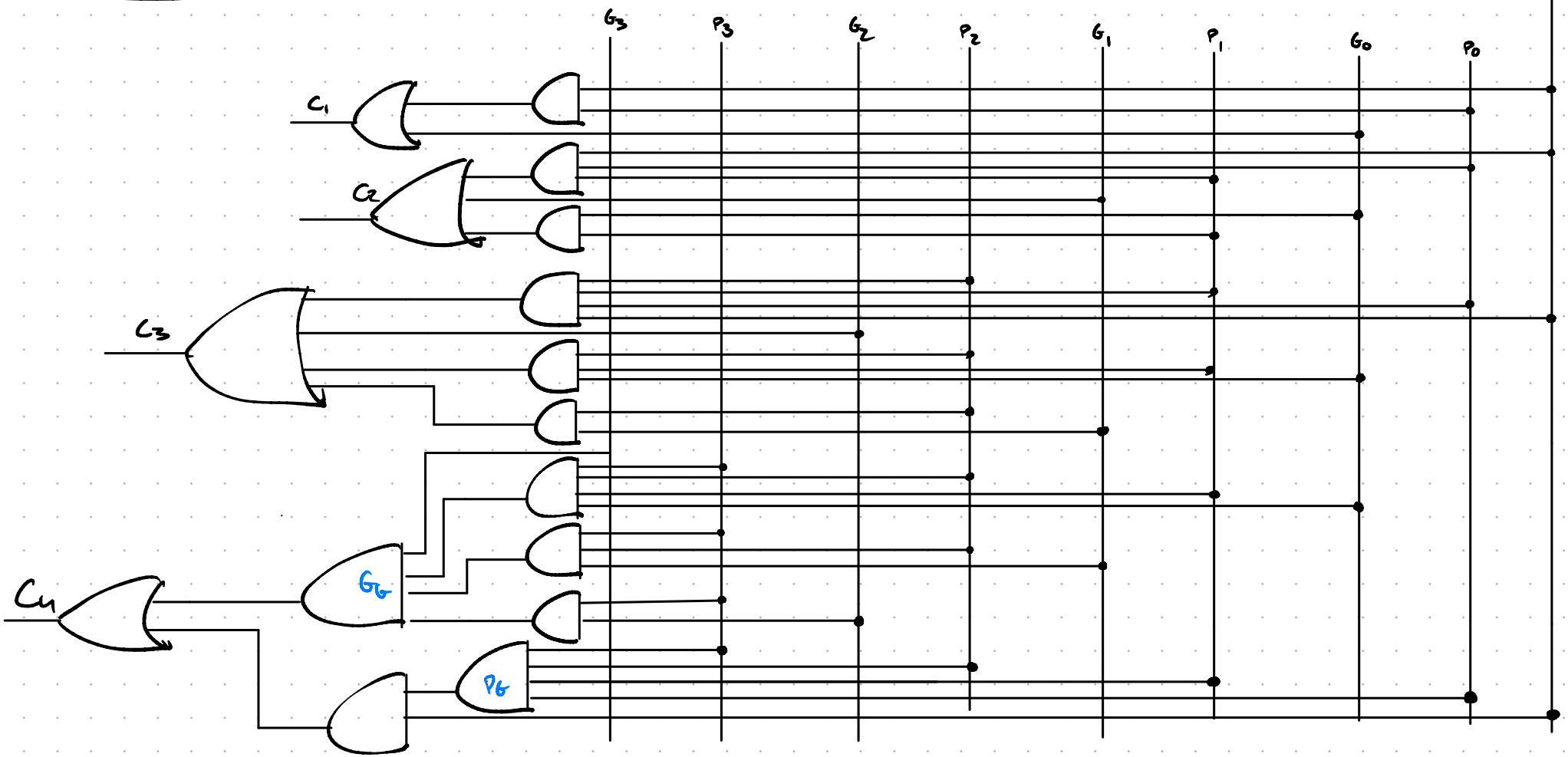


CLA Adder 32:



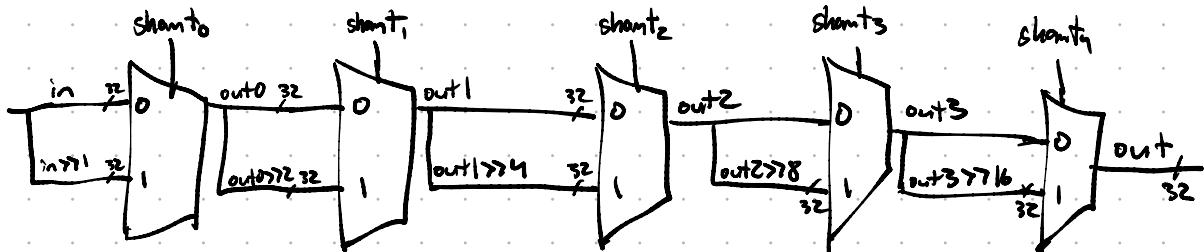
CLA Adder 4:

CLA Unity:



SR32:

f_{11} = arithmetic AND in_{31}



Shifts done purely thru wiring