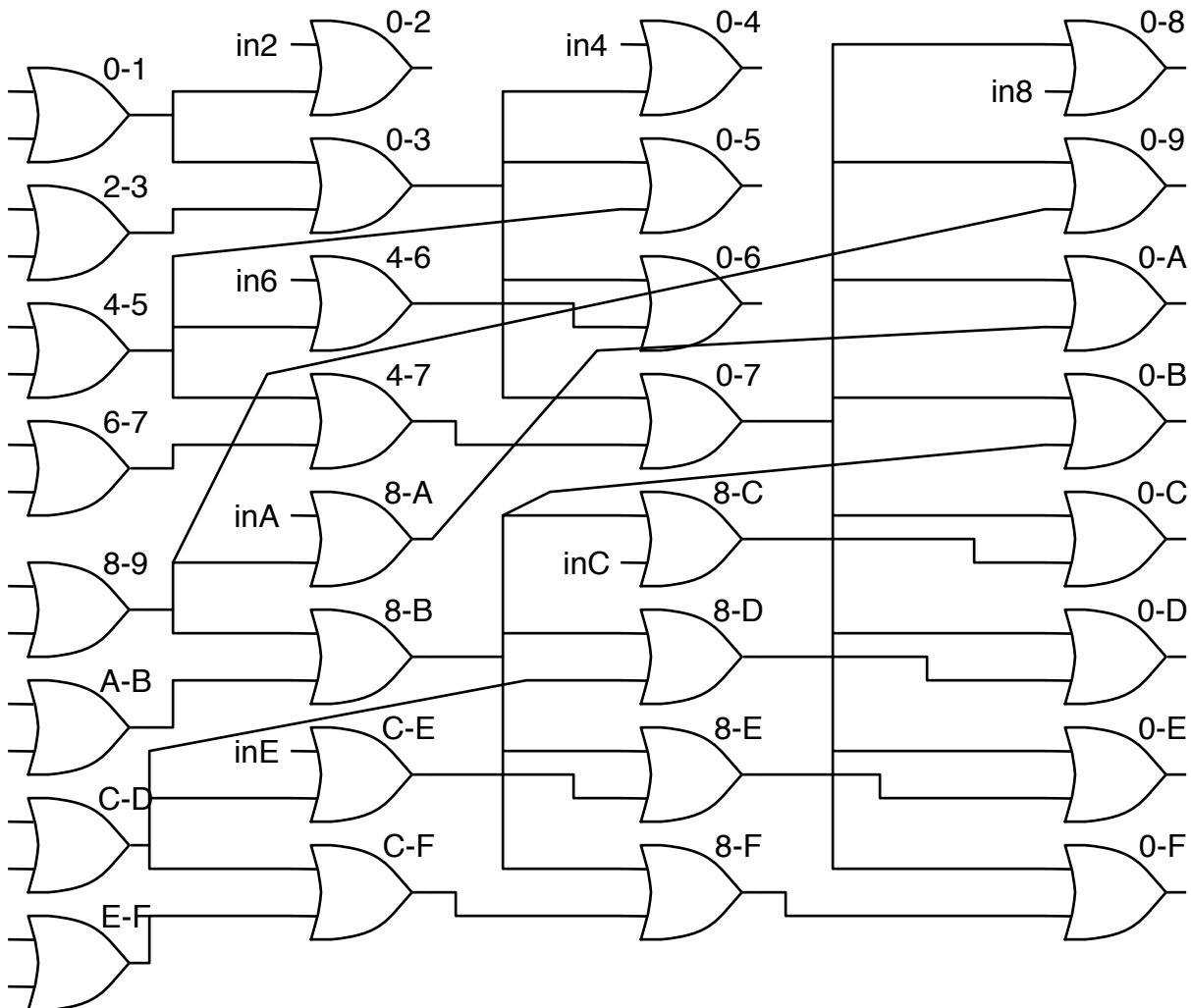
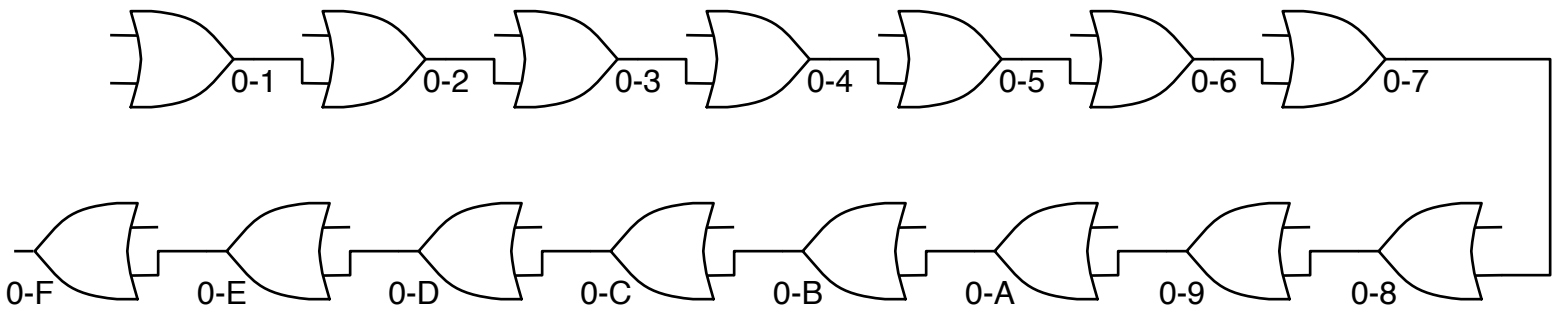


Chains and trees

Compute the OR of 16 input bits.

Then consider how to compute the "prefix" of the ORs. That is, the OR of in0 and in1, the OR of in0, in1, and in2, the OR of in0, in1, in2 and in3, ...



Generalizing Propagate and Generate

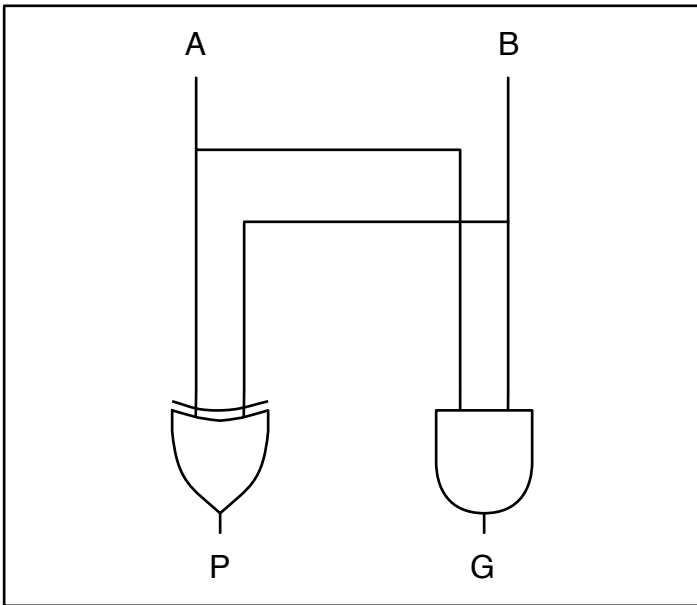
$$P_{0:1} = P_0 \& P_1$$

$$G_{0:1} = G_1 \mid (P_1 \& G_0)$$

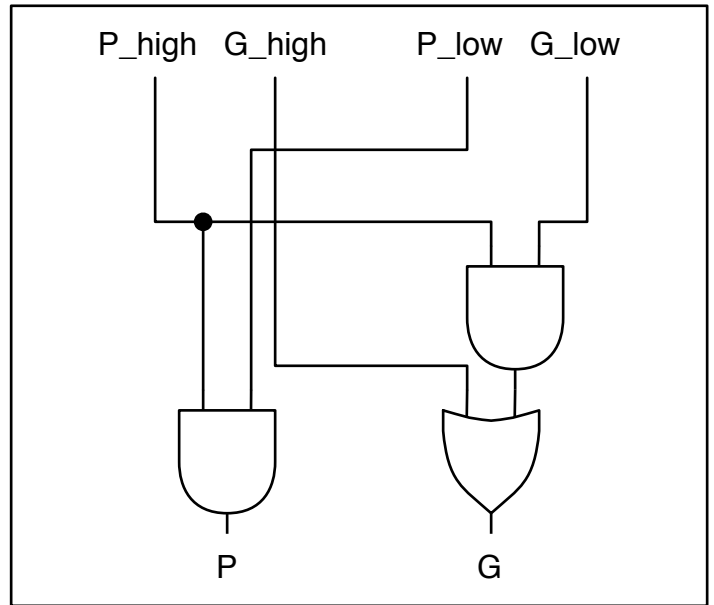
$$P_{n:m} = P_{n:(k-1)} \& P_{k:m}$$

$$G_{n:m} = G_{k:m} \mid (P_{k:m} \& G_{n:(k-1)})$$

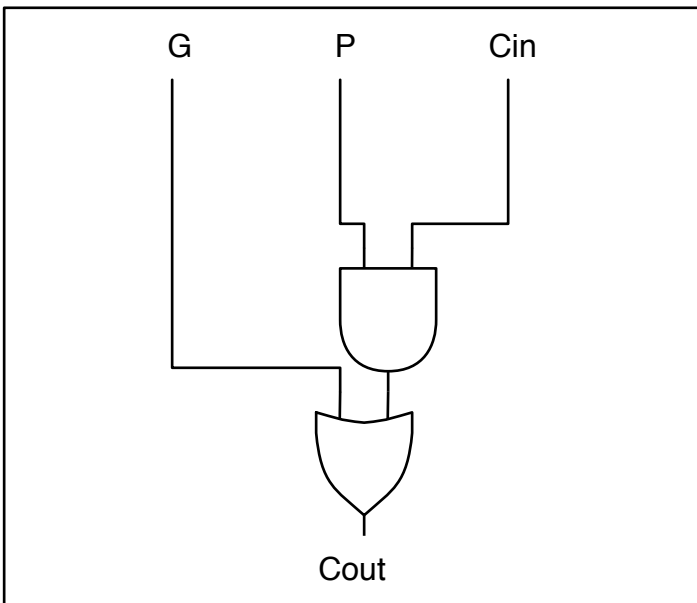
$$C_m = G_{n:(m-1)} \mid (P_{n:(m-1)} \& C_n)$$



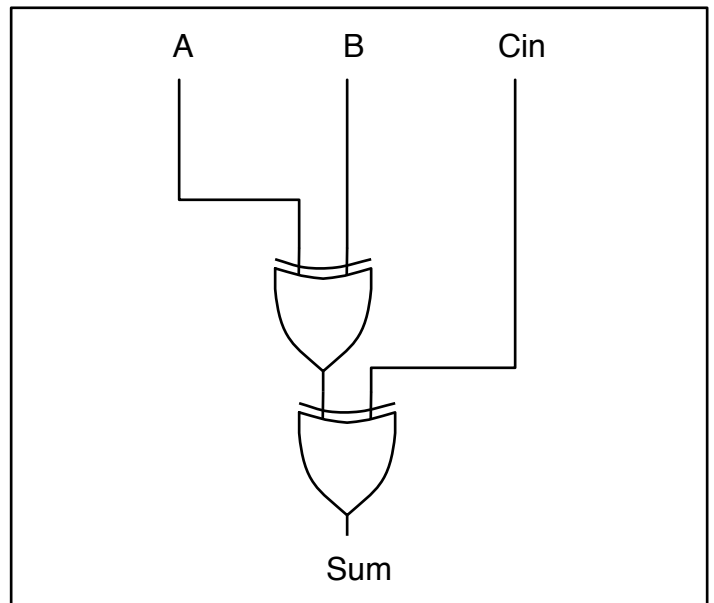
Number of gates: 2



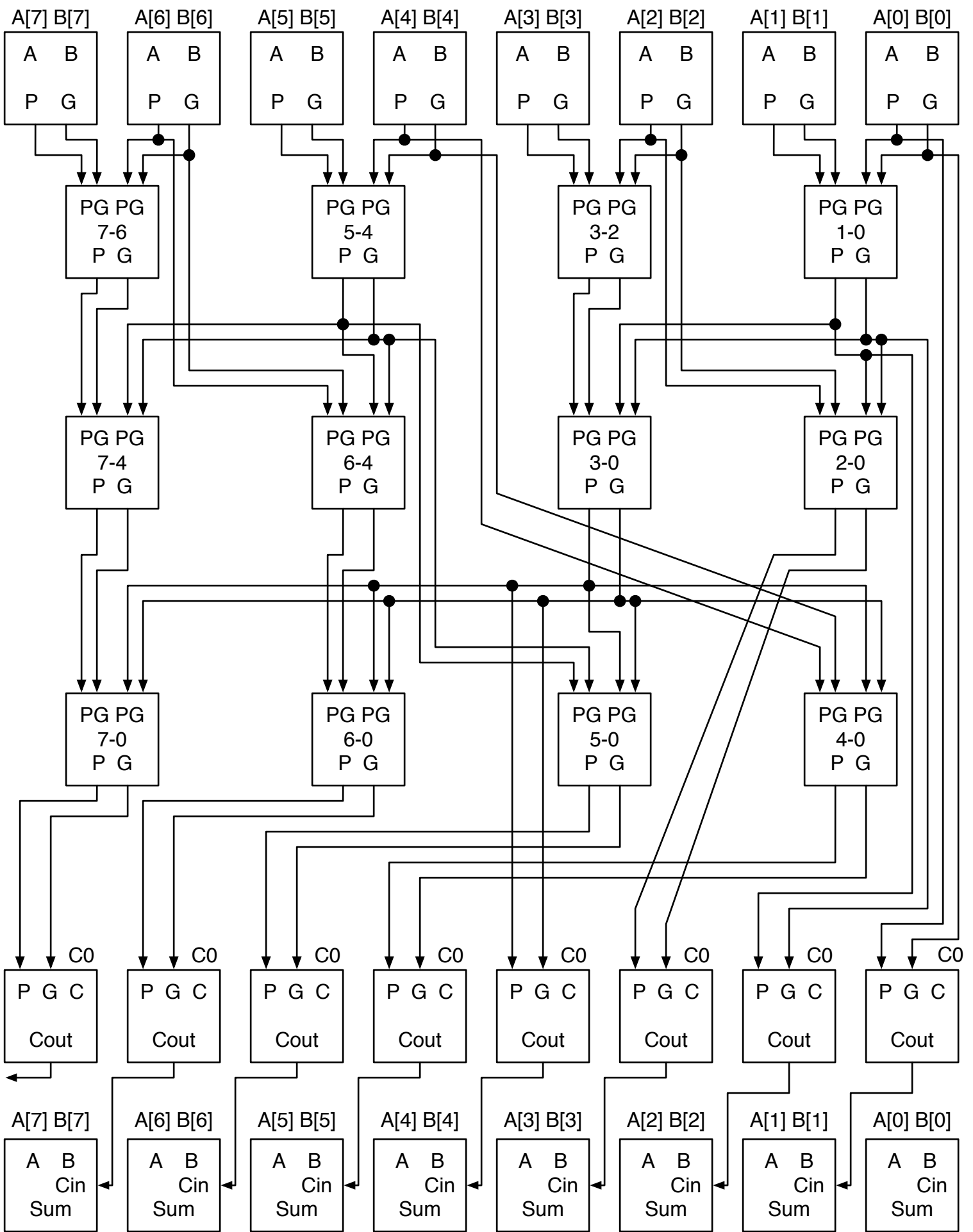
Number of gates: 3



Number of gates: 2



Number of gates: 2



Number of Gates: $(2 * 8) + (3 * 12) + (2 * 8) + (2 * 8) = 16 + 36 + 16 + 16 = 84$