Lab 4 prelab

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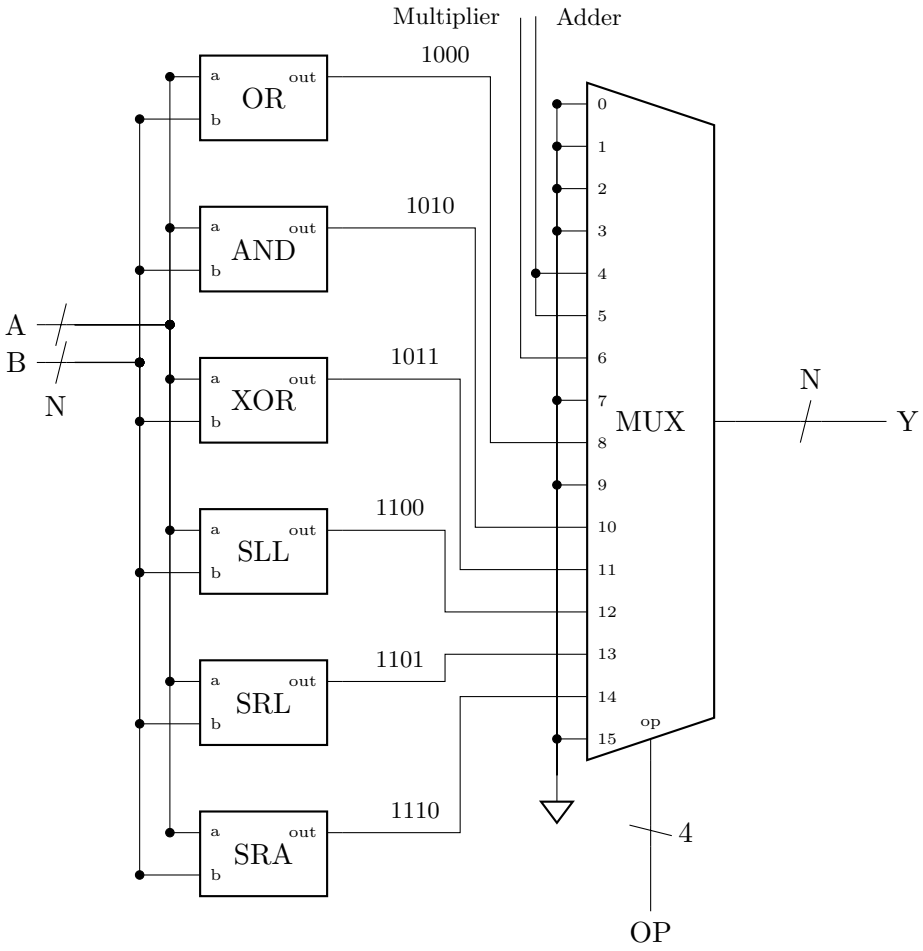

Figure 1: Layout of the N-bit ALU with eight operations

This ALU will expand on the ALU create in Exercise 1. It will support three more operations: multiply, add, subtract. The addition and subtraction come from the same circuit.

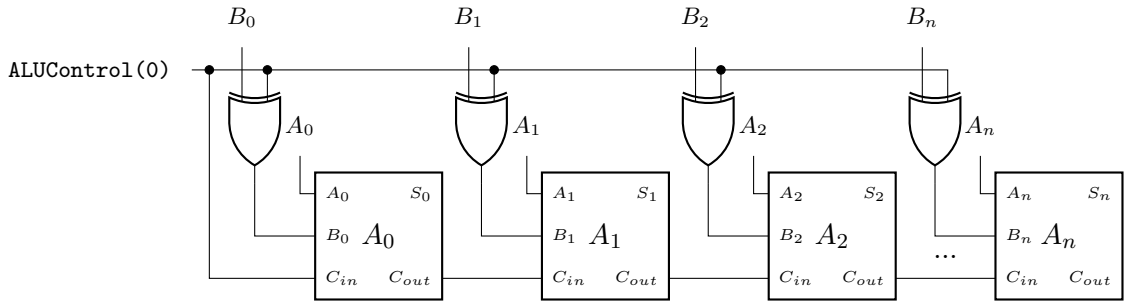

Figure 2: N-bit ripple-carry adder/subtractor.

The output of the adder/subtractor can be found in S_n ports on each full adder. A set LSB on `ALUControl` will select subtraction and compute `A-B`.

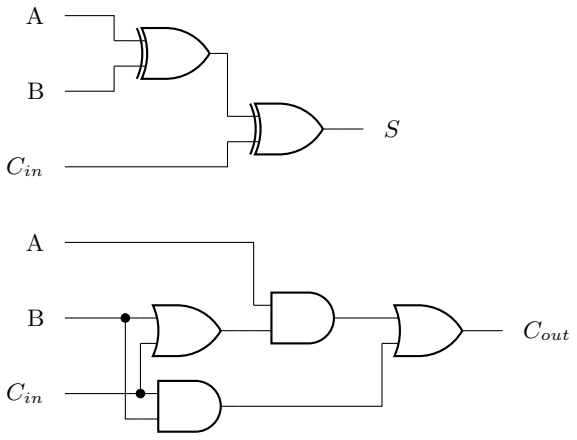

Figure 3: Full-adder circuit diagram

Figure 3 shows the inner circuit diagram of the full adders used in the ripply-carry adders (Figure 2) and the multiplier.

To multiply numbers A and B, a circuit diagram using a grid of full adders is shown. A and B are each $N/2$ bits long and the resultant product is N bits long.

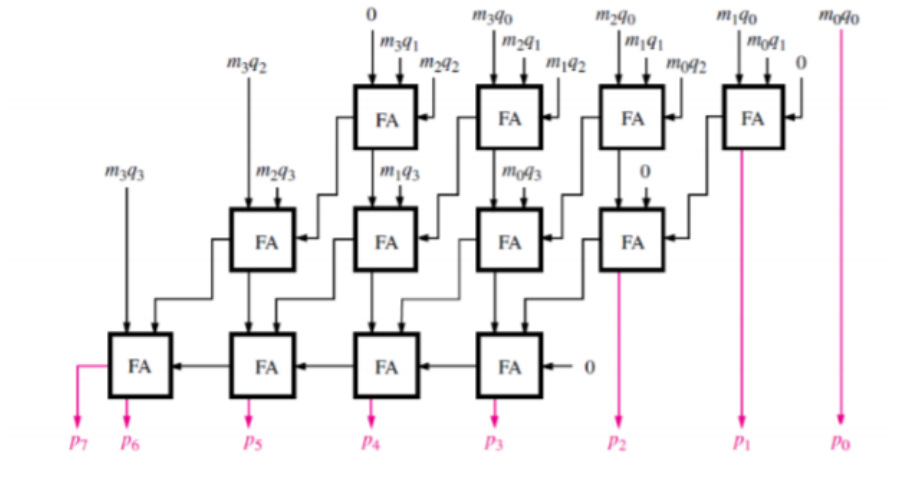

Figure 4: Diagram of a 4-bit unsigned integer multiplier circuit