EE214: Homework 1

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For M=0, the circuit act as a 4-bit adder. For M=1, the circuit act as a subtractor.

B_i	M	B_i XOR M
1	0	1
0	0	0
1	1	0
0	1	1

XOR Truth Table

For each B_i ,if M=0 the output through XOR gate is B_i itself. So binary addition is done between A and B using full adders.

If M=1, the output through XOR gate is B_i' for each i. The final output S would be A+B'. Since 2's complement subtraction for two numbers X and Y is given by X+Y', this clarifies that the subtraction has been performed by the circuit.