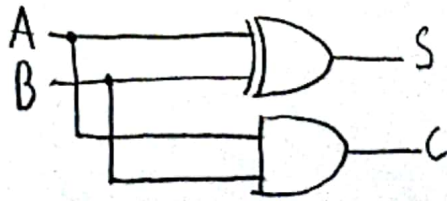


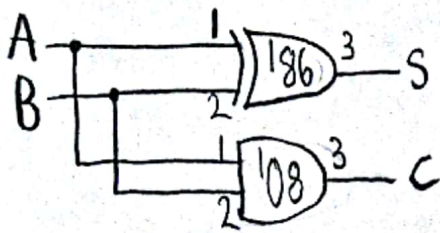
Half Adder

2 inputs: A and B. 2 outputs: S and C, $S = A \oplus B$, $C = AB$

Logic Diagram:



Circuit Schematic:



IC List for Circuit Schematic:

- ① One 7486 Quad 2-Input XOR Gate
- ② One 7408 Quad 2-Input AND Gate

Pin Numbers for GND and +V for Circuit Schematic:

7486 Quad 2-Input XOR Gate

GND — 7
+5V — 14

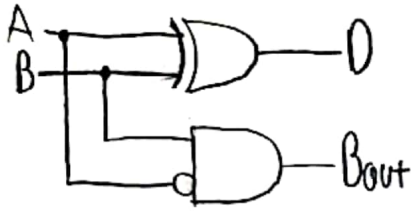
7408 Quad 2-Input AND Gate

GND — 7
+5V — 14

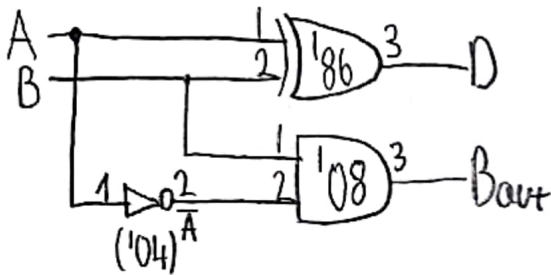
Half Subtractor

2 inputs: A and B. 2 outputs: D and Bout, $D = A \oplus B$, $B_{out} = \bar{A}B$

Logic Diagram:



Circuit Schematic:



IC List for Circuit Schematic:

- ① One 7486 Quad 2-Input XOR Gate
- ② One 7408 Quad 2-Input AND Gate
- ③ One 7404 INVERTER

Pin Numbers for GND and +V for Circuit Schematic:

7486 Quad 2-Input XOR Gate

GND — 7
+5V — 14

7408 Quad 2-Input AND Gate

GND — 7
+5V — 14

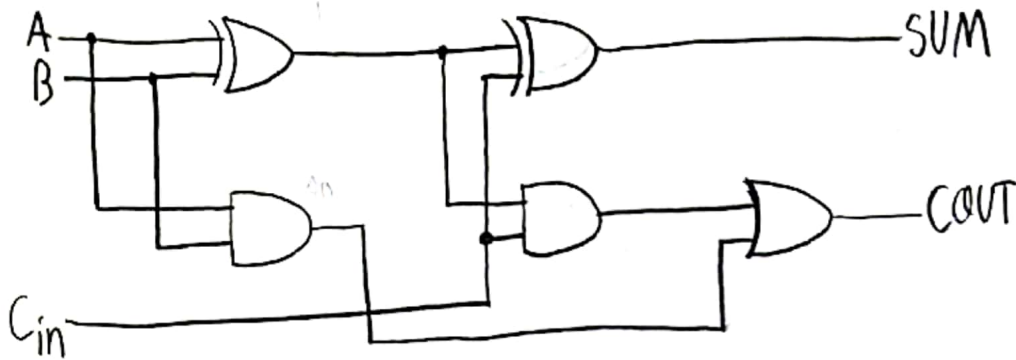
7404 INVERTER

GND — 7
+5V — 14

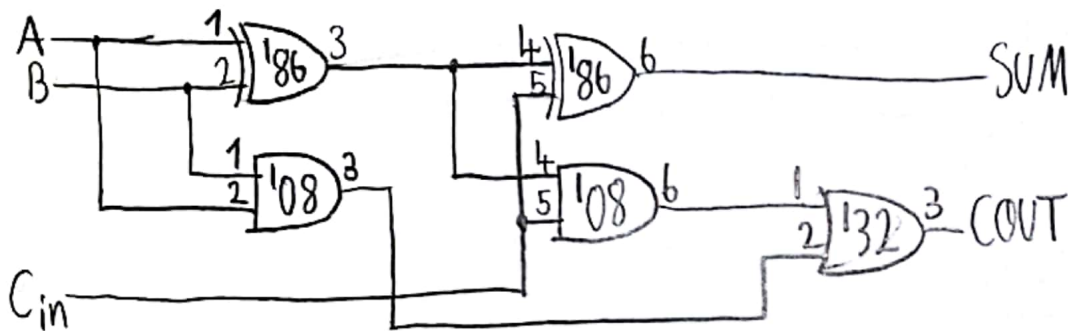
Full Adder

3 inputs: A, B, and C_{in} . 2 outputs: SUM and COUT

Logic Diagram:



Circuit Schematic:



IC List for Circuit Schematic:

- ① One 7486 Quad 2-Input XOR Gate
- ② One 7432 Quad 2-Input OR Gate
- ③ One 7408 Quad 2-Input AND Gate

Pin Numbers for GND and +V for Circuit Schematic:

7486 Quad 2-Input XOR Gate

GND — 7
+5V — 14

7432 Quad 2-Input OR Gate

GND — 7
+5V — 14

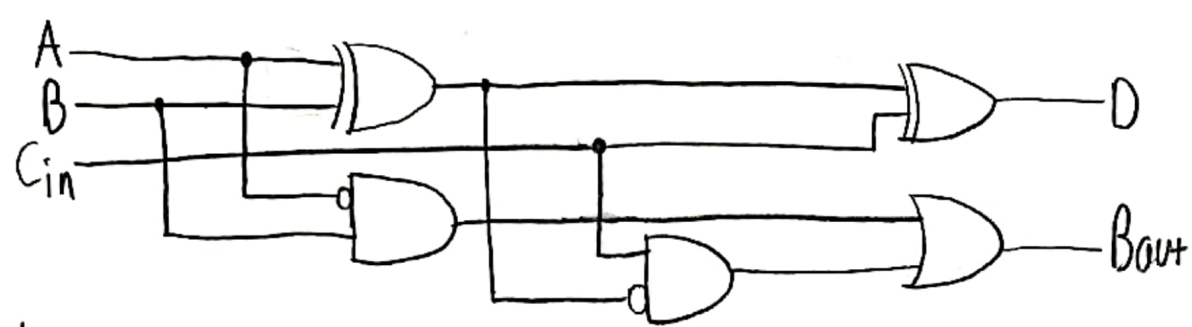
7408 Quad 2-Input AND Gate

GND — 7
+5V — 14

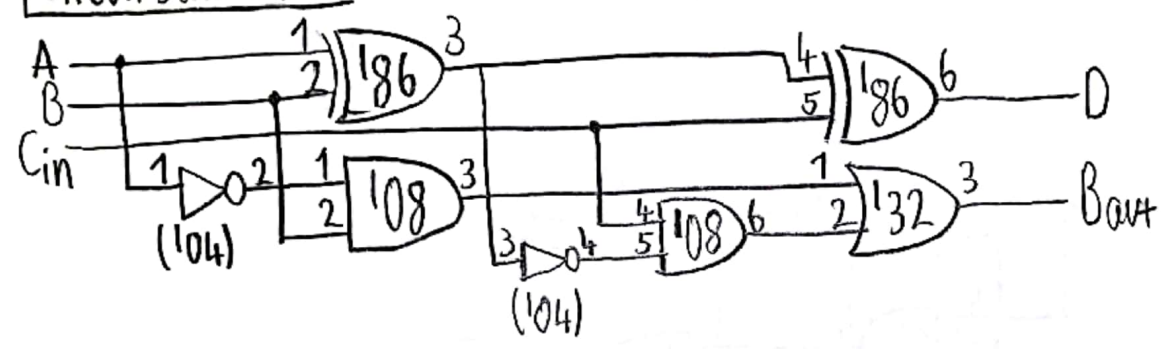
Full Subtractor

3 inputs: A, B, and C_{in}. 2 outputs: D and B_{out}

Logic Diagram:



Circuit Schematic:



IC List for Circuit Schematic:

- ① One 7486 Quad 2-Input XOR Gate
- ② One 7432 Quad 2-Input OR Gate
- ③ One 7408 Quad 2-Input AND Gate
- ④ One 7404 INVERTER

Pin Numbers for GND and +V for Circuit Schematic:

7486 Quad 2-Input XOR Gate
GND — 7
+5V — 14

7432 Quad 2-Input OR Gate
GND — 7
+5V — 14

7408 Quad 2-Input AND Gate
GND — 7
+5V — 14

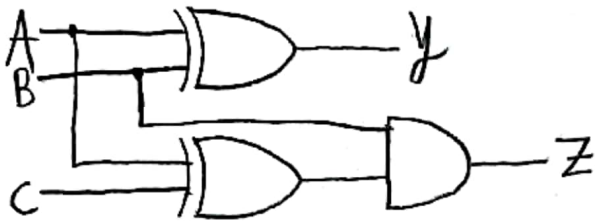
7404 INVERTER

GND — 7
+5V — 14

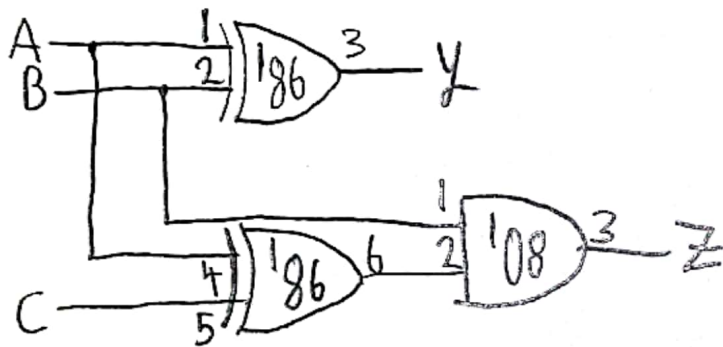
First Lab Calculator:

3 inputs: A, B, and C. 2 outputs: $Y = C(A \oplus B) + \bar{C}(A \oplus B) = (C + \bar{C})(A \oplus B) = A \oplus B$
and $Z = \bar{C}AB + C\bar{A}B = (\bar{C}A + C\bar{A})B = (C \oplus A)B$

Logic Diagram:



Circuit Schematic:



IC List for Circuit Schematic:

- ① One 7486 Quad 2-Input XOR Gate
- ② One 7408 Quad 2-Input AND Gate

Pin Numbers for GND and +V for Circuit Schematic:

7486 Quad 2-Input XOR Gate

GND — 7
+5V — 14

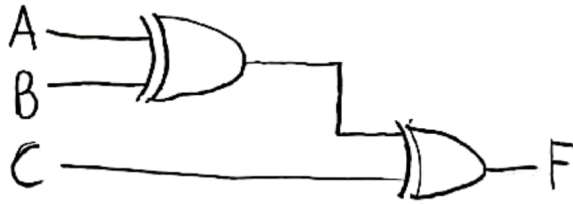
7408 Quad 2-Input AND Gate

GND — 7
+5V — 14

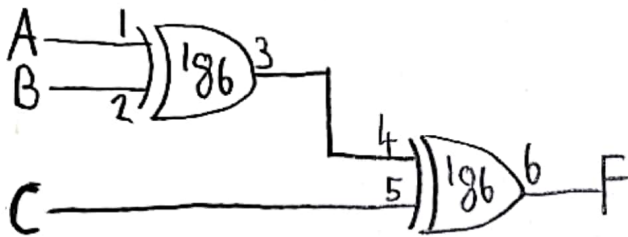
3 input XOR gates using two input XOR gates:

3 inputs: A, B and C. Output: $F = A \oplus B \oplus C$

Logic Diagram:



Circuit Schematic:



IC List for Circuit Schematic:

① One 7486 Quad 2-Input XOR Gate

Pin Numbers for GND and +V for Circuit Schematic:

7486 Quad 2-Input XOR Gate

GND — 7

+5V — 14