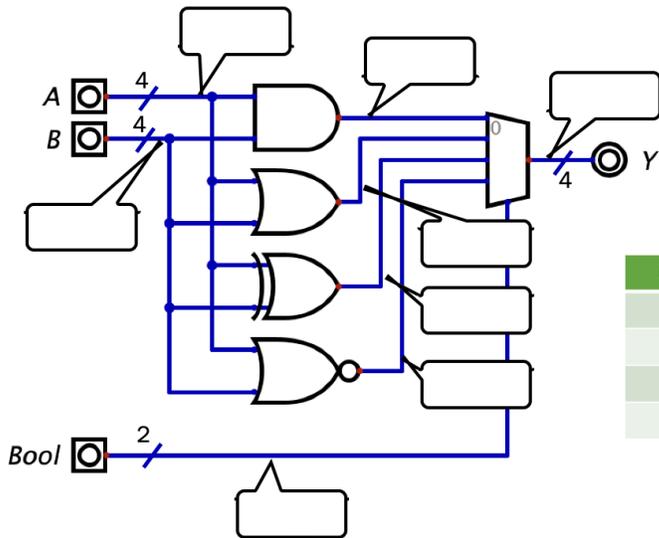**Question 1: Boolean Unit**  What are the values on each signal when we want to perform $Y = A \oplus B$, where A is $0b1010$ and B is $0b0001$?



| Operation | Expression | Bool |
|-----------|------------|------|
| AND | A x B | 0b00 |
| OR | A + B | 0b01 |
| XOR | A⊕B | 0b10 |
| NOR | $\overline{A + B}$ | 0b11 |

**Question 2: ALU Control Table**  Fill in the table!

| Operation | Sub | Bool | Shift | Math |
|-----------|-----|------|-------|------|
| A + B | | | | |
| A - B | | | | |
| B << A | | | | |
| B >> A | | | | |
| B >>> A | | | | |
| A AND B | | | | |
| A OR B | | | | |
| A XOR B | | | | |
| A NOR B | | | | |

**Question 3: ALU Shift** For the given operation 1 « 2, trace the data path through the ALU and show:

1. Which functional unit is activated (Add/Sub, Bidirectional Shifter, Boolean Unit).
2. What the control signal setting must be (Math, Shift, Bool, or Sub).
3. The intermediate input/output values at each stage.
4. The final 4-bit Result produced.



*if the bool input to the bidirectional shifter is 0b01, output 0