

Supplementary Questions and Exercises

Computations

- | | <i>a</i> | <i>b</i> | <i>c</i> |
|--|----------|----------|----------|
| | 0 | 0 | 0 |
| | 0 | 1 | 1 |
| | 1 | 0 | 1 |
| | 1 | 1 | 0 |
- The logical operator, **xor** is defined as follows.
 $a \text{ xor } b = (\text{not } a \text{ and } b) \text{ or } (a \text{ and not } b)$
 The truth table for $c = a \text{ xor } b$ is shown at right.
 Note that the number of 1s in each row is even.
 Write a computation, $xor(a, b, c)$, which can accept the most possible subsets of $\{a, b, c\}$ as inputs.
 - Write a computation which gives all possible results from the relationship among the integers *dividend*, *divisor*, *quotient*, and *remainder*.
 - a) and b) Write two computations, one for each of the relationships

$$d = d_0 + v_0 \times t + a \times t \times t/2$$

and

$$v = v_0 + a \times t$$

- Discuss how these might be combined, in a future implementation of Aldat, to solve the two equations together: discuss each possible invocation.
- Write the **post** update handlers that will display “Trigger” and “New” for the code


```
update R change X <- "c" using ijoin P;
update R add Q;
update R delete S;
```

and show the results produced by relix for

<i>R</i> (<i>X</i> <i>Y</i>)	<i>P</i> (<i>X</i> <i>Y</i>)	<i>Q</i> (<i>X</i> <i>Y</i>)	<i>S</i> (<i>X</i> <i>Y</i>)
a 1	a 1	a 3	b 1
a 2			
b 1			

- Define a computation, **comp** $X(R, S, T, B, C, D)$, which puts in T all pairs of values, B from R and D from S , which are associated with the same sets of values of C from both R and S . Invoke your computation on the relations $R(A, B, C)$ and $S(C, D, E)$. Write a second **alt** block in your computation which constructs as much of S as possible given R and T .
- Write an event handler which prints out a sequence of consecutive integers from 4 to 1 then stops, using only a relation *counter* which is always a singleton. Write the code to invoke it.

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