4-bit ALU X35448_en

Design a small ALU that receives two input numbers, a and b, and produces the result of an operation encoded by the signals op. There are four operations: addition ($a + b$, when op=00), subtraction ($a - b$, when op=01), transfer a (a, when op=10) and double a ($2a$, when op=11). The ALU also has an additional output ($zero$) that is activated when the result is zero.

Design the ALU for 4-bit operands.

Specification

```
module ALU(a, b, op, result, zero);
    input [3:0] a, b;
    input [1:0] op;
    output [3:0] result;
    output zero;
```

Input

- a and b are the two input 4-bit operands.
- op indicates the type of operation.

Output

- $result$ is the 4-bit result of the operation.
- $zero$ indicates when the result is zero.

Problem information

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