
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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