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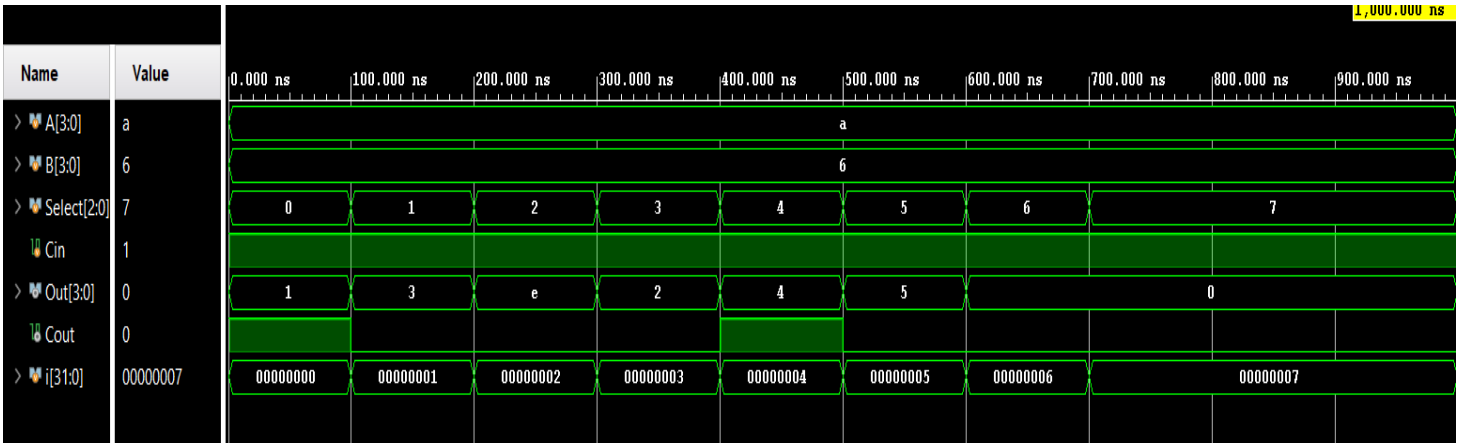
Timing Chart



Lab6.v

Lab6.v U ✕ Lab6_tb.v U

Lab-6 > Lab-6.srcs > sources_1 > new > Lab6.v > ...

```
1   `timescale 1ns / 1ps
2
3   module ALU_4b (
4
5       input [3:0] A, B,
6       input Cin,
7       input [2:0] Select,
8       output reg [3:0] Out,
9       output reg Cout
10
11  );
12
13      always @( A, B, Cin, Select ) begin
14
15          case( Select )
16
17              3'b000: { Cout, Out } <= A + B + Cin;
18              3'b001: { Cout, Out } <= A - B - Cin;
19              3'b010: { Cout, Out } <= A | B;
20              3'b011: { Cout, Out } <= A & B;
21              3'b100: { Cout, Out } <= A << 1'b1;
22              3'b101: { Cout, Out } <= A >> 1'b1;
23              3'b110: { Cout, Out } <= A[2:0] & A[3];
24              3'b111: { Cout, Out } <= A[0] & A[3:1];
25
26          endcase
27
28      end
29
30  endmodule
31
```

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Lab6_tb.v

Lab6.v U Lab6_tb.v U

Lab-6 > Lab-6.srcs > sim_1 > new > Lab6_tb.v > Lab6_tb

```
module Lab6_tb();
    reg [3:0] A, B;
    reg [2:0] Select;
    reg Cin;

    wire [3:0] Out;
    wire Cout;

    ALU_4b alu( A, B, Cin, Select, Out, Cout );

    integer i;
    initial begin

        A = 4'b1010;
        B = 4'b0110;
        Cin = 1'b1;

        Select = 3'b000;

        $monitor( "\nSelect: %b\n\nA: %b\nB: %b\nCin: %b\nOut: %b\nCout: %b\n", Select, A, B, Cin, Out, Cout );
        $monitor( "-----------------------------------------------------" );

        for ( i = 0; i < 7; i = i + 1 ) begin
            #100

            $monitor( "\nSelect: %b\n\nA: %b\nB: %b\nCin: %b\nOut: %b\nCout: %b\n", Select, A, B, Cin, Out, Cout );
            $monitor( "-----------------------------------------------------" );

            Select = Select + 1'b1;

        end

    end

endmodule
```

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TCL Console

Select: 000

A: 1010

B: 0110

Cin: 1

Out: 0001

Cout: 1

Select: 001

A: 1010

B: 0110

Cin: 1

Out: 0011

Cout: 0

Select: 001

A: 1010

B: 0110

Cin: 1

Out: 0011

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Cout: 0

Select: 010

A: 1010

B: 0110

Cin: 1

Out: 1110

Cout: 0

Select: 010

A: 1010

B: 0110

Cin: 1

Out: 1110

Cout: 0

Select: 011

A: 1010

B: 0110

Cin: 1

Out: 0010

Cout: 0

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Select: 011

A: 1010

B: 0110

Cin: 1

Out: 0010

Cout: 0

Select: 100

A: 1010

B: 0110

Cin: 1

Out: 0100

Cout: 1

Select: 100

A: 1010

B: 0110

Cin: 1

Out: 0100

Cout: 1

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Select: 101

A: 1010

B: 0110

Cin: 1

Out: 0101

Cout: 0

Select: 101

A: 1010

B: 0110

Cin: 1

Out: 0101

Cout: 0

Select: 110

A: 1010

B: 0110

Cin: 1

Out: 0000

Cout: 0

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Select: 110

A: 1010

B: 0110

Cin: 1

Out: 0000

Cout: 0

Select: 111

A: 1010

B: 0110

Cin: 1

Out: 0000

Cout: 0

Select: 111

A: 1010

B: 0110

Cin: 1

Out: 0000

Cout: 0