// LIFT CONTROLLER MODULE

```
module lift_c (
    input wire clk,
    input wire dl, // Door lock signal (1=door open)
    input wire [1:0] rf,
    input wire [1:0] cf,
    output reg b,   // Buzzer
    output reg u_d, // Up/Down (1 = up, 0 = down)
    output reg m   // Motor (1 = move, 0 = stop)
);

always @(*) begin
    // Default values
    b = 0;
    u_d = 0;
    m = 0;

    if (dl == 1) begin
        // Door open → Buzzer ON, Motor OFF
        b = 1;
        u_d = 0;
        m = 0;
    end
    else if (cf < rf) begin
        // Lift below target → Move UP
        b = 0;
        u_d = 1;
```

```
        m = 1;
    end
    else if (cf > rf) begin
        // Lift above target → Move DOWN
        b = 0;
        u_d = 0;
        m = 1;
    end
    else begin
        // Same floor → Stop
        b = 0;
        u_d = 0;
        m = 0;
    end
end
endmodule
```

// Test Bench

```
module lift_c_tb;

    reg clk;
    reg dl;
    reg [1:0] rf;
    reg [1:0] cf;

    wire b;
    wire u_d;
```

```
wire m;

// Instantiate the Unit Under Test (UUT)
lift_c uut (
    .clk(clk),
    .dl(dl),
    .b(b),
    .u_d(u_d),
    .m(m),
    .rf(rf),
    .cf(cf)
);

// Clock generation
initial begin
    clk = 0;
    forever #10 clk = ~clk;
end

// Stimulus block
initial begin
    $monitor("Time=%0t | dl=%b rf=%b cf=%b --> b=%b u_d=%b m=%b",
             $time, dl, rf, cf, b, u_d, m);

    dl = 1; rf = 2'b00; cf = 2'b00; #50; // Door open → buzzer ON
    dl = 0; rf = 2'b00; cf = 2'b00; #10;
    dl = 0; rf = 2'b01; cf = 2'b00; #10;
```

```
        dl = 0; rf = 2'b10; cf = 2'b00; #10;
        dl = 0; rf = 2'b11; cf = 2'b00; #10;
        dl = 0; rf = 2'b00; cf = 2'b01; #10;
        dl = 0; rf = 2'b01; cf = 2'b01; #10;
        dl = 0; rf = 2'b10; cf = 2'b01; #10;
        dl = 0; rf = 2'b11; cf = 2'b01; #10;
        dl = 0; rf = 2'b00; cf = 2'b10; #10;
        dl = 0; rf = 2'b01; cf = 2'b10; #10;
        dl = 0; rf = 2'b10; cf = 2'b10; #10;
        dl = 0; rf = 2'b11; cf = 2'b10; #10;
        dl = 0; rf = 2'b00; cf = 2'b11; #10;
        dl = 0; rf = 2'b01; cf = 2'b11; #10;
        dl = 0; rf = 2'b10; cf = 2'b11; #10;
        dl = 0; rf = 2'b11; cf = 2'b11; #10;

        $finish;
    end
endmodule
```