Task -2(ii)

Team- 2

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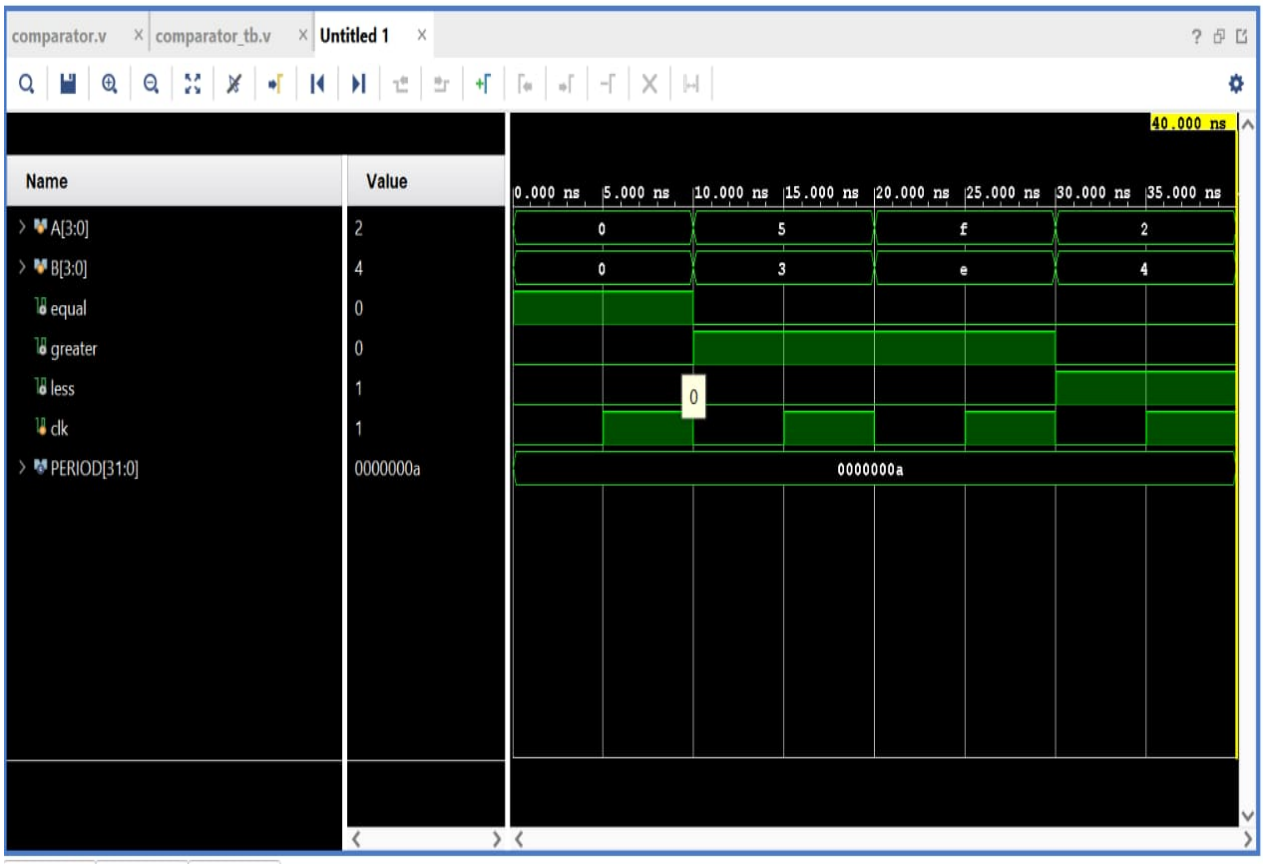
1. 4-Bit Comparator

```
module comparator_4bit(
    input [3:0] A,
    input [3:0] B,
    output equal,
    output greater,
    output less
);

assign equal = (A == B);
assign greater = (A > B);
assign less = (A < B);

endmodule

module tb_comparator_4bit;

    // Inputs
    reg [3:0] A;
    reg [3:0] B;

    // Outputs
    wire equal;
    wire greater;
    wire less;

    // Instantiate the comparator
    comparator_4bit uut(
        .A(A),
        .B(B),
        .equal(equal),
        .greater(greater),
        .less(less)
    );

    // Clock period definition
    parameter PERIOD = 10;
```

```
    // Clock and reset generation
    reg clk = 0;
    always #5 clk = ~clk;

    // Test vector generation
    initial begin
        $display("Starting 4-bit comparator test...");

        // Test case 1: A = B = 4'b0000
        A = 4'b0000; B = 4'b0000;
        #PERIOD;
        $display("Test Case 1: A = %b, B = %b, equal = %b, greater = %b, less = %b",
A, B, equal, greater, less);

        // Test case 2: A = 4'b0101, B = 4'b0011
        A = 4'b0101; B = 4'b0011;
        #PERIOD;
        $display("Test Case 2: A = %b, B = %b, equal = %b, greater = %b, less = %b",
A, B, equal, greater, less);

        // Test case 3: A = 4'b1111, B = 4'b1110
        A = 4'b1111; B = 4'b1110;
        #PERIOD;
        $display("Test Case 3: A = %b, B = %b, equal = %b, greater = %b, less = %b",
A, B, equal, greater, less);

        // Test case 4: A = 4'b0010, B = 4'b0100
        A = 4'b0010; B = 4'b0100;
        #PERIOD;
        $display("Test Case 4: A = %b, B = %b, equal = %b, greater = %b, less = %b",
A, B, equal, greater, less);

        // Add more test cases as needed...

        $display("4-bit comparator testbench finished.");
        $finish;
    end

endmodule
```


comparator.v
comparator_tb.v
Untitled 1
Name
Value
A[3:0]
2
B[3:0]
4
equal
0
greater
0
less
1
clk
1
PERIOD[31:0]
0000000a
40.000 ns
0.000 ns
5.000 ns
10.000 ns
15.000 ns
20.000 ns
25.000 ns
30.000 ns
35.000 ns
0
5
f
2
0
3
e
4
0
0000000a