

DDCO Assignment 3

(Up Counter)

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i) Testbench (upcountertb.v)

 upcounter.tb - Notepad
File Edit View

```
module synchronouscounter_tb;
    reg clk, reset;
    wire [3:0] count;
    synchronouscounter syncctr(clk,reset,count);

    initial begin
        clk = 0;    //initializing clk to zero
        reset = 1;
        #125;        // change values after 125ns
        reset = 0;
        #4500;
        $finish;
    end

    always #50 clk=~clk;    //clk negates after 50ns

    always@(posedge clk)    //clk is +ve edged
    begin
        $display ("value is %d", count);
    end

    initial begin $dumpfile("dump.vcd");
    $dumpvars;
    end

endmodule
```

ii) upcounter.v file

```
upcounter - Notepad
File Edit View

module synchronouscounter(clk,reset,count);
input clk,reset;
output reg [3:0] count; // 4 count vectors

    always@(posedge clk) //clk is always +ve edged
    begin
        if(reset)
            count <= 4'b0000;
        else
            count <= count + 1; // conditional statement to reset 4bit count value
        end
    end
endmodule
```

iii) command prompt

```
C:\Windows\System32\cmd.e
C:\iverilog\bin>iverilog -o test upcounter.v upcountertb.v
C:\iverilog\bin>vvp test
VCD info: dumpfile dump.vcd opened for output.
value is x
value is 0
value is 1
value is 2
value is 3
value is 4
value is 5
value is 6
value is 7
value is 8
value is 9
value is 10
value is 11
value is 12
value is 13
value is 14
value is 15
value is 0
value is 1
value is 2
value is 3
value is 4
value is 5
value is 6
value is 7
value is 8
value is 9
value is 10
value is 11
value is 12
value is 13
value is 14
value is 15
value is 0
value is 1
```

```
C:\Windows\System32\cmd.exe
value is 0
value is 1
value is 2
value is 3
value is 4
value is 5
value is 6
value is 7
value is 8
value is 9
value is 10
value is 11
value is 12
value is 13
value is 14
value is 15
value is 0
value is 1
value is 2
value is 3
value is 4
value is 5
value is 6
value is 7
value is 8
value is 9
value is 10
value is 11
value is 12

C:\iverilog\bin>gtkwave dump.vcd

GTKWave Analyzer v3.3.48 (w)1999-2013 BSI

[0] start time.
[4625] end time.
WM Destroy

C:\iverilog\bin>
```

iv) GTK Wave

