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// File: whiskey_mux_tb.v
// John Hubbard, 24 Oct 2014
// hw5 assignment for Verilog 0764 class: Problem 4.4.3: Liquid dispenser MUX
//
// Steps to run in ModelSim (on Linux this time):
// cd $HOME/git_wa/classes/ucsc/verilog_0764/hw5/c_whiskey_mux/modelsim
// vlib work
// vlog -sv ../whiskey_mux.v ../whiskey_mux_tb.v
// vsim work.whiskey_mux_tb
// run 400 ns
//

`timescale 1ns/1ns
module whiskey_mux_tb;
    reg [1:0]select_tb;
    reg beer_tb, wine_tb, rum_tb, whiskey_tb;
    wire f_tb;
    integer count, bev;

    whiskey_mux DUT(select_tb, beer_tb, wine_tb, rum_tb, whiskey_tb, f_tb);

    // This block prints whenever the inputs or outputs change, for either
    // the DUT or the DUT_REFERENCE instantiations:
    initial
    begin
        $monitor("Time %t, beer, wine, rum, whiskey: %b%b%b%b, ",
            $time, beer_tb, wine_tb, rum_tb, whiskey_tb,
            "sel: %b%b, f_tb: %b", select_tb[1:1], select_tb[0:0], f_tb);
    end

    // Test pattern: exhaustive inputs, but selective checks for MUX input-to-
    // output comparisons:
    initial
    begin
        for (count = 0; count < 4; count++)
        begin
            {select_tb} = count[1:0];
            for (bev = 0; bev < 16; bev++)
            begin
                {beer_tb, wine_tb, rum_tb, whiskey_tb} = bev[3:0];
                #10;

                if (count == 0 && f_tb != beer_tb)
                    $display("beer failure: sel: %b%b, beer: %b, f_tb: %b",
                        select_tb[1:1], select_tb[0:0], beer_tb, f_tb);
                else if (count == 1 && f_tb != wine_tb)
                    $display("Wine failure: sel: %b%b, wine_tb: %b, f_tb: %b",
                        select_tb[1:1], select_tb[0:0], wine_tb, f_tb);
                else if (count == 2 && f_tb != rum_tb)
                    $display("Rum failure: sel: %b%b, rum_tb: %b, f_tb: %b",
                        select_tb[1:1], select_tb[0:0], rum_tb, f_tb);
                else if (count == 3 && f_tb != whiskey_tb)
                    $display("Whiskey failure: sel: %b%b, whiskey_tb: %b, f_tb: %b",
                        select_tb[1:1], select_tb[0:0], whiskey_tb, f_tb);
            end
        end
    end
endmodule

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        end // beverage
    end // count (select line)

    $display("DONE\n");
end
endmodule

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/* Sample test run:
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vlog -sv ../*.v
# Model Technology ModelSim ALTERA vlog 10.1e Compiler 2013.06 Jun 12 2013
# -- Compiling module whiskey_mux
# -- Compiling module whiskey_mux_tb
#
# Top level modules:
#   whiskey_mux_tb
run 400 ns
vsim work.whiskey_mux_tb
# vsim work.whiskey_mux_tb
# Loading sv_std.std
# Loading work.whiskey_mux_tb
# Loading work.whiskey_mux
run 2000ns
# Time          0, beer, wine, rum, whiskey: 0000, sel: 00, f_tb: 0
# Time         10, beer, wine, rum, whiskey: 0001, sel: 00, f_tb: 0
# Time         20, beer, wine, rum, whiskey: 0010, sel: 00, f_tb: 0
# Time         30, beer, wine, rum, whiskey: 0011, sel: 00, f_tb: 0
# Time         40, beer, wine, rum, whiskey: 0100, sel: 00, f_tb: 0
# Time         50, beer, wine, rum, whiskey: 0101, sel: 00, f_tb: 0
# Time         60, beer, wine, rum, whiskey: 0110, sel: 00, f_tb: 0
# Time         70, beer, wine, rum, whiskey: 0111, sel: 00, f_tb: 0
# Time         80, beer, wine, rum, whiskey: 1000, sel: 00, f_tb: 1
# Time         90, beer, wine, rum, whiskey: 1001, sel: 00, f_tb: 1
# Time        100, beer, wine, rum, whiskey: 1010, sel: 00, f_tb: 1
# Time        110, beer, wine, rum, whiskey: 1011, sel: 00, f_tb: 1
# Time        120, beer, wine, rum, whiskey: 1100, sel: 00, f_tb: 1
# Time        130, beer, wine, rum, whiskey: 1101, sel: 00, f_tb: 1
# Time        140, beer, wine, rum, whiskey: 1110, sel: 00, f_tb: 1
# Time        150, beer, wine, rum, whiskey: 1111, sel: 00, f_tb: 1
# Time        160, beer, wine, rum, whiskey: 0000, sel: 01, f_tb: 0
# Time        170, beer, wine, rum, whiskey: 0001, sel: 01, f_tb: 0
# Time        180, beer, wine, rum, whiskey: 0010, sel: 01, f_tb: 0
# Time        190, beer, wine, rum, whiskey: 0011, sel: 01, f_tb: 0
# Time        200, beer, wine, rum, whiskey: 0100, sel: 01, f_tb: 1
# Time        210, beer, wine, rum, whiskey: 0101, sel: 01, f_tb: 1
# Time        220, beer, wine, rum, whiskey: 0110, sel: 01, f_tb: 1
# Time        230, beer, wine, rum, whiskey: 0111, sel: 01, f_tb: 1
# Time        240, beer, wine, rum, whiskey: 1000, sel: 01, f_tb: 0
# Time        250, beer, wine, rum, whiskey: 1001, sel: 01, f_tb: 0
# Time        260, beer, wine, rum, whiskey: 1010, sel: 01, f_tb: 0
# Time        270, beer, wine, rum, whiskey: 1011, sel: 01, f_tb: 0
# Time        280, beer, wine, rum, whiskey: 1100, sel: 01, f_tb: 1
# Time        290, beer, wine, rum, whiskey: 1101, sel: 01, f_tb: 1
# Time        300, beer, wine, rum, whiskey: 1110, sel: 01, f_tb: 1

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# Time      310, beer, wine, rum, whiskey: 1111, sel: 01, f_tb: 1
# Time      320, beer, wine, rum, whiskey: 0000, sel: 10, f_tb: 0
# Time      330, beer, wine, rum, whiskey: 0001, sel: 10, f_tb: 0
# Time      340, beer, wine, rum, whiskey: 0010, sel: 10, f_tb: 1
# Time      350, beer, wine, rum, whiskey: 0011, sel: 10, f_tb: 1
# Time      360, beer, wine, rum, whiskey: 0100, sel: 10, f_tb: 0
# Time      370, beer, wine, rum, whiskey: 0101, sel: 10, f_tb: 0
# Time      380, beer, wine, rum, whiskey: 0110, sel: 10, f_tb: 1
# Time      390, beer, wine, rum, whiskey: 0111, sel: 10, f_tb: 1
# Time      400, beer, wine, rum, whiskey: 1000, sel: 10, f_tb: 0
# Time      410, beer, wine, rum, whiskey: 1001, sel: 10, f_tb: 0
# Time      420, beer, wine, rum, whiskey: 1010, sel: 10, f_tb: 1
# Time      430, beer, wine, rum, whiskey: 1011, sel: 10, f_tb: 1
# Time      440, beer, wine, rum, whiskey: 1100, sel: 10, f_tb: 0
# Time      450, beer, wine, rum, whiskey: 1101, sel: 10, f_tb: 0
# Time      460, beer, wine, rum, whiskey: 1110, sel: 10, f_tb: 1
# Time      470, beer, wine, rum, whiskey: 1111, sel: 10, f_tb: 1
# Time      480, beer, wine, rum, whiskey: 0000, sel: 11, f_tb: 0
# Time      490, beer, wine, rum, whiskey: 0001, sel: 11, f_tb: 1
# Time      500, beer, wine, rum, whiskey: 0010, sel: 11, f_tb: 0
# Time      510, beer, wine, rum, whiskey: 0011, sel: 11, f_tb: 1
# Time      520, beer, wine, rum, whiskey: 0100, sel: 11, f_tb: 0
# Time      530, beer, wine, rum, whiskey: 0101, sel: 11, f_tb: 1
# Time      540, beer, wine, rum, whiskey: 0110, sel: 11, f_tb: 0
# Time      550, beer, wine, rum, whiskey: 0111, sel: 11, f_tb: 1
# Time      560, beer, wine, rum, whiskey: 1000, sel: 11, f_tb: 0
# Time      570, beer, wine, rum, whiskey: 1001, sel: 11, f_tb: 1
# Time      580, beer, wine, rum, whiskey: 1010, sel: 11, f_tb: 0
# Time      590, beer, wine, rum, whiskey: 1011, sel: 11, f_tb: 1
# Time      600, beer, wine, rum, whiskey: 1100, sel: 11, f_tb: 0
# Time      610, beer, wine, rum, whiskey: 1101, sel: 11, f_tb: 1
# Time      620, beer, wine, rum, whiskey: 1110, sel: 11, f_tb: 0
# Time      630, beer, wine, rum, whiskey: 1111, sel: 11, f_tb: 1
# DONE
#
*/
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