Mux

Design code:

2x1:

`timescale 1ns / 1ps

module Mux2to1(

input a,

input b,

input sel,

output y

);

assign y = (a & sel) | (!sel & b);

endmodule

4x1:

`timescale 1ns / 1ps

module Mux4to1(

input a, b, c, d, sel1, sel2, sel3,

output P

);

wire P0, P1;

Mux2to1 uud(.a(a), .b(b), .sel(sel1), .y(P0));

Mux2to1 uud1(.a(c), .b(d), .sel(sel2), .y(P1));

Mux2to1 uud2(.a(P0), .b(P1), .sel(sel3), .y(P));

Endmodule

8x1:

`timescale 1ns / 1ps

module Mux8to1(

input A, B, C, D, E, F, G, H, sel1, sel2, sel3, sel4, sel5, sel6, sel7,

output Y

);

wire p0, p1;

Mux4to1 uud1(.a(A), .b(B), .c(C), .d(D), .sel1(sel1), .sel2(sel2), .sel3(sel3), .P(p0));

Mux4to1 uud2(.a(E), .b(F), .c(G), .d(H), .sel1(sel4), .sel2(sel5), .sel3(sel6), .P(p1));

Mux2to1 uud3(.a(p0), .b(p1), .sel(sel7), .y(Y));

endmodule

Test Bench code:

2x1:

`timescale 1ns / 1ps

module Mux2to1(

input a,

input b,

input sel,

output y

);

assign y = (a & sel) | (!sel & b);

endmodule

4x1:

`timescale 1ns / 1ps

module TestBench4to1;

reg d3, d2, d1, d0, s2, s1, s0;

wire y;

Mux4to1 uud(.a(d0), .b(d1), .c(d2), .d(d3), .sel1(s0), .sel2(s1), .sel3(s2));

integer i;

initial begin

$display("Mux 4 to 1 tester!");

d0 = 1'b1; d1 = 1'b0;

d2 = 1'bx; d3 = 1'b1;

$display("\tTest case\td3\td2\td1\td0\ts2\ts1\ts0\t|\ty");

for (i = 0; i < 4; i = i+1)

begin

{s2, s1, s0} = i;

#1 $display("%d\t\t%b\t%b\t%b\t%b\t|\t%b", i, d3, d2, d1, d0, s2, s1, s0, y);

end

$finish;

end

endmodule

8to1:

`timescale 1ns / 1ps

module TestBench4to1;

reg d3, d2, d1, d0, s2, s1, s0;

wire y;

Mux4to1 uud(.a(d0), .b(d1), .c(d2), .d(d3), .sel1(s0), .sel2(s1), .sel3(s2));

integer i;

initial begin

$display("Mux 4 to 1 tester!");

d0 = 1'b1; d1 = 1'b0;

d2 = 1'bx; d3 = 1'b1;

$display("\tTest case\td3\td2\td1\td0\ts2\ts1\ts0\t|\ty");

for (i = 0; i < 4; i = i+1)

begin

{s2, s1, s0} = i;

#1 $display("%d\t\t%b\t%b\t%b\t%b\t|\t%b", i, d3, d2, d1, d0, s2, s1, s0, y);

end

$finish;

end

endmodule

Youtube link:

<https://youtu.be/rv74RKqrkUY>