DEMULTIPLEXER

module demux\_8\_1\_gate(input D, input [2:0]S,output Y0,Y1,Y2,Y3,Y4,Y5,Y6,Y7);

wire inv0, inv1, inv2;

not not\_0 (inv0, S[0]);

not not\_1 (inv1, S[1]);

not not\_2 (inv2, S[2]);

and and\_0 (Y0, inv2, inv1, inv0, D );

and and\_1 (Y1, inv2, inv1, S[0], D );

and and\_2 (Y2, inv2, S[1], inv0, D );

and and\_3 (Y3, inv2, S[1], S[0], D );

and and\_4 (Y4, S[2], inv1, inv0, D );

and and\_5 (Y5, S[2], inv1, S[0], D );

and and\_6 (Y6, S[2], S[1], inv0, D );

and and\_7 (Y7, S[2], S[1], S[0], D );

endmodule

TESTBENCH

module demux\_8\_1\_gate\_tb;

reg D;

reg [2:0] S;

wire Y0,Y1,Y2,Y3,Y4,Y5,Y6,Y7;

demux\_8\_1\_gate

demux(.D(D),.S(S),.Y0(Y0),.Y1(Y1),.Y2(Y2),.Y3(Y3),.Y4(Y4),.Y5(Y5),.Y6(Y6),.Y7(Y7));

initial

begin

D=$random; S= 000;

#10 S= 001;D=$random;

#10 S= 010;D=$random;

#10 S= 011;D=$random;

#10 S= 100;D=$random;

#10 S= 101;D=$random;

#10 S= 110;D=$random;

#10 S= 111;

D=$random;

#10$stop;

end

initial

begin

$dumpfile("dump.vcd");

$dumpvars(1);

#10000$finish;

end

always @(\*)

$display("time =%0t \tINPUT VALUES: \t D =%b \t S = %b \t output value Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7 = %b%b%b%b%b%b%b%b ",$time,D,S,Y0,Y1,Y2,Y3,Y4,Y5,Y6,Y7);

endmoduleor or\_0(Y, a0, a1, a2, a3, a4, a5, a6, a7);

endmodule