TESTBENCH

module tb();

reg clk, rst, write\_enable, read\_enable;

reg [7:0] password\_input, data\_input;

wire [7:0] data\_output;

// Instantiate the module

password\_RAM\_ROM uut (

.clk(clk),

.rst(rst),

.password\_input(password\_input),

.data\_input(data\_input),

.write\_enable(write\_enable),

.read\_enable(read\_enable),

.data\_output(data\_output)

);

// Clock generation

initial begin

clk = 0;

forever #5 clk = ~clk;

end

// Test scenarios

initial begin

$dumpfile("dump.vcd"); $dumpvars;

// Apply reset at the beginning

$display("Applying Reset");

rst = 1;

#10;

rst = 0;

#10;

// Scenario 1: Wrong password for RAM writing

$display("Scenario 1: Wrong password for RAM writing");

password\_input = 8'b10011010; // Wrong RAM password

data\_input = 8'hee;

write\_enable = 1;

#20;

write\_enable = 0;

#50;

// Scenario 2: Correct password for RAM writing and reading

$display("Scenario 2: Correct password for RAM writing");

password\_input = 8'b10111111; // Correct RAM password

data\_input = 8'hdd;

write\_enable = 1;

#20;

write\_enable = 0;

#20;

read\_enable = 1;

#20;

read\_enable = 0;

#50;

// Scenario 3: Write and Read RAM with different data

$display("Scenario 3: Write and Read RAM with different data");

password\_input = 8'b10111111; // Correct RAM password

data\_input = 8'hbb;

write\_enable = 1;

#20;

write\_enable = 0;

#20;

read\_enable = 1;

#20;

read\_enable = 0;

#50;

// Scenario 4: Wrong password for ROM writing

$display("Scenario 4: Wrong password for ROM writing");

password\_input = 8'b01011011; // Wrong ROM password

data\_input = 8'hcc;

write\_enable = 1;

#20;

write\_enable = 0;

#50;

// Scenario 5: Correct password for ROM writing and reading

$display("Scenario 5: Correct password for ROM writing and reading");

password\_input = 8'b00111110; // Correct ROM password

data\_input = 8'hcc;

write\_enable = 1;

#20;

write\_enable = 0;

#10;

read\_enable = 1;

#20;

read\_enable = 0;

#50;

// Scenario 6: Write and Read ROM with different data

$display("Scenario 6: Write and Read ROM with different data");

password\_input = 8'b00111110; // Correct ROM password

data\_input = 8'hff;

write\_enable = 1;

#20;

write\_enable = 0;

#10;

read\_enable = 1;

#20;

read\_enable = 0;

#50;

$finish();

end

endmodule

**OUTPUT WAVEFORM**

