

Day8-Grey_Binary_Coverter

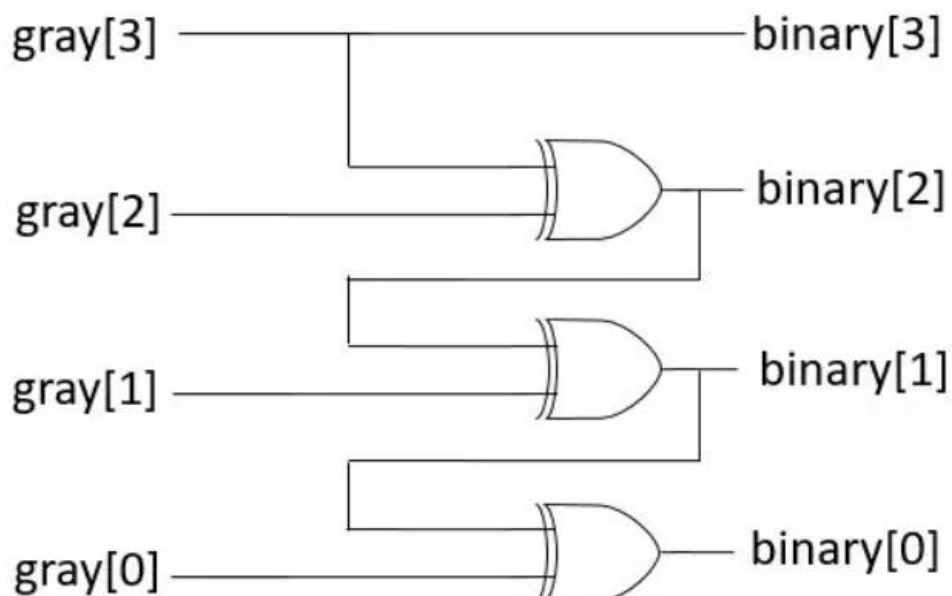
#75daysRTL

Gray Code is a form of binary that uses a different method of incrementing from one number to the next. With Gray Code, only one bit changes state from one position to another. We are designing a basic 4-bit Grey to Binary Converter using **XOR Gates**.

Truth Table-

Decimal Number	Grey Code	Binary Code
0	0000	0000
1	0001	0001
2	0011	0010
3	0010	0011
4	0110	0100
5	0111	0101
6	0101	0110
7	0100	0111
8	1100	1000
9	1101	1001
10	1111	1010
11	1110	1011
12	1010	1100
13	1011	1101
14	1001	1110
15	1000	1111

Block Diagram of Grey to Binary Converter-



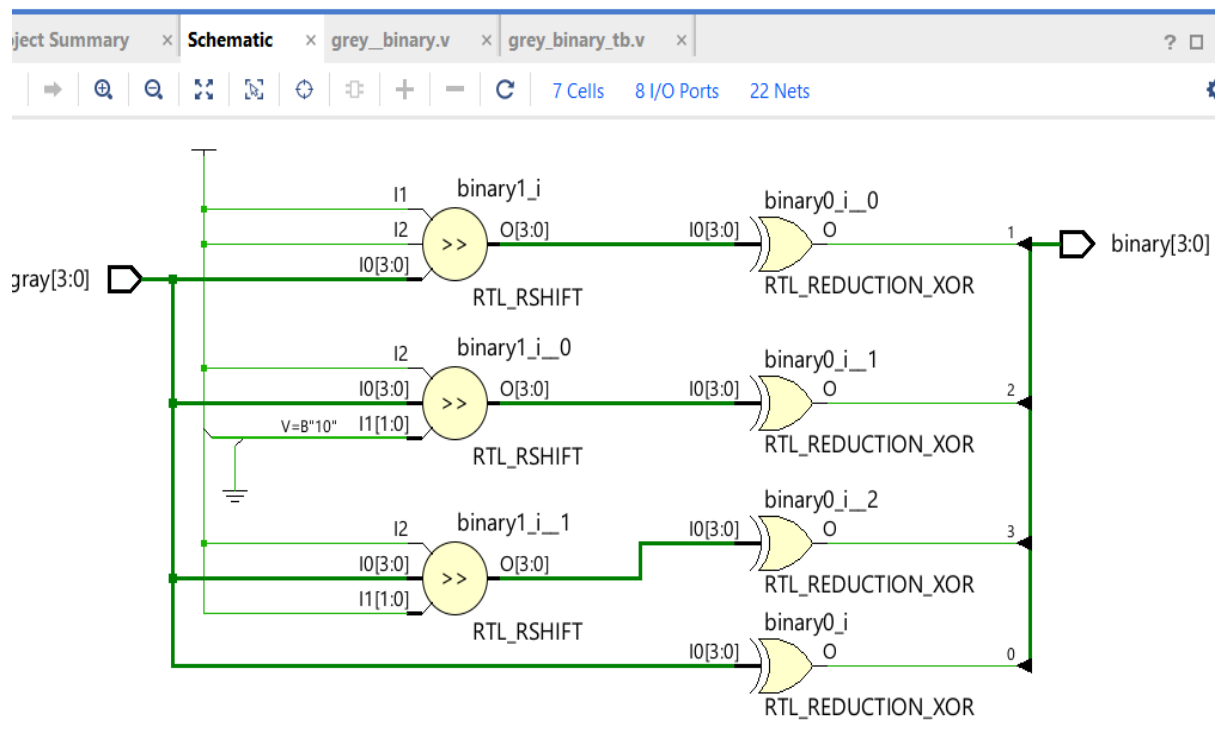
Verilog Code –

```
module grey__binary(input [3:0]gray, output [3:0] binary);
genvar i;
    generate
        for(i=0;i<4;i=i+1)
            begin
                assign binary[i] = ^(gray >> i);
            end
    endgenerate
endmodule
```

TestBench Code-

```
module grey_binary_tb();
wire [3:0]binary;
reg [3:0]gray;
grey__binary dut(gray,binary);
initial begin
    gray=4'b0000;
    #20;
    gray=4'b0100;
    #20;
    gray=4'b1001;
    #20;
    gray=4'b0110;
    #20;
    gray=4'b0111;
    #20;
    gray=4'b1111;
    #20; $finish;
end
endmodule
```

Schematic View of Grey to Binary Converter-



Simulation Result of Grey to Binary Converter -

