

SRMIST

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

DELHI NCR CAMPUS, MODINAGAR

**DEPARTMENT OF ELECTRONICS AND
COMMUNICATION ENGINEERING**

II YEAR / III SEMESTER

ANALOG AND DIGITAL ELECTRONICS LABORATORY

(18CSS201J)

Name of the candidate : ANANYA GUPTA

Register Number : RA1911003030265

Branch-Section :CSE-I

Year/Semester :2ND / 3RD

S. No.	TITLE OF EXPERIMENT
EXPERIMENT - 11	Design a)-BINARY TO GRAY Converter b)- GRAY TO BINARY Converter using gate level modeling.

EXPERIMENT : 11

AIM: Design

a)-BINARY TO GRAY Converter

b)- GRAY TO BINARY Converter

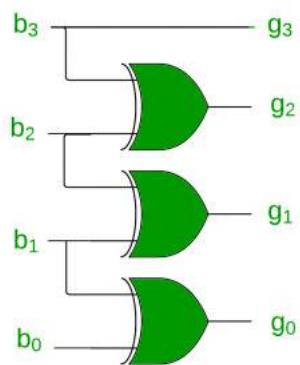
using gate level modeling.

SOFTWARE REQUIRED: MODEL SIMULATOR (verilog).

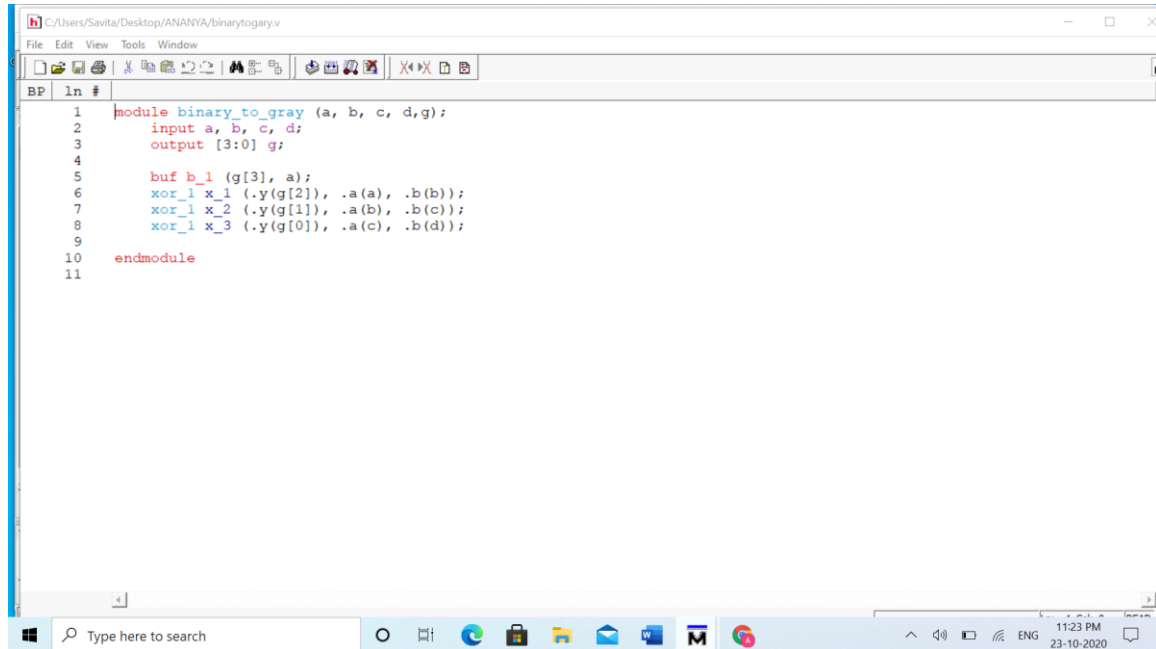
a)- BINARY TO GRAY Converter.

LOGIC DIAGRAM:

Decimal Number	4 bit Binary Number <u>ABCD</u>	4 bit Gray Code <u>G₁G₂G₃G₄</u>
0	0 0 0 0	0 0 0 0
1	0 0 0 1	0 0 0 1
2	0 0 1 0	0 0 1 1
3	0 0 1 1	0 0 1 0
4	0 1 0 0	0 1 1 0
5	0 1 0 1	0 1 1 1
6	0 1 1 0	0 1 0 1
7	0 1 1 1	0 1 0 0
8	1 0 0 0	1 1 0 0
9	1 0 0 1	1 1 0 1
10	1 0 1 0	1 1 1 1
11	1 0 1 1	1 1 1 0
12	1 1 0 0	1 0 1 0
13	1 1 0 1	1 0 1 1
14	1 1 1 0	1 0 0 1
15	1 1 1 1	1 0 0 0

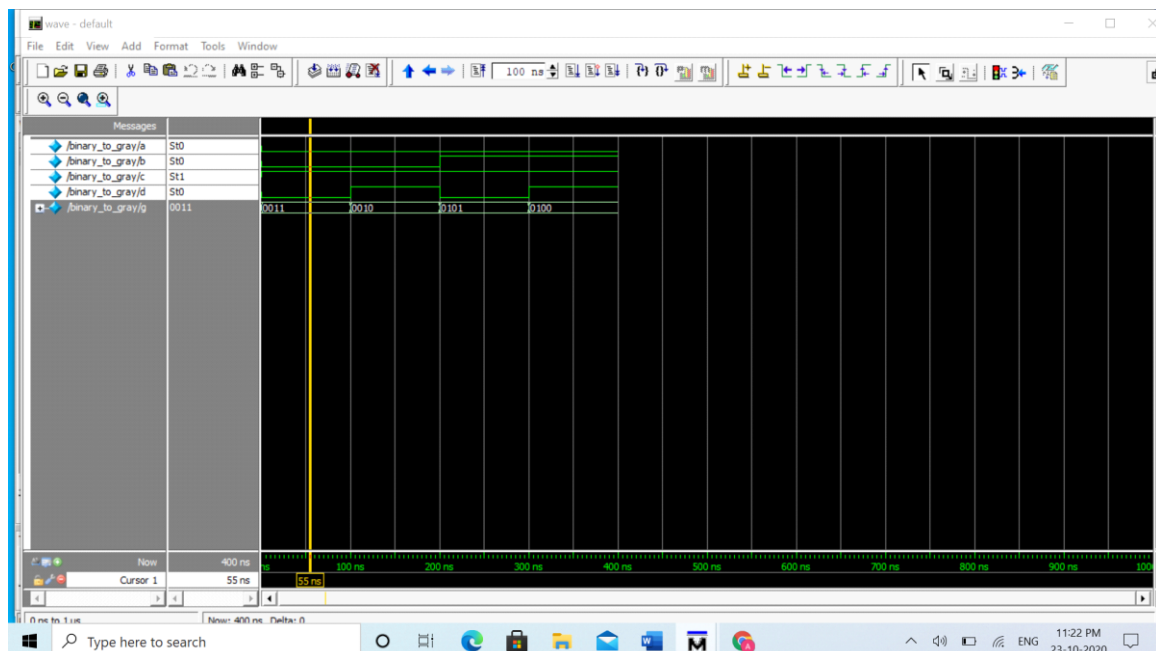


CODE:



```
1 module binary_to_gray (a, b, c, d, g);
2     input a, b, c, d;
3     output [3:0] g;
4
5     buf b_1 (g[3], a);
6     xor_1 x_1 (.y(g[2]), .a(a), .b(b));
7     xor_1 x_2 (.y(g[1]), .a(b), .b(c));
8     xor_1 x_3 (.y(g[0]), .a(c), .b(d));
9
10 endmodule
11
```

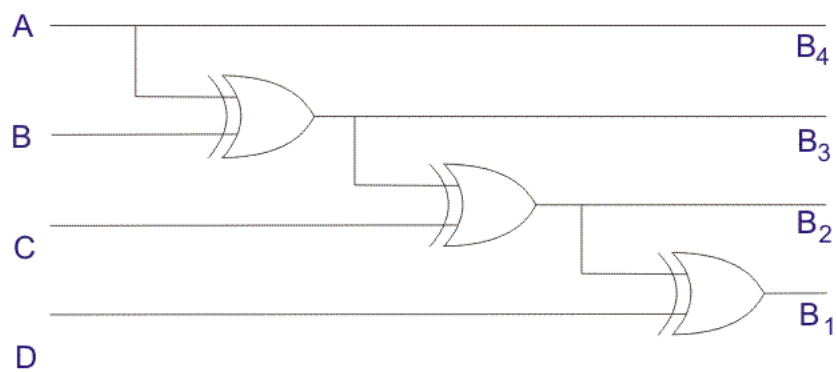
WAVEFORM:



b)- GRAY TO BINARY Converter.

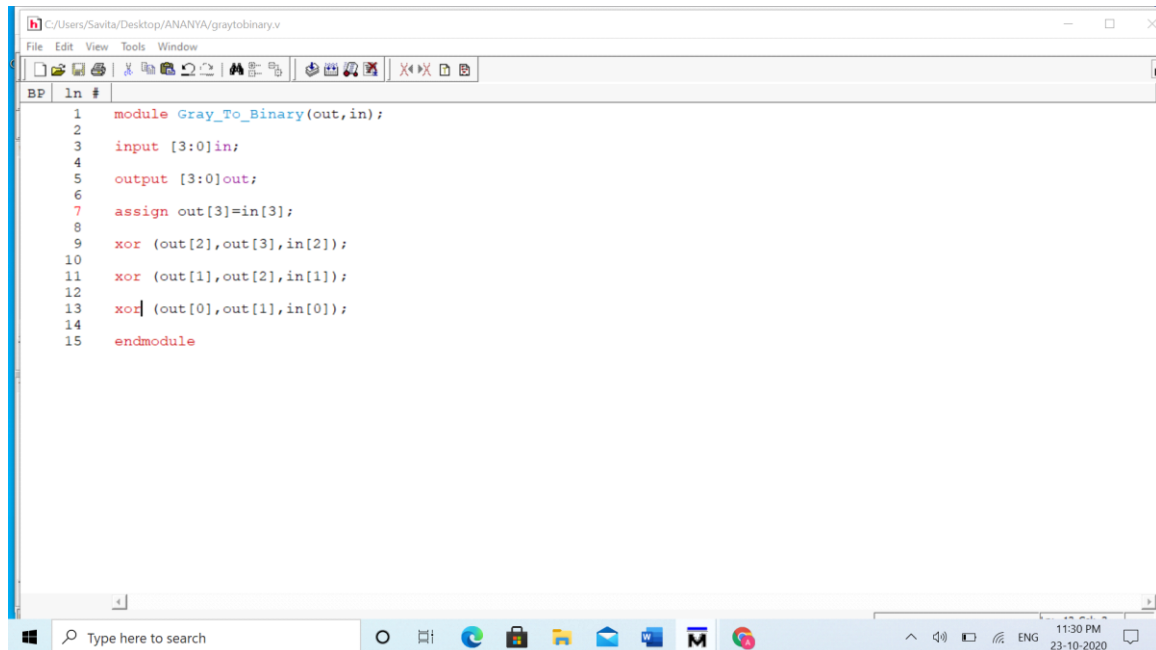
LOGIC DIAGRAM:

4 bit Gray Code	4 bit Binary Code
A B C D	B ₄ B ₃ B ₂ B ₁
0 0 0 0	0 0 0 0
0 0 0 1	0 0 0 1
0 0 1 1	0 0 1 0
0 0 1 0	0 0 1 1
0 1 1 0	0 1 0 0
0 1 1 1	0 1 0 1
0 1 0 1	0 1 1 0
0 1 0 0	0 1 1 1
1 1 0 0	1 0 0 0
1 1 0 1	1 0 0 1
1 1 1 1	1 0 1 0
1 1 1 0	1 0 1 1
1 0 1 0	1 1 0 0
1 0 1 1	1 1 0 1
1 0 0 1	1 1 1 0
1 0 0 0	1 1 1 1



Logic Circuit for Gray to Binary Code Converter

CODE:



```
1 module Gray_To_Binary(out,in);
2
3 input [3:0]in;
4
5 output [3:0]out;
6
7 assign out[3]=in[3];
8
9 xor (out[2],out[3],in[2]);
10
11 xor (out[1],out[2],in[1]);
12
13 xor (out[0],out[1],in[0]);
14
15 endmodule
```

WAVEFORM:

