EXPERIMENT-5

AIM: To design a binary to gray and a gray to binary code converter circuit.

HARDWARE / SOFTWARE APPARATUS : Power supply , bread board , connecting wires , respective IC (7486)

TRUTH TABLE:

Gray Code Input				Binary Code Output			
G3	G2	G1	G0	B3	B2	B1	B0
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

THEORY: Gray code is defined as an ordering of the binary number system such that each incremental value can differ by one bit. To convert to gray code,

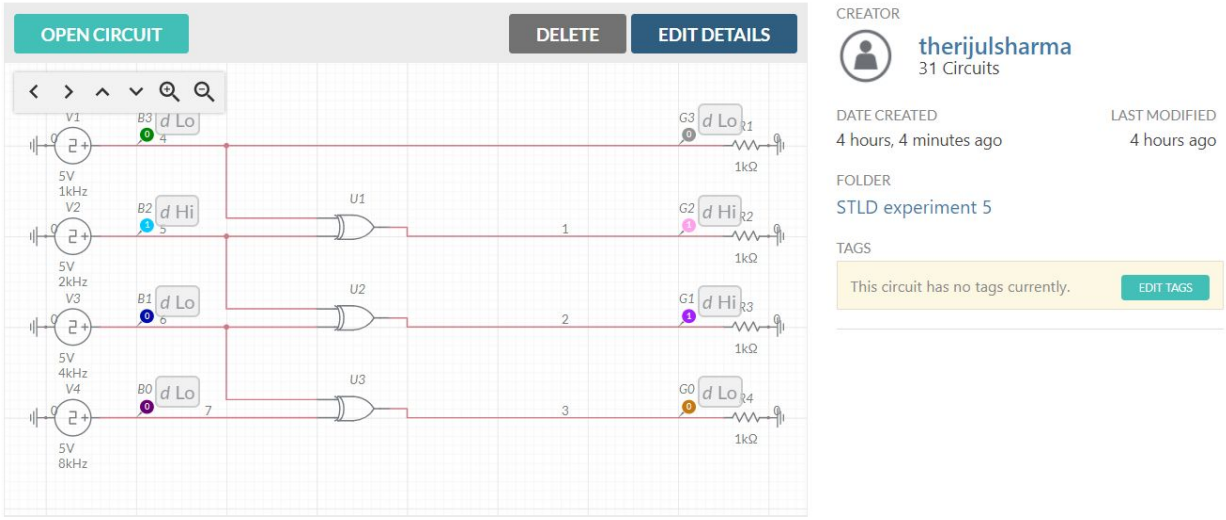
1. The MSB of the gray code will be exactly equal to the first bit of the binary number.
2. The second bit of the code will be exclusive or of the first and second bit of the binary number.
3. The third bit of the gray code will be equal to the exclusive or of the second and third bits and so on.

PROCEDURE (MULTISIM):

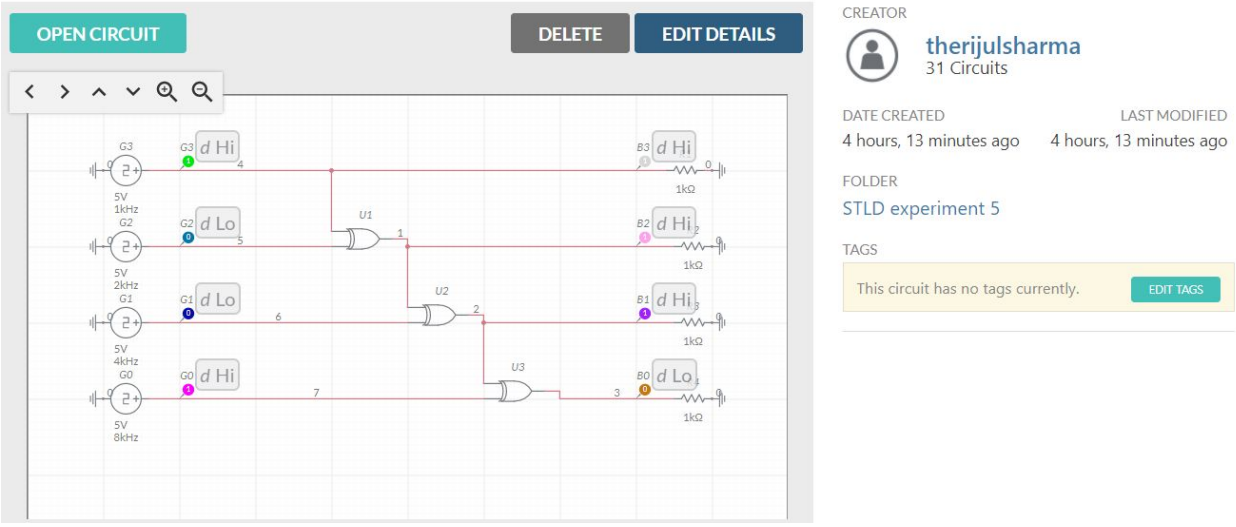
- Select the required gate symbol from the digital section of the tool bar on the left .
- Select a resistor from the same toolbar.
- Select the voltage sources and ground symbols from that toolbar.
- Ground both the voltage sources(clock) and then connect them to the input terminal of the gate.
- Connect the output terminal to 1kohm resistor and ground it.

CIRCUIT DIAGRAMS:

BINARY TO GRAY CONVERTOR

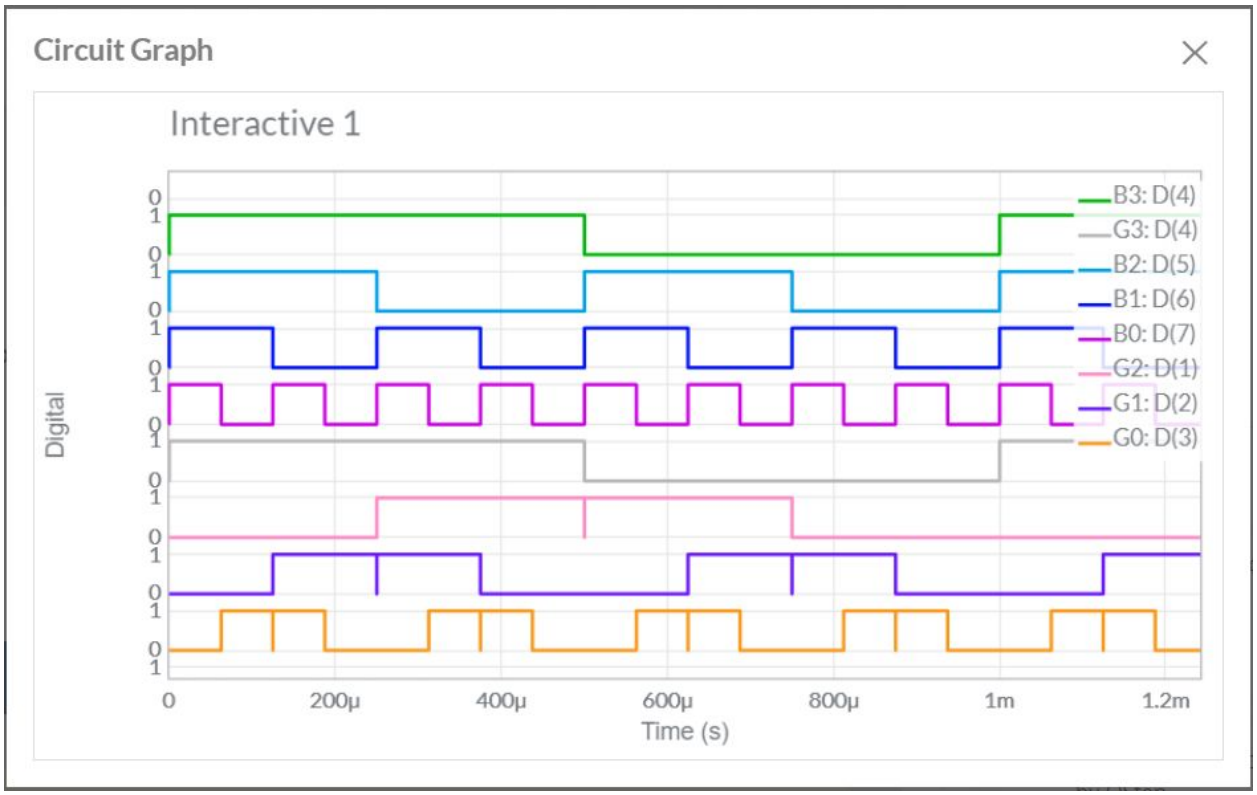


GRAY TO BINARY CONVERTOR

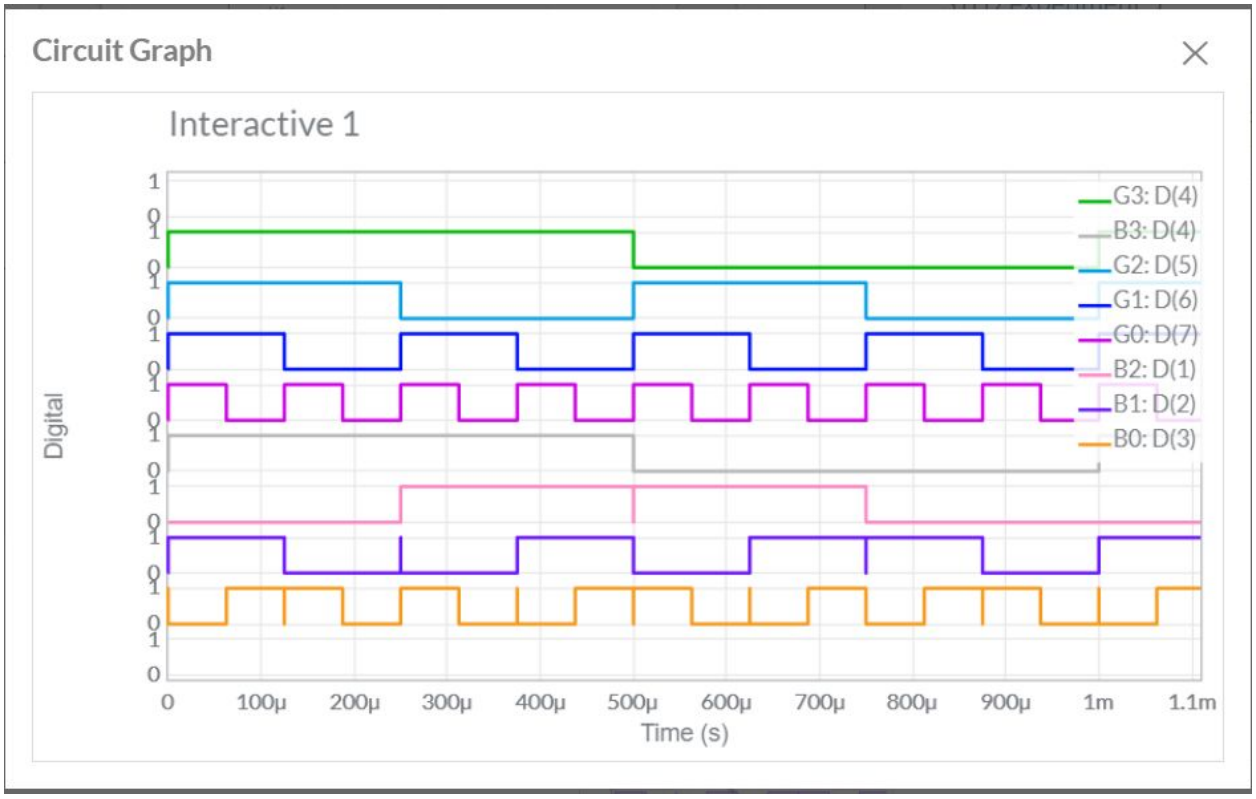


INPUT /OUTPUT WAVEFORMS:

BINARY TO GRAY



GRAY TO BINARY



PRECAUTIONS:

- Power supply should not exceed than 5V.
- Connections should be tight.
- Components should be tested before the practical.