Faculty of Computers and Artificial Intelligence

CS221: Logic Design

Lab no 01: Binary System & Logic Gate Training Board

The purpose of this Lab is to:

1) Be familiar with the logic gates training board (Green board)

2) Review the binary system and implement binary numbers using switches and LEDs on the Green board.

3) Convert from binary to decimal and display the number on the seven segments display on the Green board.

Part1: Binary System

Table.1 shows the binary numbers from 0 to 15 and their corresponding implementation by LEDs.

Switch	State	LED
Down	OFF	●
Up	ON	○

Table 1. Binary Numbers Representation on LEDs.

Number in Decimal	Number in Binary	Output in LEDs
0	0000	● ● ● ●
1	0001	● ● ● ○
2	0010	● ● ○ ●
3	0011	● ● ○ ○
4	0100	● ○ ● ●
5	0101	● ○ ● ○
6	0110	● ○ ○ ●
7	0111	● ○ ○ ○
8	1000	○ ● ● ●
9	1001	○ ● ● ○

10	1010	○ ● ○ ●
11	1011	○ ● ○ ○
12	1100	○ ○ ● ●
13	1101	○ ○ ● ○
14	1110	○ ○ ○ ●
15	1111	○ ○ ○ ○

1. Connect the switches to LEDs using wires as shown in Figure 1.
2. Implement different numbers from the table.1 using switches.
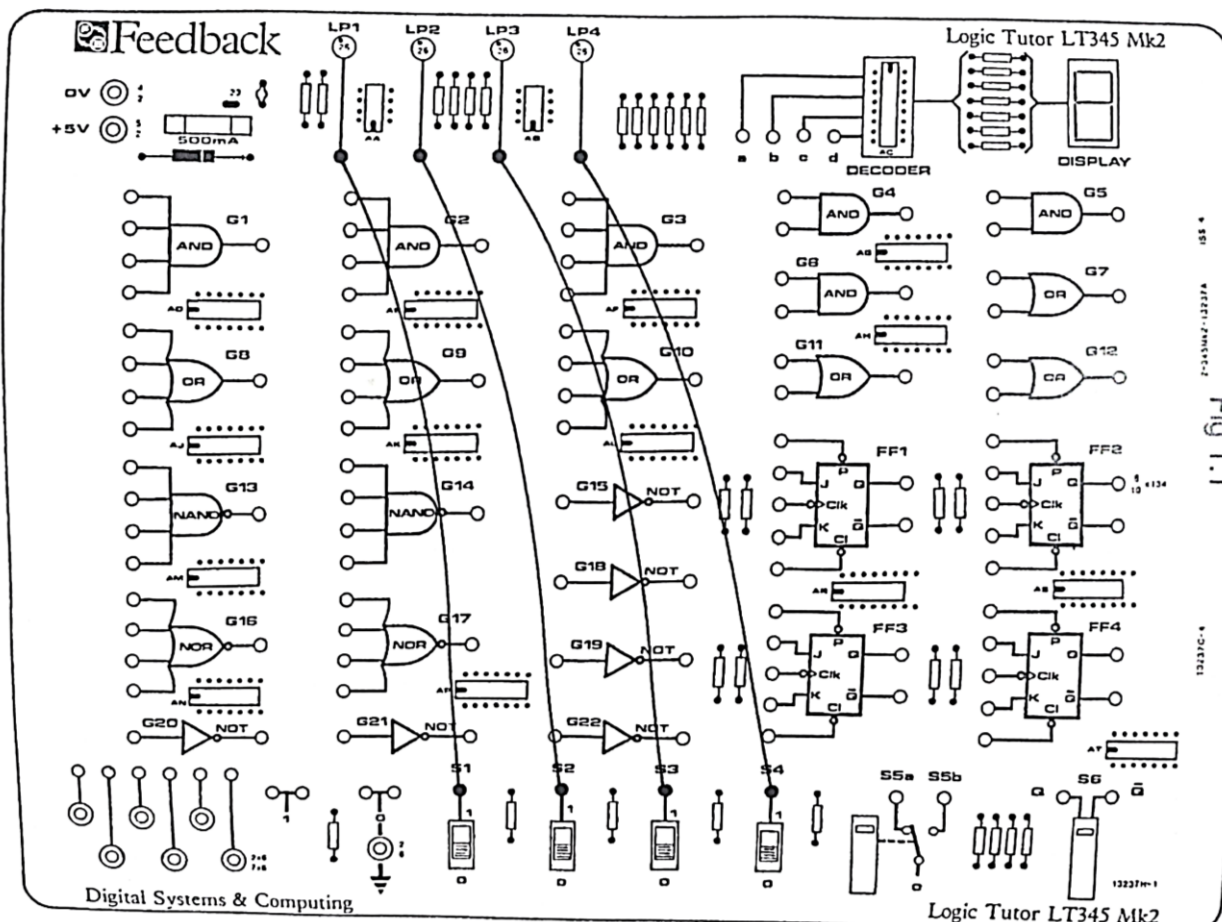3. Verify the binary number implementation using LEDs.

Figure.1 Binary Numbers Implementation on logic gates training board (Green Board)

Part 2: Binary to Decimal Conversion & Seven Segments Display.

Figure.2 shows the binary numbers from 0 to 9 and their corresponding representation on the seven segments display.
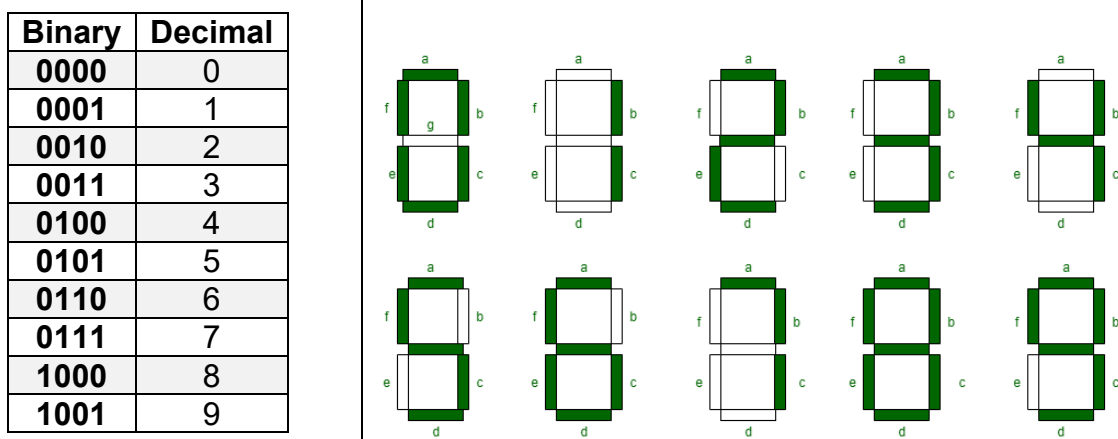
Binary	Decimal
0000	0
0001	1
0010	2
0011	3
0100	4
0101	5
0110	6
0111	7
1000	8
1001	9

Figure.2 Numbers from 0 to 9 Representation on the Seven Segments display.

1. Connect the switches to the Decoder inputs using wires as shown in Figure 3.
2. Implement different numbers from the table.2 using switches.
3. Verify the binary number implementation using the seven segments display.
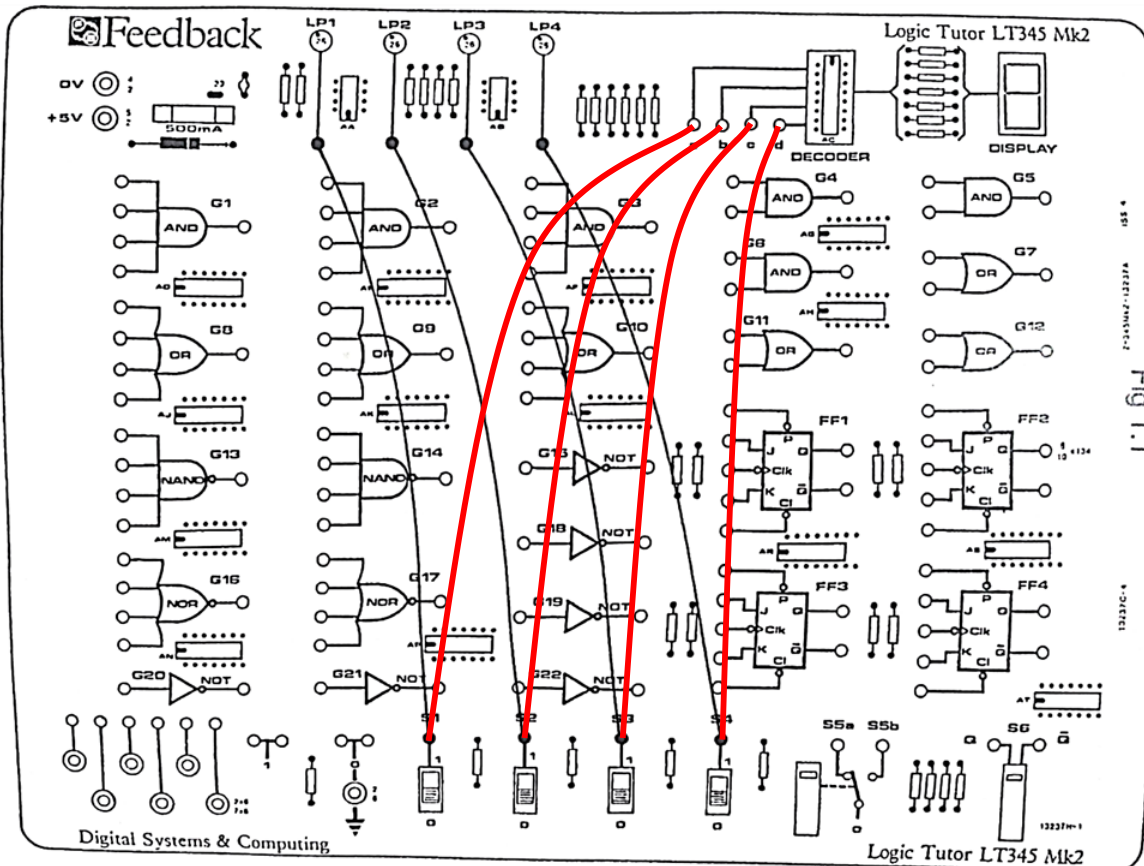
Figure.3 Binary Numbers Representation on the Seven Segments Display - Green Board