

Notes for Discussion

4-bit Full Adder

- Inputs range from 0 to 15.
- Output ranges from 0 to 30 as C_{in} is grounded and an output of 31 can occur if the C_{in} is connected to the V_{CC} and both inputs are 15.

EEPROM

- Number of addresses that can be programmed are $2^{11} = 2048$ but we programmed only 32 addresses from 0 to 31 as needed for the circuit of the 4-bit Full Adder.
- It was programmed using a push button (that is on only while being pressed only) and 1 nF capacitor and 2 resistors of value 1 k Ω connected in series with the capacitor to form an RC circuit which causes a fast change in the current when pressing the button leading to what is called a save process. The first end of the push button is connected to the ground while the other end is connected to the first end of the capacitor which is connected to the ground by one of the resistors and the other end is grounded by the other resistor and connected by a wire to the write enable pin of the EEPROM.

7 segment

- Type of used 7 segment is common cathode.

Circuit Simulation

- The RAM is programmed the following relation decimally:
$$\text{Output}_n = \text{Input}_n + 6 * (\text{integer division of } (\text{Input}_n / 10))$$

ex. for input (22):

$$\begin{aligned} &= 22 + 6 * (\text{integer division of } (22/10)) \\ &= 22 + 6 * 2 \\ &= 22 + 12 \\ &= 34 \end{aligned}$$
$$(34)_{10} = (100010)_2 = (0010\ 0010)_{BCD}$$
- The 7 segment has built in decoder so it accepts 8-bit binary number and produce its equivalent 2-digit hexadecimal number.