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**Batch-D2D**

**Subject-DE**

**Project Title-24 Hour Digital Clock**

### **Explanation-**

The Seven-Segment display circuit is made up of seven different sub-circuits. Each sub-circuit controls a segment of the Seven-Segment display, and each of these segments is identified with an alphabetical letter (from a to f respectively).

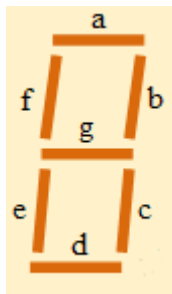


Fig.1



Fig.2

<i>w</i>	<i>x</i>	<i>y</i>	<i>z</i>	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>
0	0	0	0	1	1	1	1	1	1	0
0	0	0	1	0	1	1	0	0	0	0
0	0	1	0	1	1	0	1	1	0	1
0	0	1	1	1	1	1	0	0	1	1
0	1	0	0	0	1	1	0	0	1	1
0	1	0	1	1	0	1	1	0	1	1
0	1	1	0	1	0	1	1	1	1	1
0	1	1	1	1	1	0	0	0	0	0
1	0	0	0	1	1	1	1	1	1	1
1	0	0	1	1	1	1	0	1	1	1
1	0	1	0	x	x	x	x	x	x	x
1	0	1	1	x	x	x	x	x	x	x
1	1	0	0	x	x	x	x	x	x	x
1	1	0	1	x	x	x	x	x	x	x
1	1	1	0	x	x	x	x	x	x	x
1	1	1	1	x	x	x	x	x	x	x

Fig.3

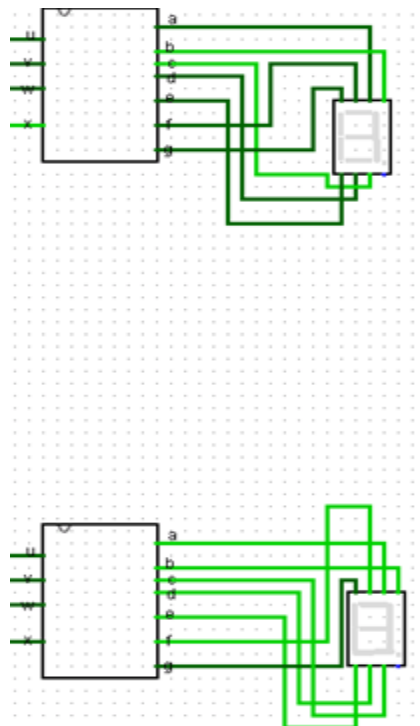
The main idea behind the Seven-Segment display circuit is that a segment lights up if it constitutes a part of the representation of the number that the Seven-Segment display is trying to depict. For example, as shown in Fig. 2, if the number that the Seven-Segment display is trying to depict is zero, then the segments a, b, c, d, e and f should light up, and the segment g should not. Fig.3 shows combinations on which the segments illuminate according to the input.

The circuit decides whether a segment on the Seven-Segment display should light up or not by checking the input bit value of that segment. If the input bit value of a segment is 1, that segment is lit up by the circuit. However, if the input bit value of a segment is 0, that segment is not lit up by the circuit. The Seven-Segment display circuit designed for this article operates on a four-bit input signal. Because of this, any number that is to be depicted on a Seven-Segment display is first expressed in terms of four-bit binary digits, and then, the segments of the display associated with this number are lit up.

## Construction-

After designing the Seven-Segment display digital circuit, create a new Logisim canvas and import two copies of the Seven-Segment display circuit into this new canvas. After doing this, select two Seven-Segment displays from the Explorer Pane of the Logisim software and place each one beside a different Seven-Segment display digital circuit.

After this has been done, select wires from the Explorer Pane of the Logisim software and use them to connect the various output pins of each Seven-Segment display circuit to the input pins of their corresponding Seven-Segment displays, as shown in Fig. 8. This is done to ensure that each segment in a Seven-Segment display is controlled by its corresponding sub-circuit in a Seven-Segment display circuit.



The thing to ensure that the counters do not exceed the number 9. This is because the Seven-Segment displays can only showcase numbers from 0 to 9.

We can ensure that the counters do not exceed the number 9 by using an AND gate to keep track of the value of the numbers that are currently being displayed on the counter. The AND gate is meant to reset the number displayed on the Seven-Segment display to zero immediately if the number displayed on the counter becomes more than 9.

### Circuit-

