CSE231
SEC: 06

Project

Seven-Segment Display
on
BABAFAFA

Submitted to:
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Intraduction:-

In this project we are going to see defination and implementation of encoder, decoder, seven-segment display. By all this we can learn how to display many thing to seven-segment display. we will also know the simplification by using k-map.

The given project is to portrayed "BABAFAFA" to the seven-segment display with its truth table, simplified circuit and also the simplification of k-map and it's circuit.

Encoder:-

By encoder in digital logic means a combinational circuit that converts binary information in the form of a 2^n input lines into n output lines, which represent n-bit code for the input. The purpose of encoder is standardization, speed, secrecy, security or saving space by shrinking size.

Decoder:-

A combinational circuit that converts n lines of input into 2^n lines of output, which means decoder represent the opposite of encoder. A decoder can take the form of a multiple-input, multiple-output logic circuit that converts coded input into coded output, where the input and output codes

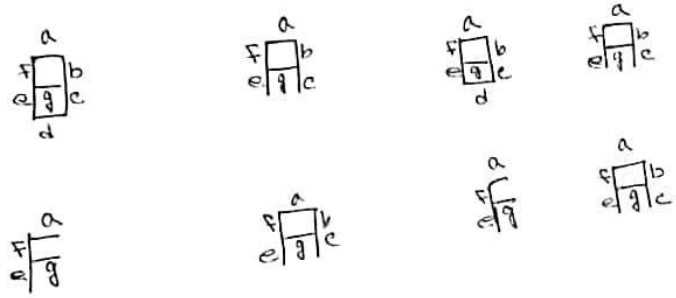
are different. Decoding is necessary in application such as data multiple -xing, 7 segment display and memory -address decoding.

Seven-Segment Display :-

We know, A seven-segment display is a set of seven bar shaped LCD elements, which are arranged to form a squared-off figure 8. Seven-segment displays use other illumination devices, such as - incandescent or gas-plasma lamps. If all elements are activated, the display shows a numeral 8. When some of the elements are activated but not others, any single-digit numeral from 0 to 9, as well as most uppercase and lowercase letters of the English can be portrayed.

Our project on BABAFAFA

let's point it,



Truth Table

x	y	z	a	b	c	d	e	f	g	word
0	0	0	1	1	1	1	1	1	1	B
0	0	1	1	1	1	0	1	1	1	A
0	1	0	1	1	1	1	1	1	1	B
0	1	1	1	1	1	0	1	1	1	A
1	0	0	1	0	0	0	1	1	1	F
1	0	1	1	1	1	0	1	1	1	A
1	1	0	1	0	0	0	1	1	1	F
1	1	1	1	1	1	0	1	1	1	A

Derive equation using sum of Product:

$$a = \bar{x}\bar{y}\bar{z} + \bar{x}\bar{y}z + \bar{x}y\bar{z} + \bar{x}yz + x\bar{y}\bar{z} + x\bar{y}z + xy\bar{z} + xyz$$

$$b = \bar{x}\bar{y}\bar{z} + \bar{x}\bar{y}z + \bar{x}y\bar{z} + \bar{x}yz + x\bar{y}z + xyz$$

$$c = \bar{x}\bar{y}\bar{z} + \bar{x}\bar{y}z + \bar{x}y\bar{z} + \bar{x}yz + x\bar{y}z + xyz$$

$$d = \bar{x}\bar{y}\bar{z} + \bar{x}y\bar{z}$$

$$e = \bar{x}\bar{y}\bar{z} + \bar{x}\bar{y}z + \bar{x}y\bar{z} + \bar{x}yz + x\bar{y}\bar{z} + x\bar{y}z + xy\bar{z} + xyz$$

$$f = \bar{x}\bar{y}\bar{z} + \bar{x}\bar{y}z + \bar{x}y\bar{z} + \bar{x}yz + x\bar{y}\bar{z} + x\bar{y}z + xy\bar{z} + xyz$$

$$g = \bar{x}\bar{y}\bar{z} + \bar{x}\bar{y}z + \bar{x}y\bar{z} + \bar{x}yz + x\bar{y}\bar{z} + x\bar{y}z + xy\bar{z} + xyz$$

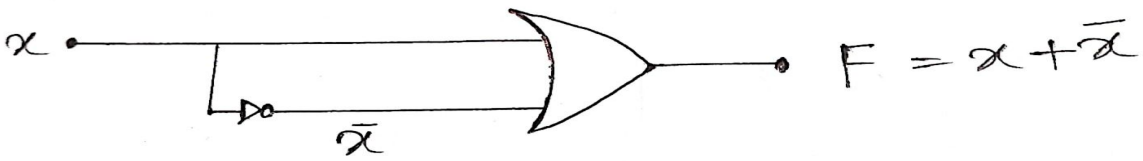
It's look's by using sop the equation is too much large for simplyfy. So, make that a small equation; now we are using K-map..

K-map for a :

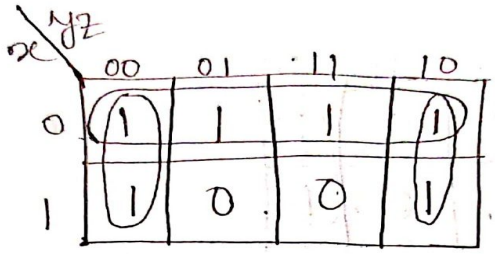
x \ yz	00	01	11	10
0	1	1	1	1
1	1	1	1	1

$F = x + \bar{x} = 1$

Circuit Diagram of A :



K-map for b:

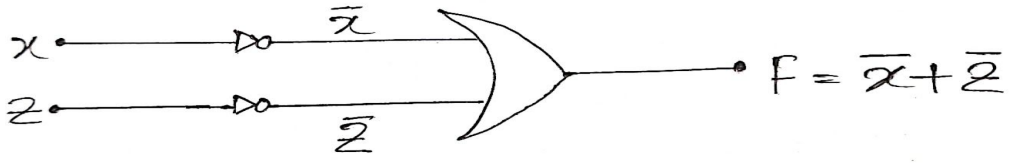


$$F = \bar{x} + \bar{y}\bar{z} + y\bar{z}$$

$$= \bar{x} + \bar{z}(y + \bar{y})$$

$$= \bar{x} + \bar{z}$$

Circuit Diagram of B :



K-map for C :

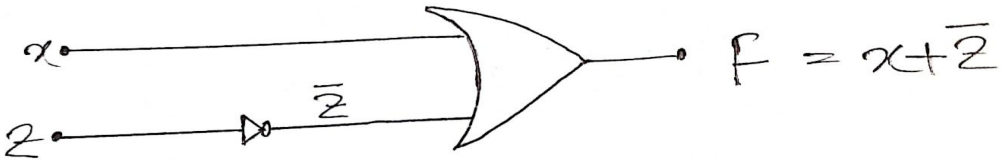
x \ yz	00	01	11	10
0	1	1	1	1
1	1	0	0	1

$$F = \bar{x} + \bar{y}\bar{z} + y\bar{z}$$

$$= x + \bar{z}(y + \bar{y})$$

$$= x + \bar{z}$$

Circuit Diagram of C :

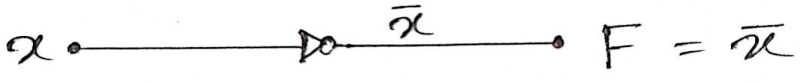


K- map for d :

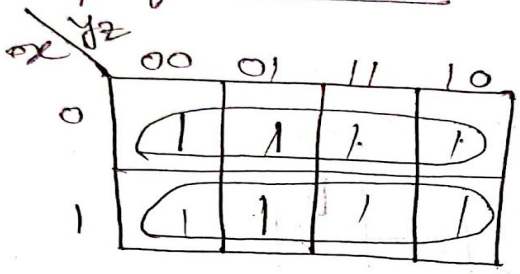
x \ yz	00	01	11	10
0	1	0	1	D
1	0	0	0	0

$$F = \bar{x}\bar{y}\bar{z} + \bar{x}yz$$
$$= \bar{x}(\bar{y} + \bar{z} + yz)$$
$$= \bar{x}$$

Circuit Diagram of D :



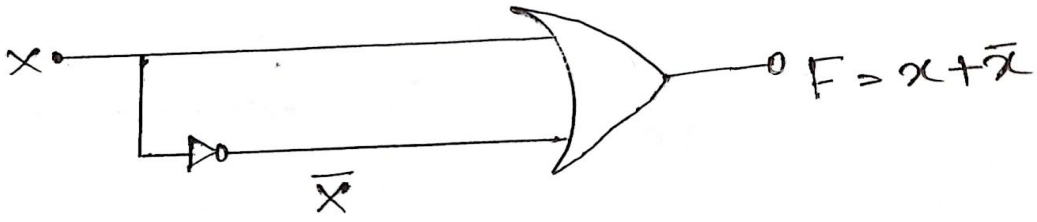
K-map for e:



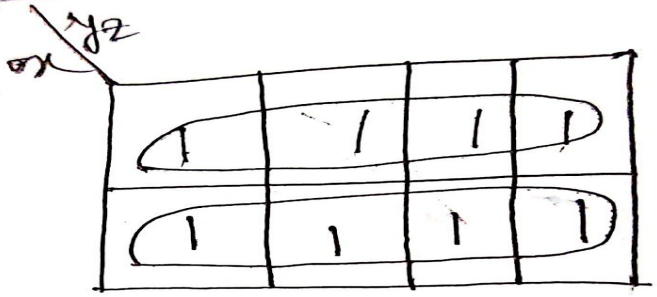
$F = x + \bar{x}$

$= 1.$

Circuit Diagram of E:

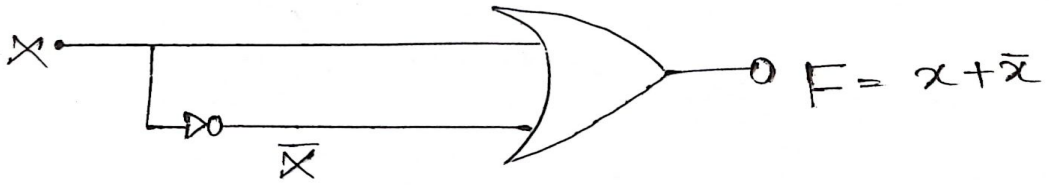


K-map for f:

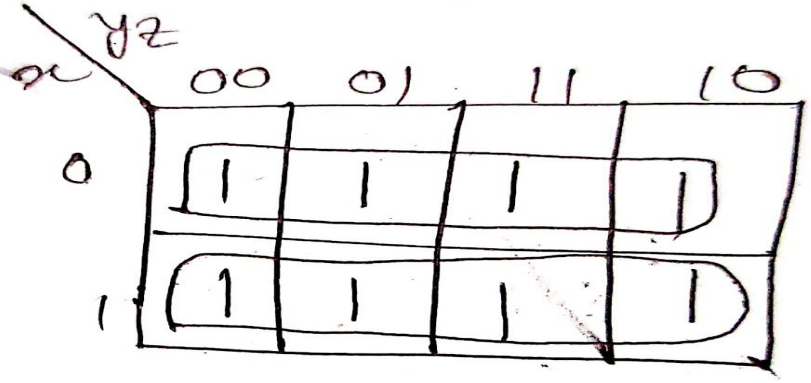


$$F = x + \bar{x}$$
$$= 1$$

Circuit Diagram of F:

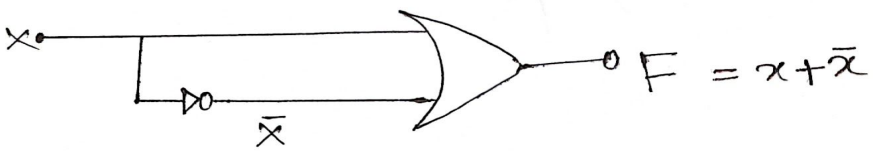


K-map for g :-

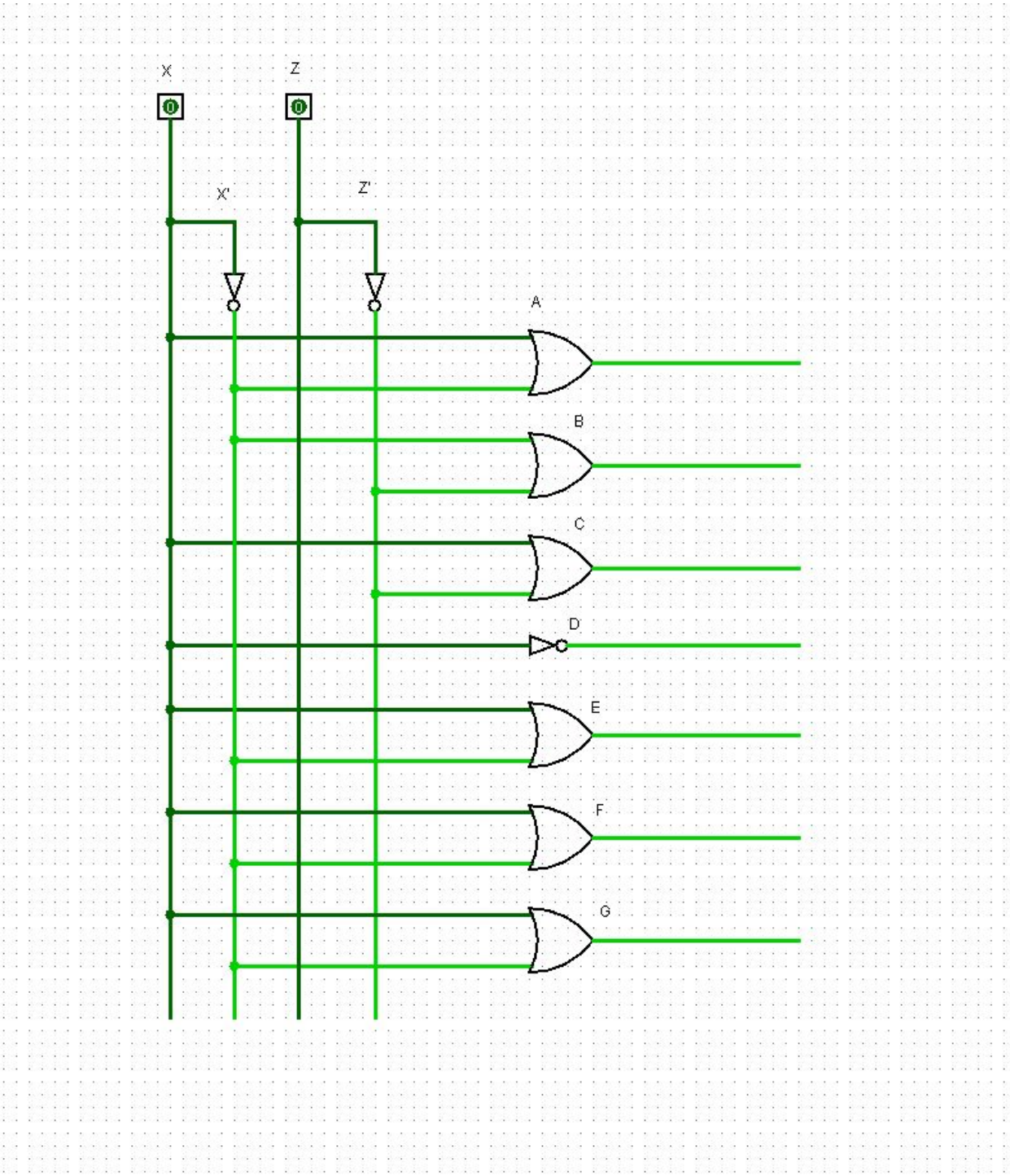


$$F = x + \bar{x}$$
$$= 1.$$

Circuit Diagram of G :



Circuit Diagram On logisim:



Logisim: BABAFAFA

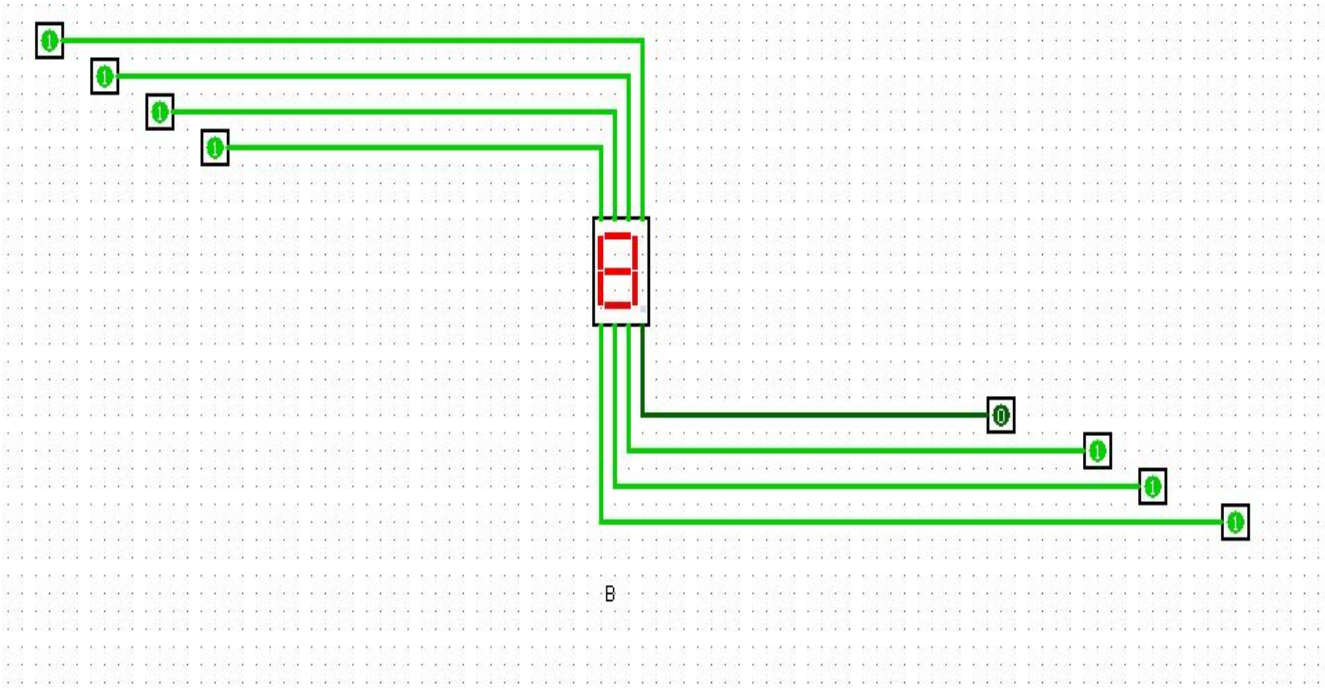


Figure B.1:B

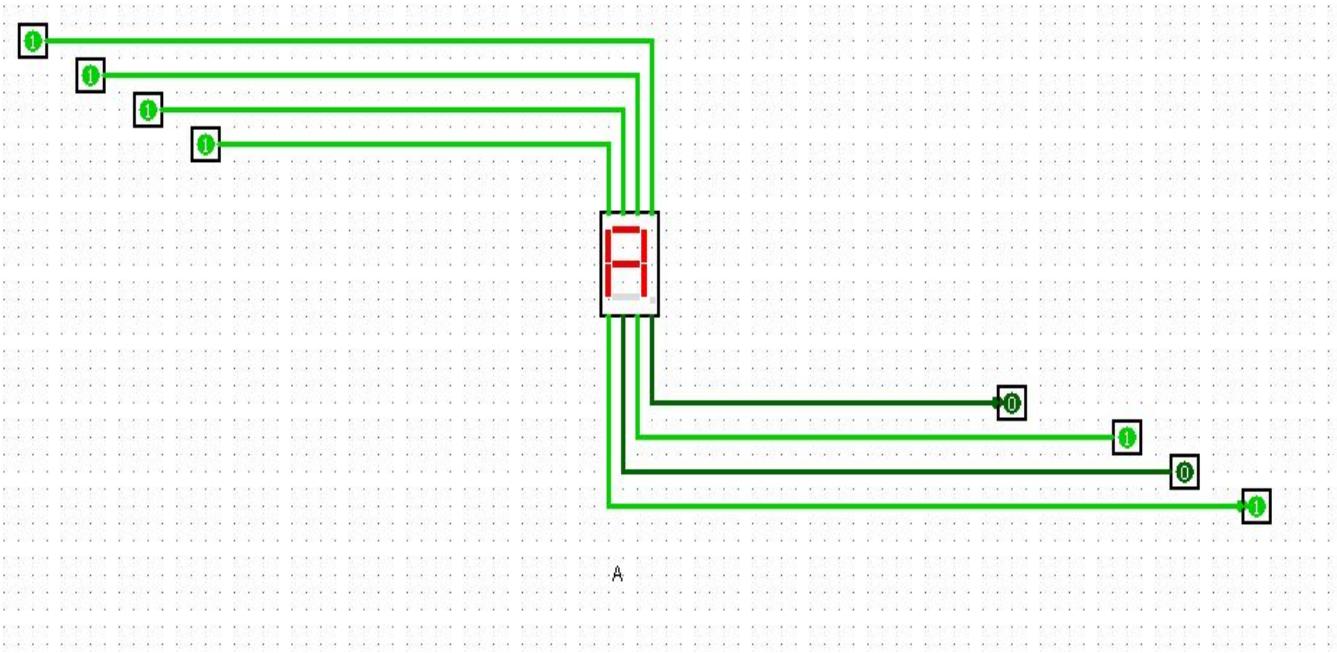


Figure B.2: A

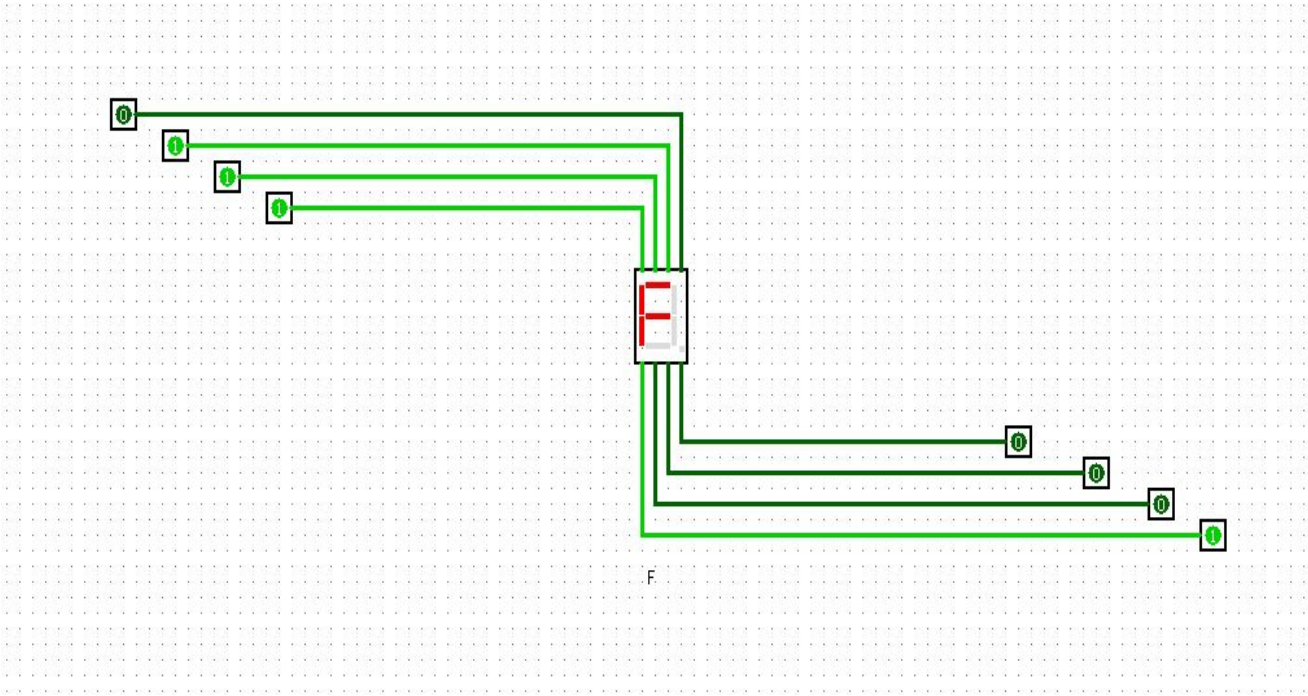


Figure B.3: F

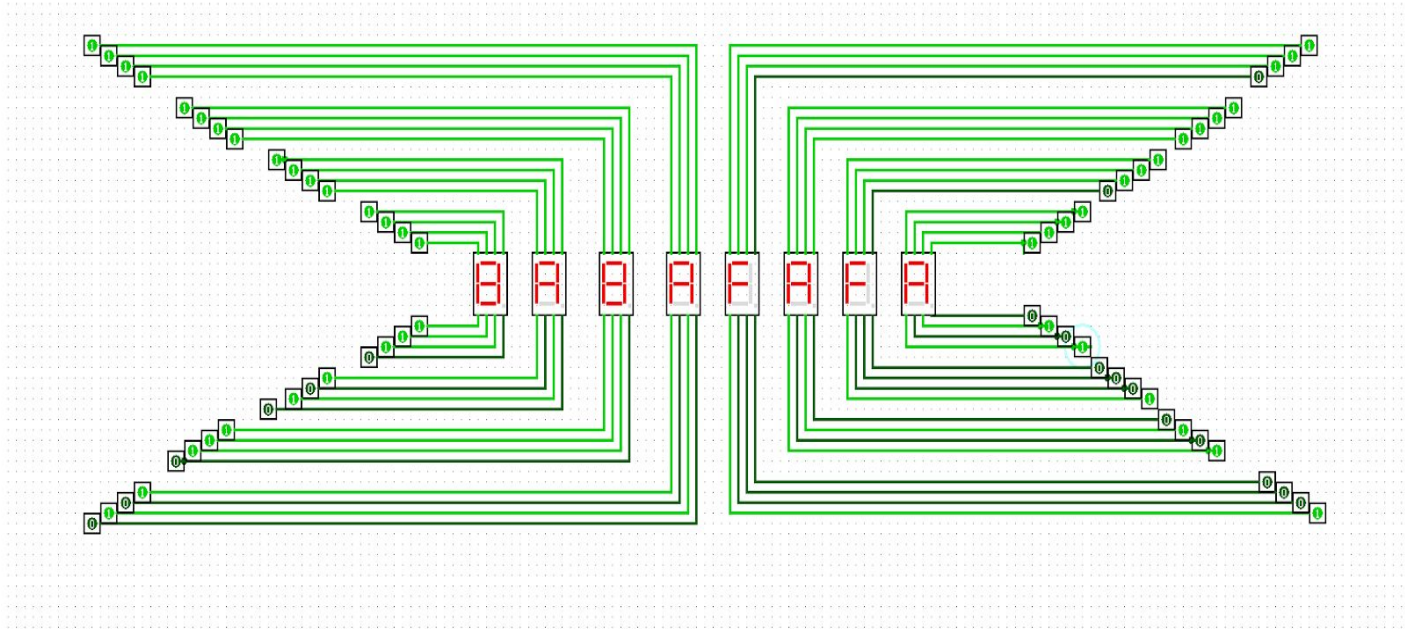


Figure B.4: Final Output

Conclusion:

We Learn from this project,Seven segment display works, by glowing the required respective LEDS in the numeral. The display is controlled using pins that are left freely. Forward biasing of these pins in a sequence will display the particular numeral or alphabet. Depending on the type of seven segment the segment pins are applied with logic high or logic zero and in the similar way to the common pins also.We can use seven-segment displays for various kinds of work.

From the truth table we got a huge equation and that could lead us to a complicated circuit. By using K-map we could minimize the equation and that makes a circuit more efficient. And we can see the outcome by using logisim.