1.

    a. Truth Table

| x | y | E |
|---|---|---|
| 0<br>0<br>1<br>1 | 0<br>1<br>0<br>1 | 1<br>0<br>0<br>1 |

b. Boolean Expression:
    $E = x'y' + xy$

c.
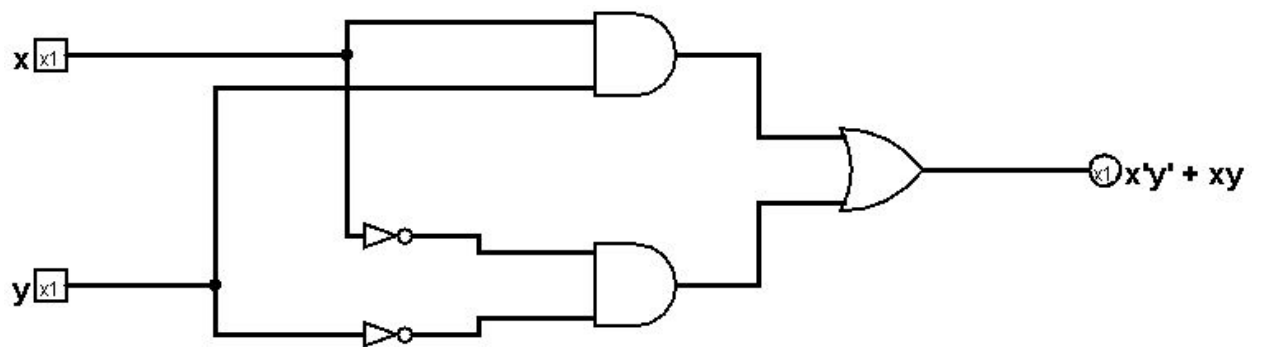


d.
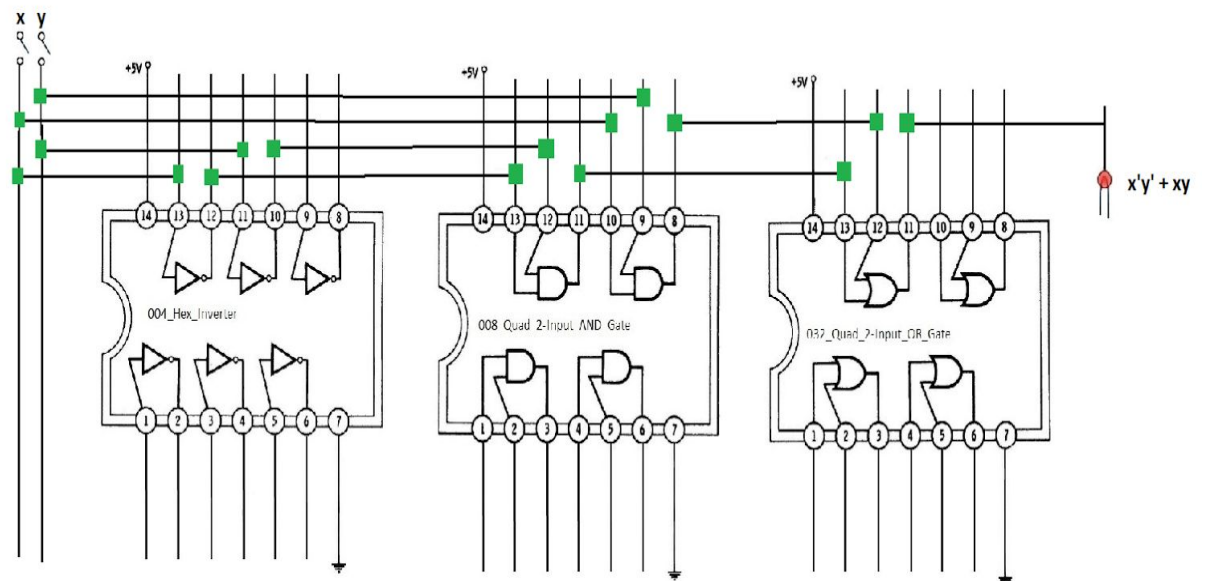
2.

a.

| x | y | A | B | C | D |
|---|---|---|---|---|---|
| 0 | 0 | 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 | 0 |
| 1 | 1 | 0 | 0 | 0 | 1 |

b. Boolean Expression

A = x'y'
B = x'y
C = xy'
D = xy

c.
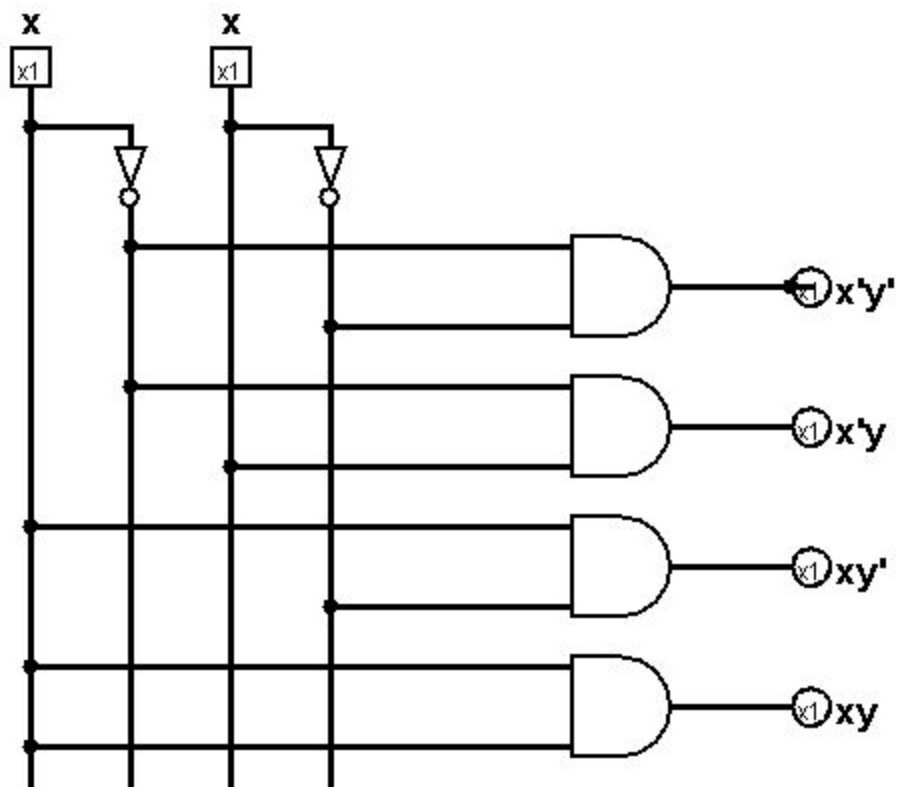


d.
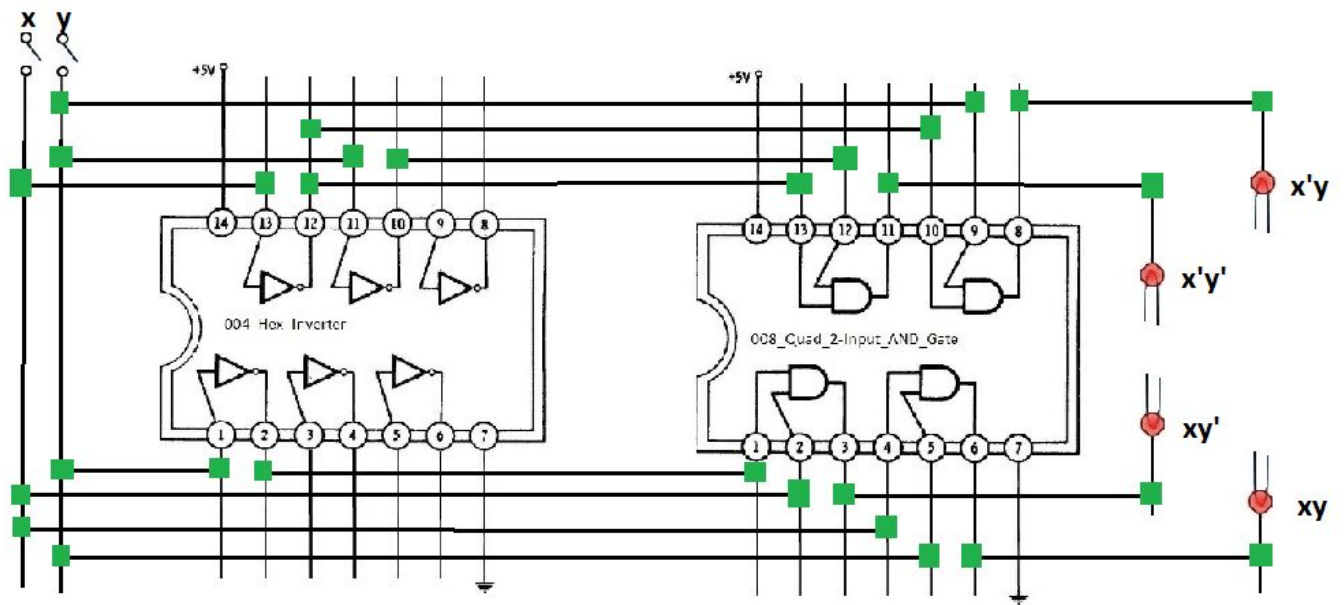
3.

a.

| x | y | z | A1 | A2 | A3 | A4 | A5 | A6 | A7 | A8 |
|---|---|---|----|----|----|----|----|----|----|----|
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

b. Boolean Expressions:

A1 = x'y'z'

A2 = x'y'z

A3 = x'yz'

A4 = x'yz

A5 = xy'z'

A6 = xy'z

A7 = xyz'

A8 = xyz

c.

x       y       z

x1       x1       x1

x'y'z'

x'y'z

x'yz'

x'yz

xy'z'

xy'z

xyz'

xyz

d.

x  y  z

x'y'z'    x'y'z    x'yz    x'yz    xy'z'    xy'z    xyz'    xyz
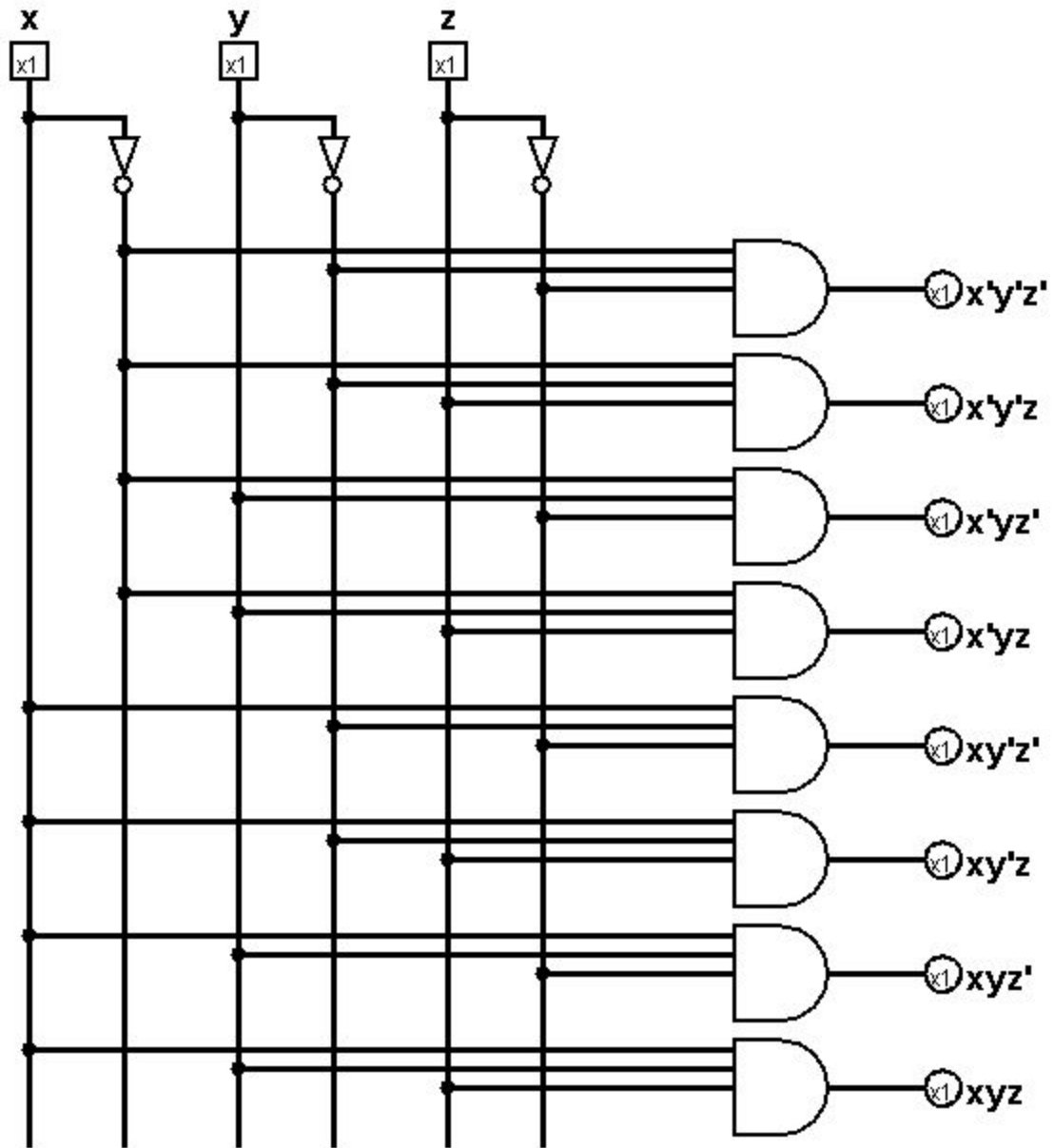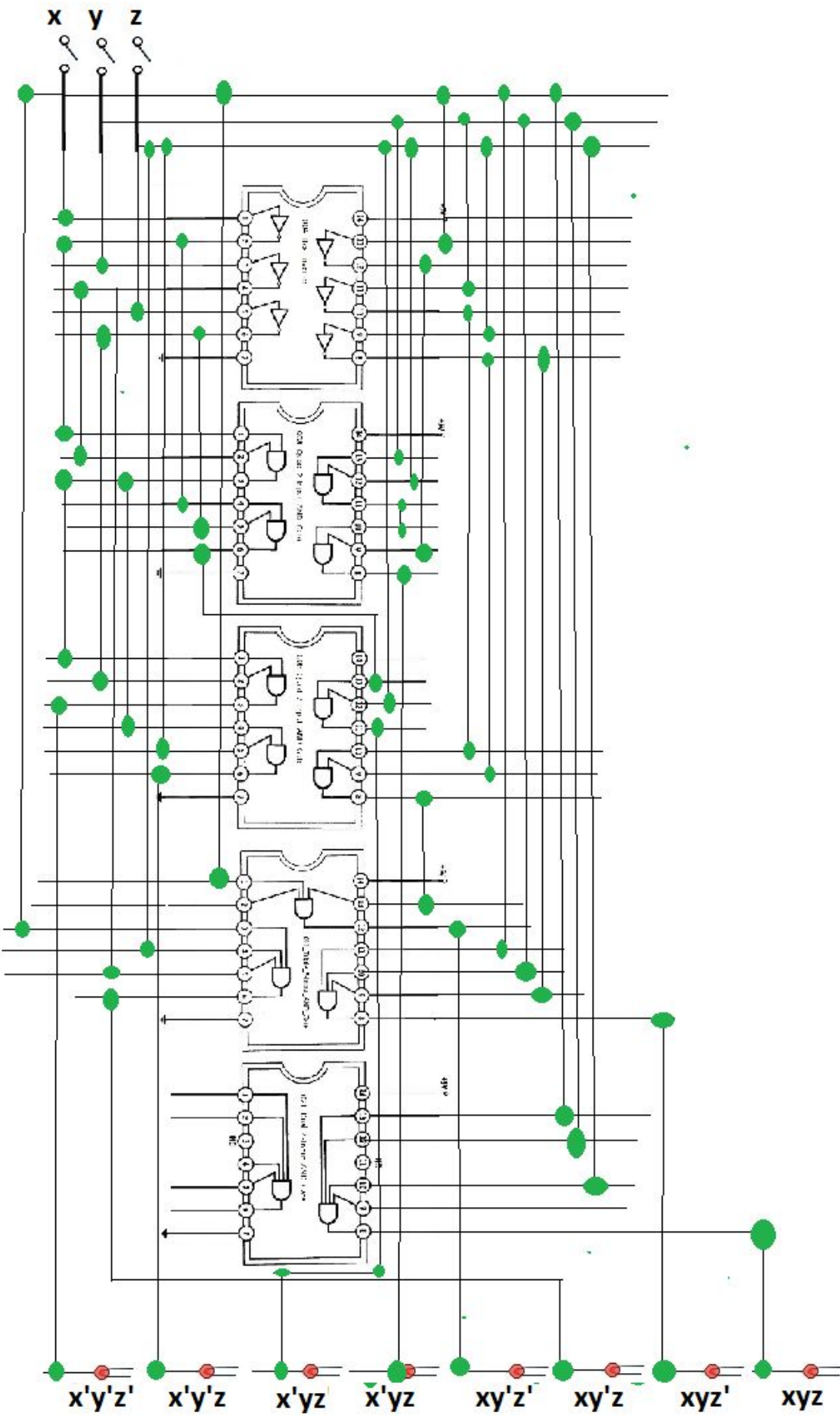
e. Choose: x'y'z', x'yz', xyz.

      x'y'z' LED is on when: all the switches are off

      x'yz' LED is on when: x,y switches are off and y switch is on

      xyz LED is on when: x,y, and z switches are on

      I choose the value randomly

4. The difference is that the result of the decoder chip is inversed compared to 2-to-4 decoder. For example, with 2-to-4 decode, when x and y = 1, only 1 LED is on. However, with the decoder chip, with x and y = 1, 3 LEDs are on, and the off one is xy.

5.

x y z

004 Hex Inverter

+5v

ENABLE ADDRESS
G A1 A0

#2
#'

1J9_Dual_2_to_4_Decoder

X0 X1 X2 X3

OUTPUTS

ENABLE ADDRESS
H B1 B0

Y0 Y1 Y2 Y3

OUTPUTS

+5V