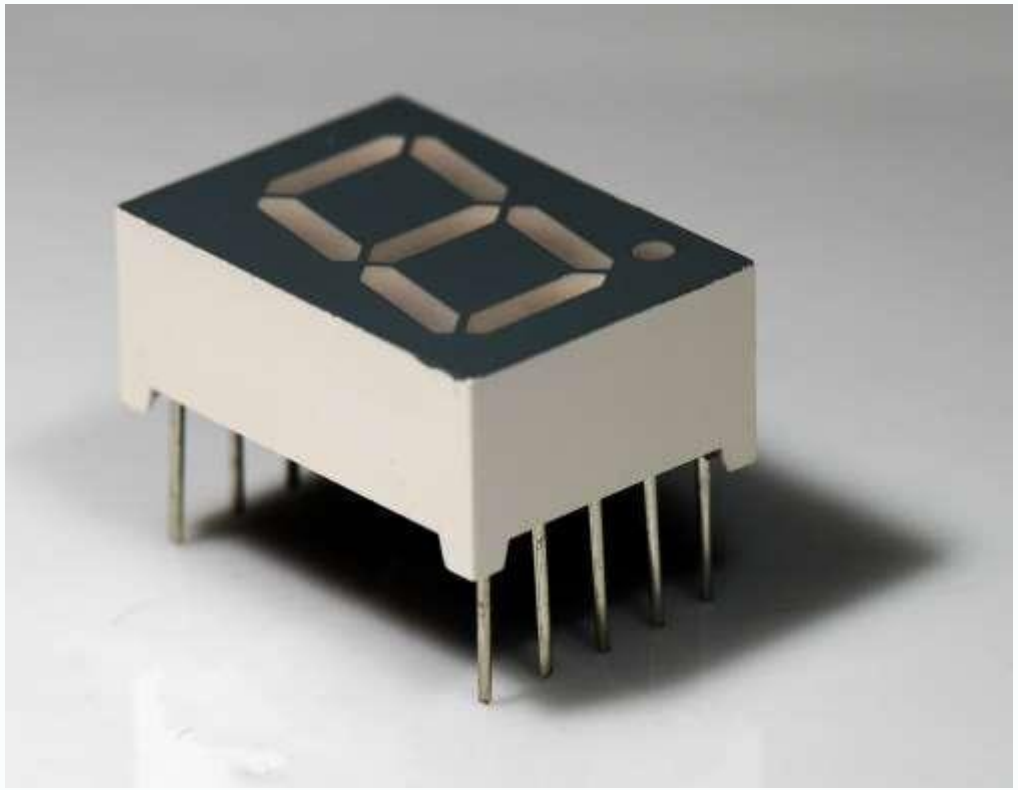
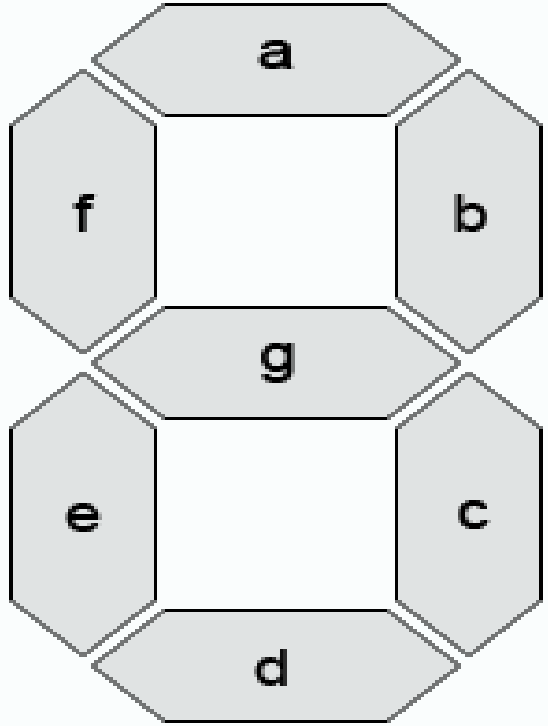
7 Segment Decoder

Presented By Nabanita Das

Seven Segment Display



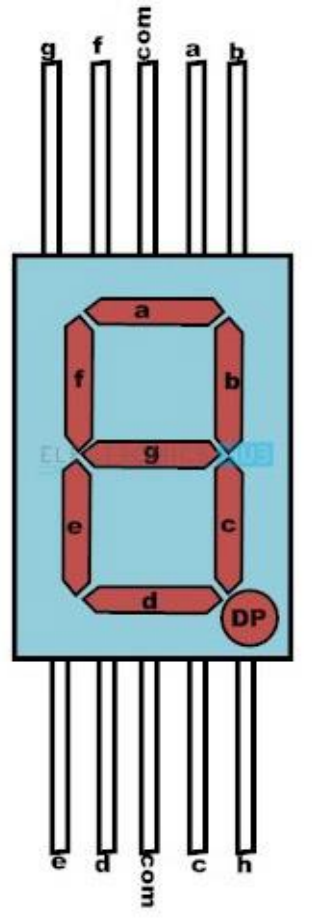


Seven Segment Display

- Seven segment display is the most common device used for displaying digits and the alphabet.
  - You can see the Seven Segment Display devices in TV shows counting down to ‘0’. The use of LEDs in seven-segment displays made it more popular.
- The binary information can be displayed in the form of decimals using this seven-segment display. Its wide range of applications is in microwave ovens, calculators, washing machines, radios, digital clocks, etc.
- Seven segment display works, by glowing the required respective LEDs in the numeral. 7 LEDs (light emitting diodes), each one controlled by an input.
- Two types
  - ✓ Common Anode
  - ✓ Common Cathode

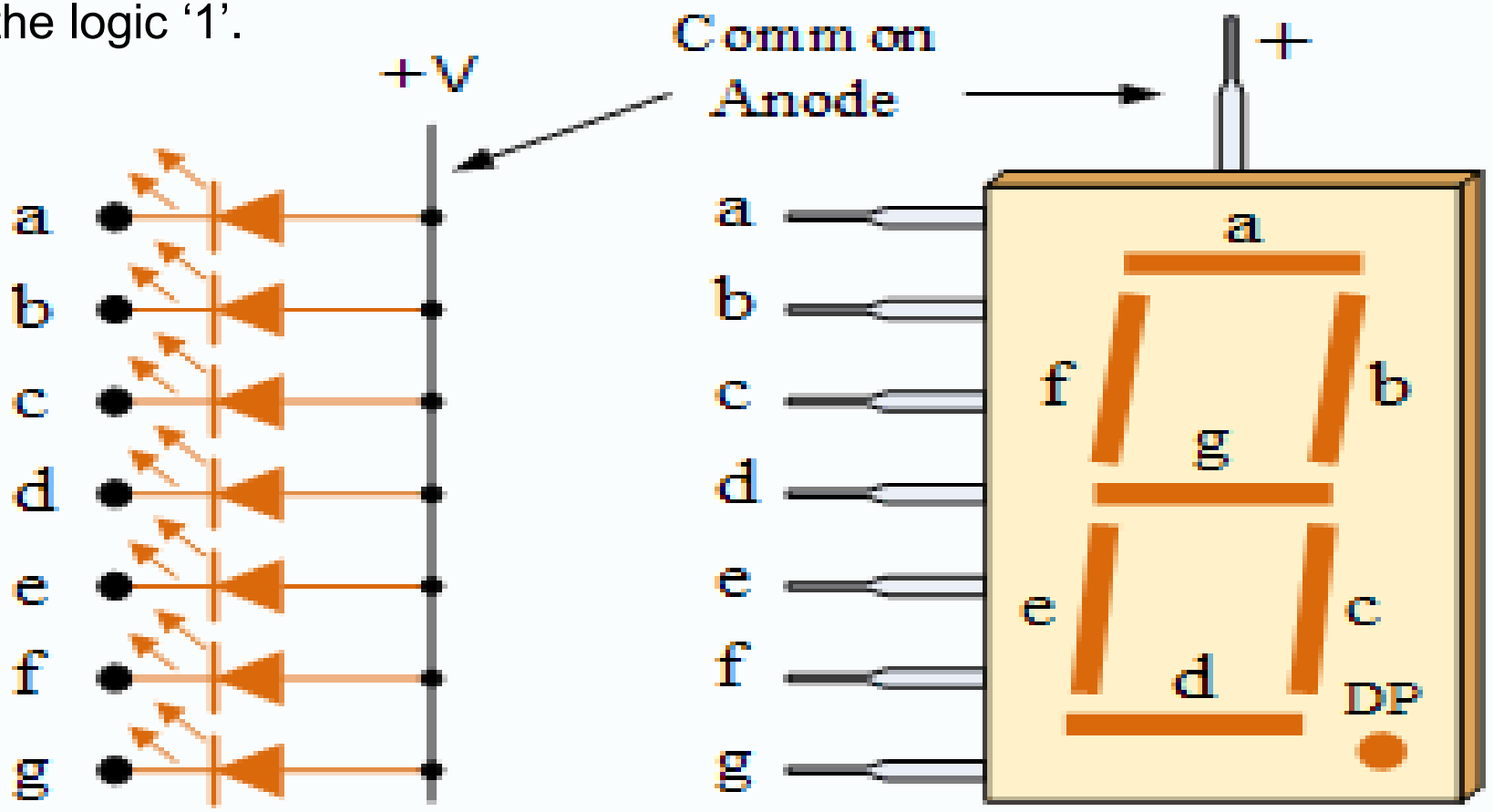
Seven Segment Display

- Generally seven segment displays are available in 10 pin package. The pin diagram of seven segment display is shown in the above figure. Seven segment display is an electronic circuit consisting of 10 pins.
- Out of 10 pins 8 are LED pins and these are left freely. 2 pins in middle are common pins and these are internally shorted. Depending on either the common pin is cathode or anode seven segment displays can be either named as common cathode or common anode display respectively.



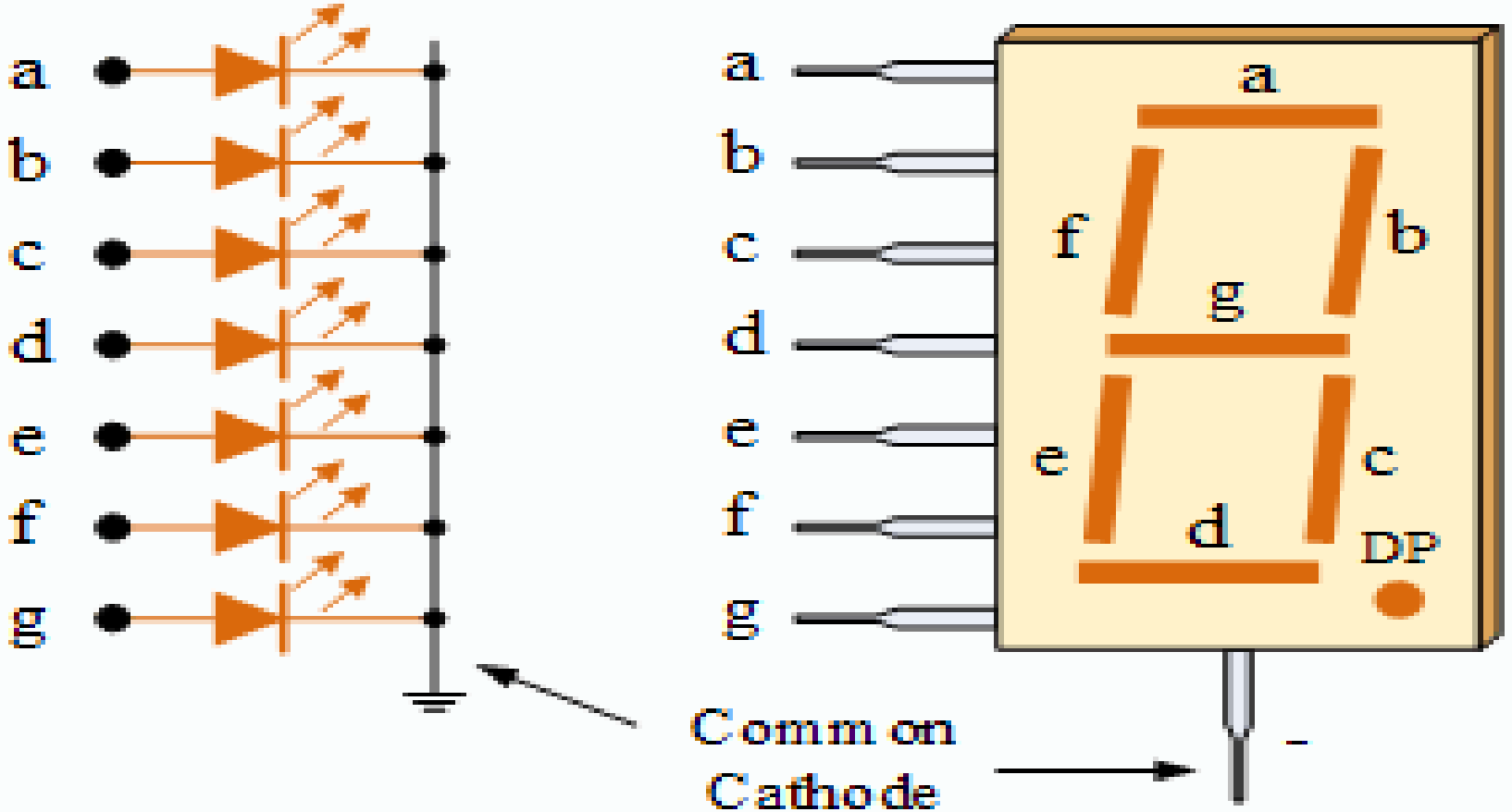
Common Anode Display

- In common anode type, all the anodes of 8 LED's are connected to the common terminal and cathodes are left free. Thus, in order to glow the LED, these cathodes have to be connected to the logic '0' and anode to the logic '1'.



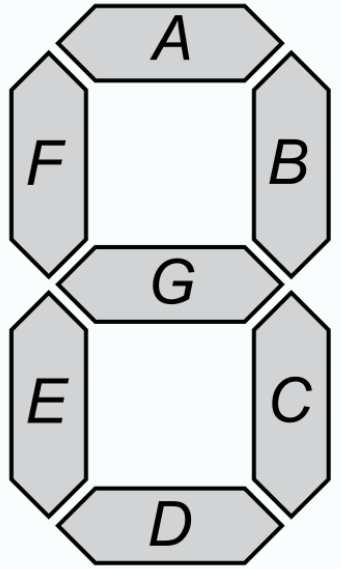
Common Cathode Display

- As the name indicates cathode is the common pin for this type of seven segments and remaining 8 pins are left free. Here, logic low is applied to the common pin and logic high to the remaining pins.



Seven Segment Decoder

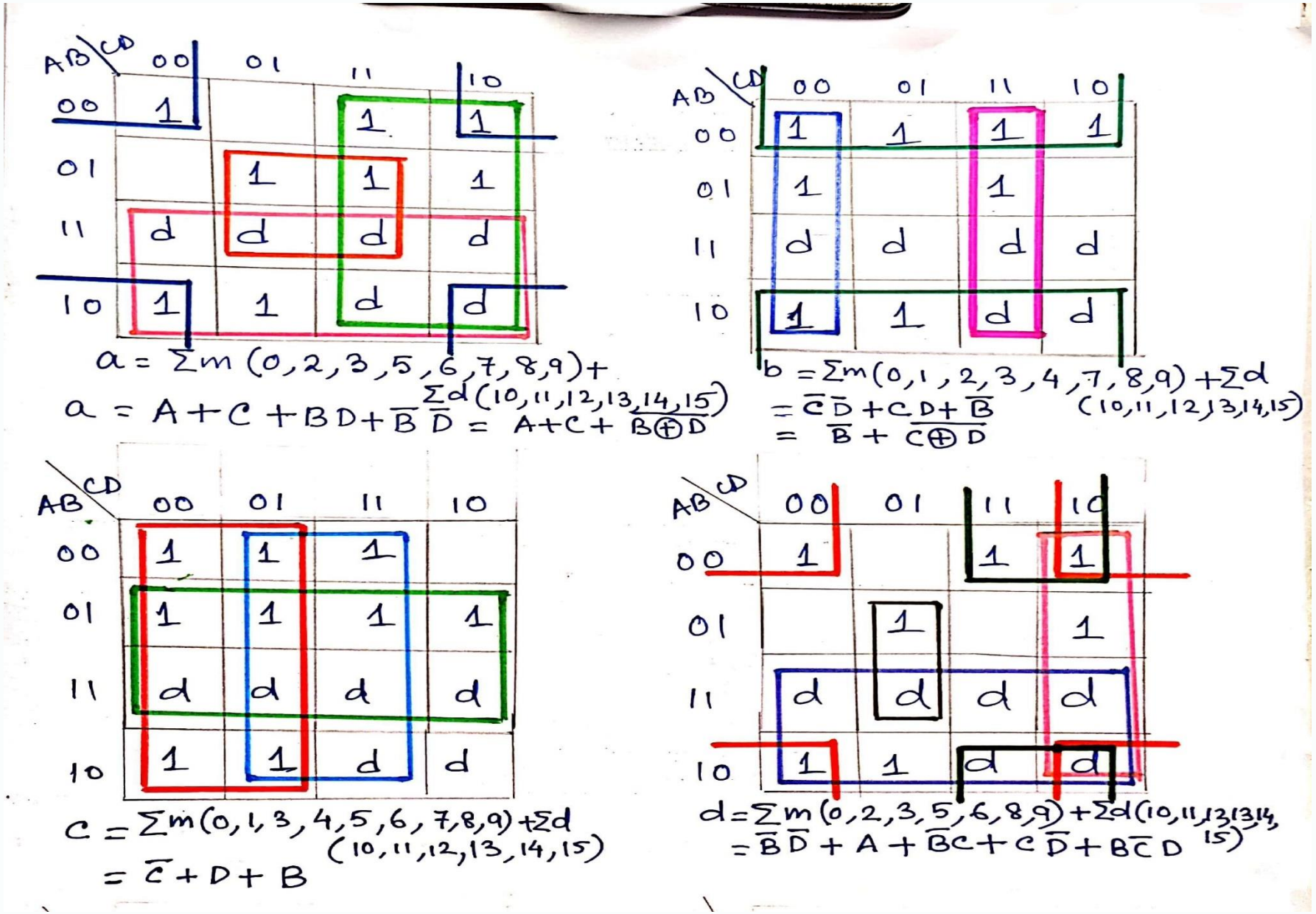
- Input is a 4-bit BCD code → 4 inputs (A, B, C, D)
- Output is a 7-bit code (a,b,c,d,e,f,g) that allows for the decimal equivalent to be displayed
- Example:
  - Input: 0000 in BCD
  - Output: 1111110 (a=b=c=d=e=f=1, g=0)



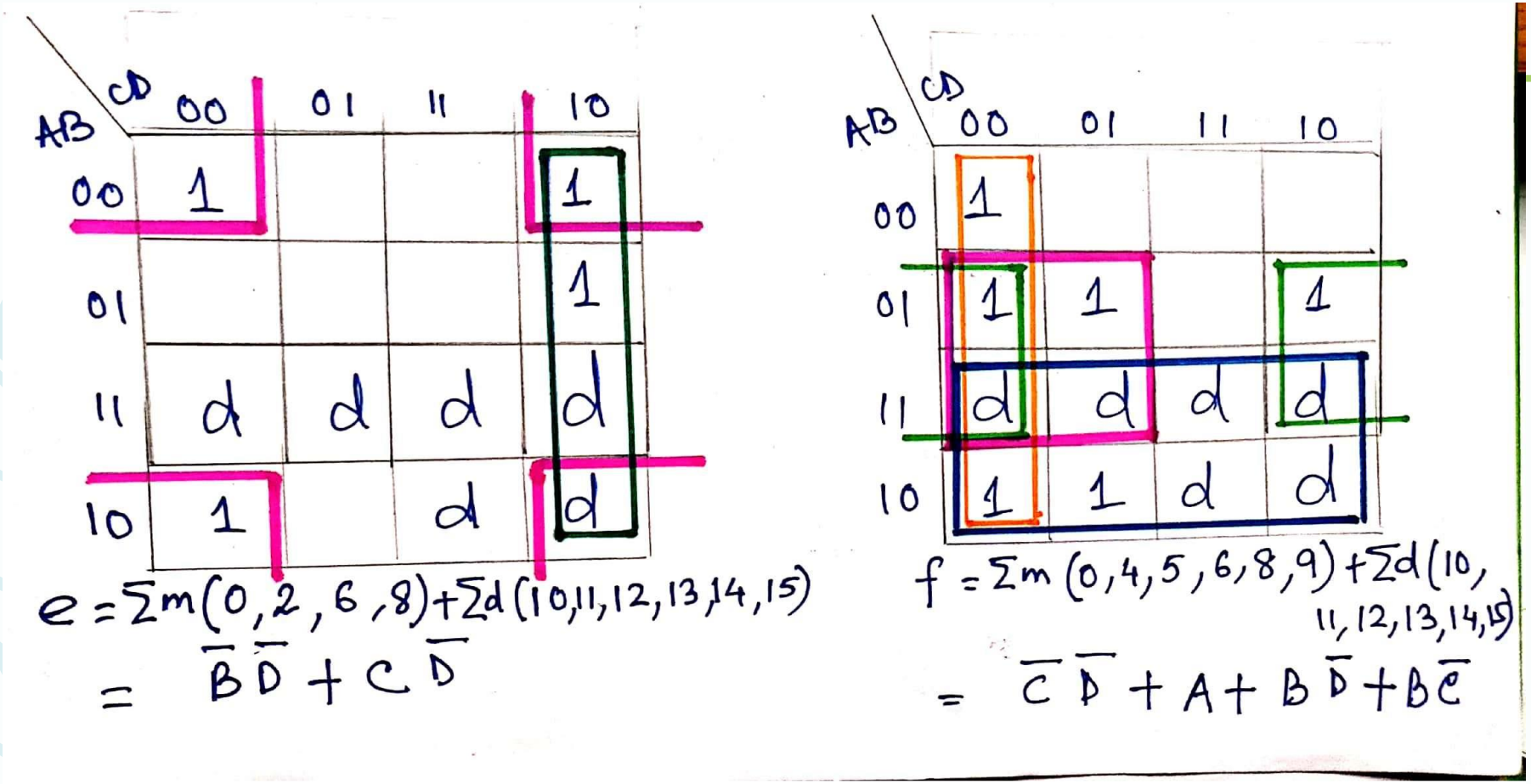
Truth Table for 7 Segment Decoder

Decimal Digit	Input lines				Output lines							Display pattern
	A	B	C	D	a	b	c	d	e	f	g	
0	0	0	0	0	1	1	1	1	1	1	0	
1	0	0	0	1	0	1	1	0	0	0	0	
2	0	0	1	0	1	1	0	1	1	0	1	
3	0	0	1	1	1	1	1	1	0	0	1	
4	0	1	0	0	0	1	1	0	0	1	1	
5	0	1	0	1	1	0	1	1	0	1	1	
6	0	1	1	0	1	0	1	1	1	1	1	
7	0	1	1	1	1	1	1	0	0	0	0	
8	1	0	0	0	1	1	1	1	1	1	1	
9	1	0	0	1	1	1	1	1	0	1	1	

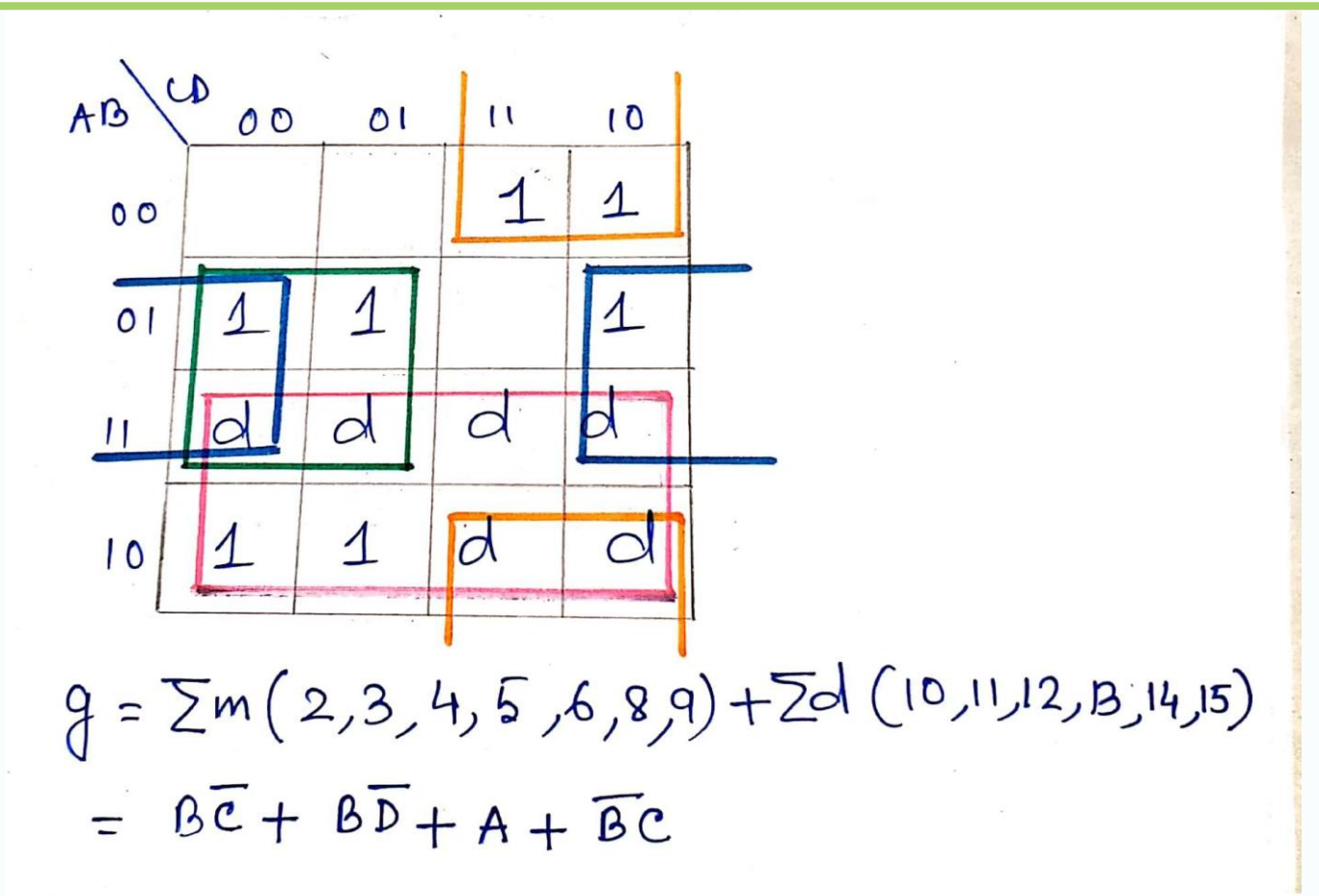
Expression for segment a, b, c, d



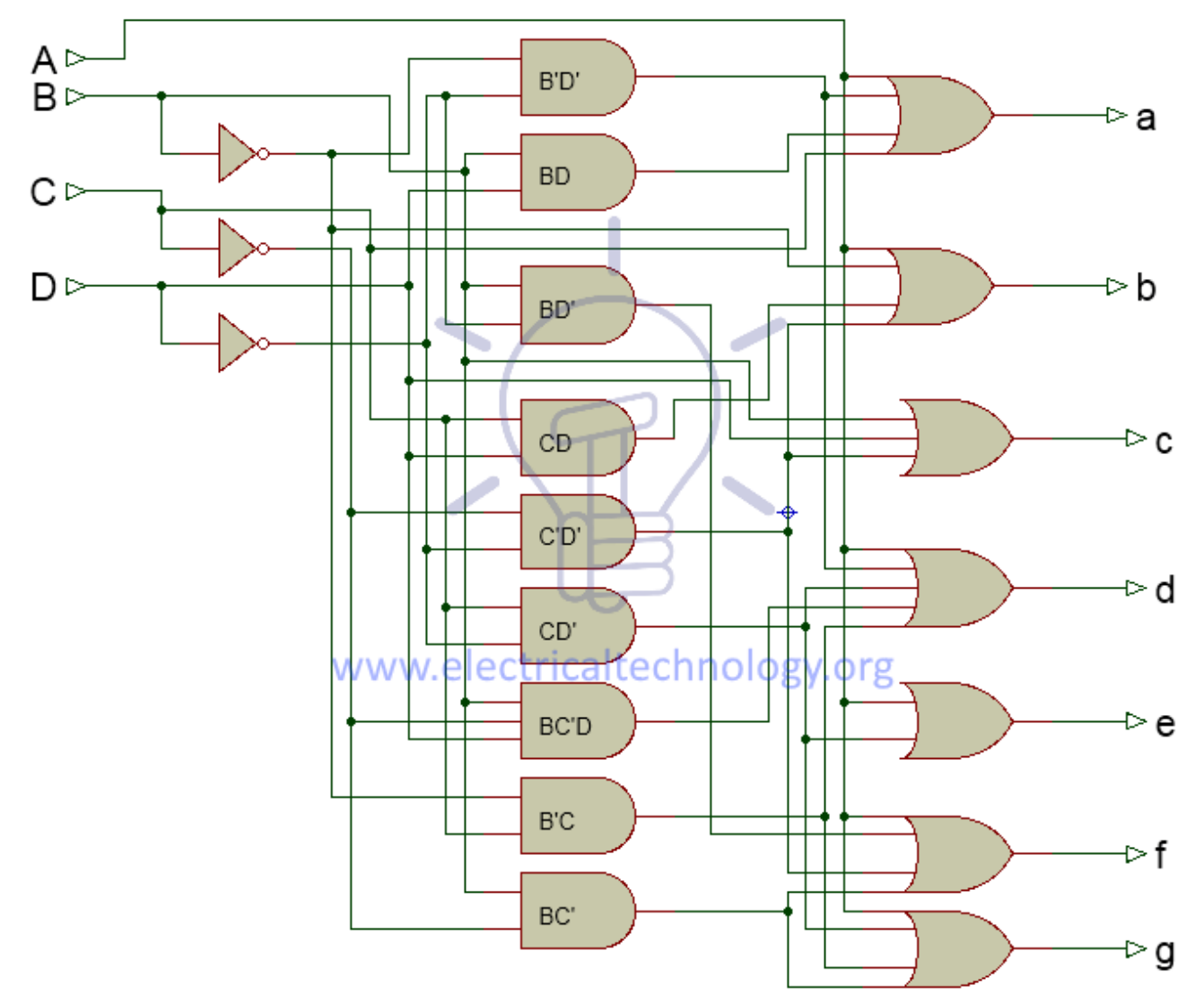
Expression for segment e, f



Expression for segment g



Final Circuit of 7 Segment Decoder



Schematic of BCD to 7-Segment Decoder