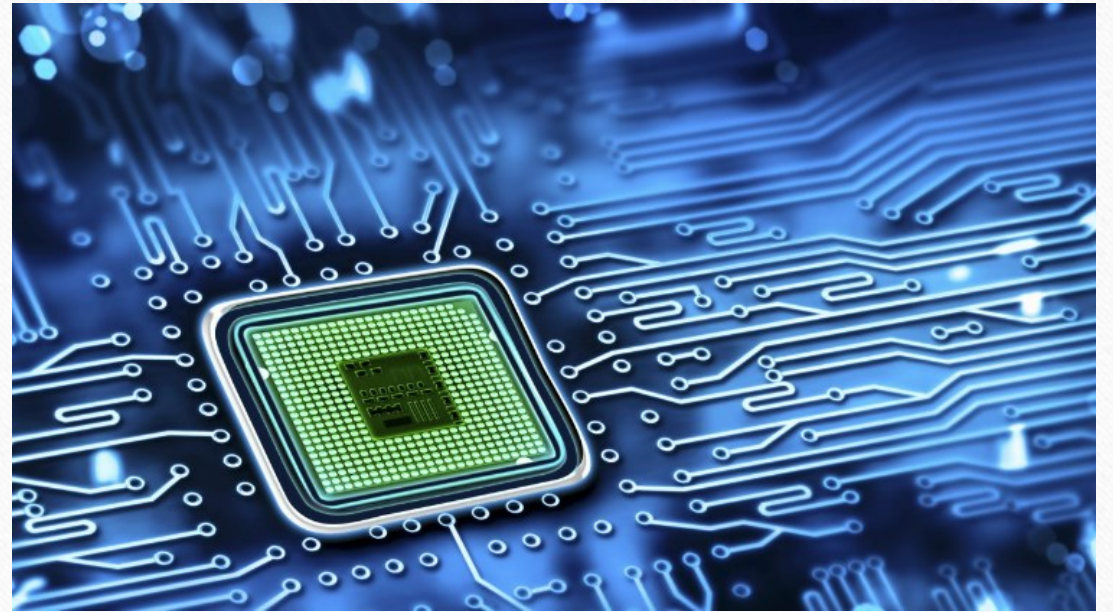


Microprocessor Applications: Interfacing of keyboards and seven segment LED display

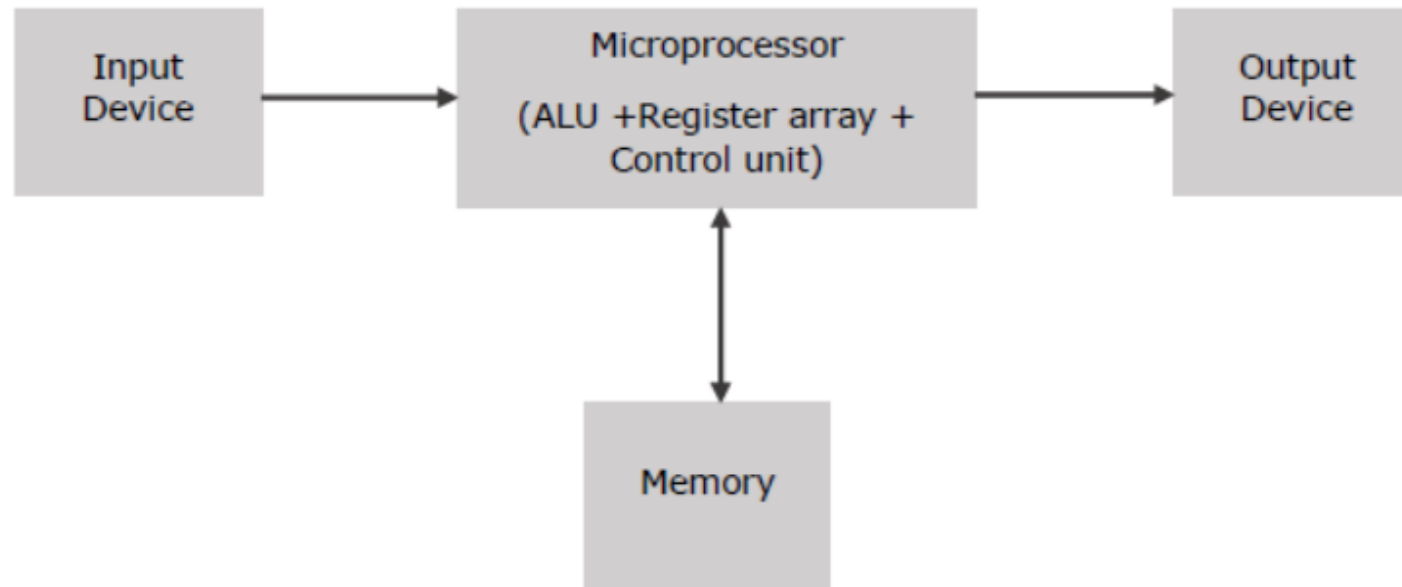
By Mr. Karan Singh

MICROPROCESSOR

- A Microprocessor is an important part of a computer architecture without which you will not be able to perform anything on your computer.
- It is a programmable device that takes in input performs some arithmetic and logical operations over it and produces the desired output.
- In simple words, a Microprocessor is a digital device on a chip that can fetch instructions from memory, decode and execute them and give results

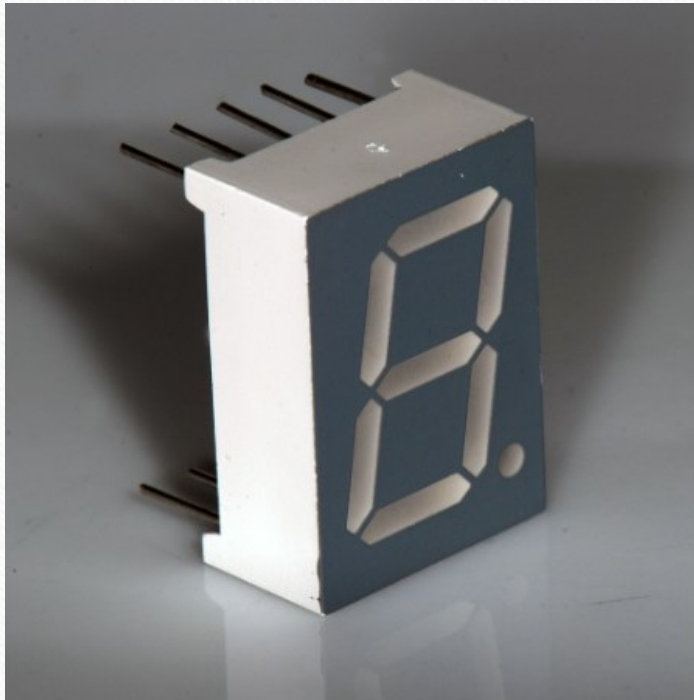


Block Diagram of a Basic Microcomputer



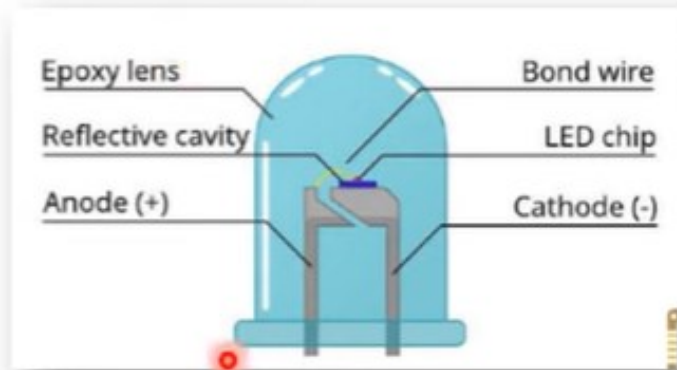
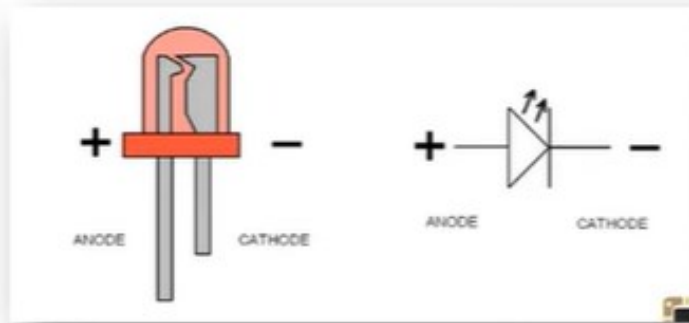
The microprocessor follows a sequence: Fetch, Decode, and then Execute.

Seven Segment LED Display



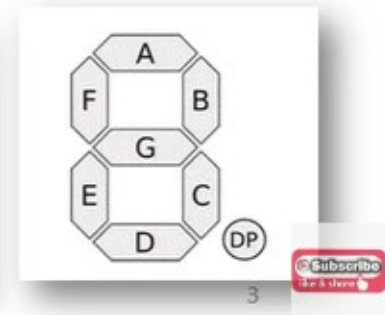
What is LED?

- Light-emitting diodes (LED) are basic display units in the electronics world.
- An LED is basically a p-n junction diode.
- It has found its way to the low power display systems recently.
- LEDs have been ruling the electronic area as no other similar technology has ever replaced them.



LED Applications

- LED bulbs are available in different colours.
 - Earlier LEDs have made using infra-red wavelength and such LEDs are used even these days in remote-control circuits.
 - LED bulbs making use of the ultraviolet wavelength is also available in the market.
 - LEDs are present in many electronic devices including lamps, digital clocks, and bulbs.
 - A very popular application of LED is a seven-segment display system.
- The advantages of LEDs over normal incandescent lights include robustness, faster switching, lower energy consumption and small size.

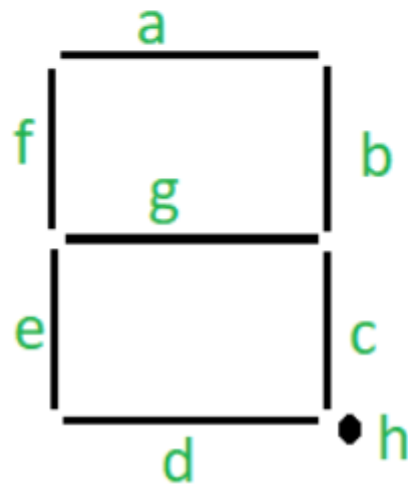


Seven segments LED display :

A seven-segment LED is a kind of LED(Light Emitting Diode) consisting of 7 small LEDs it usually comes with the microprocessor's as we commonly need to interface them with microprocessors like 8085.

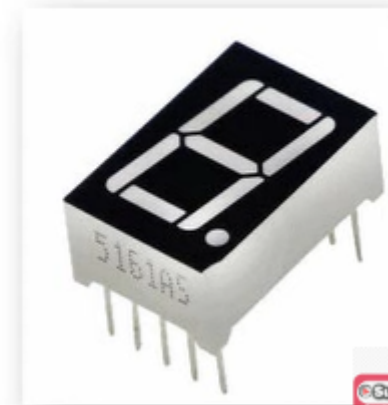
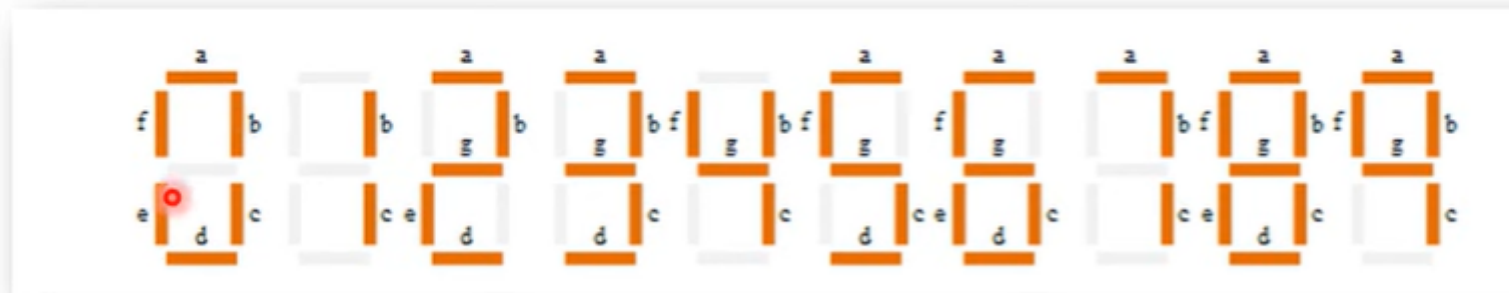
Structure of Seven Segments LED :

- The LED in Seven Segment display are arranged as below
- We have eight segments in a Seven Segment LED display consisting of 7 segments which include '.'.
- The seven segments are denoted as "a, b, c, d, e, f, g, h" respectively, and '.' is represented by "h"



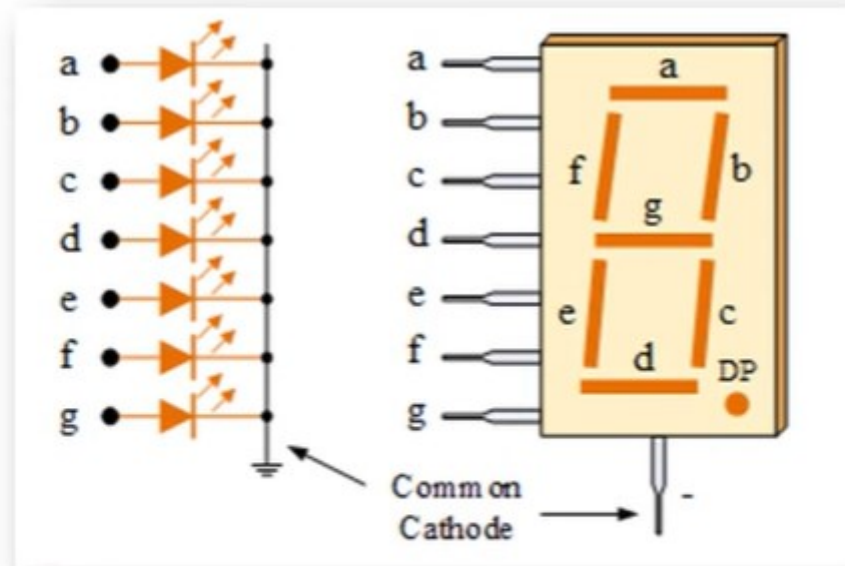
Interfacing 7 Segment Display

- The *7-segment display*, consists of seven LEDs arranged in a rectangular fashion as shown.
- Each of the seven LEDs is called a segment because when illuminated the segment forms part of a numerical digit to be displayed.
- An additional 8th LED is sometimes used within the same package thus allowing the indication of a decimal point, (DP).
- When two or more 7-segment displays are connected together to display numbers greater than ten.



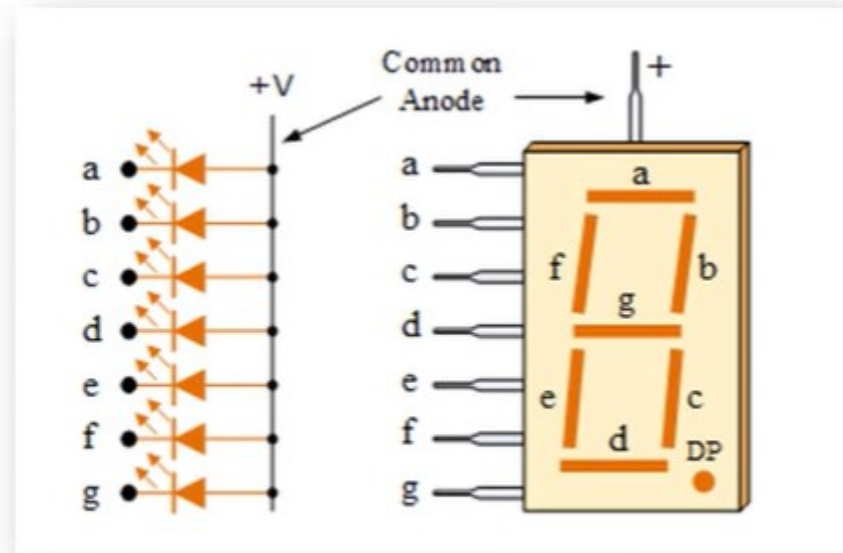
The Common Cathode (CC)

- In the common cathode display, all the cathode connections of the LED segments are joined together to logic “0” or ground.
- The individual segments are illuminated by application of a “HIGH”, or logic “1”.
- Send signal via a current limiting resistor to forward bias the individual Anode terminals (a-g).



The Common Anode (CA)

- In the common anode display, all the anode connections of the LED segments are joined together to logic “1”.
- The individual segments are illuminated by applying a ground, logic “0” or “LOW”.
- Send signal via a suitable current limiting resistor to the Cathode of the particular segment (a-g).



Seven Segment Display Code

Common catdode type '1' means ON									Common anode type '0' means ON								
	A	B	C	D	E	F	G	DP		A	B	C	D	E	F	G	DP
0	1	1	1	1	1	1	0		0	0	0	0	0	0	0	1	
1	0	1	1	0	0	0	0		1	1	0	0	1	1	1	1	
2	1	1	0	1	1	0	1		2	0	0	1	0	0	1	0	
3	1	1	1	1	0	0	1		3	0	0	0	0	1	1	0	
4	0	1	1	0	0	1	1		4	1	0	0	1	1	0	0	
5	1	0	1	1	0	1	1		5	0	1	0	0	1	0	0	
6	0	0	1	1	1	1	1		6	1	1	0	0	0	0	0	
7	1	1	1	0	0	0	0		7	0	0	0	1	1	1	1	
8	1	1	1	1	1	1	1		8	0	0	0	0	0	0	0	
9	1	1	1	0	0	1	1		9	0	0	0	1	1	0	0	

