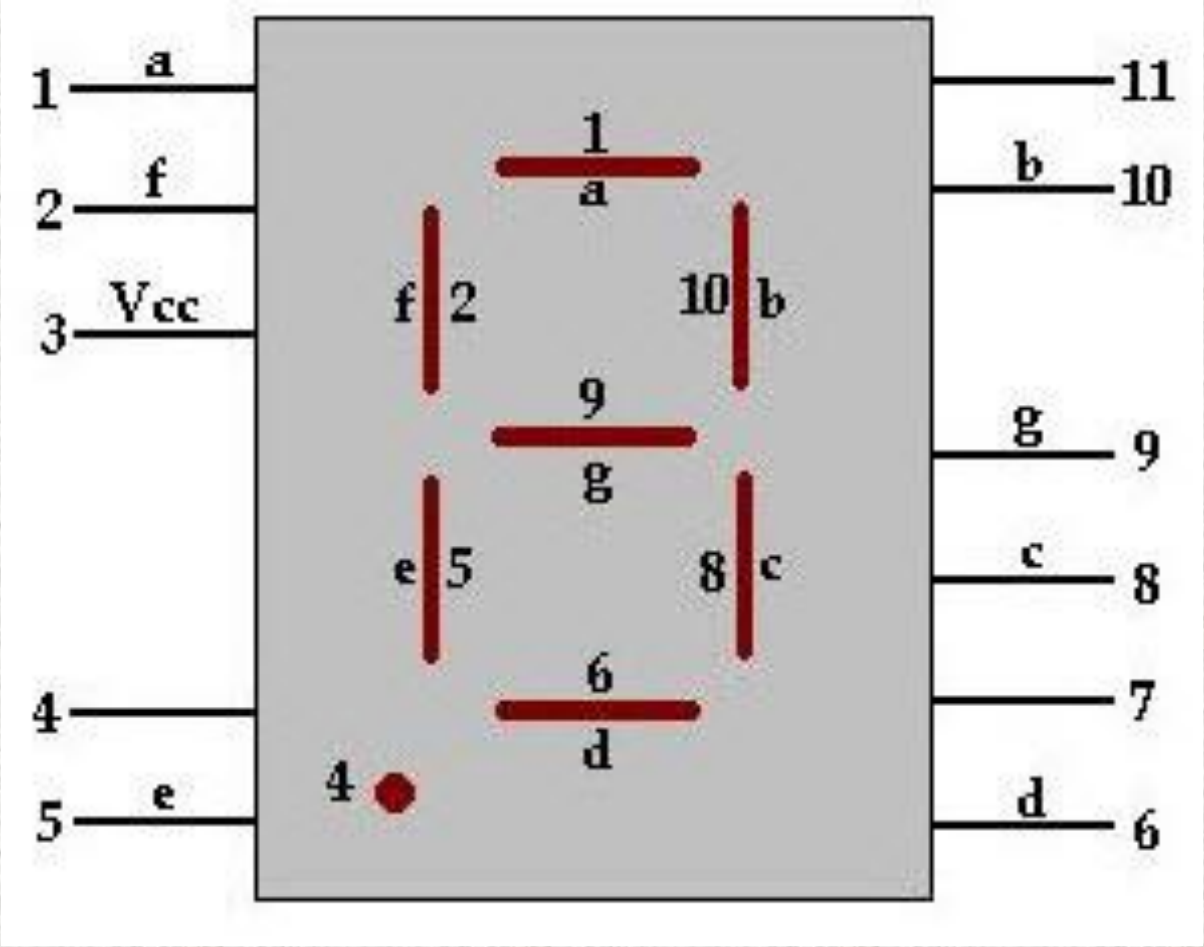
MAR Sensors

Seven Segment Display

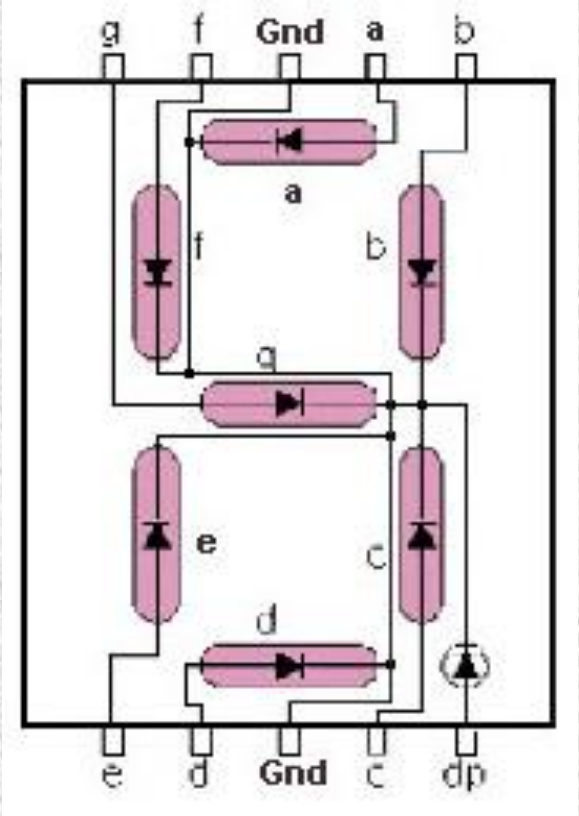
Seven Segment Diaplay

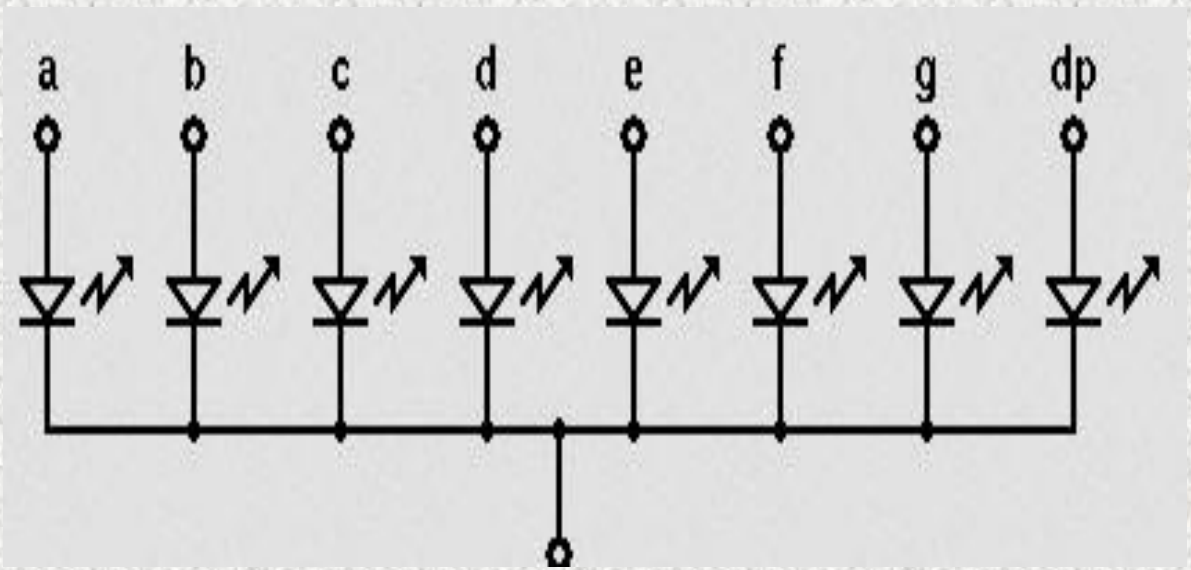
- The seven segment display is the most common display device used in many gadgets, and electronic appliances like digital meters, digital clocks, microwave oven and electric stove, etc.
- These displays consist of seven segments of LEDs assembled into a structure like numeral 8.


1
a
2
f
3
Vcc
4
5
e
11
b
10
g
9
c
8
7
6
d
1
a
f
2
10
b
9
g
e
5
8
c
6
d
4

- Actually seven segment displays contain about 8-segments wherein an extra 8th segment is used to display dot.
- This segment is useful while displaying non integer number.
- Seven segments are indicated as A-G.
- These segments come in two configurations, they are common cathode and common anode.

Common Cathode Configuration

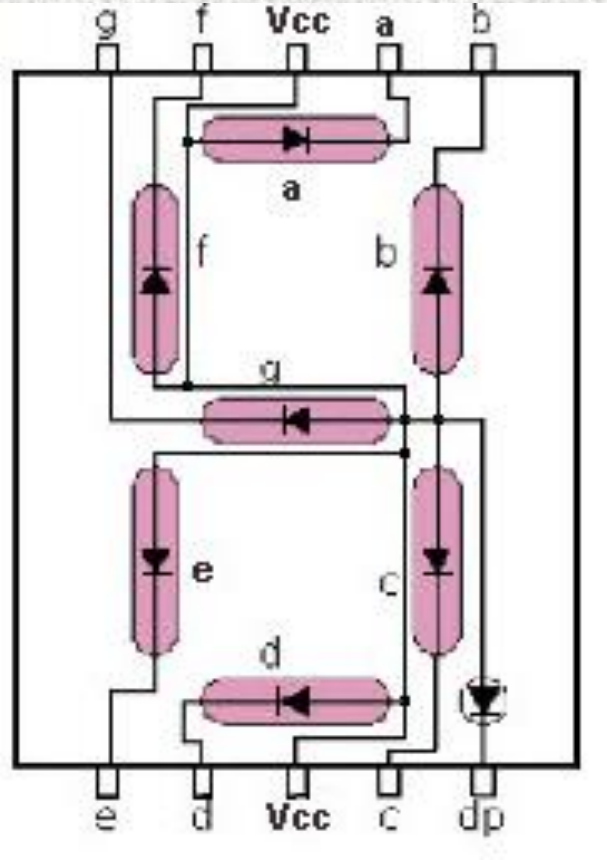


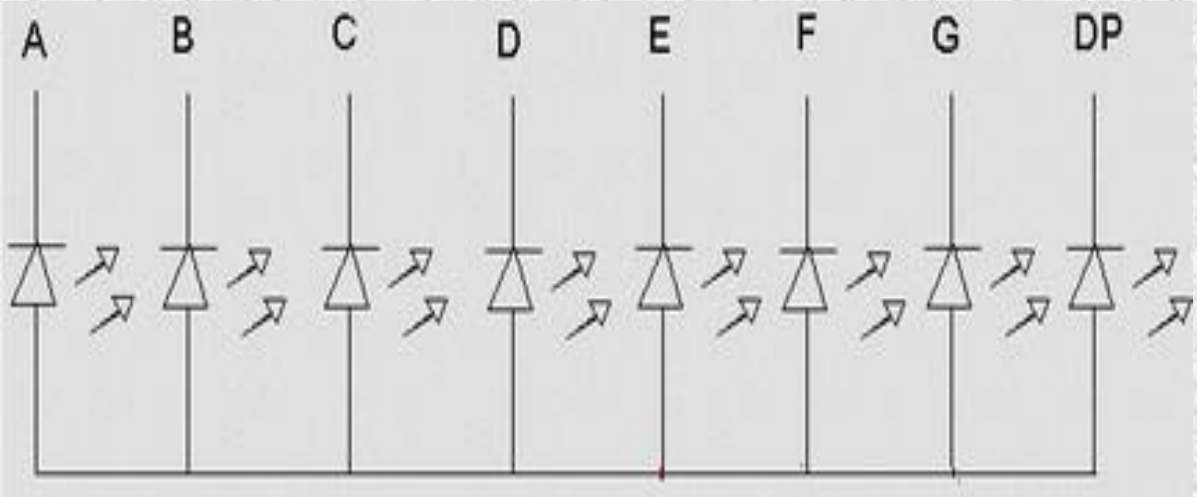


Common Cathode Configuration

- In this type of display, all the cathode connections of the LED segments are connected together to logic 0 or ground.
- The separate segments are lightened by applying the logic 1 or HIGH signal through a current limiting resistor to forward bias the individual anode terminals ‘a’ to ‘g’.

Common Anode Configuration





Common Anode Configuration

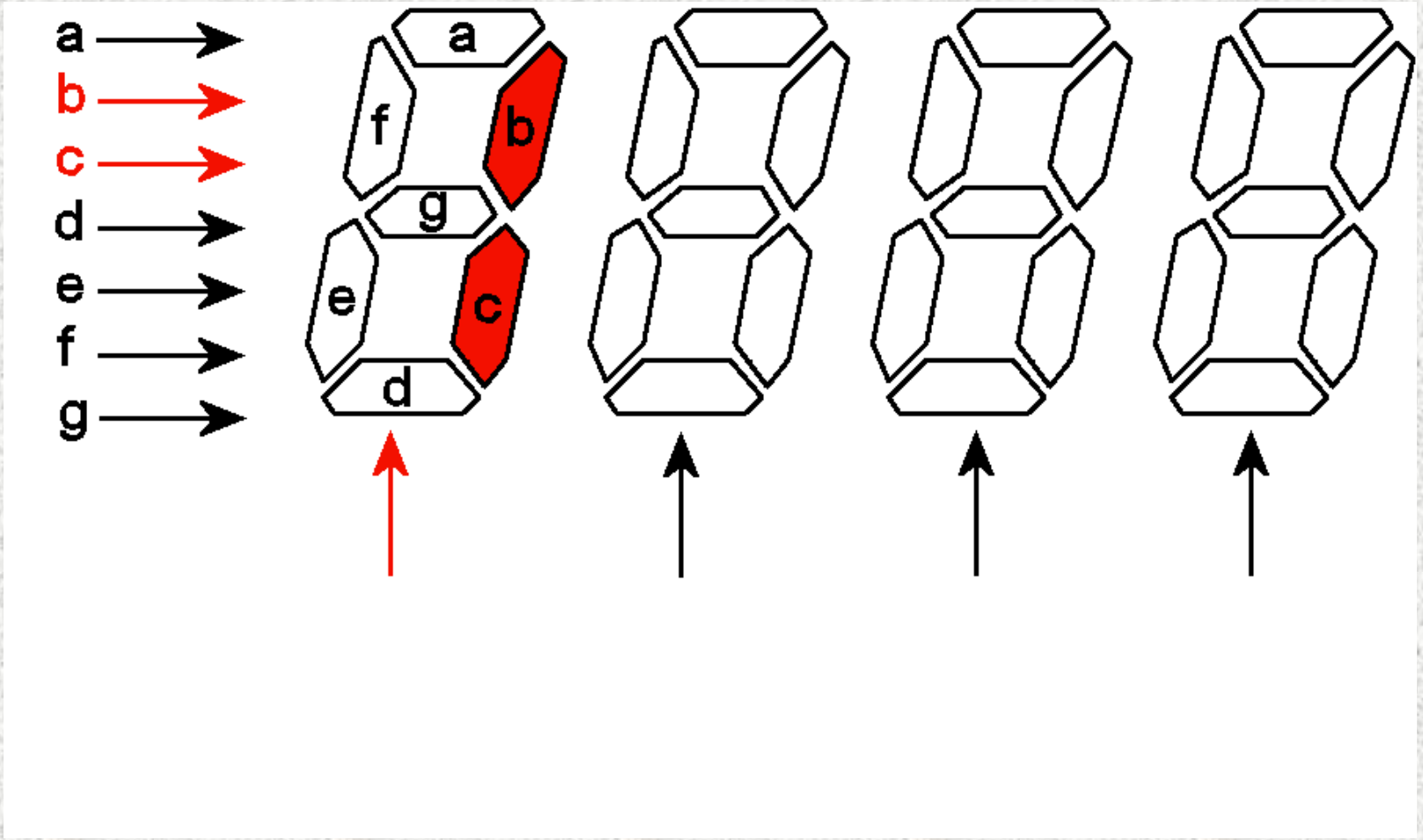
- In this type of display, all the anode connections of the LED segments are connected together to logic 1.
- The separate segments are lightened by applying of the logic 0 or LOW signal through a current limiting resistor to the cathode of the particular segment a to g.

- Common anode seven segment displays are very popular as many logic circuits can sink more current than they can source.
- These displays are not a direct replacement in a circuit for a common anode display, as it is the same as connecting the LEDs in reverse, and hence the light emission will not take place.
- Depending upon the decimal number displayed, the particular set of LEDs is forward biased.

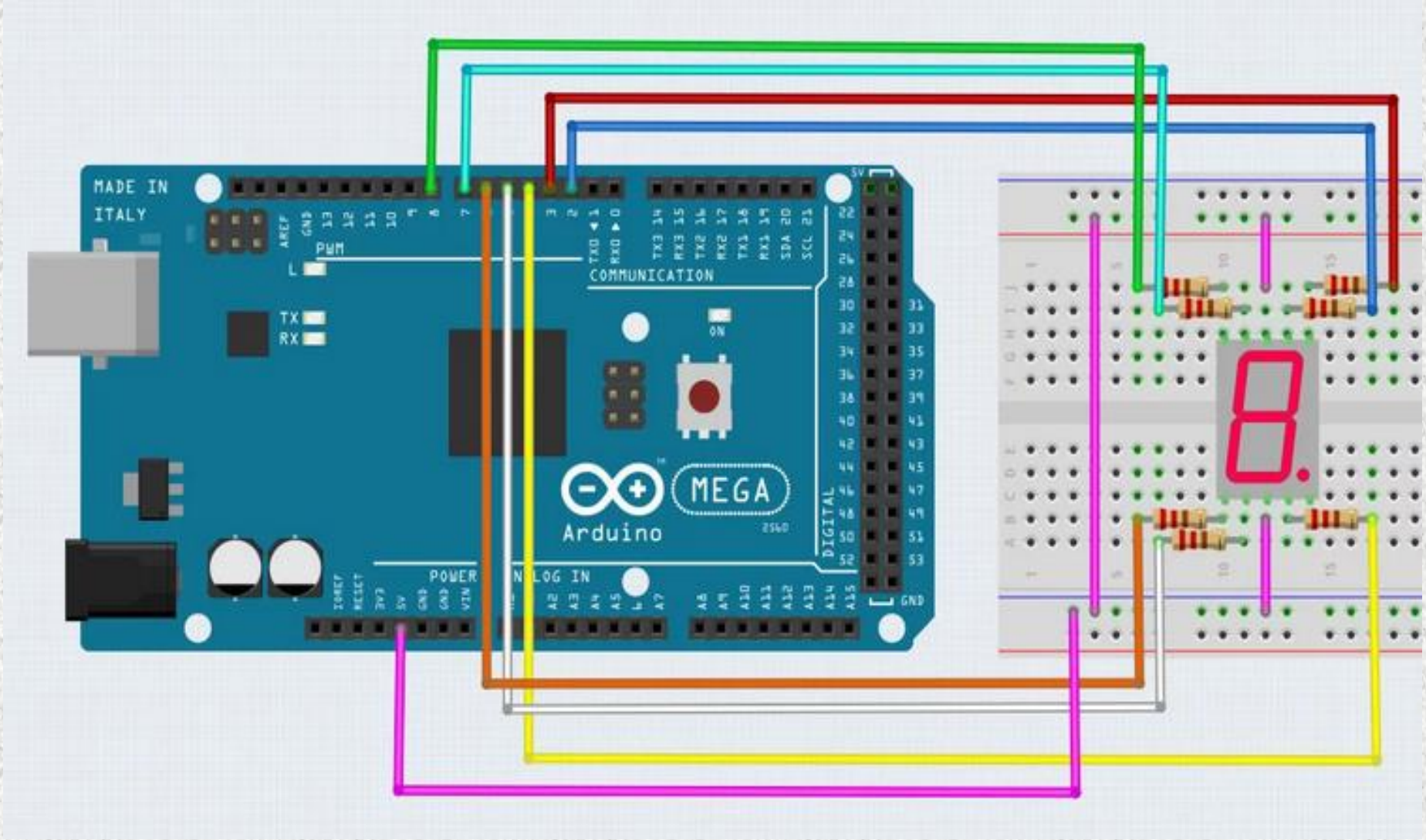
Working of Seven Segment Display

- When the power is given to all the segments, then the number 8 will be displayed.
- If we disconnect the power for segment G (that means 7) then that will result number 0.
- The circuit of the seven segment display is designed in such a way that the voltage at different pins can be applied at the same time.
- In the same way, we can form the combinations to display numerals from 0 to 9.

- The numeric seven segment displays can also display other characters.
- But generally A-G and L, T, O, S and others are also available. Some problems may occur with the H, X, 2, and Z.
- Generally, the common seven segment display is numeric only. Alphanumeric displays are also available but cost is little more.


a
b
c
d
e
f
g
a
f
b
g
e
c
d

Interfacing Seven Segment Display with Arduino



Seven segment pins	Arduino pins	Wire Color
1(e)	6	orange
2(d)	5	white
3,8(COM)	GND	n/a
c	4	yellow
5(dp)	-	
6(b)	3	red
7(a)	2	blue
9(f)	7	cyan
10(g)	8	green

Truth table

Digit	gfedcba	abcdefg	a	b	c	d	e	f	g
0	0×3F	0×7E	on	on	on	on	on	on	off
1	0×06	0×30	off	on	on	off	off	off	off
2	0×5B	0×6D	on	on	off	on	on	off	on
3	0×4F	0×79	on	on	on	on	off	off	on
4	0×66	0×33	off	on	on	off	off	on	on
5	0×6D	0×5B	on	off	on	on	off	on	on
6	0×7D	0×5F	on	off	on	on	on	on	on
7	0×07	0×70	on	on	on	off	off	off	off
8	0×7F	0×7F	on	on	on	on	on	on	on
9	0×6F	0×7B	on	on	on	on	off	on	on
A	0×77	0×77	on	on	on	off	on	on	on
B	0×7C	0×1F	off	off	on	on	on	on	on
C	0×39	0×4E	on	off	off	on	on	on	off
D	0×5E	0×3D	off	on	on	on	on	off	on
E	0×79	0×4F	on	off	off	on	on	on	on
F	0×71	0×47	on	off	off	off	on	on	on

Code for Interfacing

```
void setup()
{
 // define pin modes
pinMode(2,OUTPUT);
pinMode(3,OUTPUT);
pinMode(4,OUTPUT);
pinMode(5,OUTPUT);
pinMode(6,OUTPUT);
pinMode(7,OUTPUT);
pinMode(8,OUTPUT);
}
```

```
void loop()
{
// loop to turn leds od seven seg ON
for(int i=2;i<9;i++) {
digitalWrite(i,HIGH);
delay(600);
 }
// loop to turn leds of seven seg OFF
 for(int i=2;i<9;i++)
{
digitalWrite(i,LOW);
delay(600);
}
delay(1000); }
```