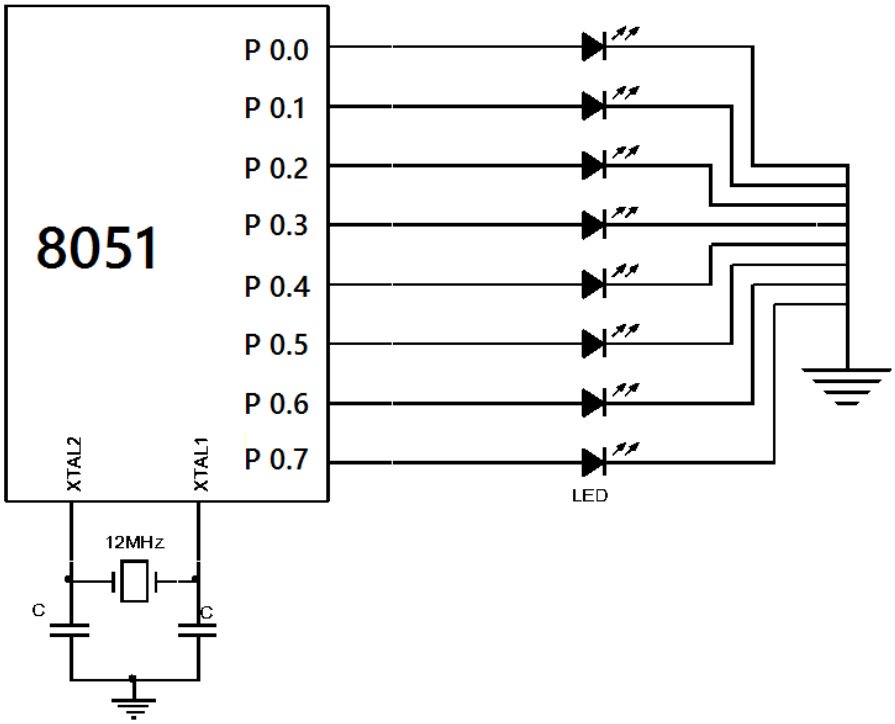
Interfacing of LEDS:



- Fig. shows Interfacing of 8 LEDs with 8051 microcontroller.
- Anodes of the LEDs are Connected to the port pins and cathodes are connected to common ground connection.
- To turn on particular LED we will need to make value of that pin "High" i.e "1".
- After making a particular pin high or low a small delay is executed to make that LED light visdible.

ASM Program:

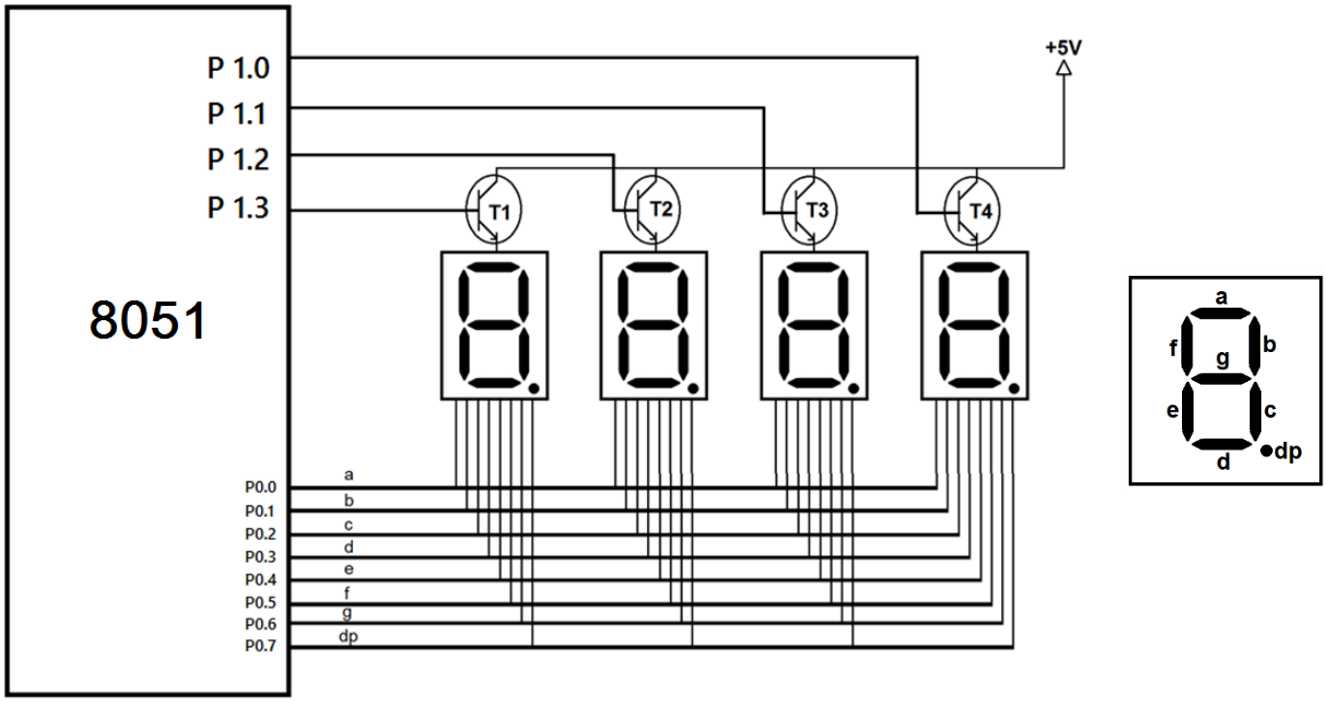
```
ORG 0000H
START:
MOV P0, #00000000B
CALL DELAY
MOV P0, #00000001B
CALL DELAY
MOV P0, #00000010B
CALL DELAY
MOV P0, #00000011B
CALL DELAY
MOV P0, #00000100B
CALL DELAY
```

```
MOV P0, #00000101B
CALL DELAY
MOV P0, #00000110B
CALL DELAY
MOV P0, #00000111B
CALL DELAY
MOV P0, #00001000B
CALL DELAY
MOV P0, #00001001B
CALL DELAY
CALL START
DELAY:
MOV R0, #0FH
L3:MOV R2, #0FFH
L1:MOV R1,#0FFH
L2: DJNZ R1, L2
DJNZ R2, L1
DJNZ R0, L3
RET
END
```

Interfacing of 7-Segment Display:

- Figure shows interfacing diagram of 8051 microcontroller and Seven segment display. It also shows structure of Seven segment display.
- There are two types of LED 7-segment displays: common cathode (CC) and common anode (CA). The difference between the two displays is the common cathode has all the cathodes of the 7-segments connected directly together and the common anode has all the anodes of the 7-segments connected together.
- In this diagram common anode seven segment display is used. So when we want to make any segment glow on, we will just make respective I/O pin low i.e. 0.
- There are total 4 seven segment displays are used. Transistors T1, T2, T3, T4 are used to trigger particular seven segment display ON and OFF.
- With the help of seven segment display we can display alphabetical characters such as A,B,C,D,E,F and numerical characters such as 0,1,2,3,4,5,6,7,8,9.

- Assembly Language Program to display all the hexadecimal characters is given below.



Program:

```
ORG 0000H
MOV P1, #00001111B
CALL DELAY
MOV P0, #11111111B
START:
MOV P0, #11000000B      ; DISPLAY 0
CALL DELAY
MOV P0, #11111001B      ; DISPLAY 1
CALL DELAY
MOV P0, #10100100B      ; DISPLAY 2
CALL DELAY
MOV P0, #10110000B      ; DISPLAY 3
CALL DELAY
MOV P0, #10011001B      ; DISPLAY 4
CALL DELAY
MOV P0, #10010010B      ; DISPLAY 5
CALL DELAY
MOV P0, #10000010B      ; DISPLAY 6
CALL DELAY
MOV P0, #11111000B      ; DISPLAY 7
CALL DELAY
MOV P0, #10000000B      ; DISPLAY 8
```

```
CALL DELAY
MOV P0, #10010000B      ; DISPLAY 9
CALL DELAY
CALL START

DELAY:
MOV R0, #0FH
L3:MOV R2, #0FFH
L1:MOV R1,#0FFH
L2: DJNZ R1, L2
DJNZ R2, L1
DJNZ R0, L3
RET
END
```