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DWORKADAS J. SANGHVI COLLEGE OF ENGINEERING

Approved by AICTE and Affiliated to the University of Mumbai

Department of Electronics & Telecommunication Engineering



Mini Project Report

On

Electric Dice using Microcontroller 8051 and LED's

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CERTIFICATE

This is to certify that _____,
SAP ID _____ of TE-EXTC 1 has submitted his/her
Mini Project Report for Microcontrollers and applications for the
Academic Year 2018-2019.

Guide

Examiner

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SR NO.	CONTENT	PAGE NO.
1.	AIM	1
2.	SOFTWARE USED	1
3.	INTRODUCTION	1
4.	WORKING	1
5.	CODE	4
6.	OUTPUT	7
7.	CONCLUSION	8
8.	REFERENCES	8



Aim: To interface LED's using 8051 Microcontroller to create an electric dice.

Software used: Keil uVision5, Proteus 8.

Introduction:

In this project, we are going to build a LED Dice using microcontroller. This project is used to simulate dice, which displays a random number from 1 to 6 by using 6 LEDs connected to port 1 of the microcontroller. Pin no 2 (or bit 0 of port 3 (P3.0)) is used as the input and a push-button switch is connected to this pin. Every time, when we press this switch, a new number is generated on the electric dice with the help of LEDs.

Microcontroller 8051

8051 microcontroller is designed by Intel in 1981. It is an 8-bit microcontroller. It is built with 40 pins DIP (dual inline package), 4kb of ROM storage and 128 bytes of RAM storage, 2 16-bit timers. It consists of are four parallel 8-bit ports, which are programmable as well as addressable as per the requirement. An on-chip crystal oscillator is integrated in the microcontroller having crystal frequency of 12 MHz.



Fig.1 Intel 8051 Microcontroller

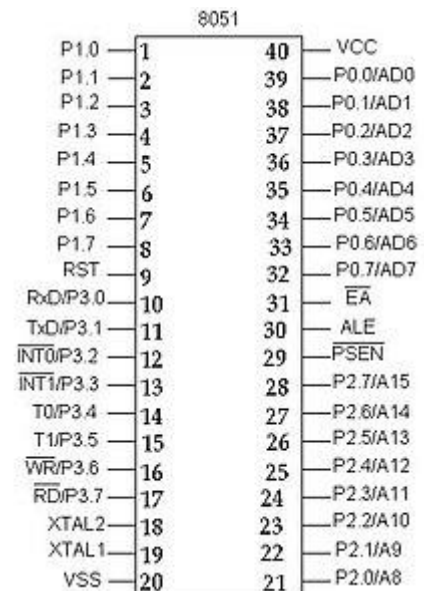


Fig.2 Pin Diagram of 8051



Push Button



Fig.3 Push Button

A push button switch is a small, sealed mechanism that completes an electric circuit when you press on it. When it's on, a small metal spring inside makes contact with two wires, allowing electricity to flow. When it's off, the spring retracts, contact is interrupted, and current won't flow. The body of the switch is made of non-conducting plastic.

Working

A random dice number is obtained during scanning of the push-button switch as follows. The program scans the push-button switch continuously. If the switch is not pressed (i.e. at logic HIGH), a number is incremented between 1 and 6. Whether the push-button is pressed, the current value of the number is read and this value is used as the new dice number. Since the switch is pressed by the user in random, the numbers generated are also random numbers from 1 to 6. The new random number is displayed on the seven LEDs appropriately. After about 2 seconds delay, all LEDs are turned off and the above process is repeated forever.

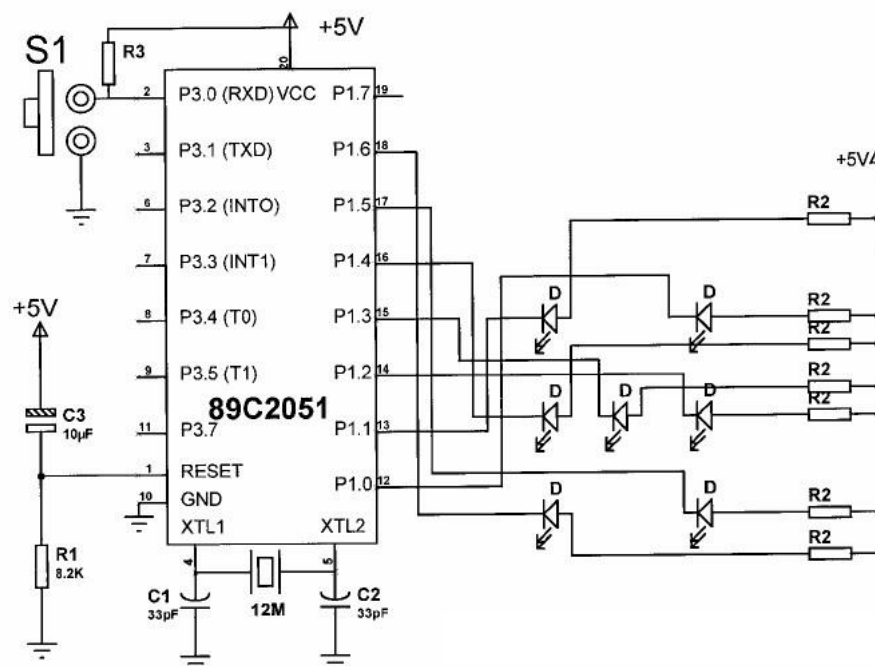


Fig.4 Interfacing 8051 with LED's



Code:

```
#include<AT892051.h>
#define ON 0
#define ALL_OFF 0xFF
```

```
sbit button=P3^0;
sbit D1=P1^0;
sbit D2=P1^1;
sbit D3=P1^2;
sbit D4=P1^3;
sbit D5=P1^4;
sbit D6=P1^5;
sbit D7=P1^6;
```

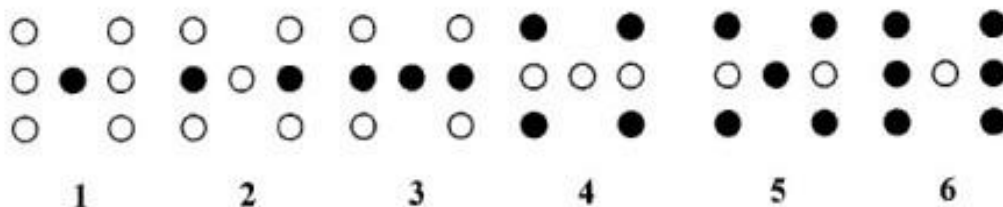
```
void wait_a_second()
{
    unsigned int x;
    for(x=0;x<33000;x++);
}
```

```
main()
{
    int DICE=0;
    for(;;)
    {
        if(button==0)
        {switch(DICE)
        {
            case 1:
                D4=ON;
                break;
            case 2:
                D3=ON;
                D5=ON;
                break;
            case 3:
                D3=ON;
                D4=ON;
                D5=ON;
                break;
            case 4:
                D1=ON;
                D2=ON;
                D6=ON;
                D7=ON;
```

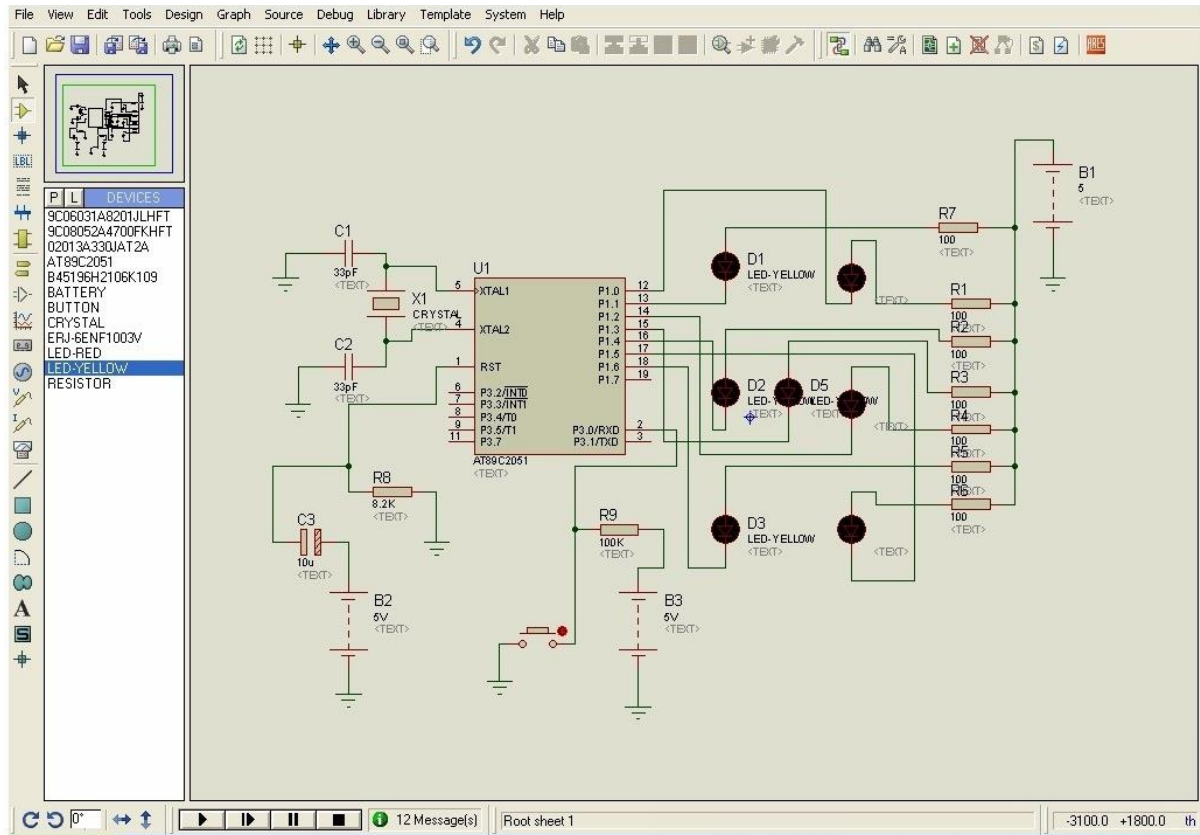


```
break;
case 5:
D1=ON;
D2=ON;
D4=ON;
D6=ON;
D7=ON;
break;
case 6:
D1=ON;
D2=ON;
D3=ON;
D5=ON;
D6=ON;
D7=ON;
break;
}
wait_a_second();
wait_a_second();
P1=ALL_OFF;
}
else
{
DICE++;
if(DICE==7)DICE=1;
}
}
}
```

OUTPUT:



Random Number Generated between 1 to 6



Conclusion:

We have successfully generated random numbers from 1-6 on LEDs using 8051. The simulation was performed on proteus.

References:

1. LED interfacing with 8051
<https://openlabpro.com/guide/led-blinking-at89s51/>
2. Interfacing push switch with 8051
<https://www.pantechsolutions.net/microcontroller-tutorials/how-to-interface-switch-with-8051-development-board>
3. Random Number generation in 8051
<https://www.electronicshub.org/random-number-generator-using-8051/>