COURSE BASED PROJECT REPORT ON

DESIGNING LED DICE USING 8051 MICRO CONTROLLER

SUBMITTED BY

VEGI NEELIMA THULASI APARNA - 228W1A04P7

VEMPATI VEDA NANDANA - 228W1A04P8

NELLURI SAI PAVAN ADITHYA – 238W5A0406

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BACHELOR OF TECHNOLOGY

With specialization in

ELECTRONICS AND COMMUNICATION ENGINEERING

Under the guidance of

Dr. K. Vara Prasad

Assistant Professor Ph.D.

J. Sravanthi

Assistant Professor M. Tech

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

VELAGAPUDI RAMAKRISHNA SIDDHARTHA ENGINEERING COLLEGE

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CERTIFICATE

This is to certify that the project report entitled "**LED Dice Using 8051 Micro Controller"** that is being submitted by **V. Neelima Thulasi Aparna (228W1A04P7) ,V. Veda Nandana(228W1A04P8) and N. Sai Pavan Adithya(238W5A046)** in partial fulfilment for the award of the Degree of Bachelor of Technology in Electronics and Communication Engineering to VR Siddhartha Engineering College affiliate to JNTUK, Kakinada is record of bona fide work carried out during the AY 2023- 24.

Dr. K. Vara Prasad
Assistant Professor M. Tech Ph.D.

J. Sravanthi
Assistant Professor M. Tech

Dr. D. Venkata Rao
(Head of the Department)

ACKNOWLEGEMENT

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v. Neelima Thulasi Aparna - 228W1A04P7

V. Veda Nandana - 228W1A04P8

N. Sai Pavan Adithya - 238W5A0406

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PROJECT DESCRIPTION

Project description of LED dice using 8051

The LED dice project using the 8051 microcontroller involves creating a digital dice simulator with LEDs to display numbers. The 8051 microcontroller serves as the brain of the system, controlling the random generation of numbers and illuminating corresponding LEDs to represent the dice face.

Key components and steps:

Microcontroller (8051): Utilize the 8051 microcontrollers as the central processing unit to manage the logic and control of the LED dice.

Random Number Generation: Implement a random number generation algorithm in the microcontroller to simulate the rolling of a traditional six-sided die.

LED: Connect LEDs to the microcontroller output pins to visually represent the numbers rolled. Each LED corresponds to a specific number on the die (1 to 6).

User Interface: Incorporate a button or sensor for user interaction, triggering the microcontroller to generate a new random number when pressed, simulating the act of rolling a die.

Programming: Develop and load the appropriate program onto the 8051 microcontroller to execute the logic of generating random numbers and controlling the LED display.

Power Supply: Provide a suitable power supply for the circuit, ensuring stable operation of the microcontroller and LEDs.

Circuit Connections: Establish proper connections between the microcontroller, LEDs, and other components, adhering to the microcontroller datasheet and LED specifications.

The LED dice project not only demonstrates microcontroller programming skills but also integrates hardware components to create a tangible and interactive output.

Resistors: To limit the current flowing through each LED, preventing damage.

Push Button: To trigger the dice rolling simulation.

INTRODUCTION

LED dice are electronic devices that mimic traditional six-sided dice using light-emitting diodes (LEDs). Typically, battery-powered, these compact gadgets simulate the randomness of dice rolls through LED displays. Users can press a button or shake the device to generate a random number, and the corresponding LED lights up, revealing the outcome. LED dice are popular in games and activities where chance or randomness adds an element of excitement, providing a modern twist to the traditional dice-rolling experience.

LED DICE USING 8051

CIRCUIT DIAGRAM

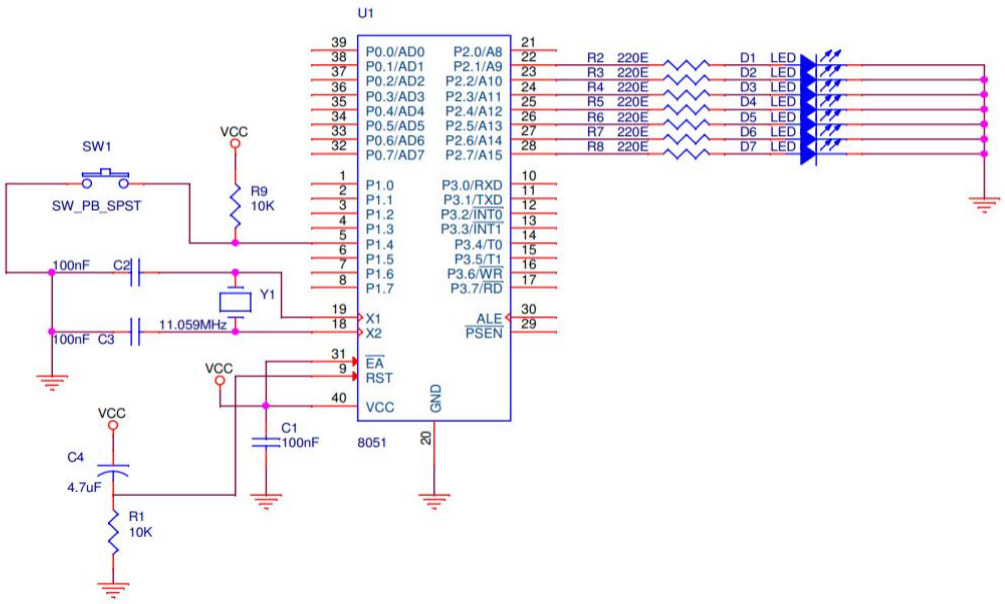


Figure about Hardware Connections of LED Dice

When the button is pressed, trigger the random number generation algorithm.

Map the generated number to the corresponding LED pattern for the dice faces.

Programming

Write the firmware in a language like Assembly or C, and compile it using an appropriate compiler.

Testing:

Upload the program to the microcontroller and test the LED dice. Ensure that the LEDs display different numbers randomly when the button is pressed. Remember to consult the datasheets for your microcontroller and other components for accurate pin configurations and specifications. If you have specific questions or need more detailed information

PROGRAM CODE

```
#include<reg52.h>
#define ALL_OFF 0x00
sbit   LED1=P2^1;
sbit   LED2=P2^2;
sbit   LED3=P2^3;
sbit   LED4=P2^4;
sbit   LED5=P2^5;
sbit   LED6=P2^6;
sbit   LED7=P2^7;
sbit   SW=P1^4;
sbit   LED=P1^1;
#define OFF 0
#define  ON 1
unsigned char Dice=0;
void MsDelay(unsigned int time)
{
unsigned int i,j;
for(i=0;i<time;i++)
{
for(j=0;j<1000;j++);
}
}

void main(void)
{
P2=0x00;
P1=0xF0;
LED=ON;
```

```
MsDelay(500);
LED=OFF;
MsDelay(500);
LED=ON;
MsDelay(500);
LED=OFF;
for(;;)
{
if(SW==0)
{
// MsDelay(500);
switch(Dice)
{
case 1:
LED7=ON;
break;
case 2: LED3=ON;
LED4=ON;
break;
case 3: LED3=ON;
LED4=ON;
LED7=ON;
break;
case 4: LED1=ON;
LED5=ON;
LED6=ON;
LED2=ON;
break;
case 5: LED1=ON;
LED5=ON;
```

```
LED2=ON;
LED6=ON;
LED7=ON;
break;
case 6: LED1=ON;
LED2=ON;
LED3=ON;
LED4=ON;
LED5=ON;
LED6=ON;
break;
}
Ms Delay(500);
P2=ALL_OFF;
}
else
{
Dice++;
if(Dice==7)Dice=1;
}
}
}
```

IMPLEMENTATION:

Creating an LED dice using the 8051 microcontroller involves interfacing the microcontroller with LEDs and programming it to simulate the rolling of a dice. Here's a basic outline:

Hardware Setup:

8051 Microcontroller Board: Use a development board with an 8051 microcontroller (e.g., AT89C51).

LEDs: Connect seven LEDs to the microcontroller pins to represent the numbers 1 to 6 and an additional LED for indicating the rolling action.

Push Button: Connect a push button to trigger the dice roll.

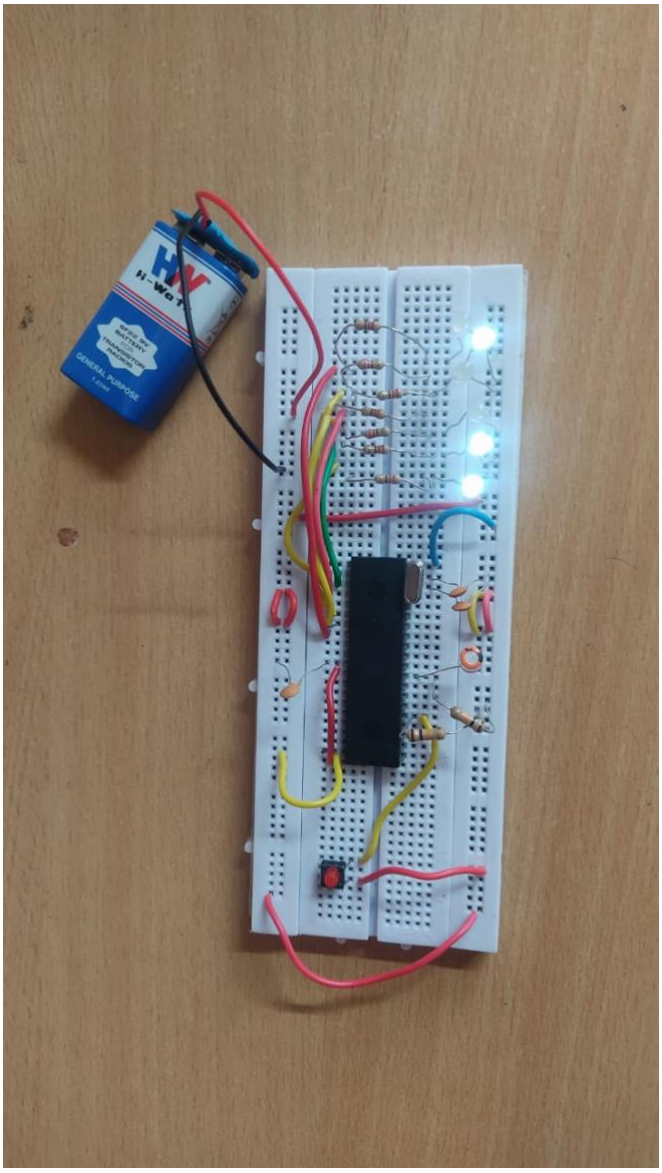
Connections:

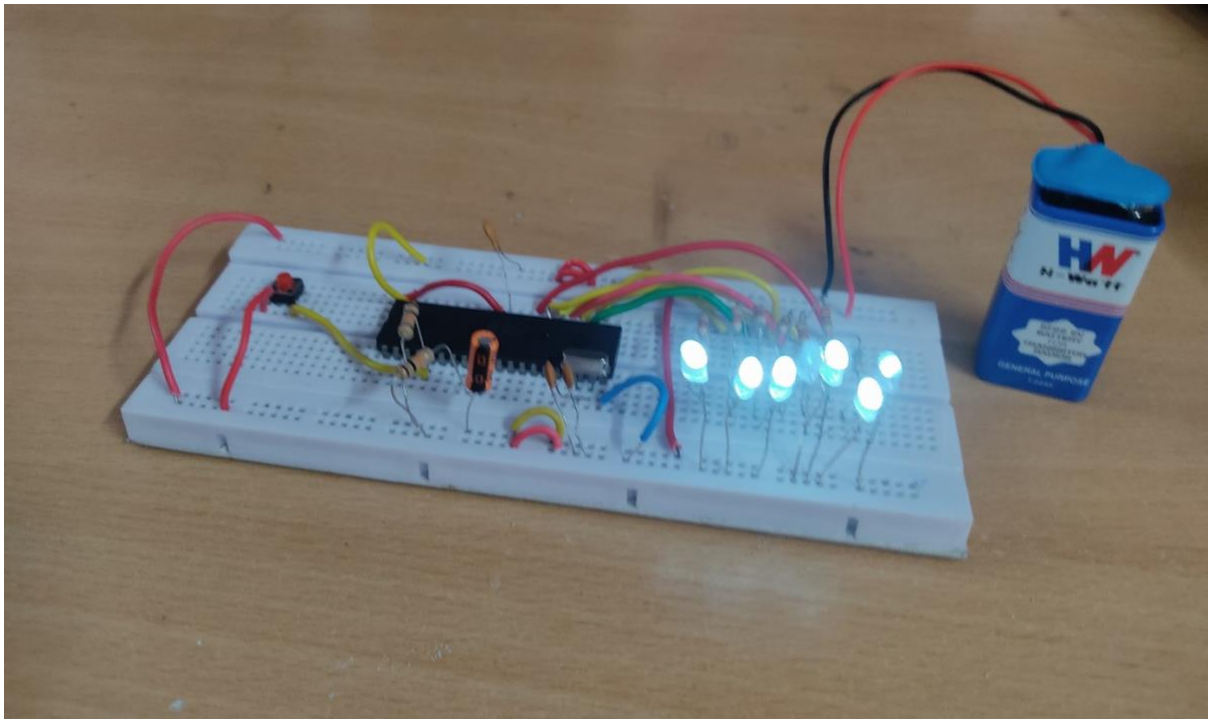
Connect the cathode of each LED to a resistor and then to a microcontroller pin.

Connect the anode of each LED to the microcontroller ground.

Connect the push button between a microcontroller pin and ground.

OUTPUTS





CONCLUSION

LED dice displays are versatile and engaging, offering a visually dynamic way to simulate traditional dice rolls. Their compact design, low power consumption, and potential for customization make them suitable for various applications, from board games to educational tools. With advancements in technology, LED dice displays continue to evolve, enhancing user experiences and providing a modern twist to age-old gaming elements.