

**Somaiya Vidyavihar University
K.J. Somaiya College of Engineering
Department of Electronics and Telecommunication Engineering**

Mini Project Report on

“Electronic Voting Machine”

Using 8051 Microcontroller

Group Members:

Abhay Singh Rana (16014323007)

Eshaan Kuttikad (16014323049)



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Basic Idea:

To design a basic voting system using an 8051 microcontroller, a 16x2 LCD display and a 4x4 matrix keypad. The system will allow voters to cast their votes for different candidates, process the data, count the number of votes per candidate and display the results. It's efficient and saves time compared to counting votes manually, and can also be modified to handle multiple rounds of voting if needed. Plus, the system could include features like preventing duplicate votes, ensuring each voter only gets one chance to cast their choice.

Components in Use:

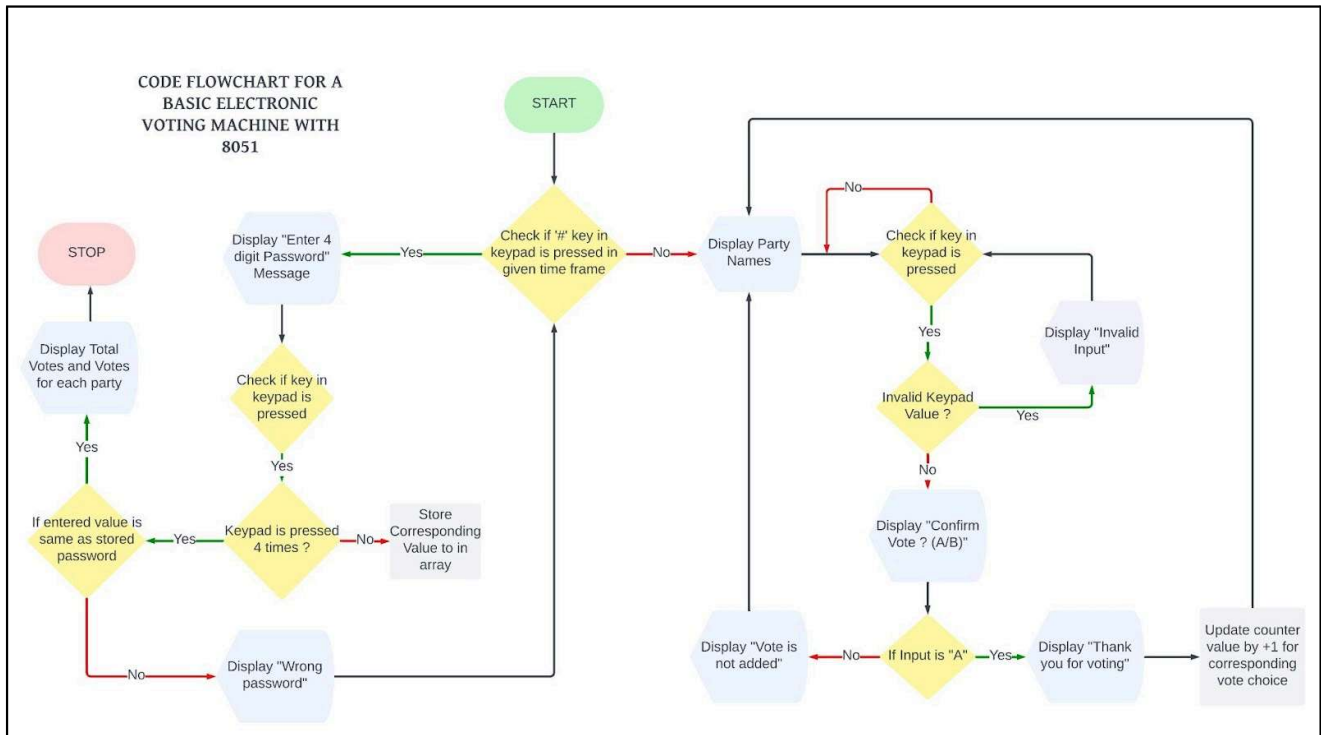
For the creation of the basic model of an EVM, the minimal required peripherals would be:

- The 8051 Microcontroller.
- A Line LCD Display.
- A 4x4 Matrix Keypad.
- Power Supply.
- Connecting Wires.

Features:

- LCD display feedback
- Keypad Input for voting
- Password protection for result security

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Working:

 **Working video.mp4**

Embedded-C code:

```

C/C++
#include <reg51.h>

// Defining LCD related functions
# define display_port P2;
sbit rs = P3^3;
sbit rw = P3^4;
sbit e = P3^5;

void lcd_cmd(unsigned char cmd);
void lcd_data(unsigned char data);
  
```

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```
void lcd_init(void);
void lcd_clear(void);
void lcd_set_cursor(unsigned char pos);
void lcd_print(unsigned char *msg);
void wait_and_show(unsigned char *msg, unsigned int delay);

// Defining keypad bits
sbit row1 = P1^0;
sbit row2 = P1^1;
sbit row3 = P1^2;
sbit row4 = P1^3;

sbit col1 = P1^7;
sbit col2 = P1^6;
sbit col3 = P1^5;
sbit col4 = P1^4;

unsigned char code keypad[4][4] = {
    {'1', '2', '3', 'A'},
    {'4', '5', '6', 'B'},
    {'7', '8', '9', 'C'},
    {'*', '0', '#', 'D'}
};

char keypad_scan(void);

// Defining logic related constants and functions
void result_mode();
void voting_mode();
void mode_choose();
unsigned int candidate_votes[4] = {0};
unsigned char code password[4] = {'1', '2', '3', '4'};

// Utilities
void msdelay(unsigned int ms)
{
    unsigned int i;
    TMOD = 0x01;
    for(i=0; i<ms; i++)
    {
        TH0 = 0xFC;
        TL0 = 0x66
        TR0 = 1;
        while(TF0 == 0);
    }
}
```

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```
        TR0 = 0;
        TF0 = 0;
    }
}

void disp_int_to_str(unsigned int num)
{
    unsigned char buf[6];
    int i=0;
    if(num == 0)
        buf[i++] = '0';
    while(num > 0)
    {
        buf[i++] = (num%10) + '0';
        num /= 10;
    }
    while(--i > 0)
        lcd_data(buf[i]);
}

// LCD functions
void lcd_cmd(unsigned char cmd)
{
    display_port = cmd;
    rs = 1; rw = 0; e = 1; msdelay(1); e = 0;
}
void lcd_data(unsigned char data)
{
    display_port = data;
    rs = 1; rw = 0; e = 1; msdelay(1); e = 0;
}
void lcd_init()
{
    lcd_cmd(0x38); msdelay(10);
    lcd_cmd(0x0F); msdelay(10);
    lcd_clear(); msdelay(10);
    lcd_set_cursor(0x01);
}
void lcd_clear()
{
    lcd_cmd(0x01);
}
void lcd_set_cursor(unsigned char pos)
{
    lcd_cmd(pos);
}
```

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```

}
void lcd_print(unsigned char *msg)
{
    unsigned char i = 0;
    lcd_clear(); lcd_set_cursor(0x80);
    while(*msg && i<32)
    {
        if(i == 16)
            lcd_cmd(0xC0);
        lcd_data(*msg++); i++;
    }
}
void wait_and_show(unsigned char *msg, unsigned int delay)
{
    lcd_print(msg);
    msdelay(delay);
}

// Keypad functions
char keypad_scan()
{
    unsigned char row, col;
    unsigned char rows[4] = {0x0E, 0X0D, 0X0B, 0X07};
    unsigned char i, j;

    for(i=0; i<4; i++)
    {
        P1 = (P1 & 0xF0) | rows[i];
        for(j=0; j<4; j++)
        {
            if(((P1 >> (7-j)) & 1) == 0)
            {
                msdelay(50);
                while(((P1 >> (7-j)) & 1) == 0);
                return keypad[i][j];
            }
        }
    }
    return 0;
}

// Logic functions
void voting_mode()
{
    unsigned char code parties[] = "1:PARTY1 2:PARTY2 3:PARTY3 4:PARTY4";

```

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```

unsigned char code confirm_msg[] = "CONFIRM? A-YES B-NO";
unsigned char code thank_msg[] = "THANKYOU FOR VOTING";
unsigned char code invalid[] = "INVALID INPUT";

char input, confirm;
int idx = -1;

wait_and_show(parties, 2000);

while(1)
{
    input = keypad_scan();
    if(input == '1')
        idx = 0;
    else if(input == '2')
        idx = 1;
    else if(input == '3')
        idx = 2;
    else if(input == '4')
        idx = 3;
    else if (input != 0)
    {
        wait_and_show(invalid, 2000);
        continue;
    }

    if(idx != -1)
    {
        wait_and_show(confirm_msg, 2000);
        confirm = keypad_scan();
        if(confirm == 'A')
        {
            candidate_votes[idx]**;
            wait_and_show(thank_msg, 2000);
        }
        break;
    }
}

void result_mode()
{
    unsigned char i=0; key, input[4];
    unsigned char code pass_msg[] = "ENTER PASSWORD";
    unsigned char code wrong_msg[] = "WRONG PASSWORD";

```

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```

wait_and_show(pass_msg, 2000);
lcd_clear();
lcs_set_cursor(0x81);

while(i<4)
{
    key = keypad_scan();
    if(key != 0)
    {
        input[i++] = key;
        lcd_data('*');
    }
}

if(input[0] == password[0] && input[1] == password[1] &&
    input[2] == password[2] && input[3] == password[3])
{
    lcd_clear();
    lcd_set_cursor(0x81);
    for(i=0; i<4; i++)
    {
        disp_int_to_str(candidate_votes[i]);
        lcd_data((i<3) ? ',' : ' ');
    }
    msdelay(10000);
}
else
    wait_and_show(wrong_msg, 3000);
}

void mode_choose()
{
    unsigned char code welcome[] = "WELCOME TO EVM";
    unsigned char code prompt[] = "PRESS #: RESULT ELSE: VOTE";
    unsigned char code res_msg[] = "RESULT MODE";
    unsigned char code vote_msg[] = "VOTING MODE";

    wait_and_show(welcome, 2000);
    wait_and_show(prompt, 2000);

    while(1)
    {
        char key = keypad_scan();
        if(key != 0)
        {
            if(key == '#')

```


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```
        {
            wait_and_show(res_msg, 2000);
            result_mode();
        }
        else
        {
            wait_and_show(vote_msg, 2000);
            voting_mode();
        }
        break;
    }
}

// Main
void main(void)
{
    lcd_init();
    while(1)
        mode_choose();
}
```

Github repository link:

<https://github.com/abhayyrana/EVM-using-8051>

Setup Picture:

