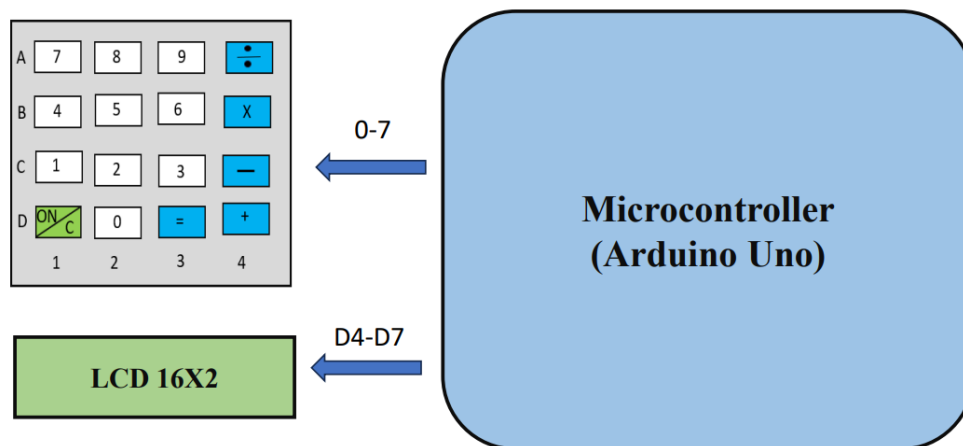


Arduino Calculator Using 4x4 keypad

Description:

An Arduino calculator is a device that performs basic arithmetic operations using an Arduino Uno microcontroller board and an LCD display. The project involves connecting the LCD display to the Arduino board and programming the board to read input from a keypad and display the results on the LCD screen. The calculator can perform addition, subtraction, multiplication, and division operations.

Block Diagram:



Input and Output:

| S.No | Description | Name | Type | Data Direction | Specification | Remarks |
|------|---------------------|------|------|----------------|---------------|-------------|
| 1 | 4X4 KEYPAD(COLUMNS) | 1 | INP | DI | Digital | Active High |
| 2 | 4X4 KEYPAD(COLUMNS) | 2 | INP | DI | Digital | Active High |
| 3 | 4X4 KEYPAD(COLUMNS) | 3 | INP | DI | Digital | Active High |
| 4 | 4X4 KEYPAD(COLUMNS) | 4 | INP | DI | Digital | Active High |
| 5 | 4X4 KEYPAD(ROW) | A | INP | DI | Digital | Active High |

| | | | | | | |
|----|-----------------|----|-----|----|---------|-------------|
| 6 | 4X4 KEYPAD(ROW) | B | INP | DI | Digital | Active High |
| 7 | 4X4 KEYPAD(ROW) | C | INP | DI | Digital | Active High |
| 8 | 4X4 KEYPAD(ROW) | D | INP | DI | Digital | Active High |
| 9 | LCD RST | RS | OUT | DO | Digital | Active High |
| 10 | LCD EN | EN | OUT | DO | Digital | Active High |
| 11 | LCD DATA PIN | D4 | OUT | DO | Digital | Active High |
| 12 | LCD DATA PIN | D5 | OUT | DO | Digital | Active High |
| 13 | LCD DATA PIN | D6 | OUT | DO | Digital | Active High |
| 14 | LCD DATA PIN | D7 | OUT | DO | Digital | Active High |

Source Code:

```
#include <LiquidCrystal.h>
#include <Keypad.h>

const byte ROWS = 4; // Four rows
const byte COLS = 4; // Three columns
// Define the Keypad
char keys[ROWS][COLS] = {
  {'7','8','9','D'},
  {'4','5','6','C'},
  {'1','2','3','B'},
  {'*','0','#','A'}
};

byte rowPins[ROWS] = { 0, 1, 2, 3. };
byte colPins[COLS] = { 4, 5, 6, 7 };

Keypad kpd = Keypad( makeKeymap(keys), rowPins, colPins, ROWS, COLS ); // Create the Keypad
const int rs = 8, en = 9, d4 = 10, d5 = 11, d6 = 12, d7 = 13; //Pins to which LCD is connected
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);

long Num1,Num2,Number;

char key,action;

boolean result = false;

void setup() {
  lcd.begin(16, 2); //We are using a 16*2 LCD display lcd.print("LALITHASHREE"); //Display a intro
  message lcd.setCursor(0, 1); // set the cursor to column 0, line 1 lcd.print("CALCULATOR");
  //Display a intro message

  delay(2000); //Wait for display to show info

  lcd.clear(); //Then clean it
```

```

}
void loop() {
key = kpd.getKey(); //storing pressed key value in a char
if (key!=NO_KEY)
DetectButtons();
if (result==true)
CalculateResult();
DisplayResult();
}
void DetectButtons()
{
  lcd.clear(); //Then clean it
  if (key=='*') //If cancel Button is pressed
  {
    Serial.println ("Button Cancel"); Number=Num1=Num2=0; result=false;}
  if (key == '1') //If Button 1 is pressed
  {
    Serial.println ("Button 1");
    if (Number==0)
    Number=1;
    else
    Number = (Number*10) + 1; //Pressed twice
  }
  if (key == '4') //If Button 4 is pressed
  {
    Serial.println ("Button 4");
    if (Number==0)
    Number=4;
    else
    Number = (Number*10) + 4; //Pressed twice
  }
  if (key == '7') //If Button 7 is pressed
  {
    Serial.println ("Button 7");
  }
}

```

```
if (Number==0)
Number=7;
else
    Number = (Number*10) + 7; //Pressed twice
}
if (key == '0')
{
Serial.println ("Button 0"); //Button 0 is Pressed
if (Number==0)
Number=0;
else
    Number = (Number*10) + 0; //Pressed twice
}
if (key == '2') //Button 2 is Pressed
{Serial.println ("Button 2");
if (Number==0)
Number=2;
Else
    Number = (Number*10) + 2; //Pressed twice
}
if (key == '5')
{
Serial.println ("Button 5");
if (Number==0)
Number=5;
else
    Number = (Number*10) + 5; //Pressed twice
}
if (key == '8')
{
Serial.println ("Button 8");
if (Number==0)
Number=8;
else
```

```

    Number = (Number*10) + 8; //Pressed twice
}
if (key == '#')
{
    Serial.println ("Button Equal");
    Num2=Number;
    result = true;
}
if (key == '3')
{
    Serial.println ("Button 3");
    if (Number==0)
        Number=3;
    else
        Number = (Number*10) + 3; //Pressed twice
}
if (key == '6')
{
    Serial.println ("Button 6");
    if (Number==0)
        Number=6;
    Else
        Number = (Number*10) + 6; //Pressed twice
}
if (key == '9')
{
    Serial.println ("Button 9");
    if (Number==0)
        Number=9;
    else
        Number = (Number*10) + 9; //Pressed twice
}
if (key == 'A' || key == 'B' || key == 'C' || key == 'D') //Detecting Buttons on Column 4
{

```

```

Num1 = Number;
Number =0;
if (key == 'A')
{
Serial.println ("Addition"); action = '+';
}
if (key == 'B')
{
Serial.println ("Subtraction"); action = '-'; }
if (key == 'C')
{
Serial.println ("Multiplication"); action = '*';}
if (key == 'D')
{Serial.println ("Devesion"); action = '/';}
delay(100);
}
}
void CalculateResult()
{
if (action=='+')
Number = Num1+Num2;
if (action=='-')
Number = Num1-Num2;
if (action=='*')
Number = Num1*Num2;
if (action=='/')
Number = Num1/Num2;
}
void DisplayResult()
{
lcd.setCursor(0, 0); // set the cursor to column 0, line 1
lcd.print(Num1); lcd.print(action); lcd.print(Num2);
if (result==true)
{

```

```

lcd.print(" ="); lcd.print(Number);} //Display the result

lcd.setCursor(0, 1); // set the cursor to column 0, line 1

lcd.print(Number); //Display the result

}

```

Schematic:

