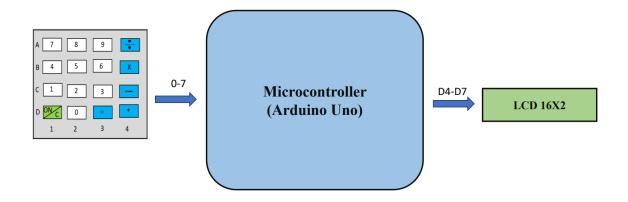# Arduino Calculator Using 4x4 keypad

Description:

An Arduino calculator is a device that performs basic arithmetic operations using an Arduino Uno microcontroller board and an LCD display. This 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 Keymap
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("JAYASHREE"); //Display a intromessage
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: