

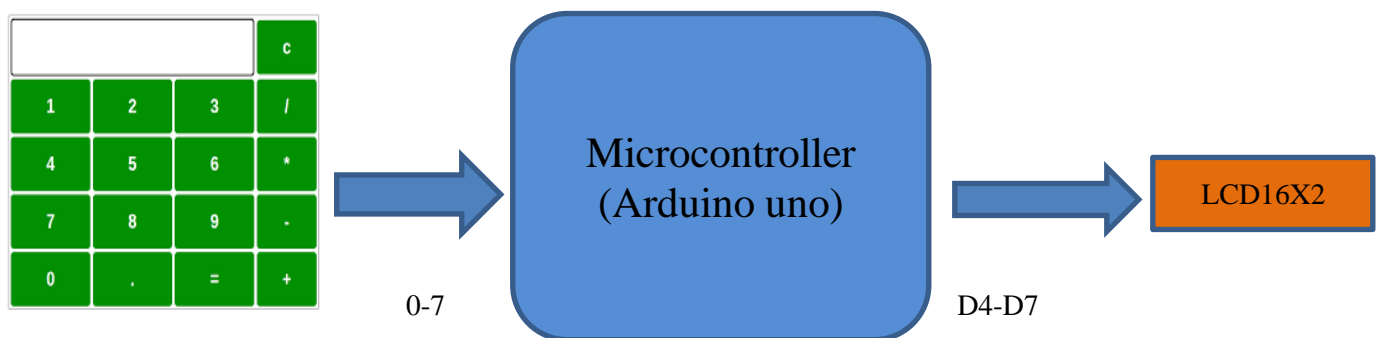
# ARDUINO CALCULATOR USING 4X4KEYPAD

## Description:

An Arduino calculator is a device that performs basic arithmetic operations using an Arduino Uno microcontroller 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. How is a calculator coded?

It processes numbers in binary code, where a combination of “0's” and “1's” are used to represent any number. So in the case of the example above, “2” would become “0010,” “4” would become “0100,” and so on.

## 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 KEYAD(ROWS)	B	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 <Keypad.h>
#include <LiquidCrystal.h>

LiquidCrystal lcd(0, 1, 2, 3, 4, 5);

const byte ROWS = 4; //four rows
const byte COLS = 4; //four columns
char keys[ROWS][COLS] = {
  {'7','8','9','/'},
  {'4','5','6','*'},
  {'1','2','3','-'},
  {'C','0','=','+'}
};
byte rowPins[ROWS] = { 13, 12, 11, 10}; //connect to the row pinouts of the keypad
byte colPins[COLS] = { 9, 8, 7, 6}; //connect to the column pinouts of the keypad

Keypad keypad = Keypad( makeKeymap(keys), rowPins, colPins, ROWS, COLS );

int num1 = 0;
int num2 = 0;
char operation = '+';
int result = 0;
bool inputNum2 = false;

void setup() {
  lcd.begin(16, 2);
  lcd.print("Calculator");
  delay(500);
  lcd.clear();
  lcd.print("Num1:");
}

void loop() {
  char key = keypad.getKey();

  if (key != NO_KEY) {
    if (key >= '0' && key <= '9') {
      if (!inputNum2) {
        num1 = num1 * 10 + (key - '0');
        lcd.setCursor(6, 0);
        lcd.print(num1);
      } else {
        num2 = num2 * 10 + (key - '0');
        lcd.setCursor(6, 1);
        lcd.print(num2);
      }
    } else if (key == '+' || key == '-' || key == '*' || key == '/') {
      operation = key;
      inputNum2 = true;
    }
  }
}
```

```

        lcd.setCursor(0, 1);
        lcd.print("Num2:");
    } else if (key == '=') {
        calculateResult();
        lcd.setCursor(0, 1);
        lcd.print("Result: ");
        lcd.print(result);
    } else if (key == 'C') {
        clearCalculator();
    }
}
}
}

```

```

void calculateResult() {
    switch (operation) {
        case '+':
            result = num1 + num2;
            break;
        case '-':
            result = num1 - num2;
            break;
        case '*':
            result = num1 * num2;
            break;
        case '/':
            if (num2 != 0) {
                result = num1 / num2;
            } else {
                lcd.setCursor(0, 1);
                lcd.print("Error: Div by 0");
                delay(2000);
                clearCalculator();
                return;
            }
            break;
    }
    num1 = result;
    num2 = 0;
    inputNum2 = false;
}

```

```

void clearCalculator() {
    num1 = 0;
    num2 = 0;
    operation = '+';
    result = 0;
    inputNum2 = false;
    lcd.clear();
    lcd.print("Num1:");
    lcd.setCursor(0, 1);
    lcd.print("    ");
}

```

}  
**Schematic:**

