4X4 KEYPAD CALCULATOR USING ARDUINO

Description: In this project we are building calculator with Arduino. For sending the input we are using 4x4 keypad that is it has 4 rows and four columns .And the result is verified using LCD display (16× 2). This calculator could perform simple operations like Addition, Subtraction, Multiplication and Division with whole numbers. Switches are placed between the rows and columns.

Block Diagram:

Inputs and Outputs:

S.No	Description	Name	Type	Data Direction	Specification	Remarks
1	keypad row 1	A	INP	DI	Digital	Active High
2	keypad row 2	B	INP	DI	Digital	Active High
3	keypad row 3	C	INP	DI	Digital	Active High
4	keypad row 4	D	INP	DI	Digital	Active High
5	keypad column 1	1	INP	DI	Digital	Active High
6	keypad column 2	2	INP	DI	Digital	Active High
7	keypad column 3	3	INP	DI	Digital	Active High
8	keypad column 4	4	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;
const byte COLS = 4;
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 );
```

```
const int rs = 8, en = 9, d4 = 10, d5 = 11, d6 = 12, d7 = 13;

LiquidCrystal lcd(rs, en, d4, d5, d6, d7);
 long Num1,Num2,Number;

char key,action;
  boolean result = false;

void setup() {
   lcd.begin(16, 2);
   lcd.print("Nandini");
   lcd.setCursor(0, 1);
   lcd.print("CALCULATOR");


   delay(2000);
    lcd.clear();

}

 void loop(){
   key = kpd.getKey();


if (key!=NO_KEY)
DetectButtons();


if (result==true)

CalculateResult();

DisplayResult();
}

void DetectButtons()

{       lcd.clear();
    if (key=='*')

{Serial.println ("Button Cancel");Number=Num1=Num2=0;result=false;}
      if (key == '1')

{Serial.println ("Button 1");
 if (Number==0)

Number=1;
 else
```

```
Number = (Number*10) + 1;

}
    if (key == '4')

{Serial.println ("Button 4");

if (Number==0)

Number=4;
 else

   Number = (Number*10) + 4;

   }     if (key == '7')

   {Serial.println ("Button 7");
    if (Number==0)
Number=7;     else

   Number = (Number*10) + 7;

   }     if (key == '0')

{Serial.println ("Button 0");
 if (Number==0)
Number=0;     else

Number = (Number*10) + 0;

}     if (key == '2')

{Serial.println ("Button 2");
  if (Number==0)
Number=2;     else

Number = (Number*10) + 2;

   }     if (key == '5')

   {Serial.println ("Button 5");
    if (Number==0)
   Number=5;

Else

Number = (Number*10) + 5;
```

```
}     if (key == '8')

  {Serial.println ("Button 8");
    if (Number==0)
   Number=8;      else

   Number = (Number*10) + 8;

   }        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;

    }       if (key == '6')

   {Serial.println ("Button 6");
    if (Number==0)
   Number=6;

   Else
   Number = (Number*10) + 6;

   }       if (key == '9')

   {Serial.println ("Button 9");
    if (Number==0)
   Number=9;
     else

    Number = (Number*10) + 9;

    }       if (key == 'A' || key == 'B' || key == 'C' || key == 'D')

{

   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);
   lcd.print(Num1);lcd.print(action);lcd.print(Num2);


  if (result==true)
```

```
  {lcd.print(" =");lcd.print(Number);}

     lcd.setCursor(0,1);
   lcd.print(Number);

}
```

Schematic: