Program No:	**20**
Roll No :	**1554**
Title of Program :	**Calculator using keypad**
Objective :	**Implement a basic calculator with an LCD and keypad for simple arithmetic operations and result display.**

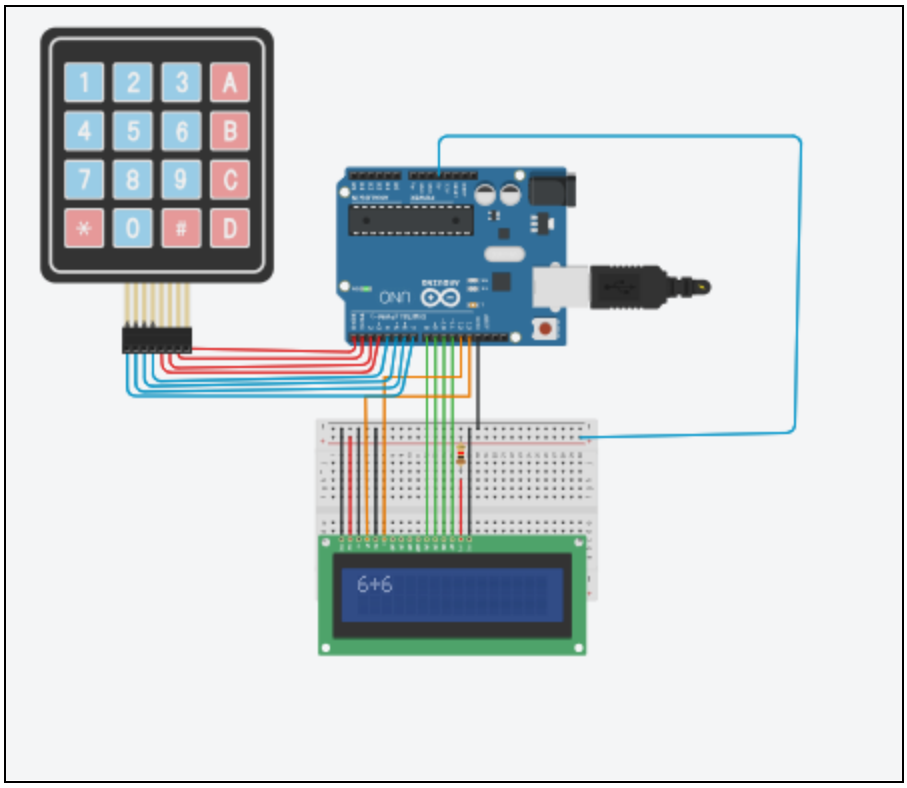
Source Code:

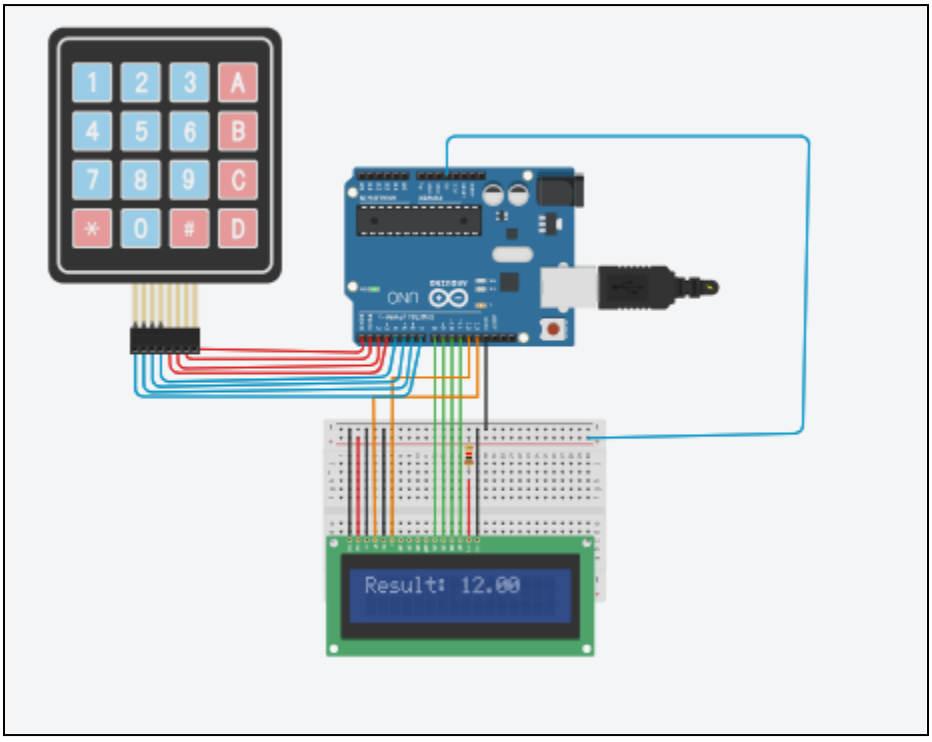
```
#include <LiquidCrystal.h>
#include <Keypad.h>

// LCD pin configuration
int rs = 13, en = 12, d4 = 8, d5 = 9, d6 = 10, d7 = 11;
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);

// Keypad configuration
const byte ROWS = 4;
const byte COLS = 4;
char keys[ROWS][COLS] = {
  {'1', '2', '3', '/'},
  {'4', '5', '6', '*'},
  {'7', '8', '9', '-'},
  {'c', '0', '=', '+'}
};
byte rowPins[ROWS] = {7, 6, 5, 4};
byte colPins[COLS] = {3, 2, 1, 0};

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

// Calculator logic
long first = 0, second = 0;
char operation = '\0';
```

```
bool enteringSecond = false;
double result = 0;

void setup() {
  lcd.begin(16, 2);
  lcd.setCursor(1, 0);
  lcd.print("Basic Calculator");
  delay(2000);
  lcd.clear();
}

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

  if (key != NO_KEY) {
    lcd.setCursor(0, 1);
    lcd.print("                "); // clear second row
    lcd.setCursor(0, 0);

    if (key >= '0' && key <= '9') {
      if (!enteringSecond) {
        first = first * 10 + (key - '0');
        lcd.print(first);
      } else {
        second = second * 10 + (key - '0');
        lcd.print(first);
        lcd.print(operation);
        lcd.print(second);
      }
    } else if (key == '+' || key == '-' || key == '*' || key == '/') {
      operation = key;
      enteringSecond = true;
      lcd.clear();
      lcd.print(first);
      lcd.print(operation);
    } else if (key == '=') {
      switch (operation) {
        case '+': result = first + second; break;
        case '-': result = first - second; break;
        case '*': result = first * second; break;
```

```
        case '/':
          if (second != 0) result = (double)first / second;
          else {
            lcd.clear();
            lcd.print("Error: Divide 0");
            delay(2000);
            resetCalculator();
            return;
          }
          break;
      }
      lcd.clear();
      lcd.print("Result: ");
      lcd.print(result);
      delay(2000);
      resetCalculator();
    } else if (key == 'c' || key == 'C') {
      resetCalculator();
      lcd.clear();
    }
  }
}

void resetCalculator() {
  first = 0;
  second = 0;
  result = 0;
  enteringSecond = false;
  operation = '\0';
}
```

OutPut:


1 2 3 A
4 5 6 B
7 8 9 C
* 0 # D
6+6


1 2 3 A
4 5 6 B
7 8 9 C
* 0 # D
Result: 12.00