STATE UNIVERSITY OF BANGLADESH (SUB)

Course No: CSE-0406

Course Name: Computer Peripherals and Interfacing Lab

Semester: 11th

Submitted to:

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Lecturer,

Department of CSE, SUB

Submitted By:

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Batch: 47th

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Task :

Design a simple calculator using Proteus and Arduino. Use LCD as a display device (The buttons pressed will be shown on LCD)

Code:

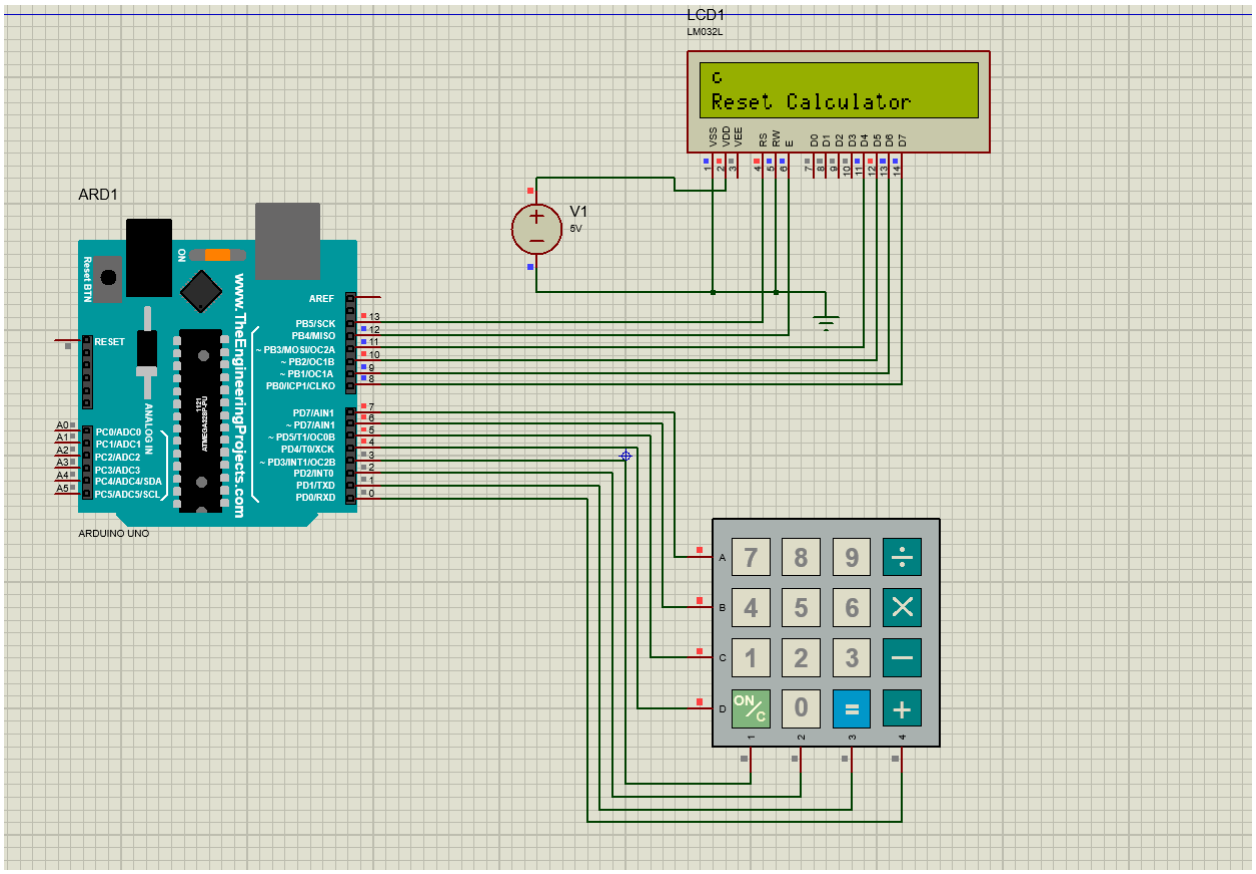
```
#include <Keypad.h>

#include <LiquidCrystal.h>

/// connected pin with lcd and arduino

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

LiquidCrystal lcd(rs, en, d4, d5, d6, d7);

const byte ROWS = 4; // Four rows

const byte COLS = 4; // Four columns as this is a 4*4 Keypad

char keys[ROWS][COLS] = {

 {'7', '8', '9', '/'},

 {'4', '5', '6', '*'},

 {'1', '2', '3', '-'},

 {'c', '0', '=', '+'}

}; // defining the keys in the keypad

byte rowPins[ROWS] = { 7, 6, 5, 4 };// Connect keypad ROW(0-3) to these Arduino pins.

byte colPins[COLS] = { 3, 2, 1, 0 }; // Connect keypad COL0, COL1, COL2 and COL3 to these Arduino pins.

Keypad kpd = Keypad( makeKeymap(keys), rowPins, colPins, ROWS, COLS ); // Create the Keypad variable to identify and store the pressed key.

long num1 = 0, num2 = 0, ans = 0;

bool opFirst = true, isFirst = true, okSecond = false, done = false;

char op = '?';

void setup() {

 lcd.begin(20, 2);//set up the LCD's number of column and rows

}
```

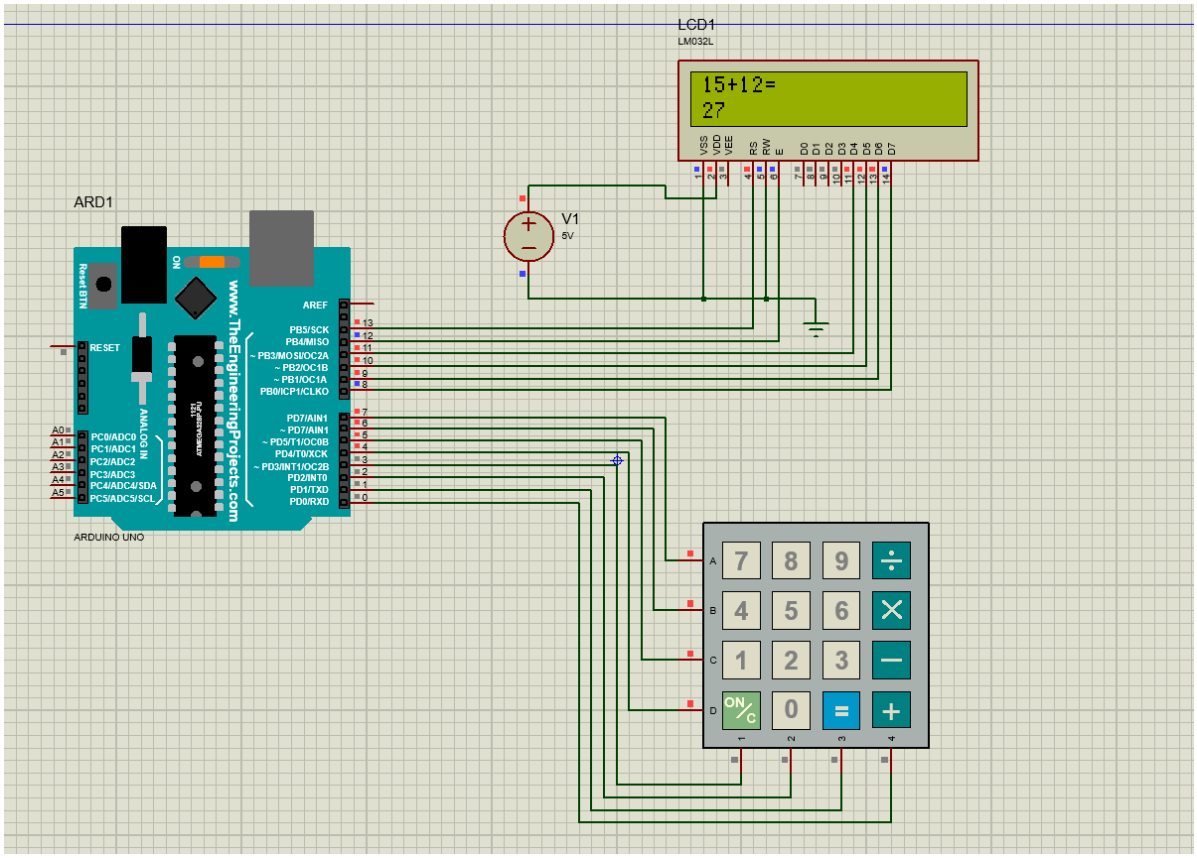
```
void loop() {
  cal();
}
void cal() {
  char key = kpd.getKey(); /// get key from keypad
  if (key != 0) {
    if (!done)lcd.print(key); // if result is not calculated
    if (key == 'c') { /// c for reset
      lcd.setCursor(0, 1);
      lcd.print("Reset Calculator");
      delay(500);
      reset();
    }
    else if (key >= '0' and key <= '9') { /// genarating number
      if (isFirst) {
        num1 = (num1 * 10) + (key - '0');
        opFirst = false;
      } else {
        num2 = (num2 * 10) + (key - '0');
        okSecond = true;
      }
    } else if (key == '=') { /// if want to know ans
      lcd.setCursor(0, 1);
      if (op == '?' or !okSecond) {
        lcd.print("Error!!!");
        delay(100);
        reset();
      } else {
        bool ck = true;
```

```
      if (op == '+') ans = num1 + num2;
      else if (op == '-') ans = num1 - num2;
      else if (op == '*') ans = num1 * num2;
      else if (op == '/' and num2 != 0) ans = num1 / num2;
      else ck = false;
      if (!ck) lcd.print("Undefined");
      else {
        lcd.print(ans);
      } done = true;
    }
   } else { /// if someone pressed opeation key
    if (!opFirst and op == '?') op = key, isFirst = false; /// set operation
    else {
     lcd.print("Invalid");
     delay(300);
     lcd.clear();
     reset();
    } /// if any invaild input found
   }
  }
}
void reset() { // reset function
  num1 = num2 = ans = 0;
  opFirst = isFirst = true;
  okSecond = done = false;
  op = '?';
  lcd.clear();
  lcd.setCursor(0, 0);
}
```

Screenshot:

1. **Reset**
2. **Addition**
3. **Subtraction**
4. **Division 1**
5. **Division 2**
6. **Invaild Input**




LCD1
LM032L
15+12=
27
VSS VDD VEE RS RW E D0 D1 D2 D3 D4 D5 D6 D7
ARD1
V1
5V
Reset BTN
ON
RESET
ANALOG IN
AREF
PB5/SCK
PB4/MISO
~ PB3/MOSI/OC2A
~ PB2/OC1B
~ PB1/OC1A
PB0/ICP1/CLKO
PD7/AIN1
~ PD7/AIN1
~ PD5/T1/OC0B
PD4/T0/XCK
~ PD3/INT1/OC2B
PD2/INT0
PD1/TXD
PD0/RXD
A0 PC0/ADC0
A1 PC1/ADC1
A2 PC2/ADC2
A3 PC3/ADC3
A4 PC4/ADC4/SDA
A5 PC5/ADC5/SCL
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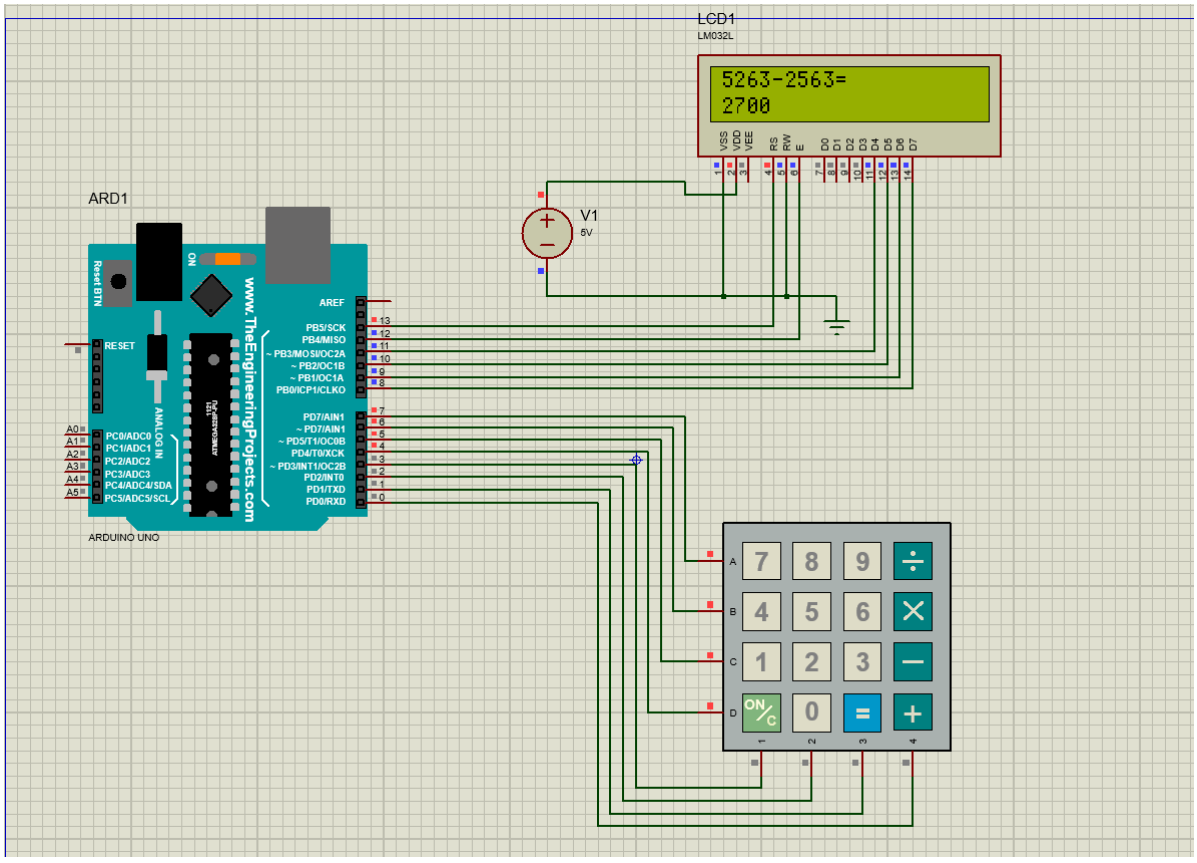
ARDUINO UNO
A 7 8 9 ÷
B 4 5 6 ×
C 1 2 3 −
D ON/C 0 = +


LCD1
LM032L
5263-2563=
2700
VSS VDD VEE RS RW E D0 D1 D2 D3 D4 D5 D6 D7
ARD1
V1
5V
Reset BTN
ON
RESET
ANALOG IN
AREF
PB5/SCK
PB4/MISO
~ PB3/MOSI/OC2A
~ PB2/OC1B
~ PB1/OC1A
PB0/ICP1/CLKO
PD7/AIN1
~ PD7/AIN1
~ PD5/T1/OC0B
PD4/T0/XCK
~ PD3/INT1/OC2B
PD2/INT0
PD1/TXD
PD0/RXD
A0 PC0/ADC0
A1 PC1/ADC1
A2 PC2/ADC2
A3 PC3/ADC3
A4 PC4/ADC4/SDA
A5 PC5/ADC5/SCL
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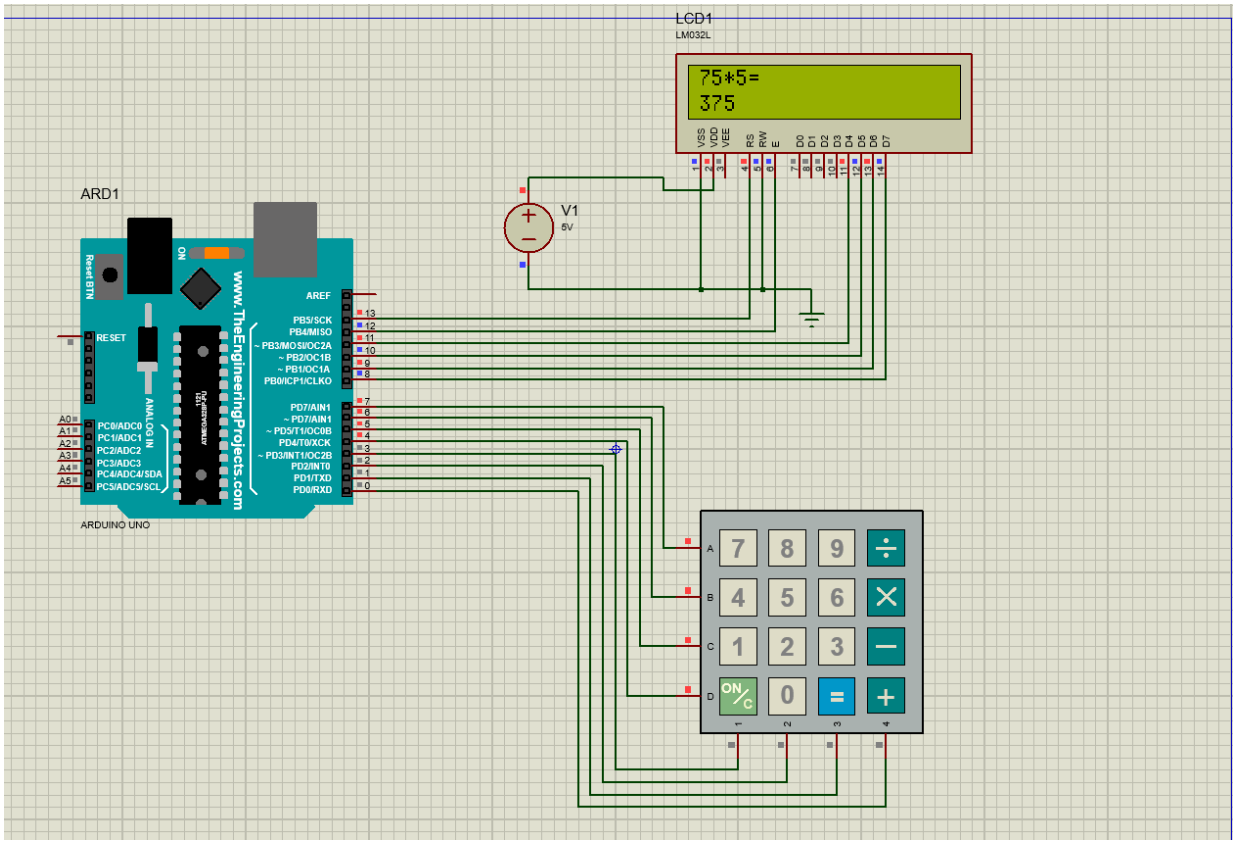
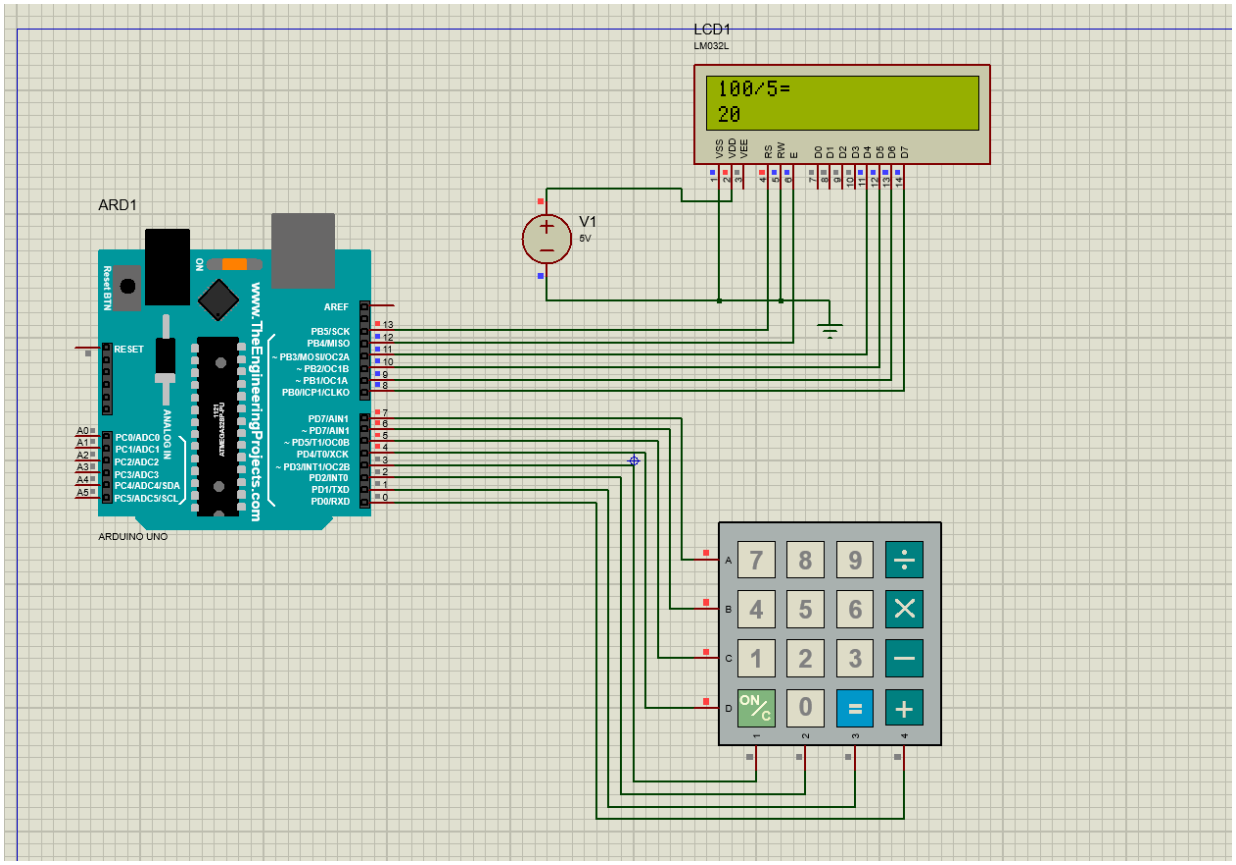
ARDUINO UNO
A 7 8 9 ÷
B 4 5 6 ×
C 1 2 3 −
D ON/C 0 = +


LCD1
LM032L
75*5=
375
VSS
VDD
VEE
RS
RW
E
D0
D1
D2
D3
D4
D5
D6
D7
ARD1
V1
5V
Reset BTN
ON
RESET
AREF
PB5/SCK
PB4/MISO
~ PB3/MOSI/OC2A
~ PB2/OC1B
~ PB1/OC1A
PB0/ICP1/CLKO
PD7/AIN1
~ PD7/AIN1
~ PD5/T1/OC0B
PD4/T0/XCK
~ PD3/INT1/OC2B
PD2/INT0
PD1/TXD
PD0/RXD
ANALOG IN
PC0/ADC0
PC1/ADC1
PC2/ADC2
PC3/ADC3
PC4/ADC4/SDA
PC5/ADC5/SCL
www.TheEngineeringProjects.com
ARDUINO UNO
7
8
9
÷
4
5
6
×
1
2
3
−
ON/C
0
=
+


LCD1
LM032L
100/5=
20
VSS
VDD
VEE
RS
RW
E
D0
D1
D2
D3
D4
D5
D6
D7
ARD1
V1
5V
Reset BTN
ON
RESET
AREF
PB5/SCK
PB4/MISO
~ PB3/MOSI/OC2A
~ PB2/OC1B
~ PB1/OC1A
PB0/ICP1/CLKO
PD7/AIN1
~ PD7/AIN1
~ PD5/T1/OC0B
PD4/T0/XCK
~ PD3/INT1/OC2B
PD2/INT0
PD1/TXD
PD0/RXD
ANALOG IN
PC0/ADC0
PC1/ADC1
PC2/ADC2
PC3/ADC3
PC4/ADC4/SDA
PC5/ADC5/SCL
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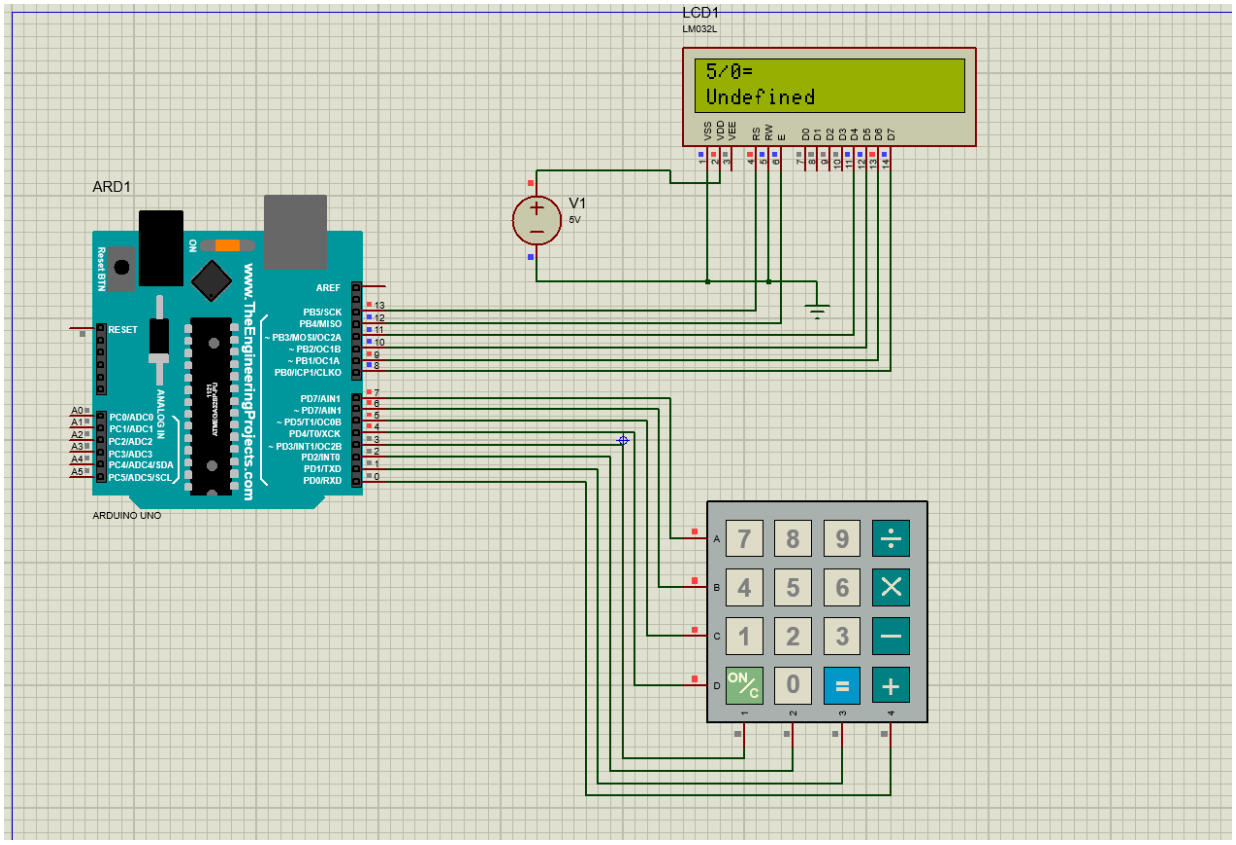
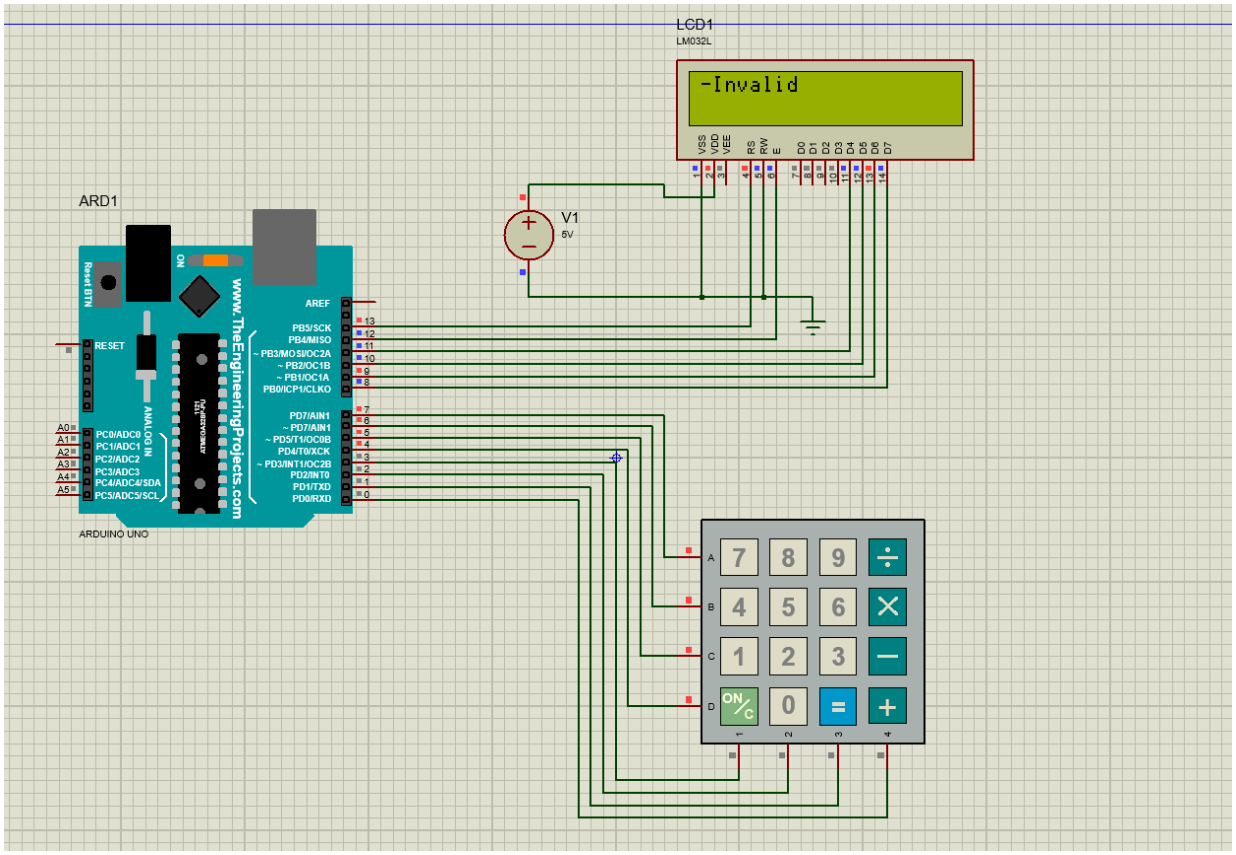
ARDUINO UNO
7
8
9
÷
4
5
6
×
1
2
3
−
ON/C
0
=
+


LCD1
LM032L
5/0=
Undefined
VSS VDD VEE RS RW E D0 D1 D2 D3 D4 D5 D6 D7
ARD1
V1
5V
Reset BTN
ON
RESET
ANALOG IN
AREF
PB5/SCK
PB4/MISO
~ PB3/MOSI/OC2A
~ PB2/OC1B
~ PB1/OC1A
PB0/ICP1/CLKO
PD7/AIN1
~ PD7/AIN1
~ PD5/T1/OC0B
PD4/T0/XCK
~ PD3/INT1/OC2B
PD2/INT0
PD1/TXD
PD0/RXD
A0 PC0/ADC0
A1 PC1/ADC1
A2 PC2/ADC2
A3 PC3/ADC3
A4 PC4/ADC4/SDA
A5 PC5/ADC5/SCL
www.TheEngineeringProjects.com
ARDUINO UNO
7 8 9 ÷
4 5 6 ×
1 2 3 −
ON/C 0 = +


LCD1
LM032L
-Invalid
VSS VDD VEE RS RW E D0 D1 D2 D3 D4 D5 D6 D7
ARD1
V1
5V
Reset BTN
ON
RESET
ANALOG IN
AREF
PB5/SCK
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PD7/AIN1
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~ PD5/T1/OC0B
PD4/T0/XCK
~ PD3/INT1/OC2B
PD2/INT0
PD1/TXD
PD0/RXD
A0 PC0/ADC0
A1 PC1/ADC1
A2 PC2/ADC2
A3 PC3/ADC3
A4 PC4/ADC4/SDA
A5 PC5/ADC5/SCL
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7 8 9 ÷
4 5 6 ×
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