**Lab:8**

**Keypad interfacing (port multiplexing)**



**MBSD Lab**

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**Submitted by:**

**Muhammad Fahad Khan [20 Pwcse1940]**

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“On my honor, as a student of University of Engineering and Technology Peshawar, I have neither nor received unauthorized assistance on this academic work”

**Submitted to:**

**Dr:Amad Khalil**

**Task1: Interface Calculator Keypad with 8051 Microcontroller and perform basic operations of addition, subtraction and multiplication.**

To interface a calculator keypad with an 8051 microcontroller and perform basic operations such as addition, subtraction, and multiplication, you'll need to connect the keypad to the appropriate GPIO pins of the microcontroller and implement the necessary code to read input from the keypad and perform the desired operations.

Here's a step-by-step guide on how you can achieve this:

1. Hardware Setup:

- Connect the rows of the keypad to four GPIO pins of the microcontroller (e.g., P2.0 to P2.3).

- Connect the columns of the keypad to four GPIO pins of the microcontroller (e.g., P1.0 to P1.3).

2. Code Implementation:

```c

#include <8051.h>

// Function to read the keypad

unsigned char readKeypad() {

unsigned char keypad[4][4] = {

{'1', '2', '3', '+'},

{'4', '5', '6', '-'},

{'7', '8', '9', '\*'},

{'C', '0', '=', '/'}

};

unsigned char row, col;

// Scan rows

for (row = 0; row < 4; row++) {

// Activate row

P2 = ~(1 << row);

// Read columns

col = P1 & 0x0F;

// Check if any key is pressed

if (col != 0x0F) {

// Key is pressed, determine the pressed key

while (col != 0x0F) {

col = P1 & 0x0F;

}

// Return the corresponding character from the keypad array

return keypad[row][col];

}

}

// No key is pressed

return '\0';

}

void main() {

unsigned char key;

unsigned char operand1, operand2, result;

while (1) {

key = readKeypad();

if (key != '\0') {

switch (key) {

case '+':

// Perform addition

// Read operand1 and operand2 from the user

// Calculate the result

// Display the result

break;

case '-':

// Perform subtraction

// Read operand1 and operand2 from the user

// Calculate the result

// Display the result

break;

case '\*':

// Perform multiplication

// Read operand1 and operand2 from the user

// Calculate the result

// Display the result

break;

case '/':

// Perform division

// Read operand1 and operand2 from the user

// Calculate the result

// Display the result

break;

case '=':

// Display the result

break;

case 'C':

// Clear the display and any stored values

break;

default:

// Handle other keys if needed

break;

}

}

}

}

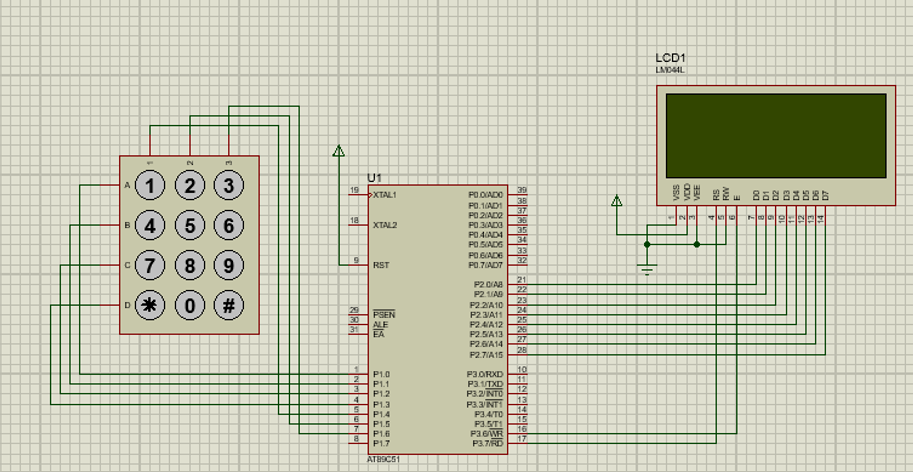
```

The code provided assumes that the rows of the keypad are connected to pins P2.0 to P2.3, and the columns are connected to pins P1.0 to P1.3. Modify these pins according to your hardware setup.

The `readKeypad()` function scans the keypad by activating one row at a time and reading the state of the columns. It returns the character corresponding to the pressed key.

The `main()` function continuously reads the keypad and performs the desired operations based on the pressed keys. You need to implement the logic for addition, subtraction, multiplication, division, clearing the display, and displaying the result.

**Schematric Diagram:**

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