

Department of Electrical Engineering Assignment

Date: 07/05/2020

Course Details

Course Title: Microcontroller Systems Interfacing

Module: 06

Instructor: Engineer Muhammad Waqas

Total Marks: 20

Student Details

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Q1. (a) Write a program where you get input from the user using a keypad and display the output on an LCD using an Arduino uno, write the code and show the circuit diagram

Marks 10 CLO 2

Q2. (a) Interface an 8x8 LED matrix with Arduino and display a custom message scrolling on the matrix, the message must be input form the user using a keypad.

Marks 10 CLO 1

## Q1

### ANSWER:

```
#include <Keypad.h>
#include <LCD4Bit_mod.h>
LCD4Bit_mod lcd = LCD4Bit_mod(2);

int v1 = 0;
int v2 = 0;
int v3 = 0;
const byte ROWS = 4;
const byte COLS = 3;

char keys[ROWS][COLS] = {
  {'1','2','3'},
  {'4','5','6'},
  {'7','8','9'},
  {'*','0','#'}
};

byte rowPins[ROWS] = { 22, 23, 24, 25 };
byte colPins[COLS] = { 26, 27, 28 };
Keypad kpd = Keypad( makeKeymap(keys), rowPins, colPins, ROWS, COLS );

void setup()
{
  lcd.init();
  lcd.commandWrite(0x0F);
  lcd.clear();
  Serial.begin(9600);
}

void loop()
{
  v1 = GetNumber();
  //Serial.println ();
  //Serial.print (v1);
  v2 = GetNumber();
  v3 = GetNumber();
}

int GetNumber()
{
  int num = 0;
  char key = kpd.getKey();
  switch (key)
  {
    case NO_KEY:
      break;
  }
}
```

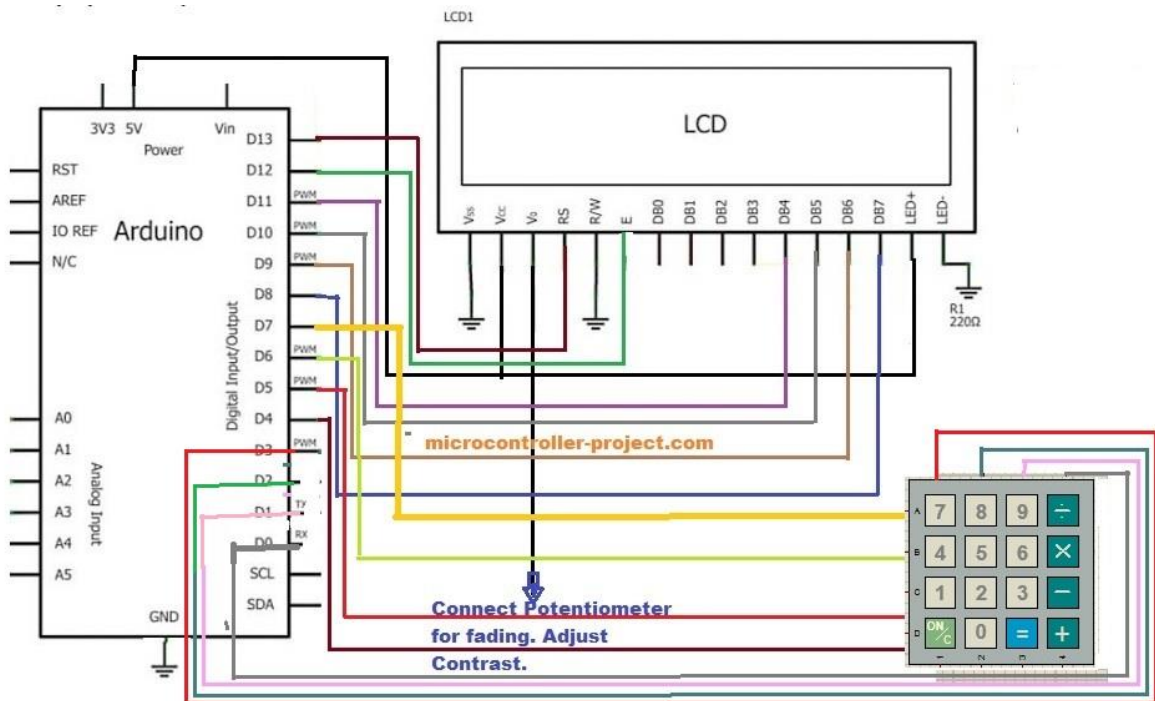
```

case '0': case '1': case '2': case '3': case '4':
case '5': case '6': case '7': case '8': case '9':
  lcd.print(key);
  num = num * 10 + (key - '0');
  break;

case '#':
  //Serial.println ();
  //Serial.print (num);
  return num;
  break;

case '*':
  num = 0;
  lcd.clear();
}
}

```



## Q2

### Answer:

```
#include <LedControl.h>

int DIN = 13;
int CS = 12;
int CLK = 11;

byte E[8] = {0x3C,0x20,0x20,0x3C,0x20,0x20,0x20,0x3C};
byte L[8] = {0x20,0x20,0x20,0x20,0x20,0x20,0x20,0x3E};
byte C[8] = {0x1C,0x20,0x20,0x20,0x20,0x20,0x20,0x1C};
byte T[8] = {0x7C,0x10,0x10,0x10,0x10,0x10,0x10,0x10};
byte R[8] = {0x38,0x24,0x24,0x28,0x30,0x28,0x24,0x24};
byte O[8] = {0x1C,0x22,0x22,0x22,0x22,0x22,0x22,0x1C};
byte N[8] = {0x42,0x62,0x52,0x52,0x4A,0x46,0x46,0x42};
byte I[8] = {0x38,0x10,0x10,0x10,0x10,0x10,0x10,0x38};
byte S[8] = {0x1C,0x20,0x20,0x10,0x08,0x04,0x04,0x38};
byte H[8] = {0x22,0x22,0x22,0x3E,0x22,0x22,0x22,0x22};
byte U[8] = {0x22,0x22,0x22,0x22,0x22,0x22,0x22,0x1C,};
byte B[8] = {0x38,0x24,0x24,0x38,0x38,0x24,0x24,0x38};
byte smile[8]= {0x3C,0x42,0xA5,0x81,0xA5,0x99,0x42,0x3C};
byte neutral[8]= {0x3C,0x42,0xA5,0x81,0xBD,0x81,0x42,0x3C};
byte frown[8]= {0x3C,0x42,0xA5,0x81,0x99,0xA5,0x42,0x3C};

LedControl lc=LedControl(DIN,CLK,CS,1);

void setup(){
  lc.shutdown(0,false);
  lc.setIntensity(0,5);
  lc.clearDisplay(0);
}

void loop()
{
  printByte(smile);
  delay(1000);

  printByte(neutral);
  delay(1000);

  printByte(frown);
  delay(1000);
}
```

```
printByte(E);  
delay(1000);
```

```
printByte(L);  
delay(1000);
```

```
printByte(E);  
delay(1000);
```

```
printByte(C);  
delay(1000);
```

```
printByte(T);  
delay(1000);
```

```
printByte(R);  
delay(1000);
```

```
printByte(O);  
delay(1000);
```

```
printByte(N);  
delay(1000);
```

```
printByte(I);  
delay(1000);
```

```
printByte(C);  
delay(1000);
```

```
printByte(S);  
delay(1000);
```

```
lc.clearDisplay(0);  
delay(1000);
```

```
printByte(H);  
delay(1000);
```

```
printByte(U);  
delay(1000);
```

```
printByte(B);  
delay(1000);
```

```

lc.clearDisplay(0);
delay(1000);
}

void printByte(byte character [])
{
  int i = 0;
  for(i=0;i<8;i++)
  {
    lc.setRow(0,i,character[i]);
  }
}
}

```

