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CPE 301-1001
Assignment #6
October 20, 2016

Assignment Description:

In Lab 6 we were to build a circuit which illuminated a 7-segment display by programming an Arduino Micro with the Arduino IDE. We used components such as the 7-segment LED, a 4-bit DIP switch, and an 8-bit buffer.

Problems Encountered:

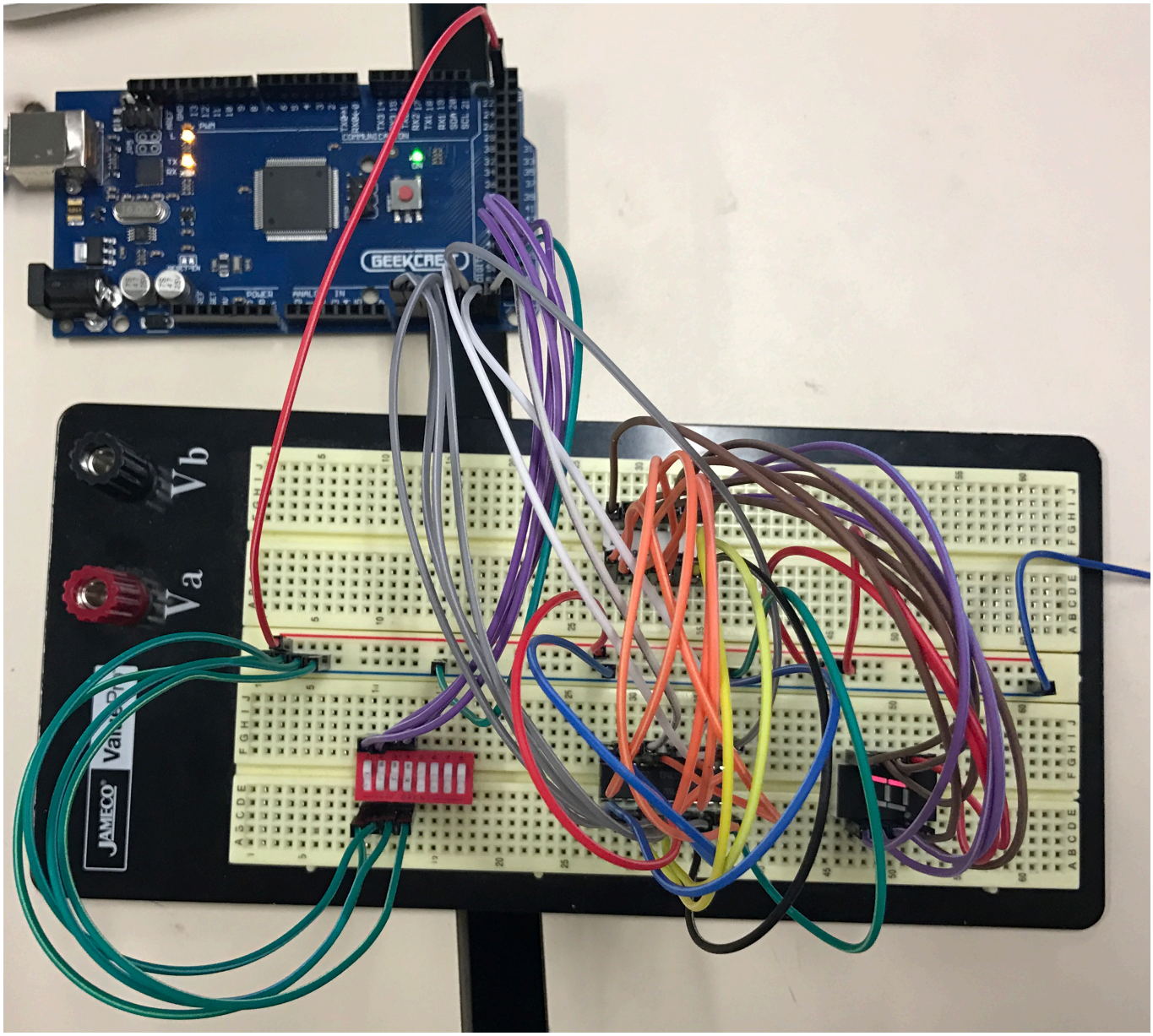
The biggest challenge I encountered in this lab was making sure all of the wires were connected correctly. I also had an issue with a faulty wire which kept me debugging my code for a while before I diagnosed the correct issue.

Lessons Learned:

I I learned that I need to more thoroughly track and organize my wires when I build circuits. Specifically, I need to keep the idea of the least significant bit being on one side of a line of wires in mind. Because I failed to do this, I had to program through the IDE in such a way that the input bits were essentially backwards. This is evident in the final code below.

Description of Completed Lab:

1) This portion of the Lab is evident in the second section. Below is a basic picture of the completed circuit. (showing a 1 in the bottom right).



2) The code for this program is below (continues to pg. 4), showing the successful compilation

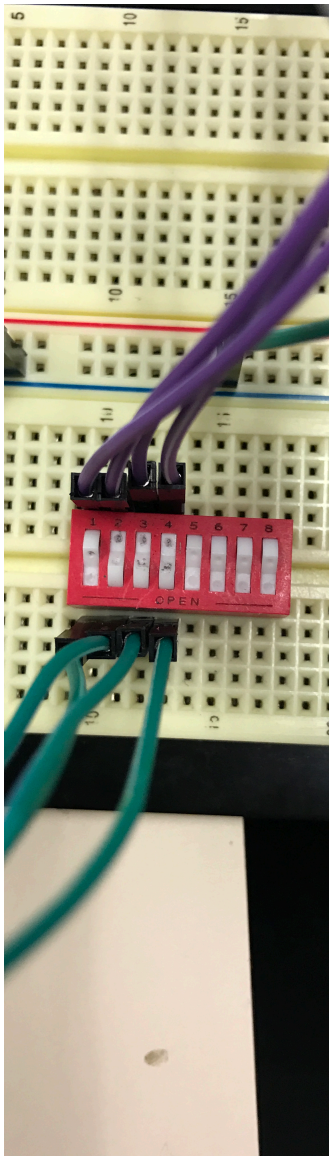
ANSI-C_Lab_6

```
volatile unsigned char *portDDRB = (unsigned char*) 0x24;
volatile unsigned char *portDataB = (unsigned char*) 0x25;
volatile unsigned char *portPinB = (unsigned char*) 0x23;
volatile unsigned char *portDDRK = (unsigned char*) 0x107;
volatile unsigned char *portDataK = (unsigned char*) 0x108;

char test[16] = {'A','B','C','D','E','F','0','1','2','3','4','5','6','7','8','9'};
volatile unsigned int index = 0;

//void changeDisplay(char);
void myDelay(unsigned long);

void setup() {
  *portDDRB &= 0b00000000; // set last 4 as inputs
  *portPinB |= 0b00001111; // turn on pullup resistor for last 4

  *portDDRK |= 0b11111111; // setting up port k
  Serial.begin(9600);
}


void loop() {

  unsigned char value = *portPinB & 0b00001111;

  Serial.println(value, BIN);

  *portDataK = 0;
  switch (value) { // 0->9 A->F
    case 0:
      *portDataK |= 0b00111111; // 0 */goes from right to left*/
      break;
    case 1:
      *portDataK |= 0b00000110; // 1 done
      break;
    case 2:
      *portDataK |= 0b01011011; // 2 done
      break;
    case 3:
      *portDataK |= 0b01001111; // 3 done
```

```
      break;
    case 4:
      *portDataK |= 0b01100110; // 4 done
      break;
    case 5:
      *portDataK |= 0b01101101; // 5 done
      break;
    case 6:
      *portDataK |= 0b01111101; // 6 done
      break;
    case 7:
      *portDataK |= 0b00000111; // 7 done
      break;
    case 8:
      *portDataK |= 0b01111111; // 8 done
      break;
    case 9:
      *portDataK |= 0b01100111; // 9 done
      break;
    case 10:
      *portDataK |= 0b01110111; // A done
      break;
    case 11:
      *portDataK |= 0b01111100; // b done
      break;
    case 12:
      *portDataK |= 0b00111001; // C done
      break;
    case 13:
      *portDataK |= 0b01011110; // D done
      break;
    case 14:
      *portDataK |= 0b01111001; // E done
      break;
    case 15:
      *portDataK |= 0b01110001; // F done
      break;

    default:
      *portDataK |= 0b00111111; // 0 by default
  }
}

void myDelay(unsigned long mSecondsApx) {
  volatile unsigned long i;
  unsigned long endTime = 1000*mSecondsApx;
  for (i = 0; i < endTime; i++);
}
```

```
Done compiling.


Sketch uses 2,492 bytes (0%) of program storage space. Maximum is 253,952 bytes.
Global variables use 208 bytes (2%) of dynamic memory, leaving 7,984 bytes for local variables. Maximum is 8,192 bytes.
```

This code above resulted in the device shown on the next page.



On the left you can see that I could enter the binary digits 0001 (from left to right) and the result is shown below.