

University of Massachusetts Dartmouth  
Department of Electrical and Computer Engineering

ECE 160  
ATmega Lab 2

Name: btn\_hold\_main.c  
Due: see <http://ece160.org>

Write a program to turn on a LED while the button is pressed. Switch B3 (leftmost) should control the Red LED, switch B2 the Green, and switch B1 (rightmost) the Blue. The corresponding LED should remain on as long as the button is held down. The LED should go off when the button is released.

By pressing combinations of buttons, you should be able to create 8 different colors on the LED: Black, Red, Green, Blue, Magenta, Cyan, Yellow, and White, based on the color table in Arduino Lab 1.

The buttons are connected to PORTE as follows:

Button	Port E bit	Value if pressed	Val if NOT pressed
B3 (leftmost)	E2	0	1
B2	E1	0	1
B1 (rightmost)	E0	0	1

Note that when the button is NOT pressed, the value of that bit on the port is 1. When the button is pressed, it is zero. Each of these bits on PORTE should be set to an input, by writing a 0 into bits 0,1,2 of DDRE. These bits of PORTE may then be read via PINE.

To insure the value of a pushbutton is 1, you need to enable the pull up resistor inside of the microcontroller. This will be covered in greater detail in ECE 263. For now, the code you should use to setup the buttons for input is as follows:

```
DDRE = DDRE & 0b11111000; // set bits 2,1,0 as inputs
PORTE = PORTE | 0b00000111; // enable pull up resistors on bits 2,1,0
```

You cannot read the state of a single button; you can only read an entire port at one time. To READ a port (input), use PINE for port x; i.e.

```
s = PINE;
```

This will copy all 8 bits of port E into the variable s. You may use if() with anding to determine which bit or bits is/are pressed. You should declare s as follows:

```
int8_t s;
```

You may refer to ATmega Lab 1 for more info on DDRx, PORTx, and PINx. Also refer to your code for lab 1 for info on which bits of PORTB/PORTD controls which color LED.

This must be checked of by TA, AND submitted to your M: drive. When submitting, INSURE that your first ATmega Lab is named led\_main.c, and NOT just main.c. This lab must be named btn\_hold\_main.c. You may use checksubmit to verify.

Student Name: \_\_\_\_\_

TA Signature: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Checksum: \_\_\_\_\_