Lab 4 - Embedded Systems

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CS312 - Computer Architecture II

February 12, 2017

In this lab you will be introduced to the Arduino platform. You will learn about the Arduinos architecture, and you will write a simple program making use of the Arduinos digital GPIO pins to simulate a traffic light.

1 Description

You are required to code a simple traffic light controller using the Arduino UNO board. It should cycle through lighting the green, yellow and red LEDs every 2 seconds. Only one LED should be lit at a time, and the sequence should be green, yellow, red; not in any other order.

1.1 Instructions

First you will need to start the Arduino IDE with default settings. Using the default program as a base, you will write a simple Arduino traffic light controller making use of the digital I/O ports. You can find the Arduino documentation on this link. A list of essential functions useful in this project is also included below for convenience.

Table 1: Arduino basic functions

Function	Description
pinMode(pin, mode)	Sets the pin to input or output mode.
digitalWrite(pin, value)	Sets a digital I/O pin to either HIGH, or LOW
delay(ms)	Pauses the program for the specified number of milliseconds.

In order to use the lab setup set the following pin outputs as given in Table 2:

1.2 Hardware

Four Arduino UNO's, LEDs, resistors, hookup wire, and a breadboard is available in Hebeler 214D during lab sessions and office hours. Otherwise, any personal Arduino device can be

Table 2: Light output pins

Pin	Light
13	Green
12	Yellow
11	Red

used to test your code.

It is standard to wire circuits using black or white wire for ground, and red for positive (the standard specifies more detail about when to use black wire vs white wire, but for the purposes of this lab, either will be accepted).

Submission

The student must submit the following file to canvas:

1. `Lab4.ino`

The file must be submitted through Canvas by 5pm February 20, 2017. The penalty for late submission is 10% for 1 day, 20% for 2 day, after which it will be zero. The grading rubric is given in Table 3.

Table 3: Grading rubric

File	Aspects	Points
`Lab4.ino`	Correct implementation	50
	Correct lighting sequence	15
	Correct timing	15
	Adequate code documentation	20