ENGR 120  Homework 3

NOTE: Use non-engineering format for problems 1, 2, 5, and 6. Use engineering format for problems 3 and 4. This is an individual assignment. You must complete the assignment on your own, although you may discuss the problems with other class members (but no copying of work).

1. Enter into the Arduino environment and open the following sketch:
   Files > Examples > Basics > BareMinimum
   a. What happens when you upload this sketch? Nothing Happens
   b. Adjust the Bare Minimum Sketch to be written similar to the sketch below. Instead of “Hello, my
   name is mighty bulldog,” write your own message. After uploading the sketch you will need to
go to Tools > Serial Monitor (or click the serial monitor shortcut in the top right of the IDE) to
allow the text to be printed on the screen.
   c. Provide a screen shot of your program and the resulting text message that is printed on the
serial monitor.
   
   ![Sketch Screenshot](image)
   
   d. The above sketch includes the commands Serial.begin() and Serial.print(). Use the Arduino
   reference page (http://arduino.cc/en/Reference/Serial) to learn about these commands and
two others from the list that you choose. Write a sentence or two describing their purpose and
how they work (spend about 15 minutes, answering to the best of your ability; some of this will
be completely new to you).

2. Set up the LED circuit discussed in class. Control the LED with the Arduino to continuously blink in
your own pattern (must be different than the patterns discussed in class).
   a. Bring your Arduino to class ready to demonstrate your implementation of this problem.
   b. Optional Challenge: Set up a second LED circuit and have your Arduino control both LEDs.

NOTE: You must be very careful with capitalization (digitalWrite will not work but digitalWrite will), with
punctuation (don’t forget the semicolons), and with brackets. The Arduino programming environment
helps you by changing the text to certain colors to let you know things are OK. For example, “HIGH” is
changed to blue when it is entered correctly.
3. For the circuit below, find
   a. The equivalent resistance of the circuit. 4.857\,\Omega
   b. The power that is dissipated by the circuit. 5.147\,W
   c. The current leaving the power source. 1.029\,A

4. For the circuit below, find
   a. The equivalent resistance of the circuit. 315.4\,\Omega
   b. The current leaving the power source. 38\,mA (mA is milliamp or 1/1000 of an amp)
   c. Find the power dissipated by the circuit. 0.457\,W
5. Consider the circuit below. Here, three 220Ω resistors are placed on a breadboard in parallel, and the multimeter reads 73.2Ω even though the multimeter is clamped only across the center resistor. Why doesn’t it read 220Ω if it is clamped across the 220Ω resistor?

6. Try to finish the assembly of your robot before the next class. Visit the Living with the Lab HelpDesk in Bogard Hall 129 if you still need to punch holes outside of class! You do not need to attach a battery pack at this time.