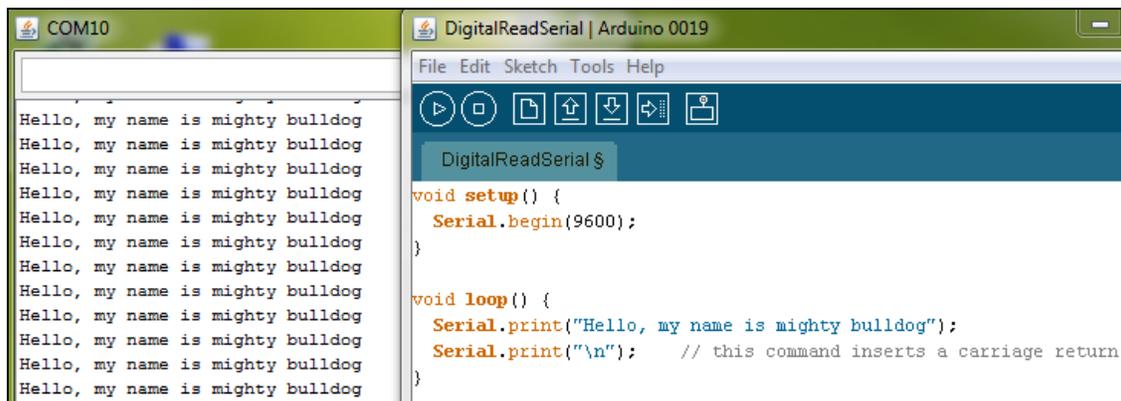


**NOTE:** Use non-engineering format for problems 1, 2, 6, and 7. Use engineering format for problems 3, 4, and 5. This is an individual assignment. You must complete the assignment on your own, although you may discuss the problems with other class members (but no copying of work).

1. Enter into the Arduino environment and open the following sketch:

**Files > Examples > Basics > BareMinimum**

- What happens when you upload this sketch? [Nothing Happens](#)
- 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.
- Provide a screen shot of your program and the resulting text message that is printed on the serial monitor.



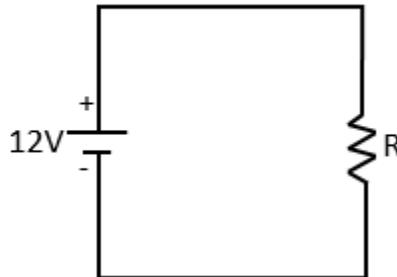
- The above sketch includes the commands `Serial.begin()` and `Serial.print()`. Use the Arduino reference page (<http://arduino.cc/en/Reference/Serial>) to learn about **these commands and two others** from the list that you choose. Write a sentence or two describing their purpose and how they work (spend about 15 minutes, answering to the best of your ability; some of this will be completely new to you).

- 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).
  - Provide a screen shot of your sketch.
  - Bring your Arduino to class ready to demonstrate your implementation of this problem.
  - Optional Challenge: Set up a second LED circuit and have your Arduino control both LEDs.

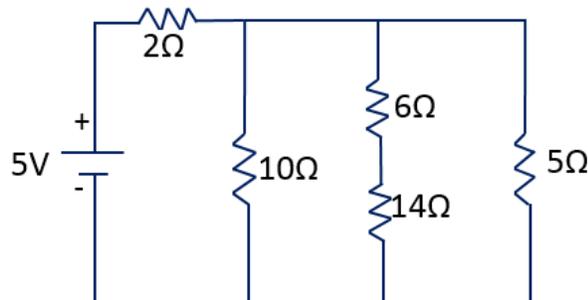
**NOTE:** You must be very careful with capitalization (`digitalwrite` will not work but `digitalWrite` will), with punctuation (don't forget the semicolons), and with brackets. The Arduino programming environment helps you by changing the text to certain colors to let you know things are OK. For example, “HIGH” is changed to blue when it is entered correctly.

**Note:** Have your Arduino/Blinking LED circuit out on your table with the program running so that your instructor or class assistant can quickly check your work. Do not turn your homework in at the front; have it ready so that the instructor / assistant can grade your blinking LED activity.

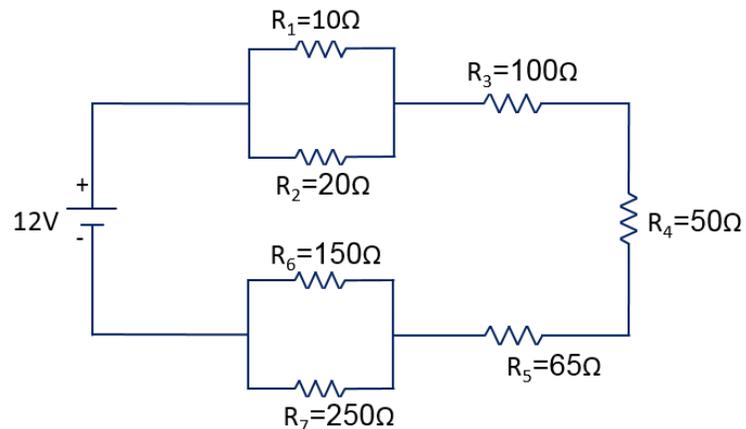
3. Suppose the net number of electrons that leave the negative side of a voltage source is  $2.35 \times 10^{20}$  electrons and the circuit has been in operation for 1.75 hours. If the voltage source is 12V, then what is the value of the resistor?  $R = 2007\Omega$



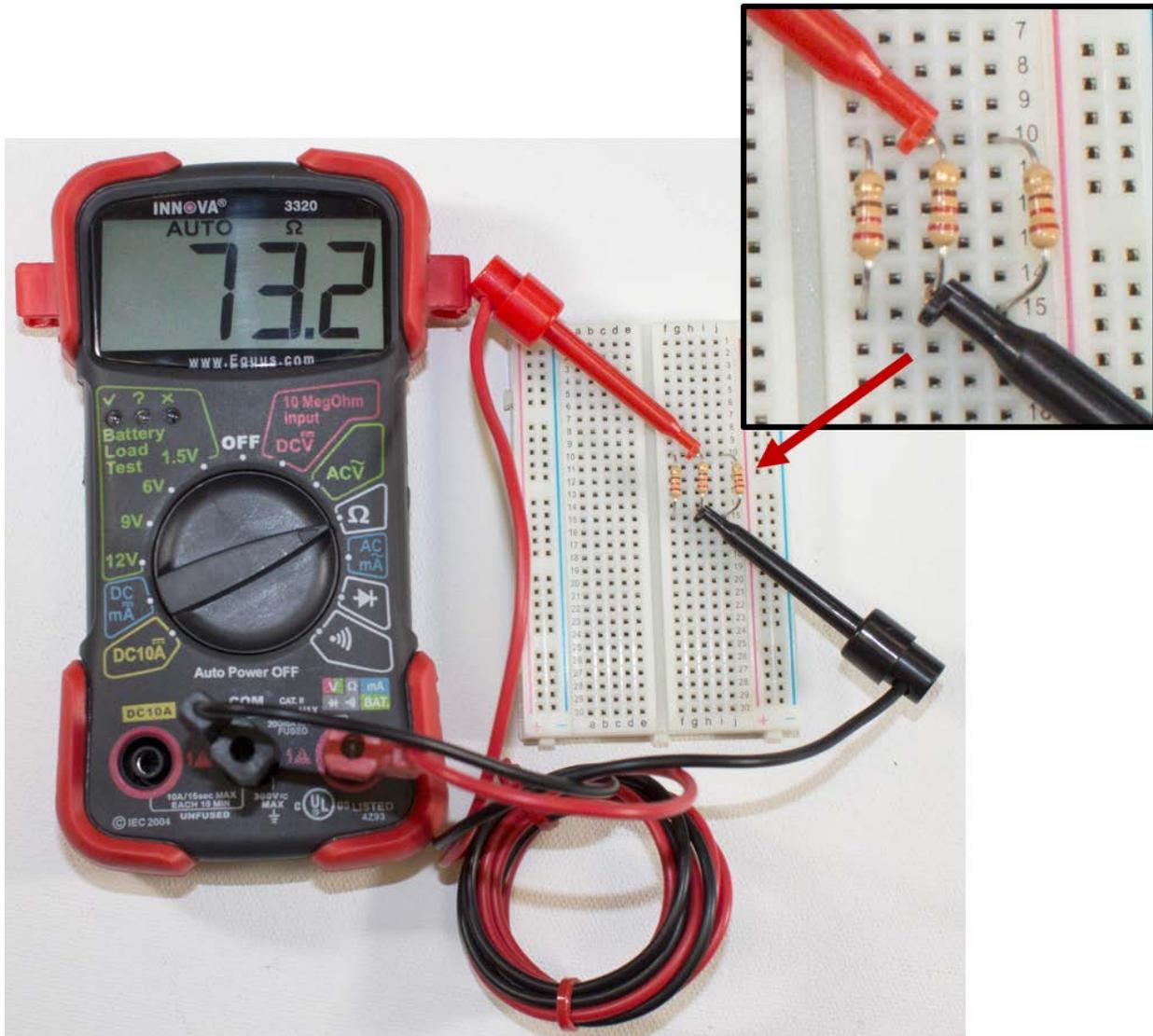
4. For the circuit below, find
- The equivalent resistance of the circuit.  $4.857\Omega$
  - The power that is dissipated by the circuit.  $5.147W$
  - The current leaving the power source.  $1.029A$



5. For the circuit below, find
- The equivalent resistance of the circuit.  $315.4\Omega$
  - The current leaving the power source.  $38mA$  (*mA is milliamp or 1/1000 of an amp*)
  - Find the power dissipated by the circuit.  $0.457W$



6. Consider the circuit below. Here, three  $220\Omega$  resistors are placed on a breadboard in parallel, and the multimeter reads  $73.2\Omega$  even though the multimeter is clamped only across the center resistor. Why doesn't it read  $220\Omega$  if it is clamped across the  $220\Omega$  resistor?



7. 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.