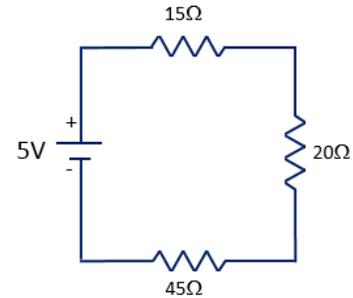


NOTE: Use engineering format for problems 1-5 and non-engineering format for problems 6-8. This is an individual assignment.

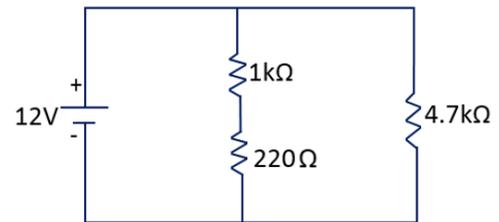
1. Consider the given circuit. Find

- The current leaving the power source. $I=62.5\text{mA}$
- The current through each resistor.
 $I_{15\Omega}=62.5\text{mA}$, $I_{20\Omega}=62.5\text{mA}$, $I_{45\Omega}=62.5\text{mA}$
- The voltage drop across each resistor.
 $\Delta V_{15\Omega}=0.9\text{V}$, $\Delta V_{20\Omega}=1.3\text{V}$, $\Delta V_{45\Omega}=2.8\text{V}$
- The power dissipated by the circuit. $P=0.31\text{W}$
- The power dissipated by the 20Ω resistor. $P_{20\Omega}=0.08\text{W}$



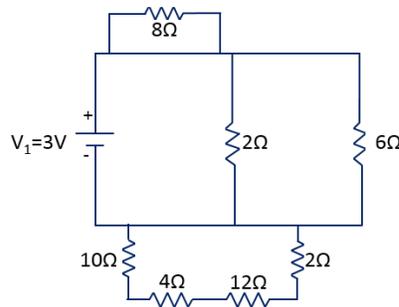
2. Consider the given circuit. Find

- The current leaving the power source. $I=12.4\text{mA}$
- The current through each resistor. $I_{1\text{k}\Omega}=9.8\text{mA}$,
 $I_{220\Omega}=9.8\text{mA}$, $I_{4.7\text{k}\Omega}=2.6\text{mA}$
- The voltage drop across each resistor. $\Delta V_{1\text{k}\Omega}=9.8\text{V}$,
 $\Delta V_{220\Omega}=2.2\text{V}$, $\Delta V_{4.7\text{k}\Omega}=12\text{V}$
- The power dissipated by the $1\text{k}\Omega$ resistor. $P_{1\text{k}\Omega}=96\text{mW}$
- Which loop does more current pass through? Does this make sense? Explain.

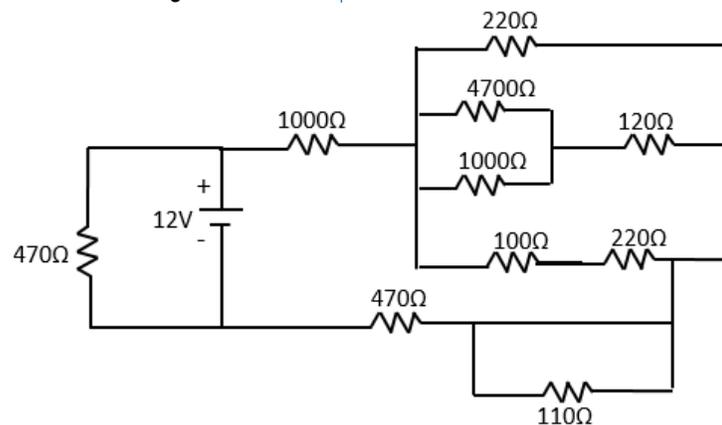


3. Find the equivalent resistance of the given circuit. (Hint: Think about how current passes in and out of nodes.)

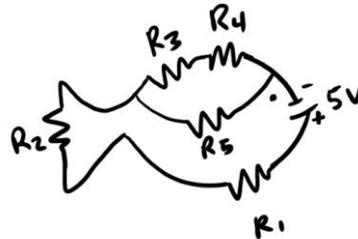
$$R_{\text{eq}} = 1.5\Omega$$



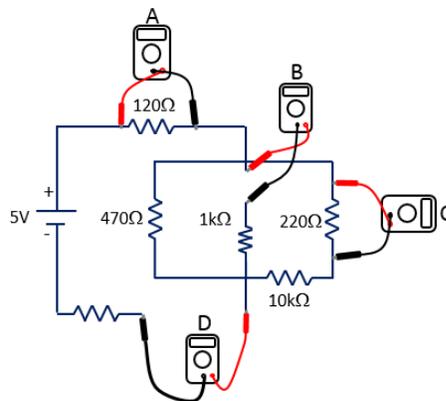
4. Find the equivalent resistance of the given circuit. $R_{\text{eq}} = 362.48\Omega$



5. Circuits do not have to be drawn as clean straight lines. Sometimes the lines are curved and messy (think about the actual wires on your breadboard; they are not straight). Use your knowledge of circuits and of how current flows to redraw the circuit below using clean lines. Then, in your own words, describe how current flows through the circuits. Identify locations where the current splits. You can use color or notations to illustrate your explanation.



6. For the circuit and multimeter setup provided, identify which multimeters (A, B, C, & D) are measuring current and which multimeters are measuring voltage. Write a few sentences to explain your answers.



7. Finish the activity discussed in class to show a working switch by printing its status on the serial monitor. The serial monitor should display a 0 if the switch is not pressed and a 1 if the switch is pressed. Provide a screen shot of your sketch along with a screen shot of your serial monitor displaying 0s and 1s.

Tips:

- When you unplug your Arduino, you can scroll through the values printed on the serial monitor without new values printing.
- If you can't find a location to show both 0s and 1s, take a screen shot of the 0s and another screen shot of the 1s.
- For PCs, to take a screen shot of just one window (i.e., the serial monitor window) and not the entire desktop, you can press ALT+Prtscn. You can also use the snipping tool.
- For Macs, to take a screen shot of just one window (i.e., the serial monitor window) and not the entire desktop, you can press Command+Shift+4 at once then hit space.

Note: Have your Arduino/Switch 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 the switch activity.

8. Review the "learning to solder" presentation in the class 5 notes.
- Write a brief definition of soldering.
 - What are some practical applications of soldering?
 - Take the soldering safety quiz through the ENGR 120 Meta Moodle. We will be soldering in class 6, so you MUST complete the quiz before soldering.
 - Take a screen shot of your completed safety quiz and print it out. Do not include the screen shot with your homework. Hold it at your desk for your instructor to pick up before you solder.

9. Please reference the SolidWorks installation instructions on the meta moodle page for the ENGR 120 course. Have SolidWorks installed on your laptop for class 7 (two classes). ***Please note it can take a long time for SolidWorks to install. Do not wait until right before class to do the installation. Allot at least 2 hours for installation.*** Include with your homework the following three statements along with your signature to indicate that you agree to comply with the guidelines of the SolidWorks license.

- I understand that this is an ACADEMIC LICENSE of the SOLIDWORKS software program and is provided by Louisiana Tech University for currently-enrolled students. I WILL ONLY USE THIS PROGRAM FOR ACADEMIC PURPOSES.
- I agree that I AM INSTALLING THIS PROGRAM ON A COMPUTER THAT I OWN. I will not install this program for professional activities or commercial use.
- I agree that I WILL ONLY USE THIS PROGRAM AS A CURRENTLY-ENROLLED STUDENT in Tech's College of Engineering & Science. I will not forward or share this information with anyone, including other students.