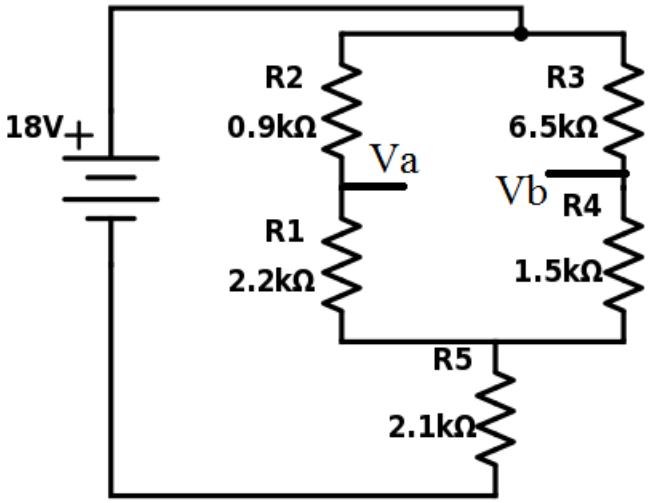
EN-3212 Electronics Worksheet 2

Grounds, Commons, and Voltage Differences

In class, we discussed how to find voltages at nodes in a circuit, with and without a ground. For the circuit shown below find:

1. Va
2. Vb
3. ΔVab = (Va-Vb).



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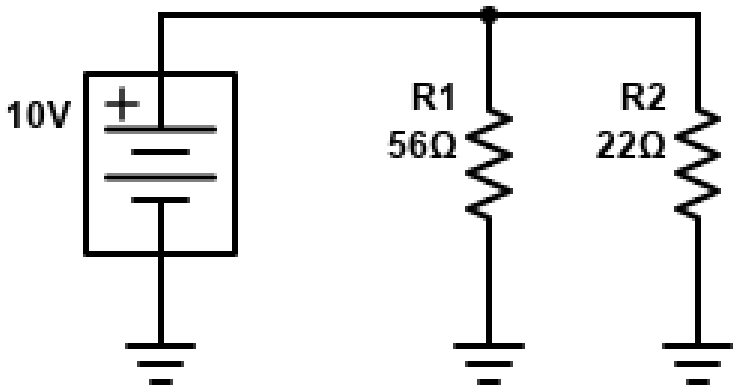
Now that you understand how to analyze circuits without a ground or a common in them, MOST circuits with a ground or a common will be easy to analyze.

Often, the ground is connected to the negative terminal of your DC voltage source. In these cases, there is absolutely no change in the way you analyze the circuit.

If you see multiple grounds or commons in a schematic diagram. Treat the grounds as if they are one node. If one were to connect all of the grounds in the diagram below with a conducting wire, erase two of the grounds, and leave one ground in the diagram (it doesn't matter which one) one would end up with an equivalent circuit. Try it out and see if you can analyze the circuit below.



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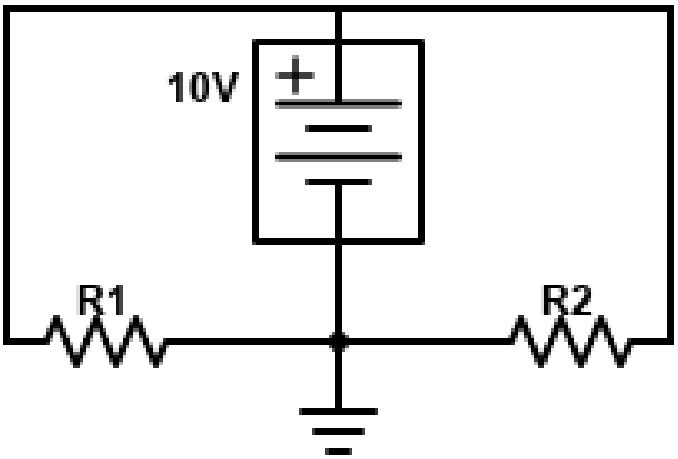
Again, in many circuits the ground is connected to the negative terminal of the battery and you can just ignore it while analyzing the circuit. If I gave you the resistor values in the circuit below, it should be very straight forward. As a challenge, lets try giving you the total current coming out of the battery; 150 mA and the current going through R1; 100ma and ask you to find the value of R1 and R2. Work hard to see if you can figure this out!



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We've also talked about what to do if a ground is attached to a point in the circuit that is not the negative terminal of the battery. Remember, analyze the circuit as if the ground is not there. Once that's done, define the voltage at the ground to 0V, and determine what the voltages are at different nodes from there.

Find the voltage at every node for the circuit below.