Circuit Simplification

Physics 230 Final Project
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Github repository: https://github.com/sdaffer/circuit_simplification

Summary:

Challenges, Modifications, Lessons Learned:
  Designing an appropriate algorithm for simplifying a circuit to a Thevenin and equivalent Norton circuits was more complex and time-intensive than originally predicted. Mathematica isn't an objected oriented programming language, thus trying to represent and simplify complicated circuits with Thevenin and Norton transitions was challenging.
  We needed to simplify the scope in order for our group to each work 4-5 hours on this project. The simplified scope we decided on removed the Thevenin and Norton transitions and replaced them with simple circuit rules. Resistors add when configured in series, and their inverses add when configured in parallel. Voltages add when configured in series, and the voltage is the same for all elements when in parallel. With these rules, a complicated circuit can be modeled as a much simpler one. The adjusted task was then to take a list representing a complicated circuit with resistors, current sources, and voltage sources and to output a list representing a much simpler circuit. In order to further simplify the problem, we assume that the input circuit is correctly formatted and has only these components configured in this way.

Data Input/Output:

Conclusion: