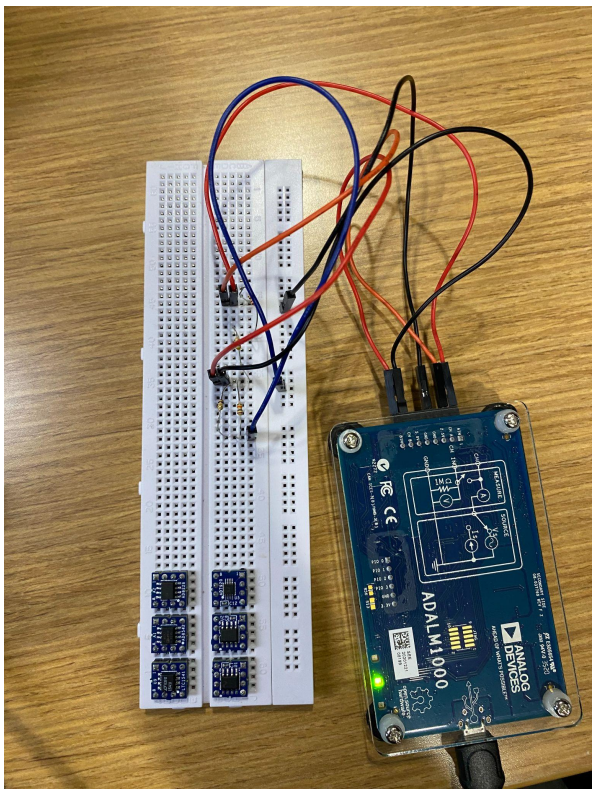
Proof of Concepts

Series and Parallel Circuits and Voltage Divider Experiment:

Building Block: Short description and schematic

Grading Note: Instead of a photo of the circuit, a schematic should be placed here



This circuit has two resistors in series and two resistors in parallel. Each node represents a different voltage drop in the circuit.

Grading Note: the mathematical analysis section should include all calculations used to arrive at the calculated values. They are missing here.

Analysis:

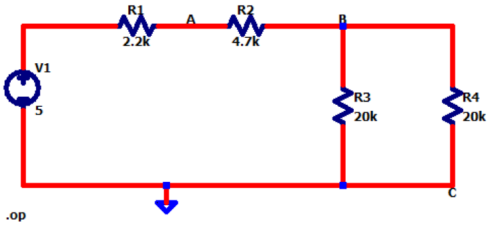
Equation and short description.

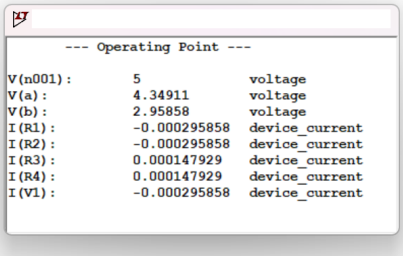
1. R1 and R2 are in series, and R3 and R4 are in parallel.
2. R1 and R2 are parallel and when added it creates resistor R12 with a resistance of 6.9k.
3. Voltage across R1 and R2 = 2.04V
4. Voltage across R3 and R4 = 2.96 V
5. Total current = 0.296 mA
6. Current Equation with KCL: $-I_{R2} + I_{R34} = 0$

Describe clearly how you are applying the concept

Simulation:

Screenshot of simulation





--- Operating Point ---

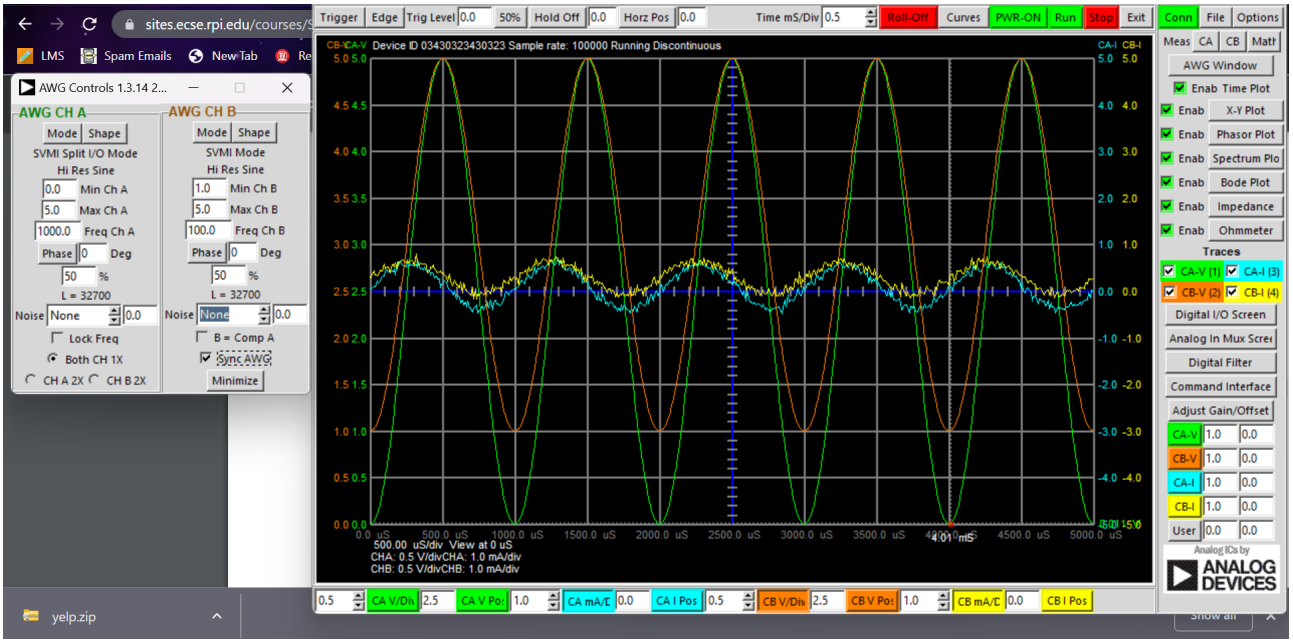
V(n001):	5	voltage
V(a):	4.34911	voltage
V(b):	2.95858	voltage
I(R1):	-0.000295858	device_current
I(R2):	-0.000295858	device_current
I(R3):	0.000147929	device_current
I(R4):	0.000147929	device_current
I(V1):	-0.000295858	device_current

Clearly labeled with nodes and/or input/output that matches with schematic above. Any important portions of output are identified (i.e. the point at which a comparator switches is circles and/or point to with labeled arrow for easy identification).

Measurement:

Screenshot of Waveforms output from circuit above.

Remember to clearly show all axes in a measurement plot. Also identify any important portions of the output.



Grading Note: Since the curves are not labeled with the voltages they correspond to and the photo is not labeled with where these measurements were taken, it is not possible to compare the experimental measurements to the mathematical analysis or simulation results. Additionally, the curves are not labeled with numerical values. As a result, the results of the experiment cannot serve as proof that the concept has been mastered.

Discussion (and answer related questions in Alpha Lab):

Comparison of Analysis, Simulation and Measurement results. Both a simple summary of results (like a numerical chart of values) and a simple description that details if the results are as you expect. Also include any speculation as to why they may be different from one another if they are different. What variation is too much for example…explore this.

Grading Note: The discussion should also include ideas as to why there are small differences between mathematical analysis, simulation, and experiment.

In the graph showing the series and parallel resistors, it shows that using the sine function creates an input voltage of varying volts. The LTSpice circuit show two parallel resistors and two series resistors with a varying voltage showing a sine wave. I then measured the resistance of the resistors and it showed varying circuit voltages and those voltages were equivalent to the simulation and measurements.