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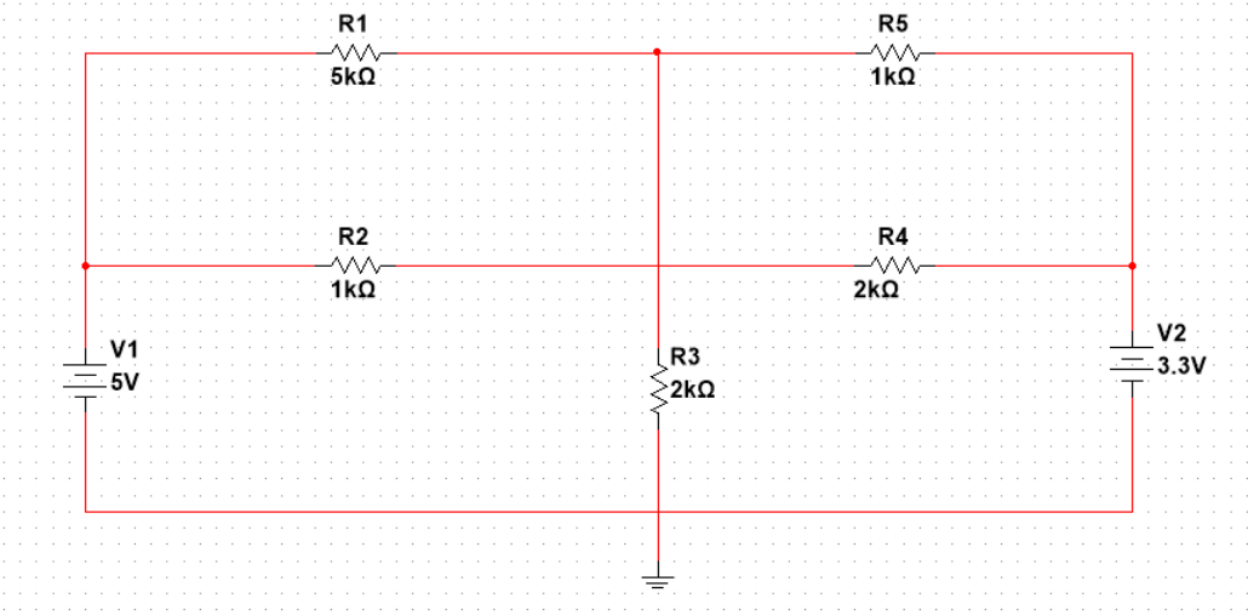
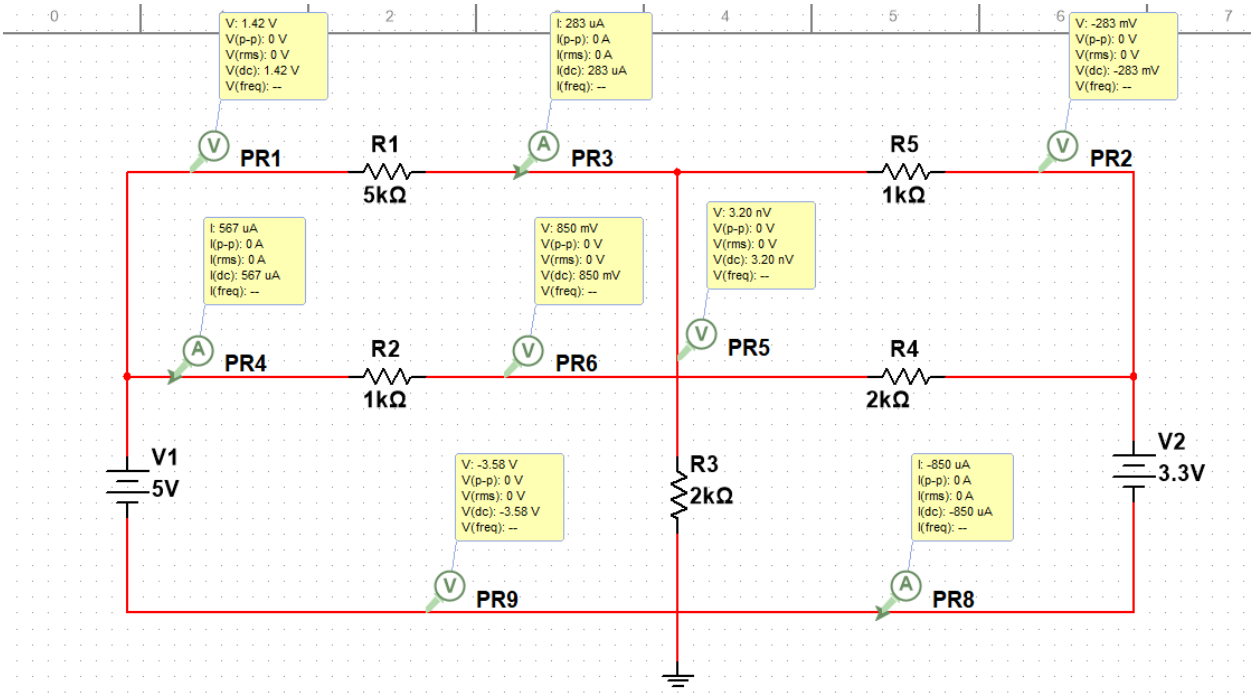
Modified Circuit:



NI Multisim (with all readings):



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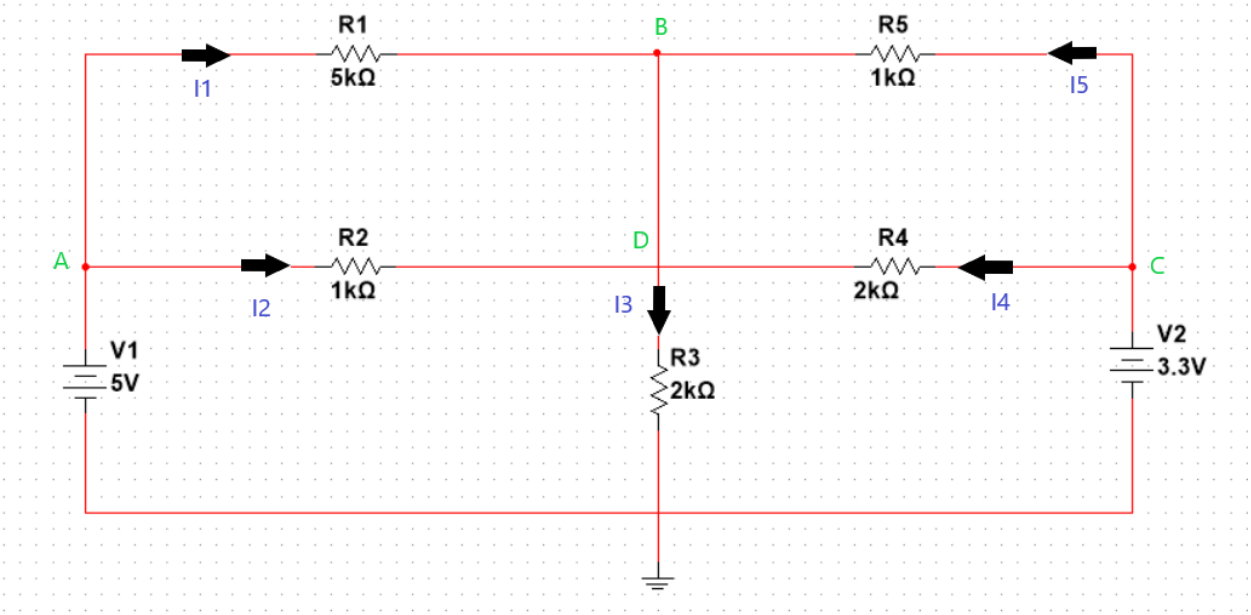
KVL/KCL



KCL at node B:

$$\sum I_{in} = \sum I_{out}$$

$$I_1 + I_5 = I_3$$

KCL at node D:

$$I_2 + I_4 = I_3$$

KVL at top-left mesh (clockwise):

$$-I_1 R_1 + I_2 R_2 = 0$$

$$-5I_1 + I_2 = 0$$

KVL at bottom-left mesh (clockwise):

$$V_1 - I_2 R_2 - I_3 R_3 = 0$$

$$5 - I_2 - 2I_3 = 0$$

KVL at top-right mesh (clockwise):

$$I_5 R_5 - I_4 R_4 = 0$$

$$I_5 - 2I_4 = 0$$

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KVL at bottom-right mesh (clockwise):

$$I_4 R_4 - V_2 + I_3 R_3 = 0$$

$$2I_4 - 3.3 + 2I_3 = 0$$

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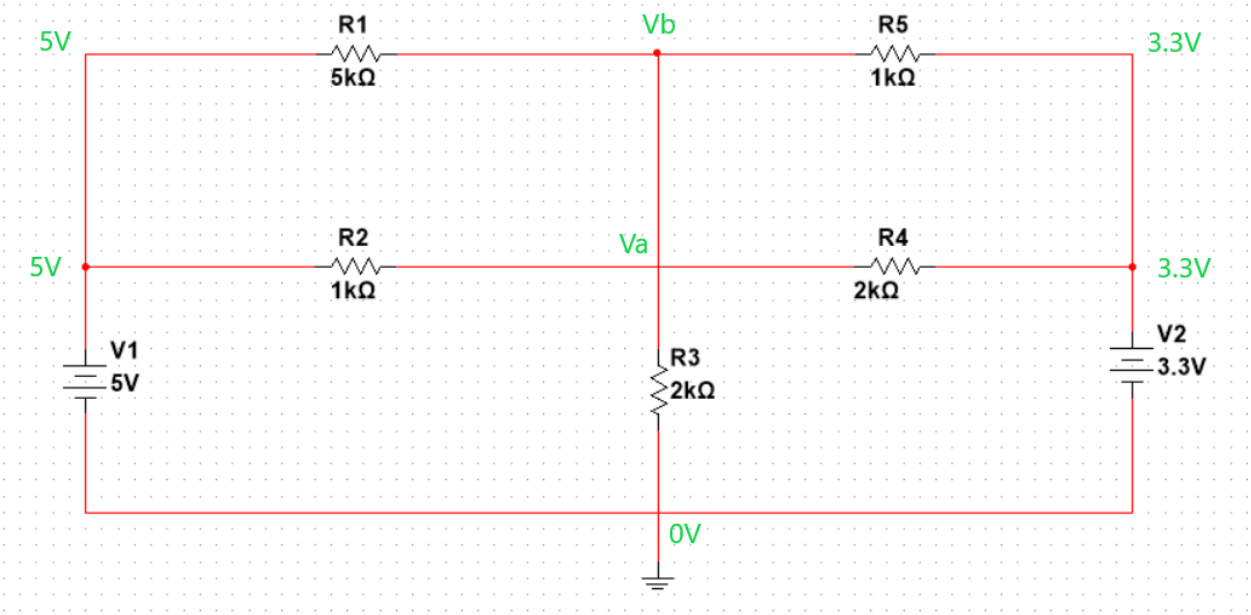
Nodal Analysis



KCL: $\sum I_{b,in} = \sum I_{b,out}$

$$\frac{5V - V_b}{5k\Omega} + \frac{3.3V - V_b}{1k\Omega} + \frac{0V - V_b}{2k\Omega} = 0$$

$$10V - 2V_b + 33V - 10V_b - 5V_b = 0$$

$$V_b = -2.529\ V$$

KCL: $\sum I_{a,in} = \sum I_{a,out}$

$$\frac{5V - V_a}{1k\Omega} + \frac{0V - V_a}{2k\Omega} + \frac{3.3V - V_a}{2k\Omega} = 0$$

$$10V - 2V_a - V_a + 3.3V - V_a = 0$$

$$V_a = 3.325V$$

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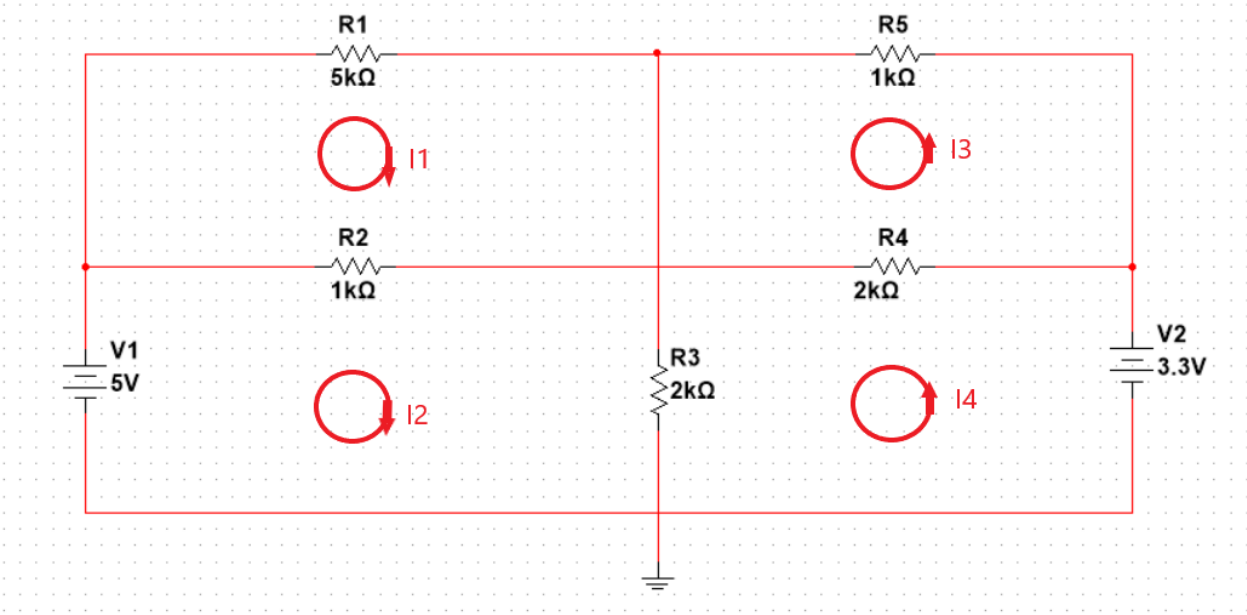
Mesh Analysis



Mesh 1:

$$-I_1R_1-\left(I_1-I_2\right)R_2=0$$

$$-5I_1-I_1+I_2=0$$

$$I_2=6I_1$$

Mesh 2:

$$V_1-\left(I_1-I_2\right)R_2-\left(I_2+I_4\right)R_3=0$$

$$5-\left(I_1-6I_1\right)(1)-\left(6I_1+I_4\right)(2)=0$$

$$5-7I_1-2I_4=0$$

$$I_4=\frac{5-7I_1}{2}$$

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Mesh 3:

$$I_3 R_5 + \left(I_3 - I_4 \right) R_4 = 0$$

$$I_3 + 2I_3 - 2I_4 = 0$$

$$3I_3 - \left(\frac{5 - 7I_1}{2} \right) = 0$$

$$6I_3 - 5 + 7I_1 = 0$$

$$I_3 = \frac{5 - 7I_1}{6}$$

Mesh 4:

$$\left(I_2 + I_4 \right) R_3 + \left(I_3 - I_4 \right) R_4 - 3.3 = 0$$

$$\left(6I_1 + \frac{5 - 7I_1}{2} \right)(2) + \left(\frac{5 - 7I_1}{6} - \frac{5 - 7I_1}{2} \right)(2) - 3.3 = 0$$

$$I_1 = 0.169\ A$$

$$\therefore I_2 = 6(0.169) = 1.014A$$

$$I_4 = 1.909A$$

$$I_3 = 0.636A$$

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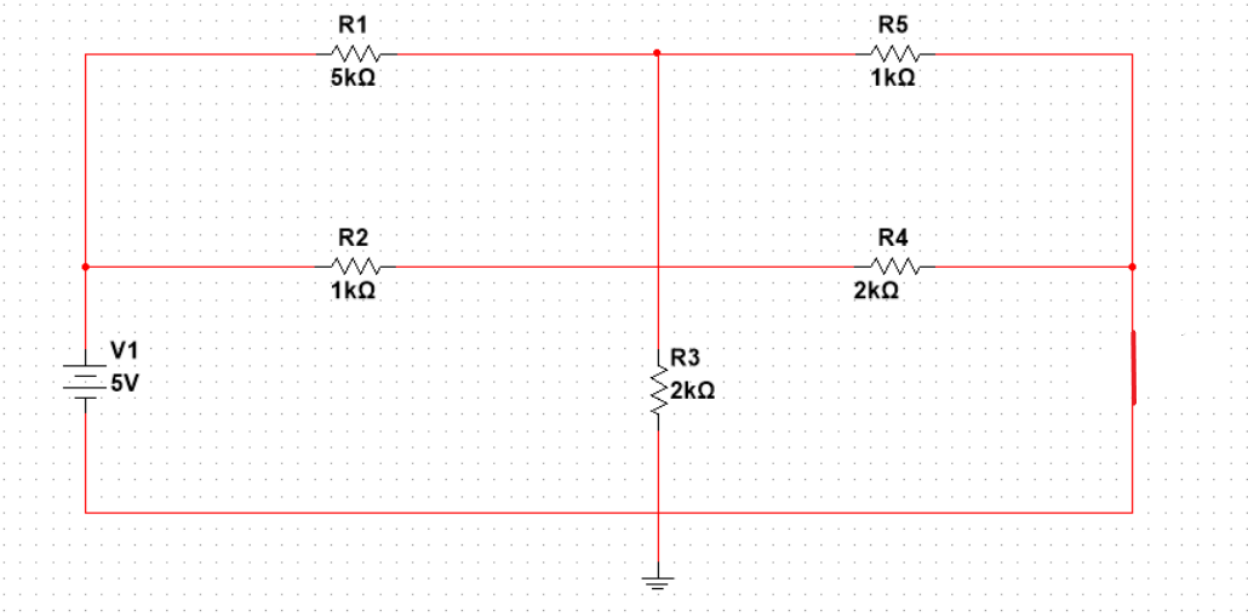
Superposition



Effective Resistance of whole circuit:

$R_1 || R_2$ *which is in series with* $R_5 || R_4 || R_3$

$\therefore R_{eff} = \frac{4}{3}$

Now I don't know what to do even after plugging the values in the voltage divider equation.

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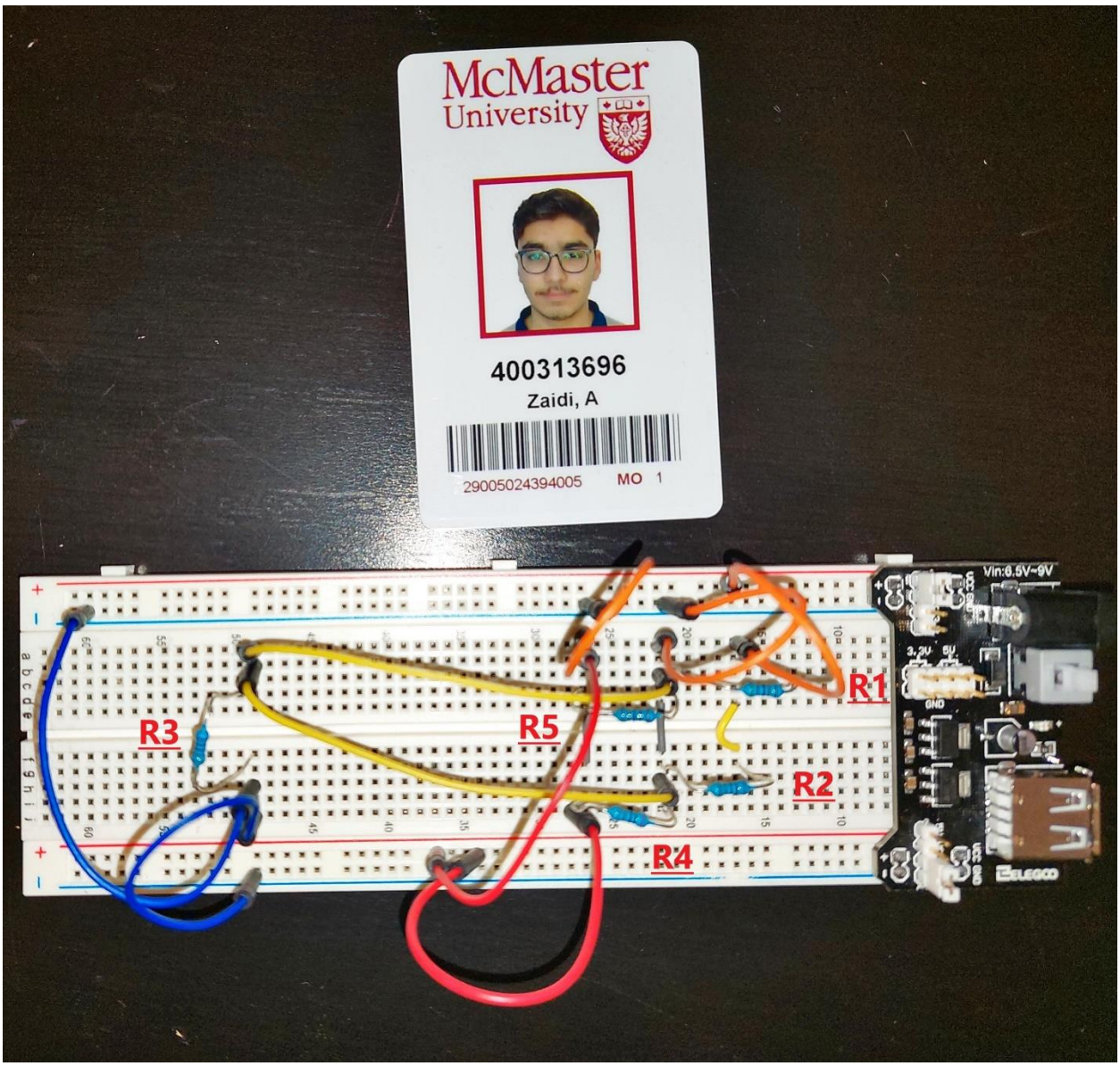
Physical Circuit



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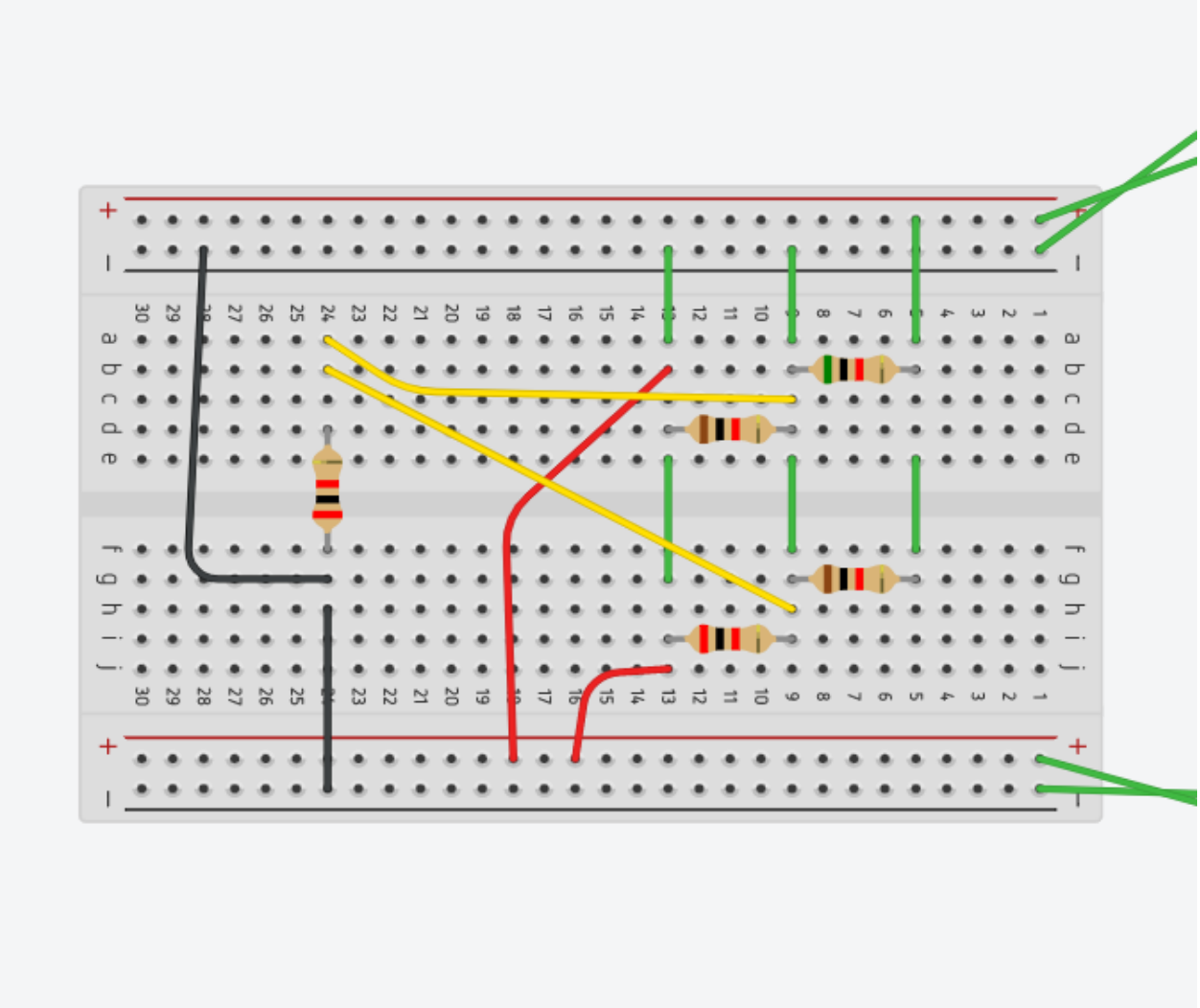

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Measurement (kΩ)	1.2% of reading (kΩ)	5 of last decimal (kΩ)	Total Uncertainty (kΩ)
R1 = 5.070	0.06084	.5	0.56
R2 = 0.997	0.01196	.5	0.51
R3 = 2.002	0.02402	.5	0.52
R4 = 1.982	0.02378	.5	0.52
R5 = 1.000	0.01200	.5	0.51

Resistance is in the 4.000kΩ range.