MAE106 Homework 1 - Solution
Circuits review

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Problem 1

Assume that in the following circuit we have a 12V battery and that the resistance across the motor when running without a load is 40 ohms.

a) How much current, in mA, will flow through the motor?

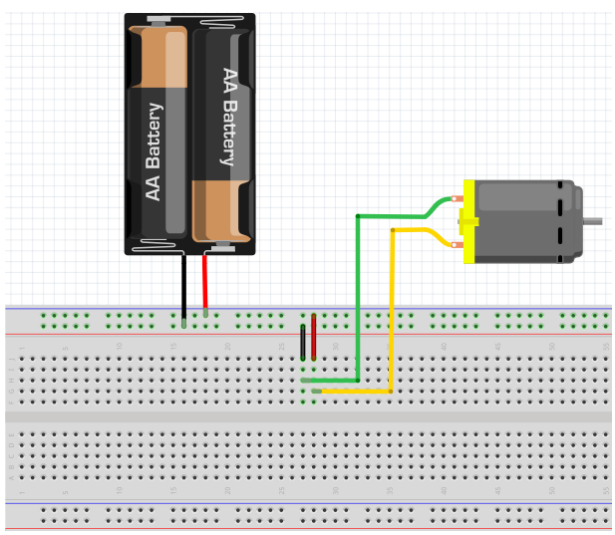
$$i = \frac{V}{R} = \frac{12V}{40\Omega} = 0.3A \;\Rightarrow 300mA$$

b) What is the power, in watts, dissipated by the motor?

$$P = Vi = 12V * 0.3A = 3.6W$$

c) If we wanted to run this motor for 10 minutes under these conditions, what capacity, in mAh, do we need from the battery?

$$300mA * 10\,\cancel{\text{min}} * \frac{1h}{60\cancel{min}} = 50mAh$$



Problem 2

Turn in the sketch of your robot. Include the names and roles of all your teammates.