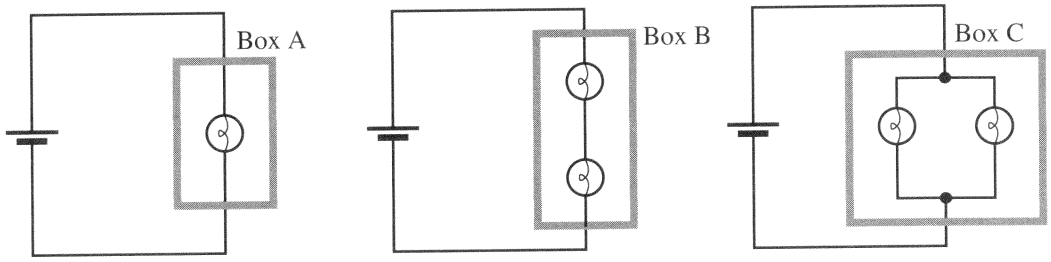
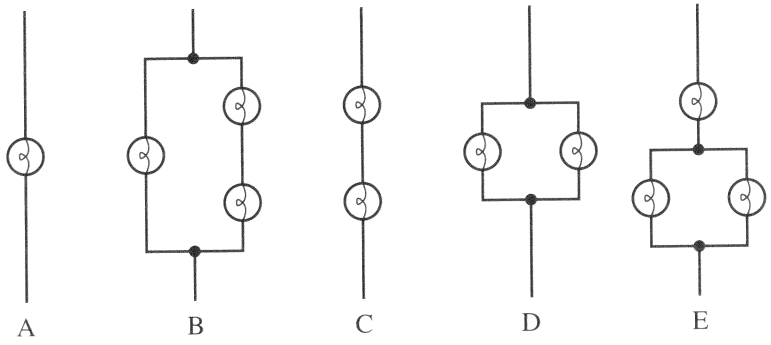
Name _____

1. In tutorial, you compared the relative brightness of the bulbs in the three circuits shown. In the diagrams, boxes have been drawn around the networks of bulbs in each circuit.

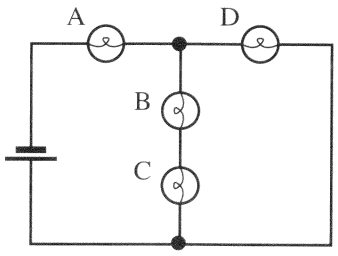


On the basis of your observations and the rule you developed in tutorial relating current through the battery to total resistance, rank the networks (boxes) A–C according to their equivalent resistance. Explain your reasoning on the basis of the model. (Do not use math.)

2. Use the model for electric current to rank the networks shown below in order according to resistance. Explain your reasoning.

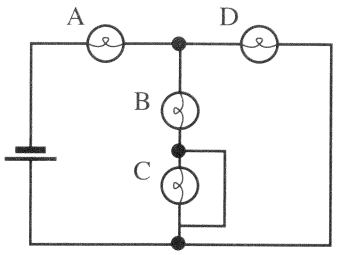


3. The circuit shown has four identical light bulbs and an ideal battery.



a. Rank the brightness of the bulbs. Explain your reasoning.

b. A wire is now added to the circuit as shown.



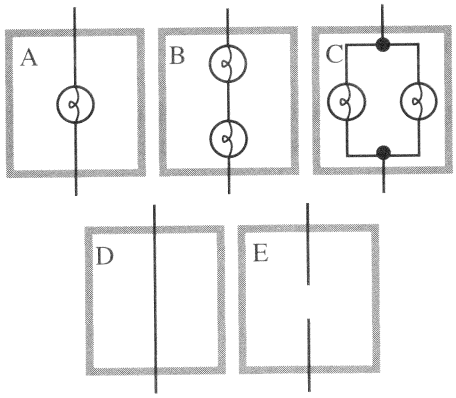
i. Does the brightness of bulb C *increase, decrease,* or *remain the same?* Explain your reasoning.

ii. Does the brightness of bulb A *increase, decrease,* or *remain the same?* Explain.

iii. Does the current through the battery *increase, decrease,* or *remain the same?* Explain.

Name _____

4. Consider the five networks shown at right.



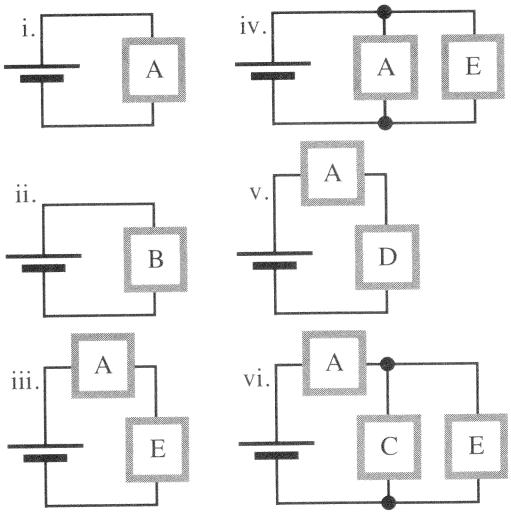
   a. Rank the networks according to their equivalent resistance. (*Hint:* Imagine placing each network in series with an indicator bulb and a battery.)

   b. How does adding a single bulb to a circuit in *series* with another bulb or network affect the resistance of the circuit?

   c. How does adding a single bulb to a circuit in *parallel* with another bulb or network affect the resistance of the circuit?

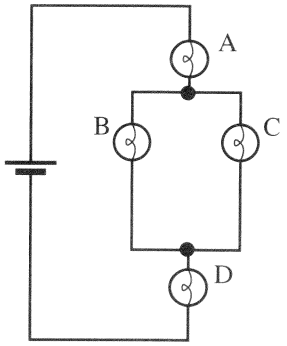
   d. The networks A–E above are connected, in turn, to identical batteries as shown. Use the model we have developed to:

      - rank the circuits according to equivalent resistance. Explain.



      - rank the circuits according to the current through the battery. Explain.

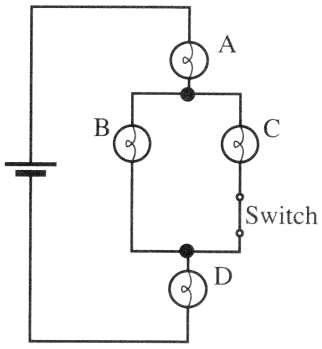
5. The circuit below shows four identical bulbs connected to an ideal battery.



   a. Rank the bulbs in order from brightest to dimmest. If two bulbs have the same brightness, indicate that explicitly.

      Explain how you determined the ranking of the bulbs.

   b. Suppose that a switch has been added to the circuit as shown. The switch is initially closed.



      When the switch is opened, will the current through bulb A *increase, decrease,* or *remain the same?* Explain how you determined your answer.