Lab – Designing a Circuit from Start to Finish

Objectives

Part 1: Use a breadboard to design a circuit in Tinkercad

- **Create an account**
- **Create a new Electronics Lab**
- **Add components to the breadboard**
- **Modify the circuit**

Background / Scenario

Tinkercad provides access to virtual electronics, allowing users to design, prototype, and print 3D designs and completed circuits. This activity will guide students through the process of building a custom circuit board.

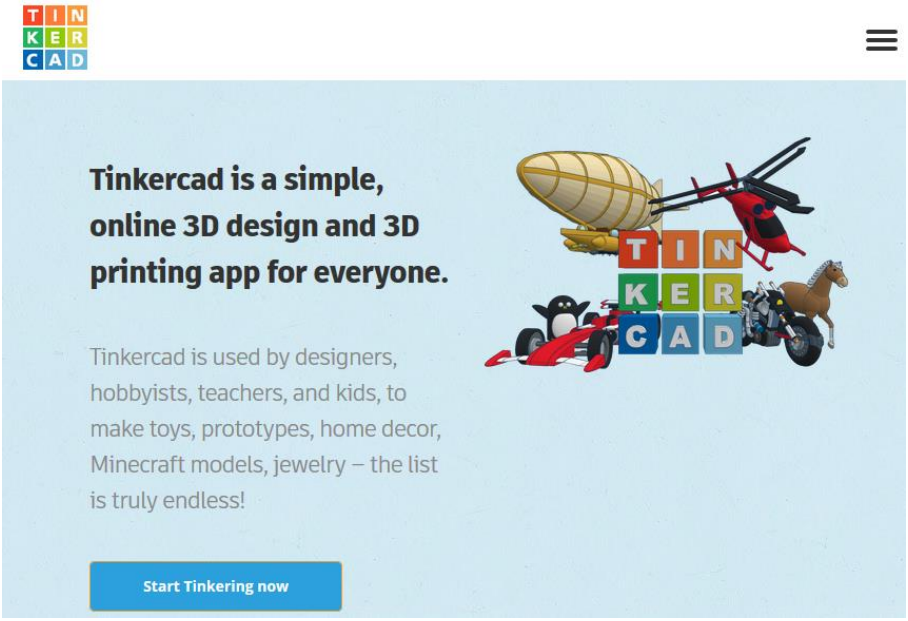
Required Resources

- PC with Internet Access
- Tinkercad account (Free)

Part 1: Use a breadboard to design a circuit in Autodesk 123D Lab View

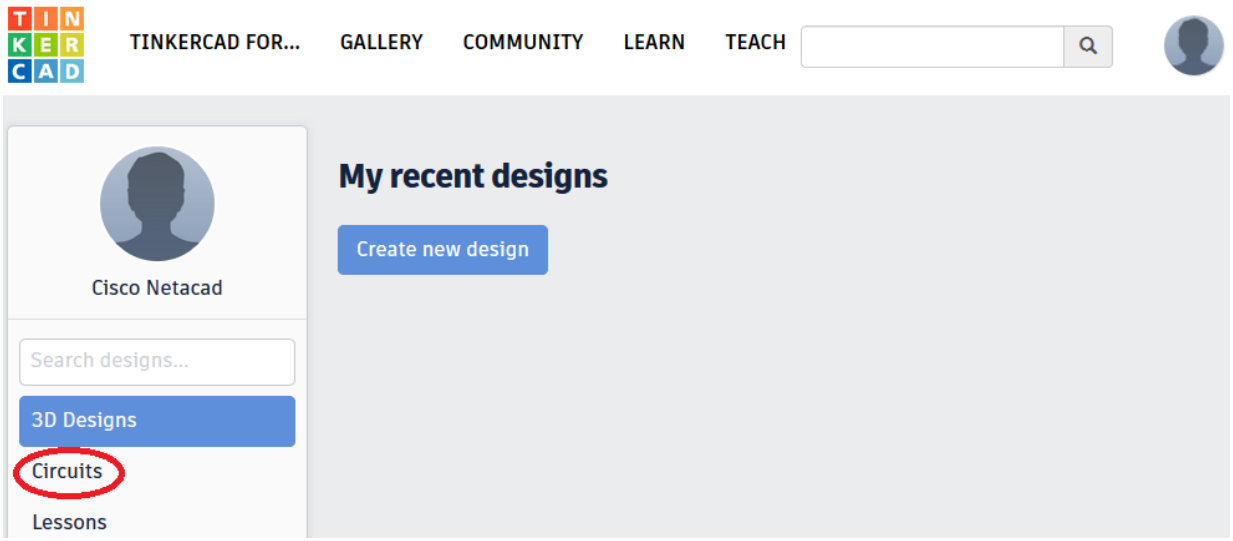
Step 1: Create an account.

Navigate to https://www.tinkercad.com/ and sign up for a free account.

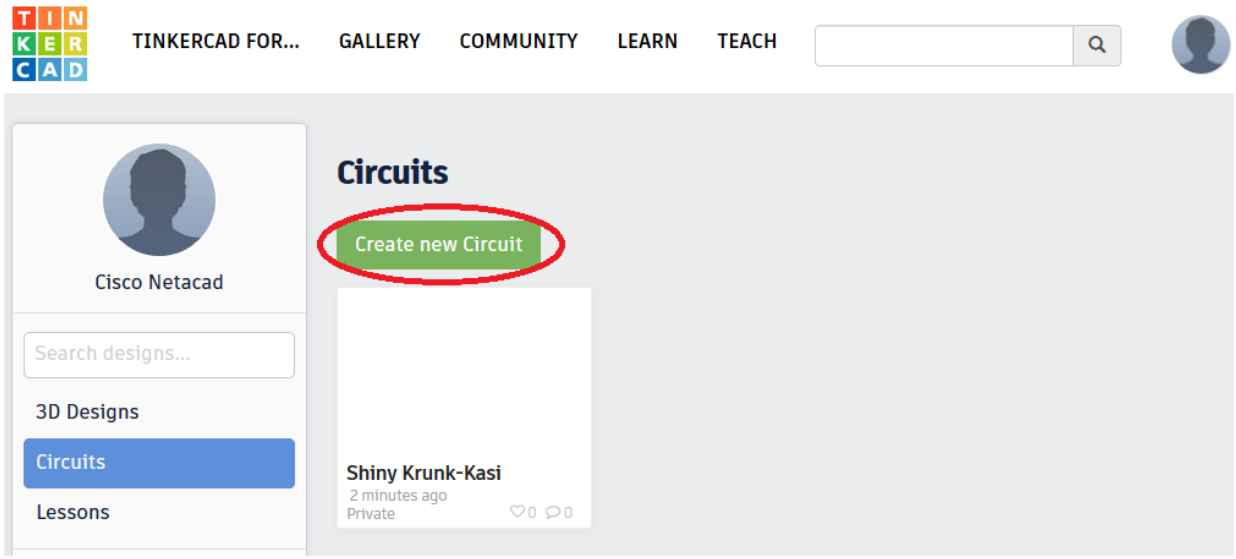


Step 2: Create a new Electronics Lab.

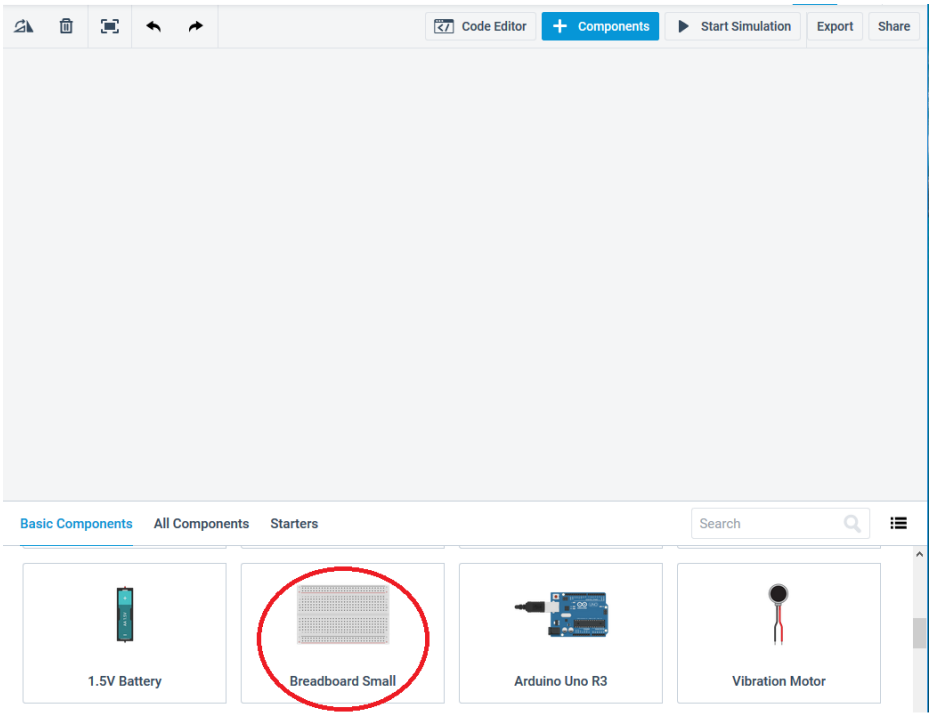
a. Click the link **Circuits** on the left side.



b. Choose the option **Create new Circuit** in the middle of the page.

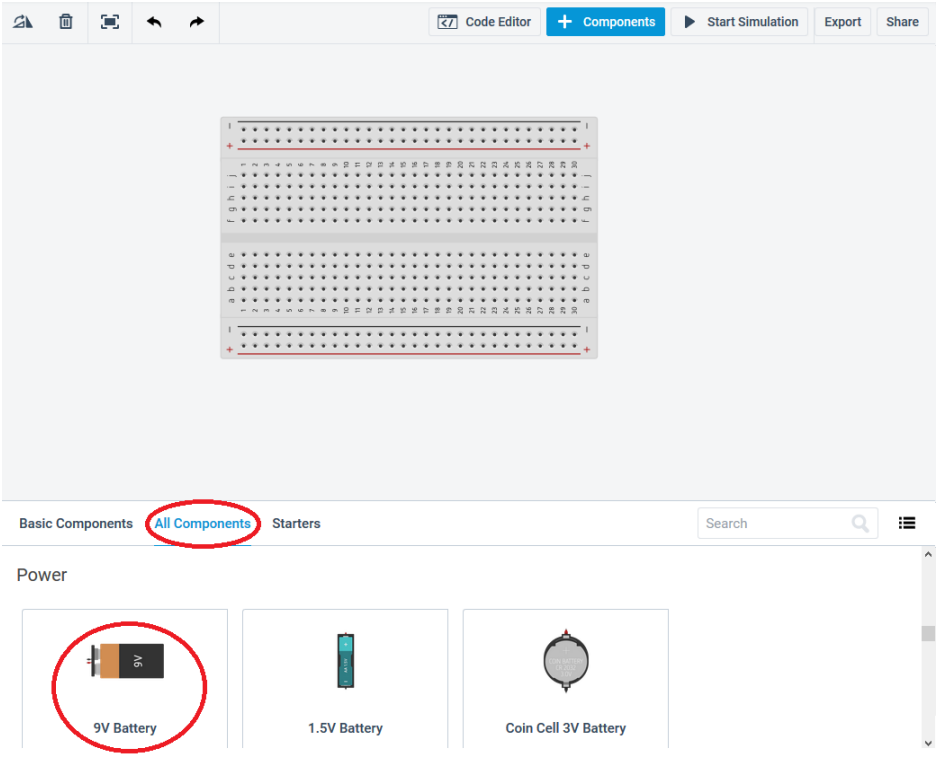


c. Select the component **Breadboard small** from the menu below and click in the whitespace.

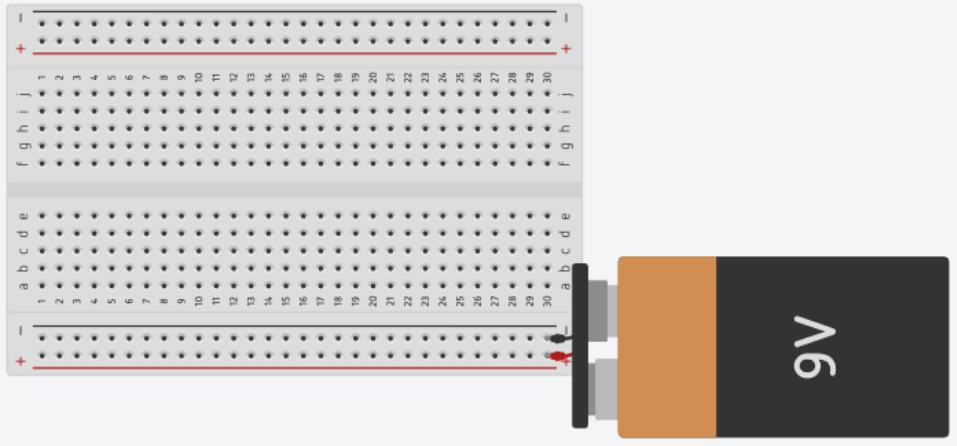


Step 3: Add components to the breadboard.

a. Select **All Components** at the bottom of the screen and choose the **9V Battery** in the components list.



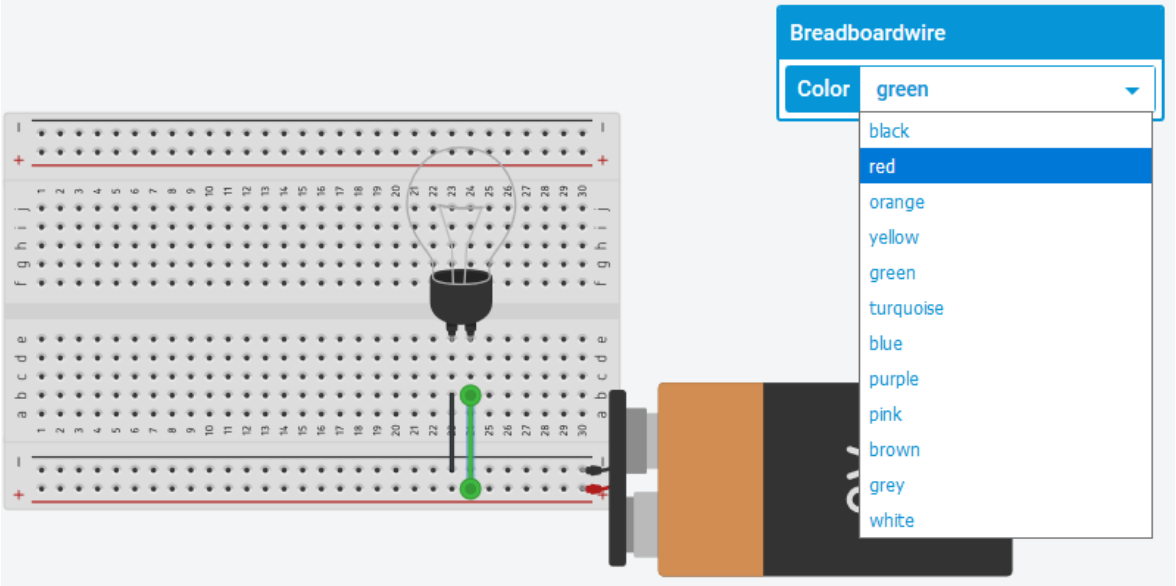
b. Place its terminals on the positive (+) and negative (-) rows at the bottom of the breadboard.



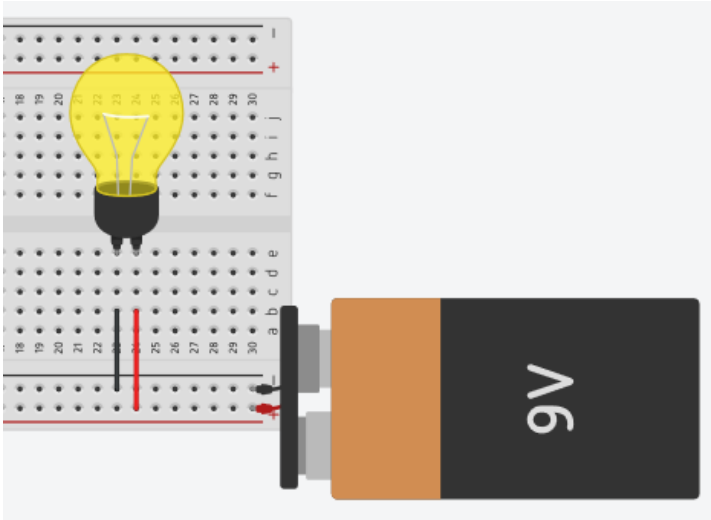
Note: Use the scroll wheel on the mouse to zoom in and out.

c. Select the **Light Bulb** from the components list and add it to the breadboard.

d. Draw two wires on the breadboard directly below the light bulb terminals by clicking once on the hole to start of the wire and then click a second time on the hole to end the wire. Use the **Breadboardwire Color** dropdown to change the wire color, select red for positive and black for negative.



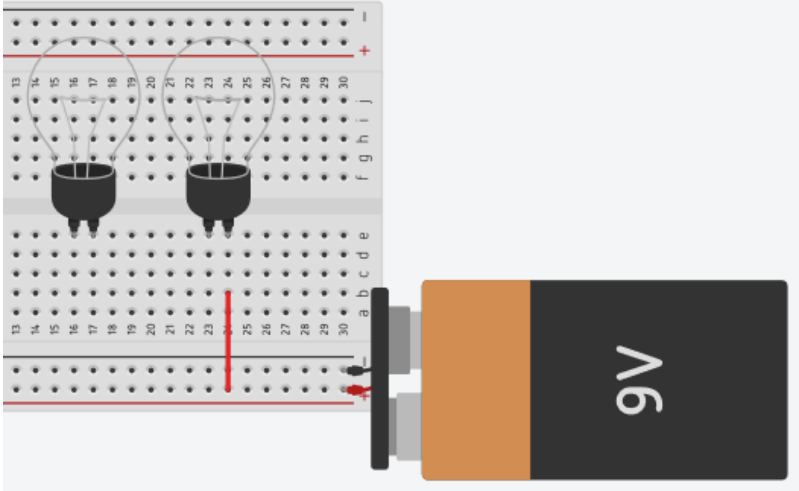
e. Use the **Start Simulation** button to turn on the light.



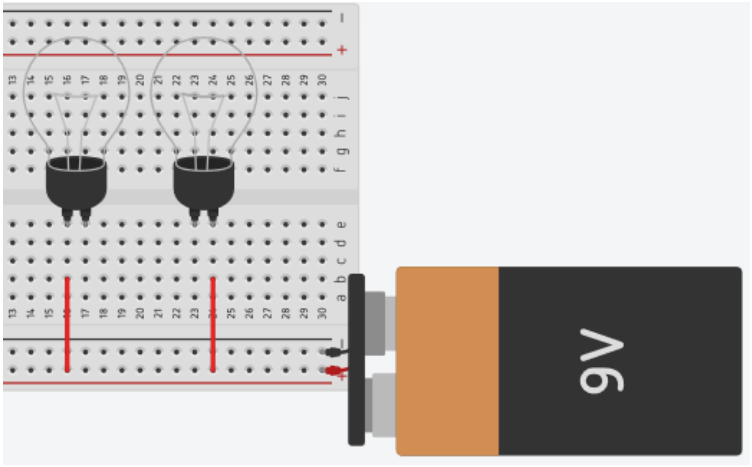
Step 4: Modify the circuit.

a. Delete the negative (black) wire from the circuit.

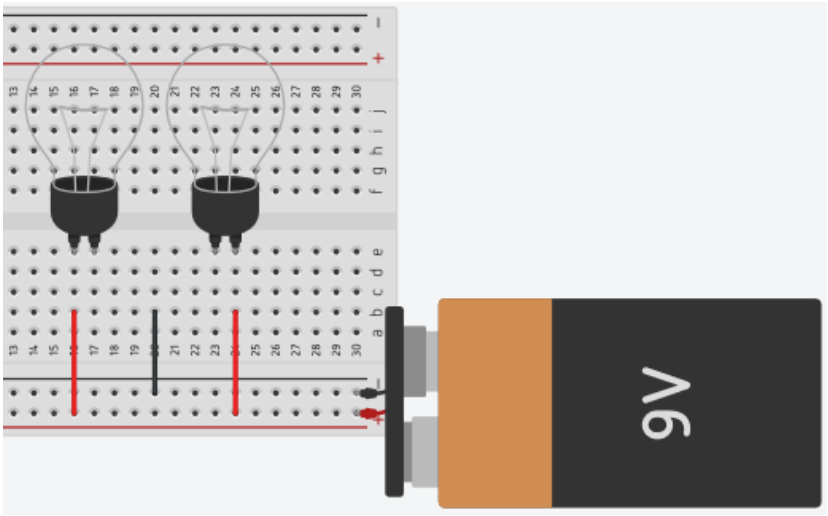
b. Add a second light on the breadboard.



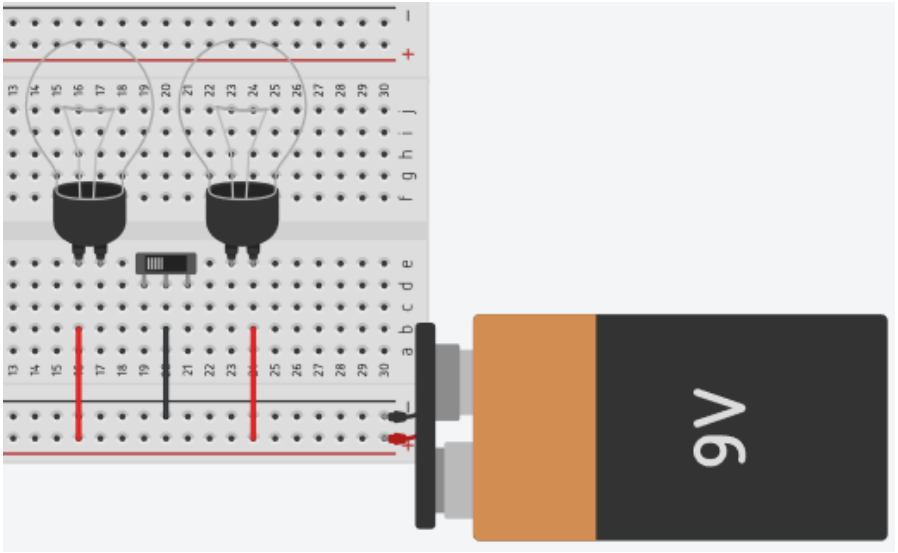
c. Draw a second red wire on the breadboard.



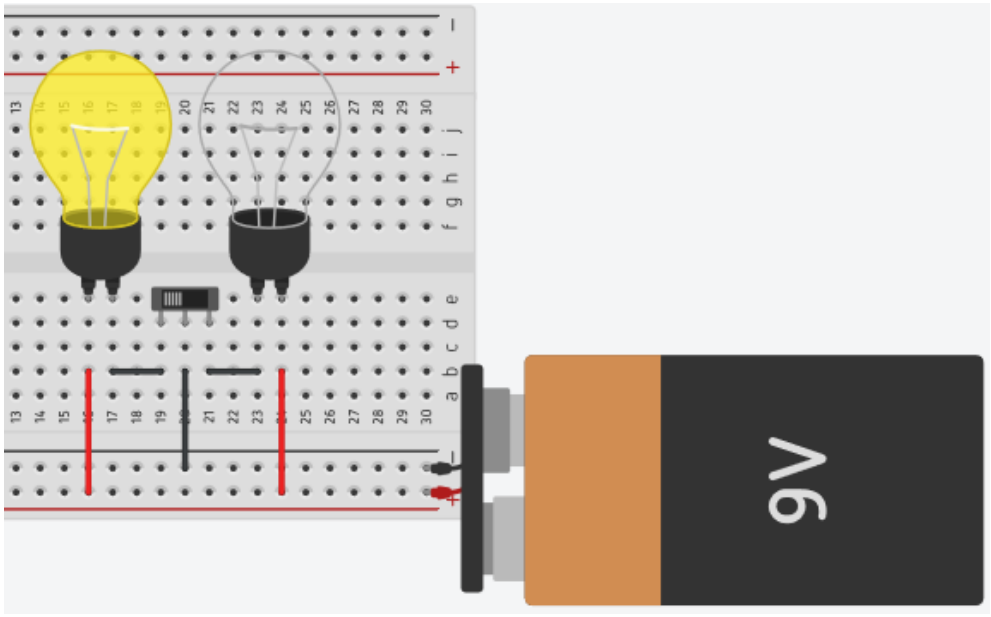
d. Create a new ground wire, negative wire, between the two lights. Color the wire black.



e. Add a **Slideswitch** component to the breadboard drawing, with the center prong in the same column as the black wire.



f. Draw wires connecting the slide switch to the columns of the negative terminals for the light bulbs.



g. Use the **Start Simulation** button and toggle the **Slideswitch** by clicking on it. The switch should complete only one circuit at a time, turning each light on and off individually.

Reflection

What would happen if a potentiometer replaced the slide switch in the drawing?

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