Simulating Arduino Code in Tinkercad Circuits

Step-by-Step Guide for Simulating Arduino Code in Tinkercad

Step 1: Create a Tinkercad Account

1. Go to the **Tinkercad** website: `https://www.tinkercad.com/`.
2. Sign up for a free account or log in if you already have one.

Step 2: Access Tinkercad Circuits

1. Once logged in, click on the **"Circuits"** tab on the dashboard.
2. Click the **"Create New Circuit"** button.

Step 3: Add an Arduino Board

1. In the circuit design environment, go to the components panel on the right-hand side.
2. Search for **"Arduino"** in the search bar.
3. Drag and drop the **Arduino Uno R3** board onto the workspace.

Step 4: Add Components (Optional)

1. To simulate sensor input, you can use a **potentiometer**.
2. Search for **"potentiometer"** or **"pot"** in the components panel.
3. Drag and drop the potentiometer onto the workspace.
4. Wire the potentiometer:
   - Connect one leg to **5V** on the Arduino.
   - Connect the middle leg to the analog input pin **A0**.
   - Connect the third leg to **GND**.

Step 5: Add a Serial Monitor

1. The Serial Monitor is built-in, so no additional setup is needed.
2. The Serial Monitor will automatically display when the simulation starts.

Step 6: Paste Your Code

1. At the top-right of the editor, click the **"Code"** button.
2. Switch from block-based code to text-based code by selecting **"Text"** from the dropdown.
3. Delete any existing code and paste the following code:

```
const int analogInPin = A0; // Analog input pin
int sensorValue = 0; // Variable to store sensor reading

void setup() {
  Serial.begin(9600); // Initialize serial communication
}

void loop() {
  sensorValue = analogRead(analogInPin); // Read the analog input
  float voltage = (sensorValue * 5.0) / 1023.0; // Convert the value to voltage
  float current = (voltage - 2.5) / 0.185; // Calculate the current
  Serial.print("Current: ");
  Serial.println(current); // Print current to Serial Monitor
  delay(1000); // Wait for a second before repeating
}
```

Step 7: Start the Simulation

1. Click the **"Start Simulation"** button at the top of the workspace.
2. The Serial Monitor will appear, displaying the current value every second.

Step 8: Adjust the Potentiometer (Simulate Sensor Input)

1. Move the potentiometer slider to simulate different analog input values.
2. Observe the changes in the current values in the Serial Monitor.

Step 9: Stop the Simulation

1. Click the red **"Stop Simulation"** button.

Step 10: Modify or Experiment

1. Modify the code or circuit as needed and run the simulation again.