Technological Institute of the Philippines
College of Computer Studies
S.Y. 2025 - 2026

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CITE 006 - IT32S3	Mr. Alfio Regla

11.1 | Traffic Light Simulation using Arduino and Tinkercad

Traffic Light Simulation using Arduino and Tinkercad

Lesson Objectives:

1. **Connect and simulate a circuit using three LEDs (Red, Yellow, Green) and resistors.**
2. **Write an Arduino program to control the LEDs in a traffic light sequence.**
3. **Use Tinkercad to test and debug the circuit and code.**

Intended Learning Outcomes (ILOs)

By the end of this activity, students should be able to:

1. **Understand and apply circuit design using a breadboard and Arduino.**
2. **Demonstrate proper use of LEDs, resistors, and digital pins in an Arduino circuit.**
3. **Write and upload Arduino code to control LEDs with timing delays.**
4. **Simulate a traffic light system in Tinkercad.**
5. **Analyze and debug wiring or coding errors in the circuit.**

Circuit Design in Tinkercad

Required Components:

- **1 Arduino Uno**
- **3 LEDs (Red, Yellow, Green)**
- **3 Resistors (220Ω each)**
- **1 Breadboard**
- **Connecting Wires**

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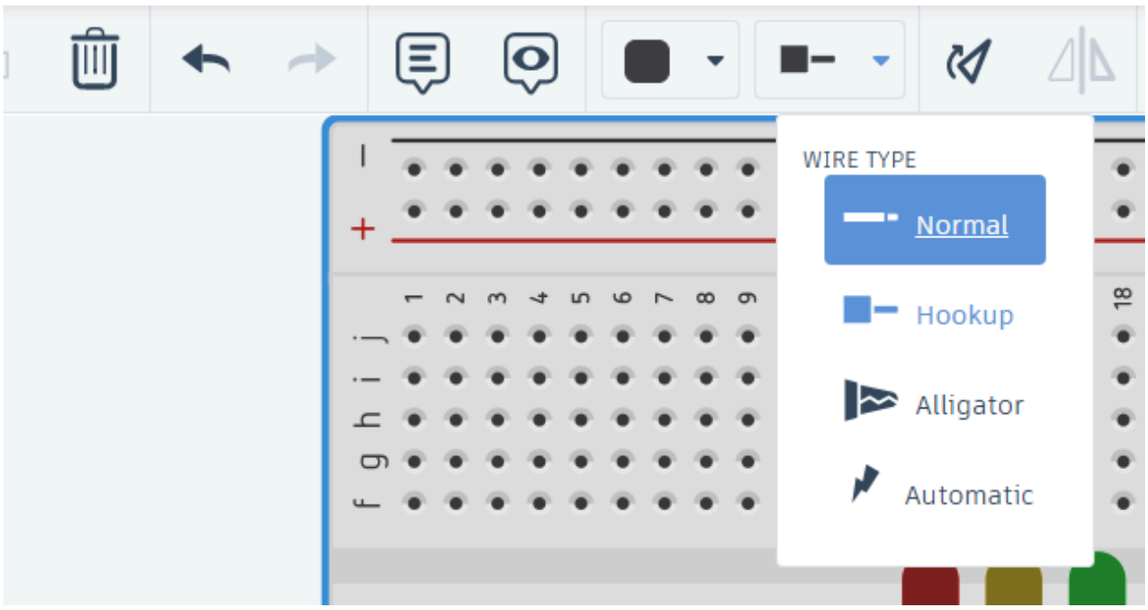
Component List

Name	Quantity	Component
U1	1	Arduino Uno R3
D1	1	Red LED
D2	1	Green LED
D3	1	Yellow LED
R1 R2 R3	3	220 kΩ Resistor

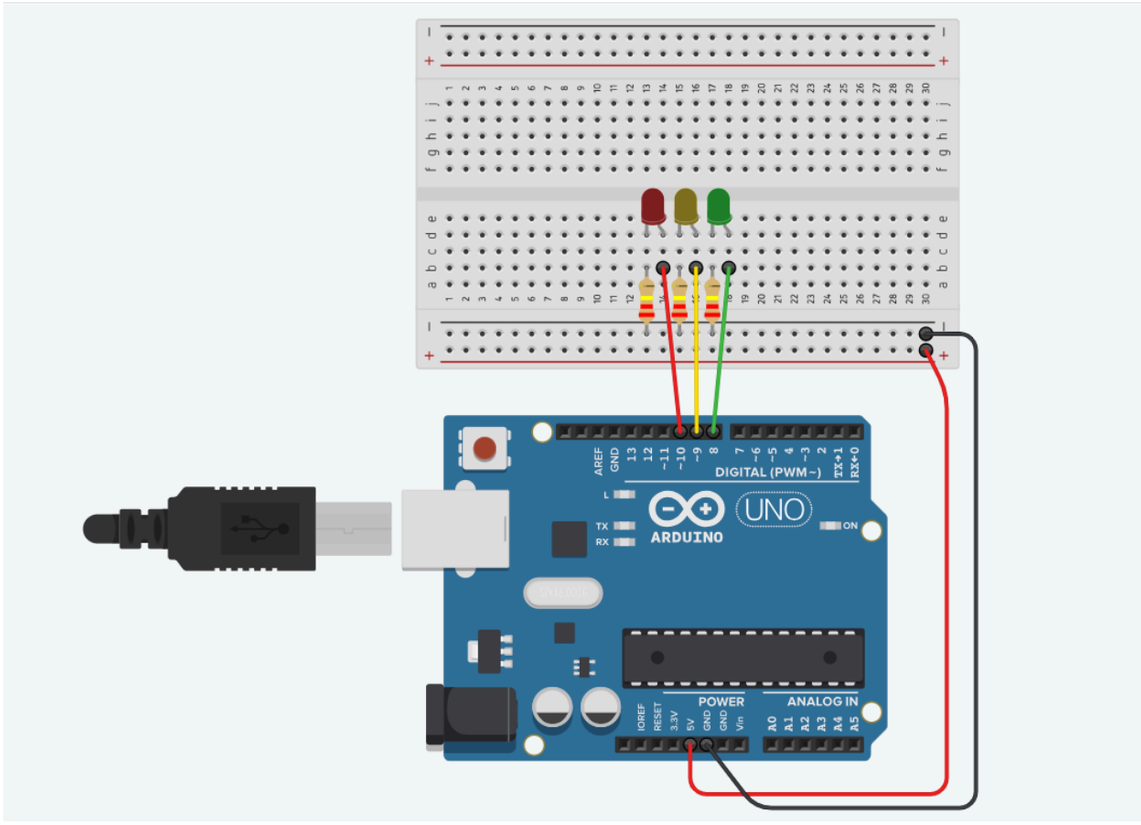
Connections:

1. Connect each **LED's positive leg** to Arduino **pins 8, 9, and 10** respectively, using **220Ω resistors**.
2. Connect each **negative leg** of the LEDs to the **GND rail** on the breadboard.
3. Use a **jumper wire** to connect the **GND rail** to the **GND pin** of the Arduino.
4. Verify all connections before proceeding.

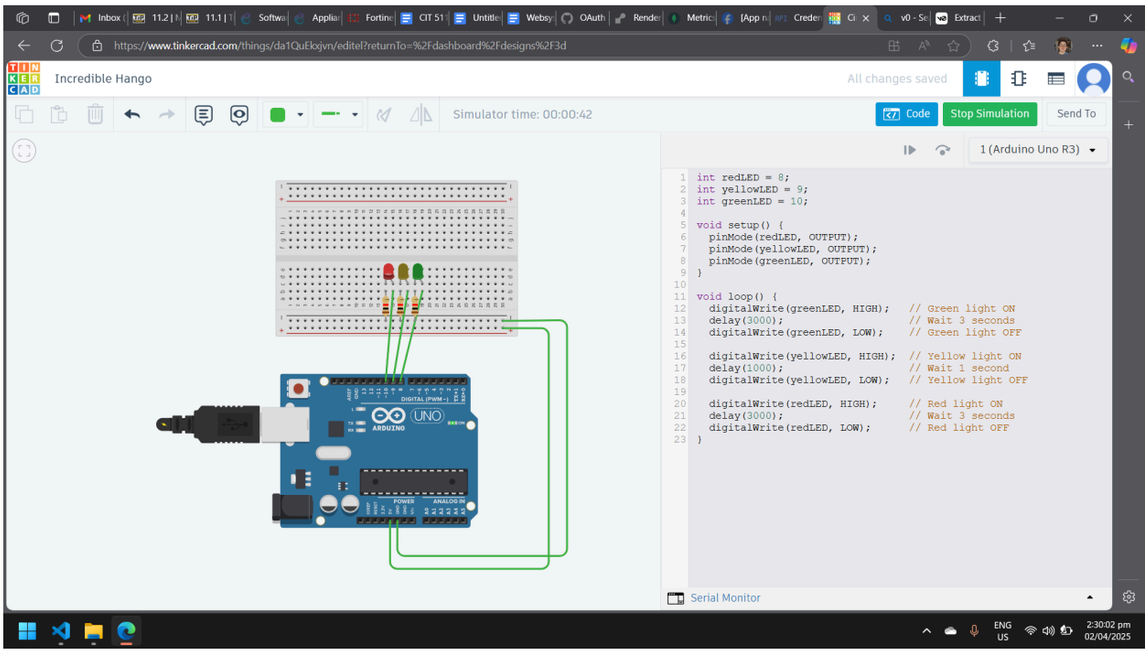


- **Hookup Wires (Recommended)** – These work like jumper wires on a breadboard.
- **Normal Wires** – These can also be used, but they don't automatically snap between breadboard rows.
- **Alligator Clips** – Not needed for breadboards; use only for external components.

- **Automatic Wires** – These adjust to connections but may not always follow the expected paths.



4. Arduino Code



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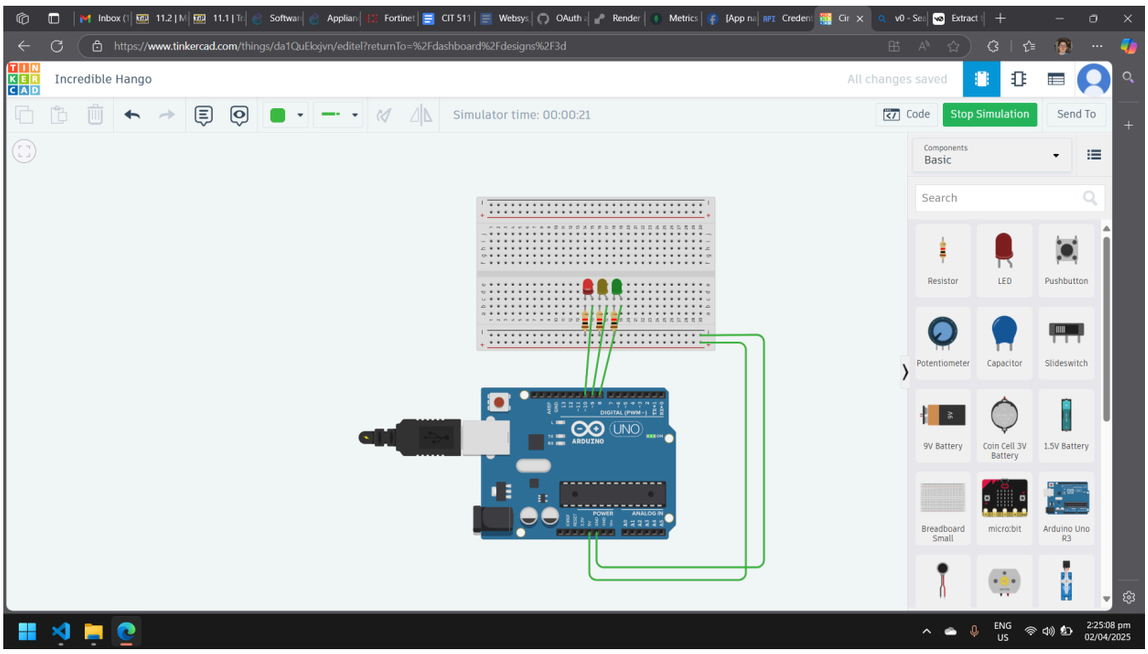
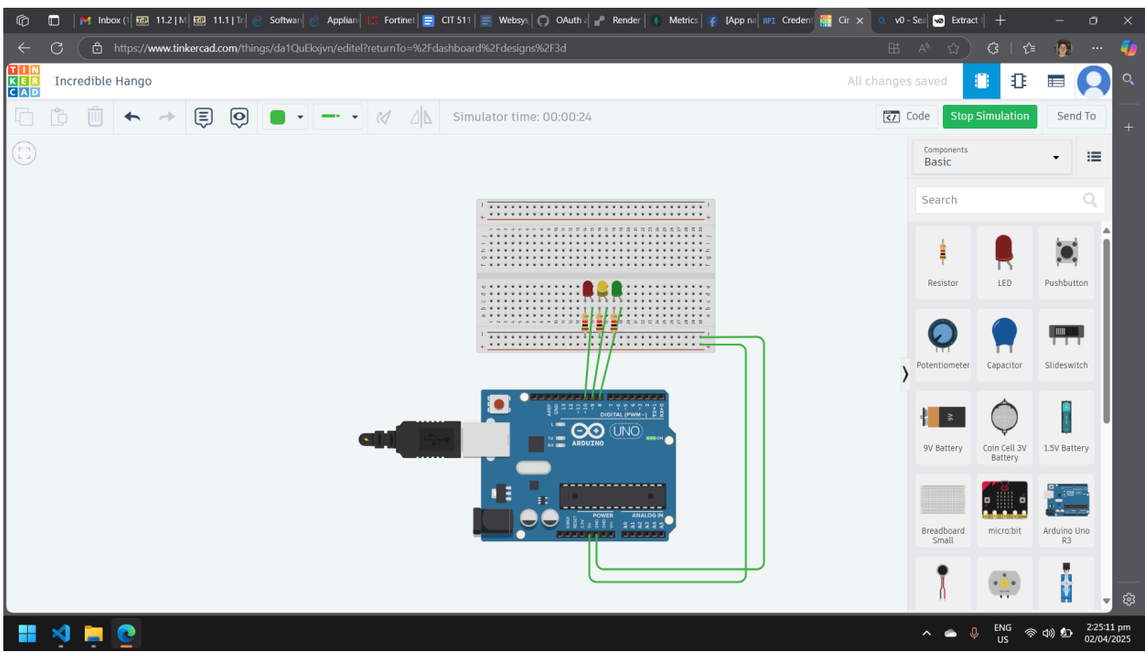
Test the Setup

- Run the Arduino code provided in your document.
- If the LEDs don't light up:
    - Check if you used **hookup wires** instead of the wrong type.
    - Verify that the **resistors are connected in series** (not in parallel).
    - Ensure that the **Arduino is powered (USB connected).**





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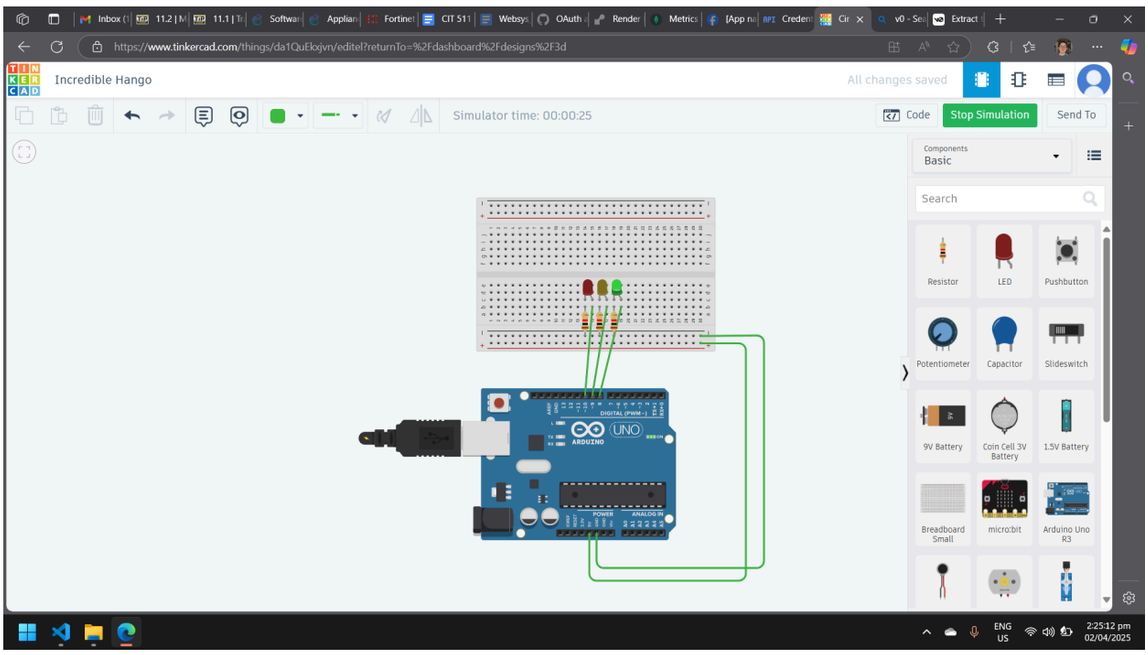

5. Observations

[Describe if the simulation worked as expected.]

The Tinkercad simulation shows an Arduino Uno controlling three LEDs (red, yellow, and green) on a breadboard to create a traffic light system. The LEDs light up in sequence - green for 3 seconds, yellow for 1 second, and red for 3 seconds - repeating continuously. Each LED connects to the Arduino through a resistor using green wires, demonstrating a simple but practical application of microcontroller programming.

6. Problems Encountered & Solutions

[Describe any debugging or issues faced and how you solved them.]

The issue I encountered is using the tinkercad because it was my first time. I need to explore and ask for help to do the activity now.

7. Tinkercad Simulation Link

[Insert the link to your Tinkercad simulation.]

https://www.tinkercad.com/things/da1QuEkxjvn/editel?returnTo=%2Fdashboard%2Fdesigns%2F3d&sharecode=1wvhFuMfNCpuVXs1yZhkH3w25NYr0AChiTZjoku5qUA

8. Reflection

[What did you learn from this activity?]

What I have learned in today's activity is using the arduino. For now, this was easy because there's a guide for completing the task.