Introduction:

The IoT-based Weather Adaptive Street Lighting System is designed to optimize street lighting by adjusting its brightness according to the weather conditions. The system utilizes IoT technology to gather real-time weather data and control the street lights accordingly. This project documentation provides a detailed overview of the system's design, implementation, and functionality using Tinkercad.

Components Used:

Arduino UNO: It serves as the microcontroller for the system.

Weather Sensor: Used to collect weather data, including light intensity and temperature.

LED Street Lights: Represents the street lighting system in the simulation.

Breadboard and Jumper Wires: Used for circuit connections.

Tinkercad: The online platform used for simulating the project.

Circuit Design:

Connect the Arduino UNO to the breadboard.

Connect the weather sensor to the Arduino UNO using jumper wires.

Connect the LED street lights to the Arduino UNO to control their brightness.

System Design:

The weather sensor collects data on light intensity and temperature.

The Arduino UNO reads the sensor data and processes it.

Based on the weather conditions, the Arduino UNO adjusts the brightness of the LED street lights.

The system continuously monitors the weather conditions and adapts the street lighting accordingly.

Implementation Steps:

Launch Tinkercad and create a new project.

Drag and drop the Arduino UNO, weather sensor, LED street lights, breadboard, and jumper wires from the component library to the workspace.

Connect the components following the circuit design mentioned above.

Write the Arduino code to read sensor data, process it, and control the LED street lights' brightness. You can use the Tinkercad's built-in Arduino code editor.

Upload the code to the Arduino UNO.

Run the simulation and observe how the LED street lights adjust their brightness based on the simulated weather data.

Functionality:

The weather sensor collects real-time data on light intensity and temperature.

The Arduino UNO reads the sensor data at regular intervals.

The system analyzes the data and determines the appropriate brightness level for the street lights.

The LED street lights are adjusted based on the calculated brightness level.

The system continuously monitors the weather conditions and adapts the street lighting accordingly.

Conclusion:

The IoT-based Weather Adaptive Street Lighting System implemented in Tinkercad provides an efficient solution for optimizing street lighting based on weather conditions. By adjusting the brightness of the LED street lights, the system ensures optimal visibility while conserving energy. This project documentation outlined the design, implementation, and functionality of the system, enabling you to replicate and understand the concept in a simulated environment using Tinkercad.