Enhancing Public Restroom Management with IoT Sensors

Phase 3 : Building and Developing with IoT

Smart Public Restroom using the Wokwi simulator. Wokwi is a platform for simulating and prototyping electronic circuits and microcontroller projects. In this example, we'll create a simple simulation of a smart public restroom that monitors the occupancy and provides feedback through an LCD.

Components you'll need:

1. Arduino board
2. An LCD to simulate the restroom occupancy indicator.
3. PIR sensor

Step 1: Sign up and log in to Wokwi

If you haven't already, sign up for a Wokwi account and log in to the platform.

Step 2: Create a New Project

1. Click on "Create a Project" to start a new project.
2. Choose the Arduino board you want to use.
3. Name your project
4. Click "Create."

Step 3: Add Components to the Project

1. On the project canvas, you'll see the Arduino board.
2. Search for "LED" in the component search bar and drag an LED component onto the canvas.

3. Search for "PIR Sensor" and add it to the canvas.

Step 4: Connect Components

1. Connect one leg of the LCD to a digital pin on the Arduino
2. Connect the other leg of the LCD to a current-limiting resistor
3. Connect the other end of the resistor to the GND (ground) on the Arduino.
4. Connect one leg of the push button to a digital pin on the Arduino
5. Connect the other leg of the push button to the GND (ground) on the Arduino.

Step 5: Write Arduino Code

Now, you'll need to write the Arduino code to control the LED based on the state of the push button.

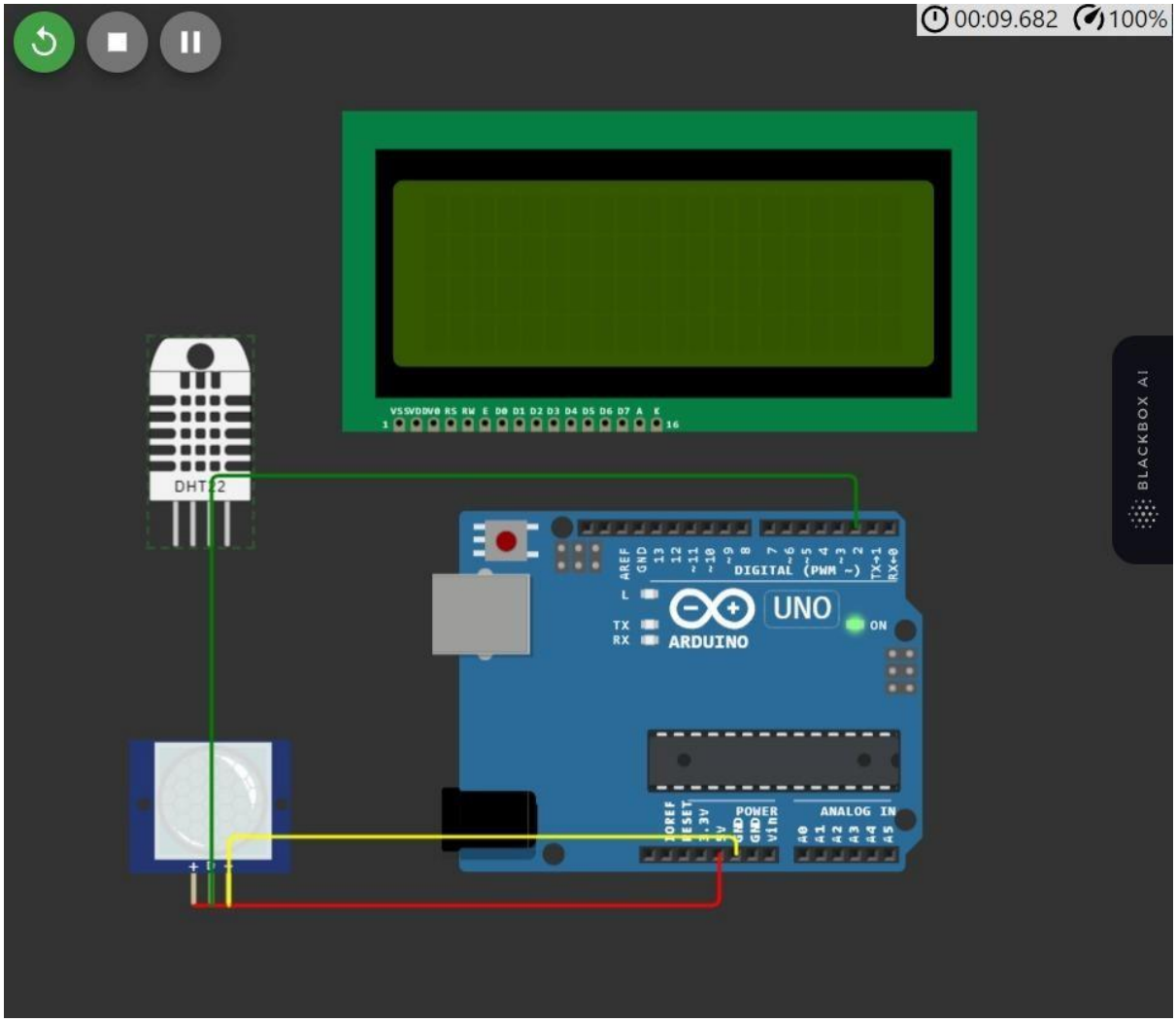
```
from wokwi.arduino import WokwiBoard, DHT22, LiquidCrystal from
wokwi.components import PIRMotionSensor


board = WokwiBoard()
pir_sensor = PIRMotionSensor(board, "D2") dht22
= DHT22(board, "D3")
lcd = LiquidCrystal(board, rs="D7", en="D6", d4="D5", d5="D4", d6="D8", d7="D9", cols=16,
rows=2)


occupancy = 0 cleanliness =
10


def handle_motion_detected(pin):
   global occupancy
occupancy = 1
update_display()


pir_sensor.set_callback(handle_motion_detected)
```

```
def update_display():
lcd.clear()
   lcd.print("Restroom      Status:")
if        occupancy        ==        1:
lcd.setCursor(0,                    1)
lcd.print("Occupied")    else:
      lcd.setCursor(0, 1)
lcd.print("Vacant")

def check_cleanliness():
   global cleanliness
cleanliness -= 1     if
cleanliness < 0:
cleanliness = 0
update_display()

board.simulation.setup()

while True:
   board.simulation.loop()
dht22.set_temperature(25)
dht22.set_humidity(40)     check_cleanliness()
```

Step 6: Simulate the Project

1. Click on the "Simulate" button to start the simulation.
2. You can now interact with the simulation by pressing the push button and observing the LED's behaviour.

This simple example simulates a smart public restroom where the LED indicates the occupancy status based on the state of the push button. You can extend and customize this project by adding more features, such as an occupancy counter or a feedback mechanism. Wokwi provides a powerful and flexible environment for simulating and testing your electronic projects before implementing them in the physical world.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