

Phase 5 development

SMART PUBLIC RESTROOM

DISCRIPTION:

- The concept of a smart public restroom powered by IoT (Internet of Things) represents a significant advancement in urban infrastructure and facility management.
- By seamlessly integrating cutting-edge technologies into public restroom facilities, these smart restrooms aim to revolutionize the way we experience and manage these essential amenities.
- IoT sensors and devices are employed to enhance hygiene, user convenience, and resource efficiency, providing real-time data and control for better user experiences and more effective maintenance.
- In this introduction, we will explore the key components and benefits of smart public restrooms using IoT, highlighting their potential to transform the way we interact with and maintain these public facilities.

COMPONENTS REQUIRED:

1 . AMMONIA SENSOR :

Ammonia sensor detects and monitors the air quality within the restroom.

This sensor can swiftly identify the presence of ammonia, a common component in human waste, and trigger automated ventilation and odor control systems to maintain fresh and pleasant air quality.

This not only ensures a more comfortable environment for users but also conserves energy by operating the ventilation system only when necessary.

2 . OCCUPANCY SENSOR :

occupancy sensor plays a crucial role in optimizing resource utilization. It detects when the restroom is occupied and unoccupied, allowing for several advantages.

When unoccupied, it can dim or turn off lights to save energy.

On the other hand, when someone enters, it can activate the lighting and ventilation, creating a more welcoming and functional space.

3 . ARDUINO MICROCONTROLLER:

- * You write code in the Arduino Integrated Development Environment (IDE) using a simplified version of the C/C++ programming language. This code specifies what the microcontroller should do.
- * When you upload your code, the Arduino IDE compiles it into machine code that the microcontroller can understand.
- * Once the code is uploaded, the microcontroller starts executing the instructions. It interacts with various input and output components, like sensors, LEDs, motors, and more, according to the code's logic.
- * Arduino microcontrollers are popular for a wide range of applications, from simple projects like blinking LEDs to complex systems like home automation and robotics, thanks to their user-friendly development environment and a vast community of users and resources.

4 . Bread Board:

A breadboard is a versatile tool used in electronics to build and prototype circuits without soldering.

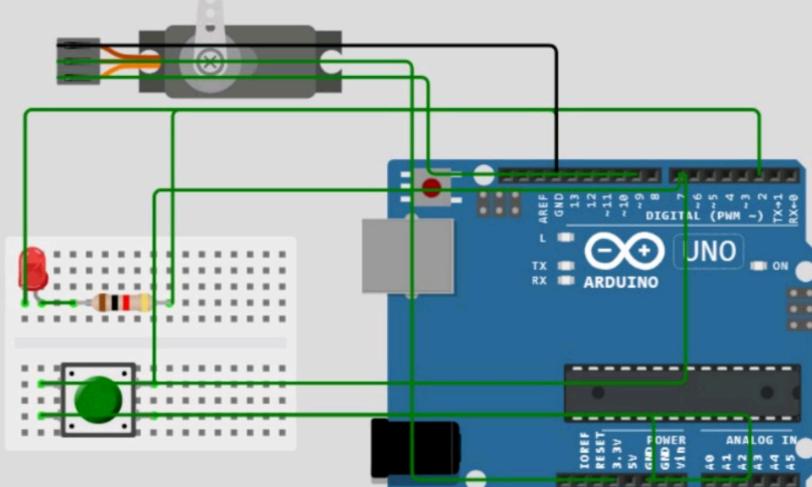
5 . SERVO MOTOR BASICS:

- * A servo motor is a rotary actuator that allows precise control of its angular position. It typically consists of a DC motor, a gearbox, a control circuit, and a feedback mechanism.
- * In a smart public restroom, servo motors can be used to automate and precisely control various functions, improving hygiene, convenience, and overall user experience. Their role can extend to hands-free faucet controls, automatic toilet flushing, door opening/closing mechanisms, and more, contributing to a modern and efficient restroom environment.

6. LED 'S:

Led's used to view the occupancy in restroom .

CIRCUIT DIAGRAM (MODEL):



PROJECT DESCRIPTION:

The "Smart Public Restroom Enhancement" project aims to transform traditional public restrooms into cutting-edge facilities that prioritize user comfort, cleanliness, and sustainability. This innovative project will leverage technology and design to create an improved public restroom experience that benefits both users and the environment.

PROJECT IMPLEMENTATION:

- Conduct a feasibility study to assess the technical and financial viability of the project.
- Develop a detailed project plan, including design specifications, technology integration, and construction requirements.
- Procure necessary equipment and materials, ensuring they meet sustainability and quality standards.
- Collaborate with architects, designers, and technology experts to create a restroom design that maximizes user comfort and efficiency.
- Pilot the smart restroom in a select location to gather user feedback and make necessary adjustments.
- Roll out the enhanced public restrooms in high-traffic areas, taking user feedback into account for continuous improvement.
- Monitor and maintain the smart restroom facilities to ensure they meet the highest standards of cleanliness and functionality.

IMPLEMENTATION IN IOT DEVICES:

```
#include <Servo.h>
```

```
const int buttonPin = 7;  
const int ledPin = 2;  
const int servoPin = 9; // Digital pin for the servo  
  
int buttonState = 0;  
  
Servo doorServo;  
  
void setup() {  
    pinMode(ledPin, OUTPUT);  
    pinMode(buttonPin, INPUT);  
  
    doorServo.attach(servoPin); // Attaching the servo to the pin  
}  
  
void loop() {  
    buttonState = digitalRead(buttonPin);  
  
    if (buttonState == HIGH) {  
        // Restroom is occupied  
        digitalWrite(ledPin, HIGH);  
  
        // Open the door (rotate the servo)  
        doorServo.write(90); // Angle to open the door  
    } else {  
        // Restroom is vacant  
        digitalWrite(ledPin, LOW);  
    }  
}
```

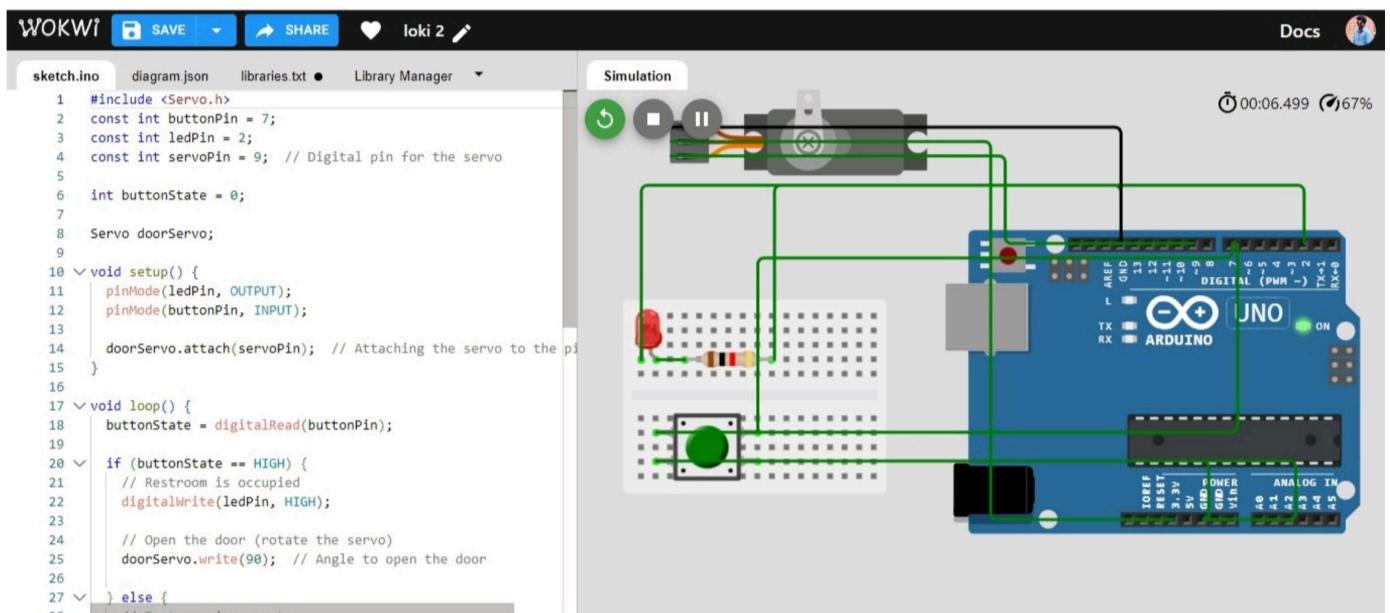
```

// Close the door (return the servo to its initial position)
doorServo.write(0); // Angle to close the door

}

}

```



Conclusion:

- * In conclusion, the integration of IoT (Internet of Things) technology in smart public restrooms has revolutionized the way we experience and interact with these facilities. These innovative restroom solutions are not just about modernizing the conveniences within these spaces but also fundamentally enhancing hygiene, efficiency, and sustainability.

- * IoT-enabled smart public restrooms offer real-time data collection and analysis, allowing for predictive maintenance, optimizing resource usage, and ensuring a clean and pleasant environment. The touchless fixtures, automated cleaning systems, and occupancy sensors have made these facilities safer and more convenient, especially in light of health concerns.

- * Additionally, the provision of real-time availability information, accessibility features, and interactive displays not only improves user experience but also caters to a diverse range of users, including those with disabilities. The incorporation of sustainability initiatives aligns these restrooms with environmental goals and promotes responsible resource management.
- * In essence, IoT has propelled the evolution of public restrooms from basic amenities to cutting-edge, user-centric spaces that prioritize hygiene, accessibility, and environmental consciousness. The implementation of IoT in smart public restrooms has set a new standard for how we approach public facilities, striving to make them cleaner, more efficient, and more inclusive. These innovations are a testament to the potential of technology to enhance everyday experiences and contribute to the well-being of communities.