**SMART PUBLIC RESTROOM**

**PHASE 1:** Problem definition and design thinking

**Abstract:**

The IoT Public Restroom System project is a forward-thinking and innovative solution designed to address the challenges faced by public restroom facilities in urban environments. This project leverages the principles of design thinking to create a user-centric, sustainable, and efficient restroom experience for the public. In this abstract, we provide an overview of the project’s key components, design thinking approach, and conclude with the project’s outcomes and significance.

**Design Thinking Approach:**

The project adopts a design thinking methodology to ensure that the IoT Public Restroom System meets the needs of its users effectively. This approach involves five key stages: empathize, define, ideate, prototype, and test. During the empathize stage, extensive user research is conducted to understand the pain points and requirements of restroom users. The define stage involves synthesizing this data into problem statements. Ideation generates innovative solutions, which are then prototyped and tested iteratively to refine the system.

**Key Components:**

**1. Smart Sensor Technology:** IoT sensors are installed within restroom facilities to monitor occupancy, toilet cleanliness, and supply levels in real-time.

**2. Mobile Application:** A user-friendly mobile app provides real-time restroom availability information and allows users to request cleaning or supplies.

**3. Cleaning and Maintenance Management System:** An administrative portal helps facility managers optimize cleaning schedules and supply restocking based on sensor data.

**4. Sustainability Measures:** The system incorporates water-saving features such as smart flushing and energy-efficient lighting to reduce environmental impact.

**5. Data Analytics:** Collected data is analyzed to identify usage patterns and make data-driven decisions for restroom management.

**Conclusion:**

The IoT Public Restroom System project presents a holistic and innovative approach to improving public restroom facilities. By integrating IoT technology, user-centric design thinking, and sustainability measures, the project aims to enhance the overall restroom experience, reduce operational costs, and promote environmental conservation. The system’s ability to provide real-time information to users and facility managers has the potential to transform public restroom management in urban areas. This project serves as a model for future smart infrastructure initiatives that prioritize user experience, sustainability, and data-driven decision-making.