# Phase 2: Innovation

**Design innovation for IoT-based smart public restrooms.**

**Lights:** One way to innovate IoT-based smart public restrooms is to make the lights more efficient and responsive. For example, occupancy sensors can be used to detect when someone is in the restroom and turn on the lights accordingly. This can help to reduce energy consumption and save money.

Another innovation is to use smart bulbs that can be controlled remotely. This would allow maintenance staff to turn on the lights in a restroom from a central location, even if they are not physically present in the restroom. This could be useful for restrooms that are located in remote or inaccessible areas.

**Occupancy monitoring:** Occupancy monitoring systems can be used to track the number of people in a restroom at any given time. This information can be used to optimize cleaning schedules, to provide information to users about the availability of restrooms, and to trigger other events, such as turning on the lights or flushing toilets.

One way to implement occupancy monitoring is to use sensors that detect the presence of people. For example, infrared sensors can be used to detect the heat of people's bodies. Another option is to use ultrasonic sensors, which detect the movement of people.

**Smart trash cans:** Smart trash cans can be equipped with sensors that detect when they are full. The trash can can then send a signal to maintenance staff to indicate that it needs to be emptied. This can help to ensure that trash cans are never overflowing and that restrooms are always clean and sanitary.

Another innovation is to use smart trash cans that can sort waste into different categories, such as recyclable materials and food waste. This can help to make it easier for maintenance staff to dispose of waste properly and to reduce the amount of waste that is sent to landfills.

**Smart soap and towel dispensers:** Smart soap and towel dispensers can be equipped with sensors that detect when hands are present. The dispenser can then automatically dispense soap or towels without the user having to touch it. This can help to reduce the risk of cross-contamination and to improve the user experience.

Another innovation is to use smart soap and towel dispensers that can be controlled remotely. This would allow maintenance staff to refill the dispensers from a central location, even if they are not physically present in the restroom. This could be useful for restrooms that are located in remote or inaccessible areas.

**Conclusion:** IoT-based smart public restrooms have the potential to revolutionize the way we use public restrooms. By making public restrooms more efficient, responsive, and user-friendly, IoT-based smart restrooms can help to improve the sanitation and accessibility of public restrooms for everyone.

**Steps to put the design into transformation:** The following steps can be taken to put the design for IoT-based smart public restrooms related to lights, occupancy monitoring, smart trash cans, and soap and towel dispensers into transformation:

* **Identify the specific problems that need to be solved.** What are the biggest challenges with public restrooms in your area? Once you have identified the problems, you can start to develop solutions.
* **Research existing IoT-based restroom technologies.** What technologies are already available that can be used to solve the problems you have identified?
* **Design your own IoT-based restroom system.** This may involve developing new hardware and software, or integrating existing technologies in a new way.
* **Build a prototype.** Once you have a design, build a prototype of your system. This will help you to test your design and to identify any problems that need to be fixed.
* **Test the prototype in a real-world setting.** Once you have a working prototype, test it out in a real-world setting to see how it works. This will help you to identify any further problems that need to be fixed and to get feedback from users.
* **Deploy system.** Once satisfied with system, you can start to deploy it in public restrooms. This may involve working with local governments or businesses.