**Name- Shivam Giri**

**Course name-B.Tech ECE**

**College name-Quantum University , Roorkee**

**Batch number- 1**

**Task no.- 4**

**Task name-** **Dear Learners, refer to the given scenario and identify key challenges and solution areas.**

**Scenario:**

**A city has introduced smart trash bins with sensors to detect waste levels and open automatically. The system aims to automate waste collection by sending alerts when bins are full. However, sensor malfunctions and unclear indicators have led to overflowing bins and slow adoption.**

**Challenges Faced:**

**Sensor Malfunctions: Bins do not always open as expected.**

**Unclear Indicators: LED signals are confusing for users.**

**Resistance to Adoption: Some users, especially older generations, prefer traditional bins.**

**Solution Areas:**

**Improve sensor reliability for consistent lid operation.**

**Use clear, color-coded indicators or audio cues for better communication.**

**Educate users on smart bin features to encourage adoption.**

**Empathy Map for Smart Trash Bins Users**

| **THINKS** | **FEELS** |
| --- | --- |
| *“Why is the bin not opening?”* | Frustration when the bin doesn’t function properly. |
| *“Is this system reliable?”* | Skepticism about sensor accuracy. |
| *“How do I know when to use it?”* | Confusion due to unclear indicators. |
| *“Why change something that works?”* | Resistance to new technology, especially among older users. |

| **SAYS** | **DOES** |
| --- | --- |
| *“I don’t understand these lights.”* | Avoids using the smart bin, leading to overflowing trash. |
| *“The old system was better.”* | Uses traditional bins or leaves waste outside full bins. |
| *“These bins should just work.”* | Complains to city officials or on social media. |

**Connecting to the Design Thinking Approach**

**1. Empathize**

* Conduct surveys and user interviews to understand pain points.
* Observe how users interact with bins in real-world scenarios.

**2. Define**

* Clearly define the key problems:
  + **Technical issues**: Sensors malfunctioning.
  + **User confusion**: Poorly designed indicators.
  + **Adoption barriers**: Resistance from older users.

**3. Ideate**

* Brainstorm solutions such as:
  + Upgrading sensors for better reliability.
  + Implementing **voice or motion-based indicators** for accessibility.
  + Creating a city-wide awareness campaign with workshops for older users.

**4. Prototype**

* Develop and test:
  + A **beta version** of improved smart bins with user-friendly sensors.
  + New indicator designs (e.g., **color-coded lights + audio cues**).
  + A **QR code** on the bin for instant user guidance.

**5. Test**

* Pilot the improved bins in selected areas.
* Gather user feedback and refine solutions before full implementation.