Department of Electronic and Telecommunication Engineering

University of Moratuwa

EN2160 – Electronic Design Realization

Preliminary Design Report – Smart Dustbin

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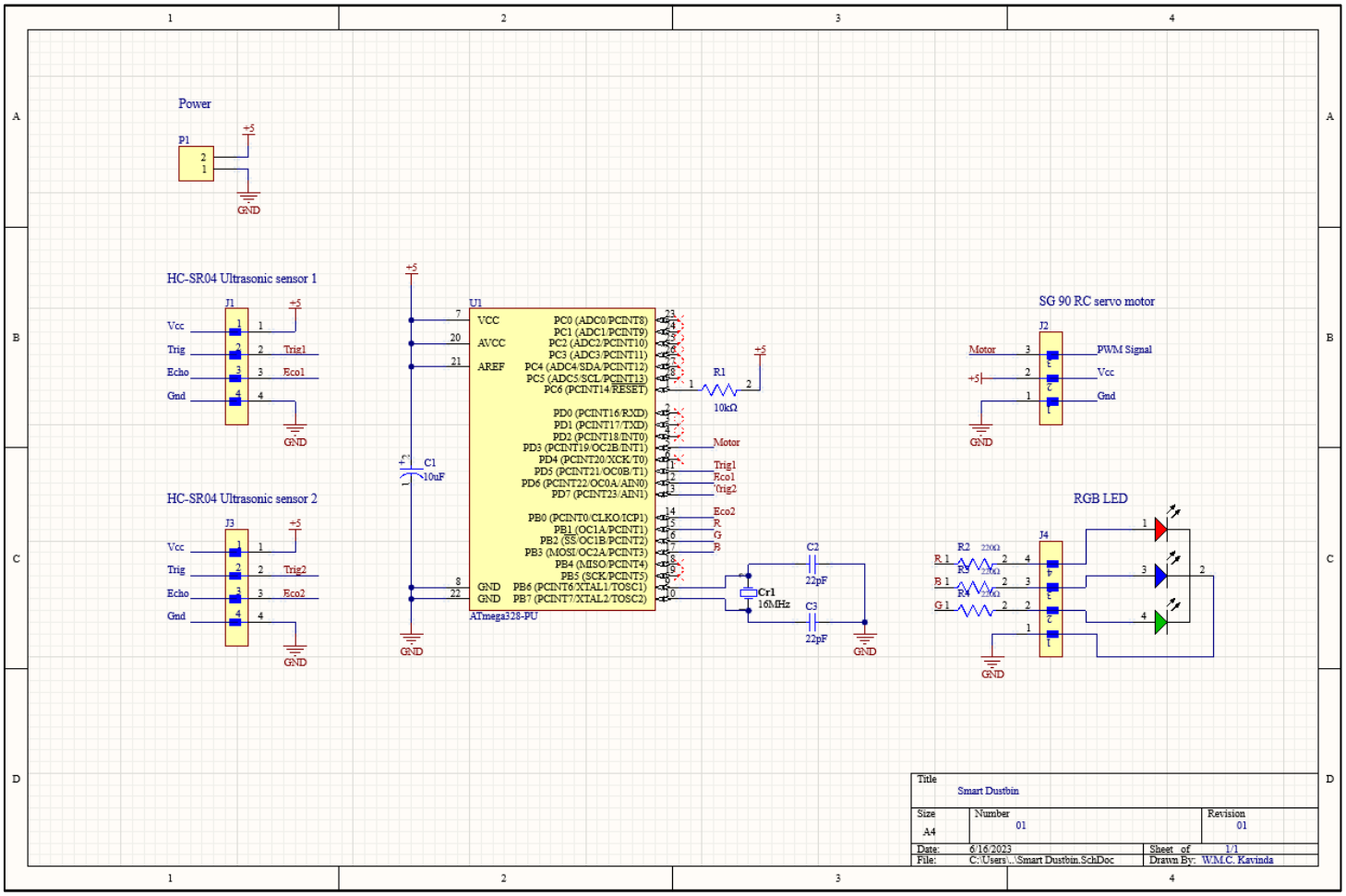
Contents

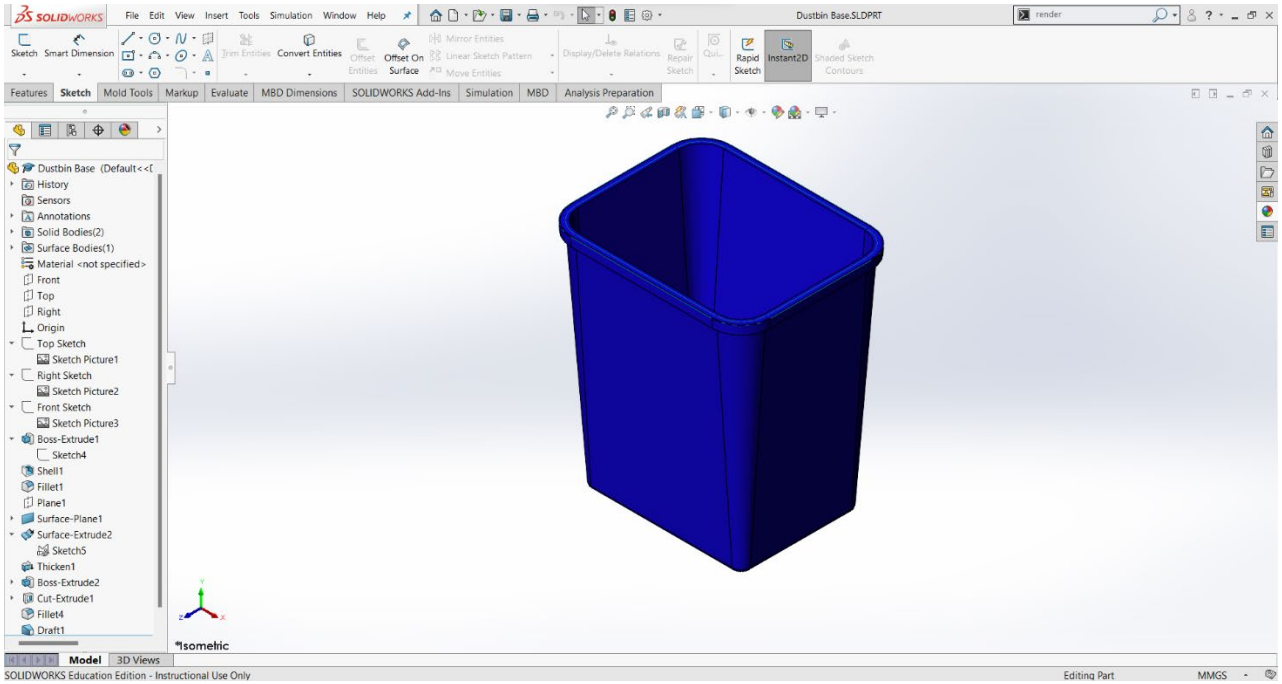
1. Introduction

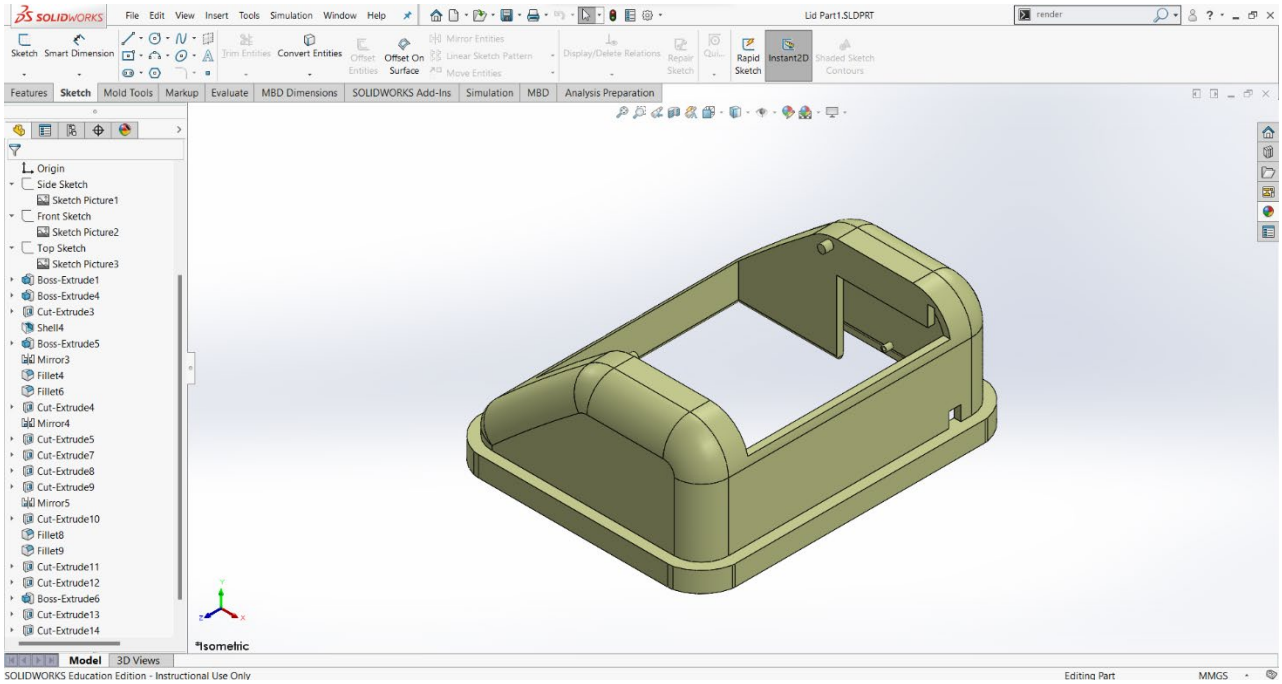
This preliminary design report introduces a groundbreaking concept the smart dustbin. This innovative solution integrates cutting-edge technology to automate the opening and closing of the dustbin, aiming to offer users a convenient and hygienic waste disposal experience. By eliminating the need for manual operation, this intelligent dustbin enhances efficiency and user convenience, transforming the way we manage waste.

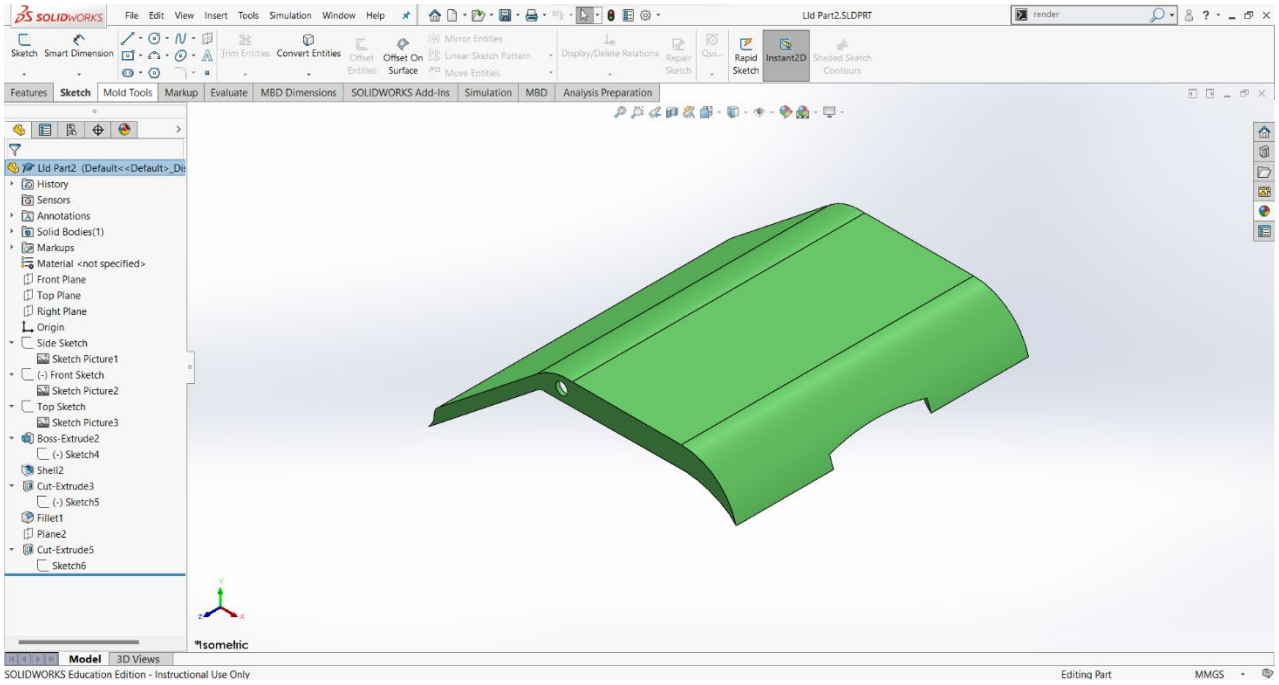
2. Schematic of the implemented design



3. Solid work design of the implemented design



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Sketch
Smart Dimension
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Convert Entities
Offset Entities
Offset On Surface
Mirror Entities
Linear Sketch Pattern
Move Entities
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Repair Sketch
Rapid Sketch
Instant2D
Shaded Sketch Contours
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Mold Tools
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Sketch Picture2
Top Sketch
Sketch Picture3
Boss-Extrude2
(-) Sketch4
Shell2
Cut-Extrude3
(-) Sketch5
Fillet1
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Sketch6
*Isometric
Model
3D Views
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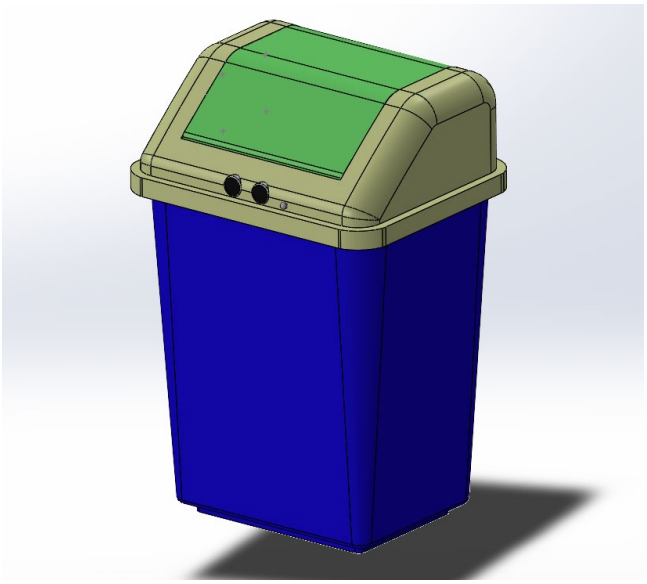
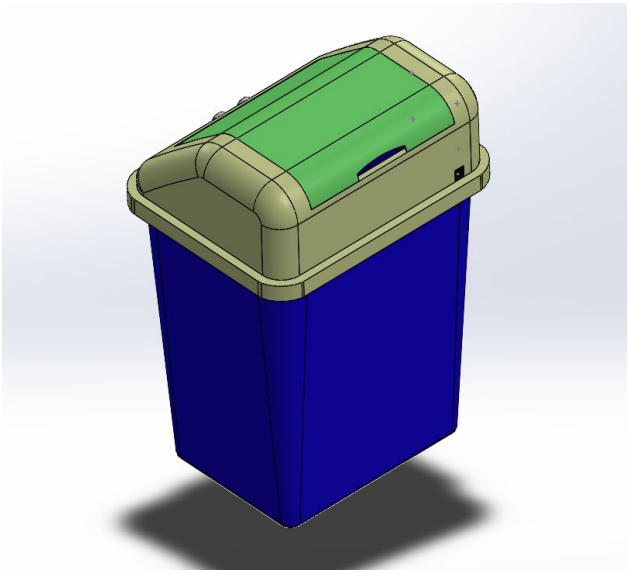
Editing Part
MMGS





4. Problems and Improvements

4.1 Problems

4.1.1 Problems identified by me

- Dustbin Lid Opening Direction – The current design of the smart dustbin has the lid opening into the dustbin. This configuration can obstruct the opening and disposal of waste, making it less convenient for users.

4.1.2 Problems identified by group members

- PCB Placement – The placement of the printed circuit board (PCB) inside the lid poses a potential problem. This positioning exposes the PCB to the risk of damage or contamination from waste, potentially affecting the functioning and lifespan of the smart dustbin.
- Inadequate LED Indicators – The current LED indicators are insufficient in indicating the waste level within the dustbin. Users may face difficulties in determining when the dustbin requires emptying, leading to inefficiencies and potential overflow.

4.1.3 Problems identified by users

- Small Size – The current size of the dustbin is insufficient, limiting its capacity and requiring frequent emptying. This inconvenience can be particularly burdensome in high-traffic areas or busy environments.
- Inadequate External Power Source – The current power source for the smart dustbin, when used in outdoor environments, is not optimal. It may not withstand harsh weather conditions or provide a reliable and sustainable power supply, compromising the dustbin's performance and functionality.

4.2 Improvements

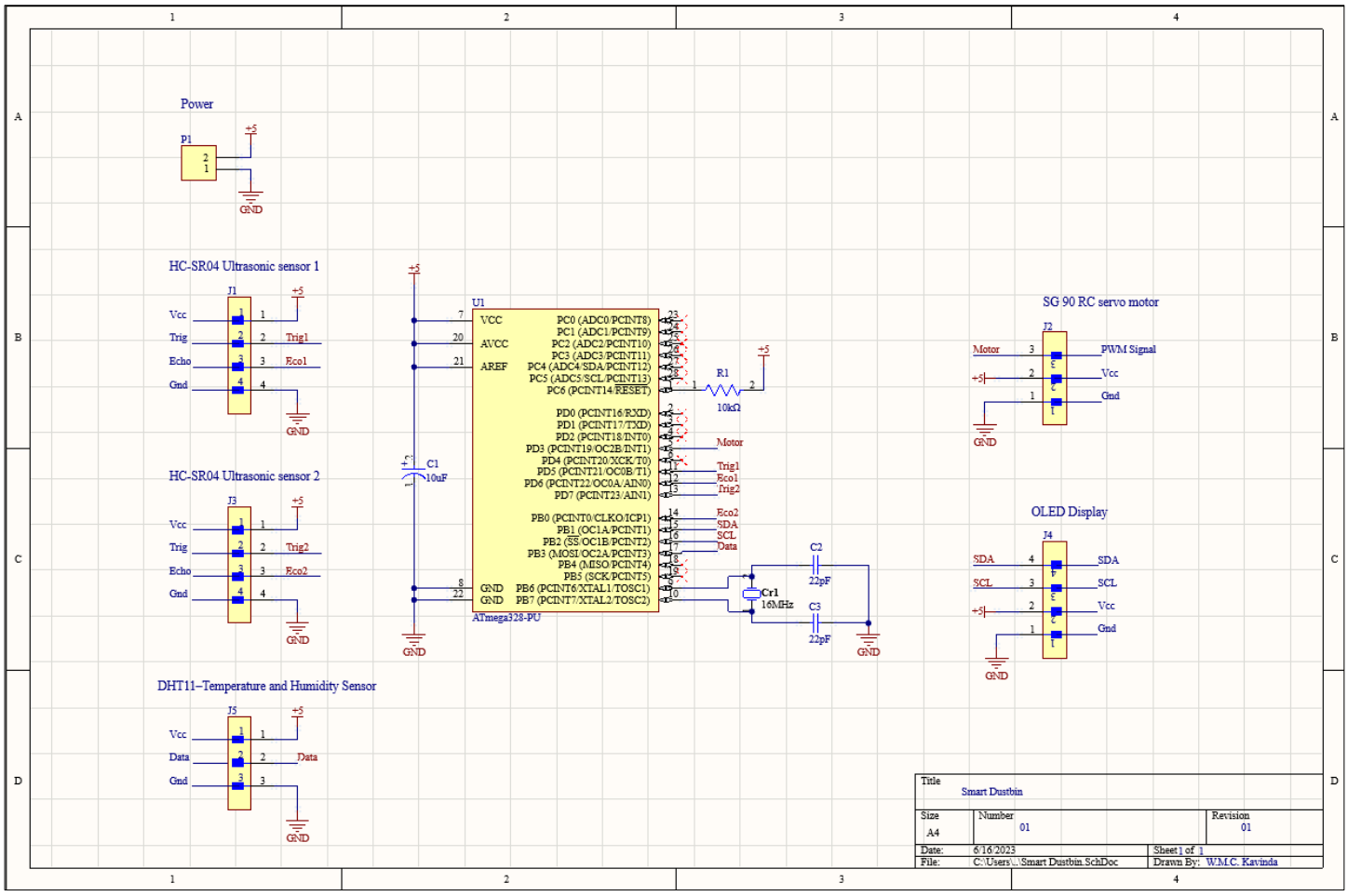
4.2.1 Improvements proposed by group members

- Lid Opening Direction – Redesign the dustbin lid to open away from the dustbin instead of into it. This modification ensures unobstructed access for waste disposal and improves user convenience.
- PCB Relocation – Move the PCB from inside the lid to a protected and sealed compartment within the dustbin, ensuring its longevity and reliable performance by minimizing the risk of damage or contamination.
- OLED Display for Level Indication – Incorporate an OLED display on the dustbin's exterior to provide clear and accurate indications of the fill level. This display can show precise measurements or visual representations, enabling users to easily monitor the dustbin's status.
- Incorporation of Humidity Sensor – Integrate a humidity sensor into the smart dustbin design. This sensor will detect the level of moisture or humidity inside the dustbin, providing valuable information about the potential presence of liquids or wet waste. By detecting high humidity levels, the sensor can alert users to take appropriate measures, such as using absorbent materials or emptying the dustbin promptly to prevent unpleasant odors, leakage, or bacterial growth.

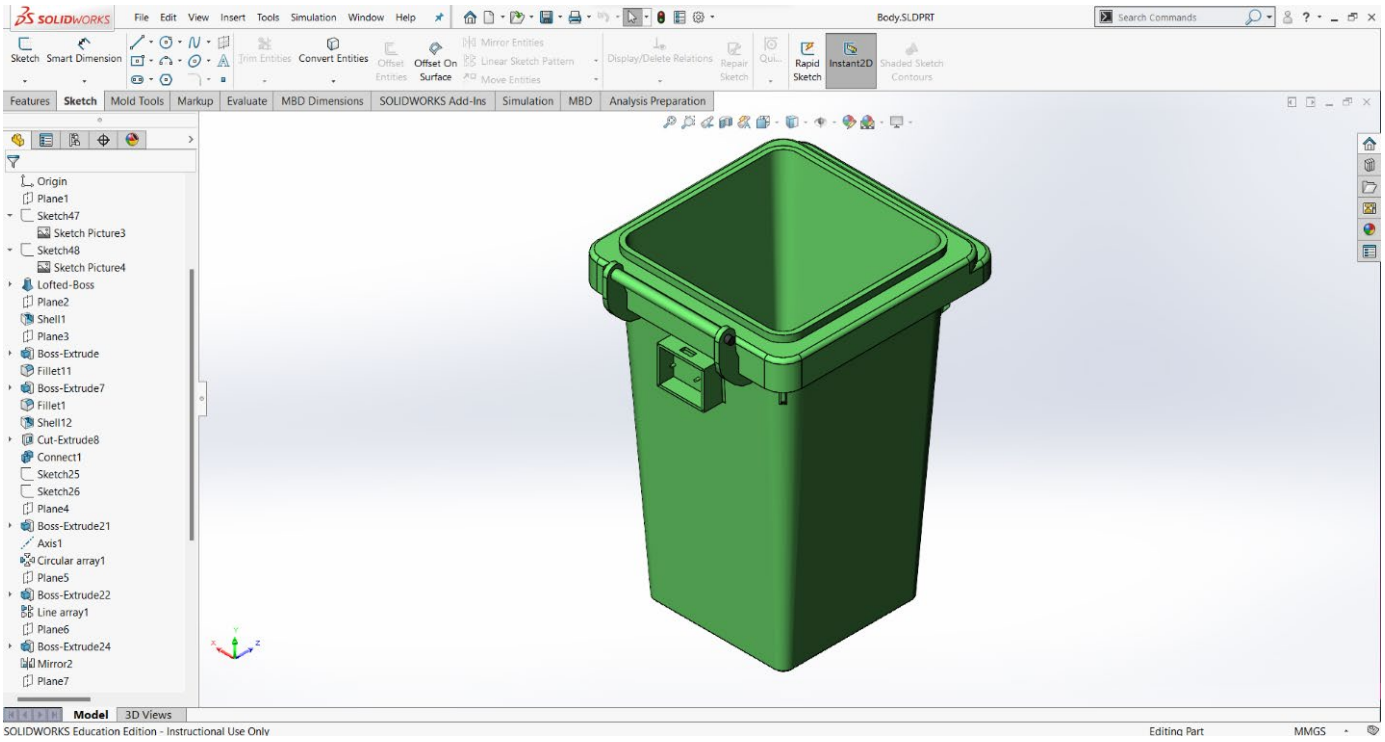
4.2.2 Improvements proposed by users

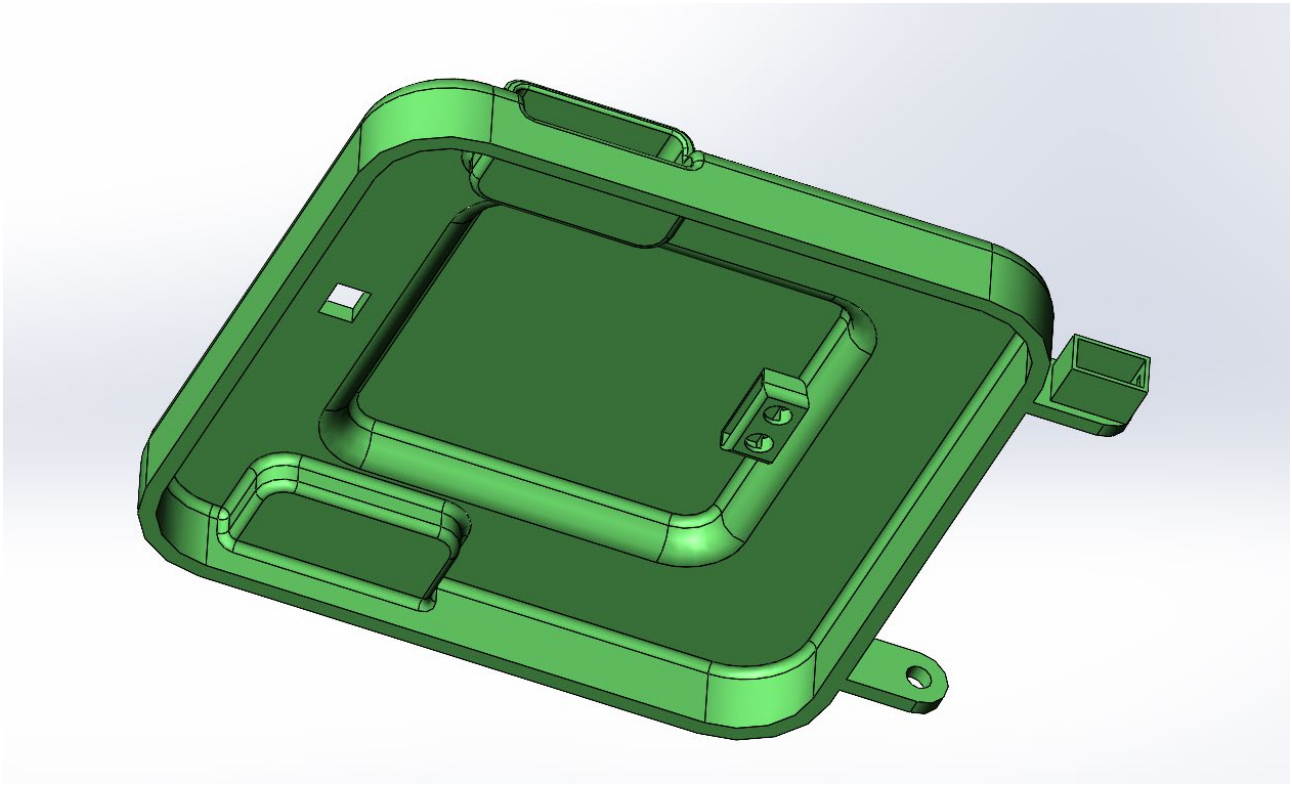
- Battery Power – Utilize batteries as a power source for the smart dustbin, eliminating the need for an external power supply. This ensures portability and independence from external power sources, making the dustbin suitable for outdoor environments without compromising its functionality.
- Increased Size – Enhance the dustbin's size and capacity to accommodate a larger volume of waste, reducing the frequency of emptiness and providing users with greater convenience.

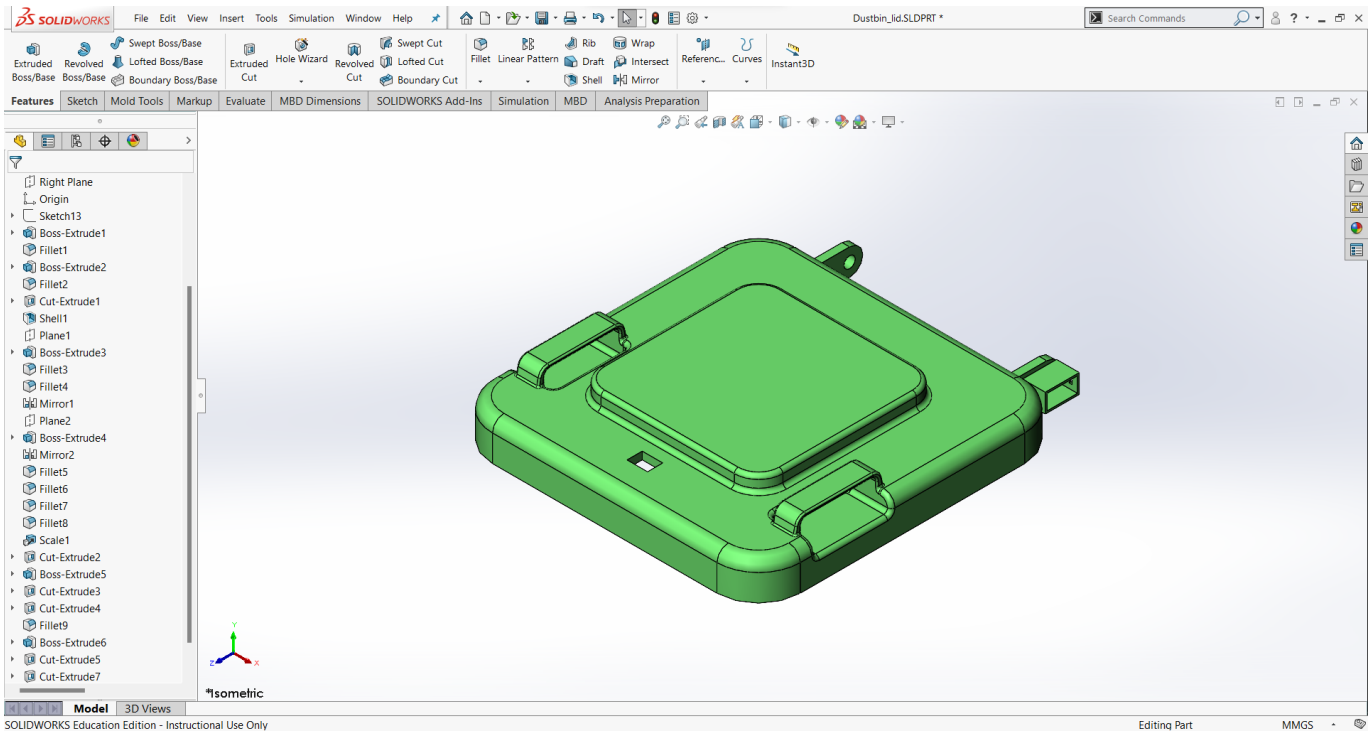
5. Schematic of the improved design



6. Solid work design of the improved design



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Fillet1
Boss-Extrude2
Fillet2
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Boss-Extrude3
Fillet3
Fillet4
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Fillet5
Fillet6
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*Isometric
Model 3D Views
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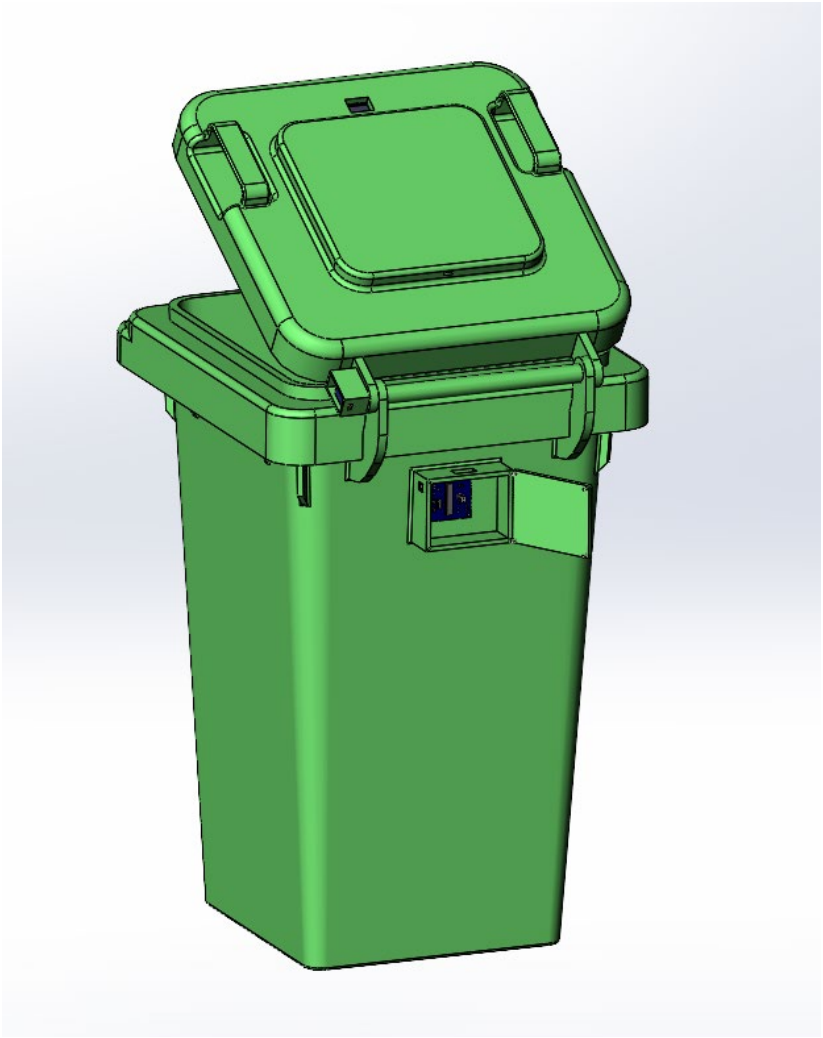

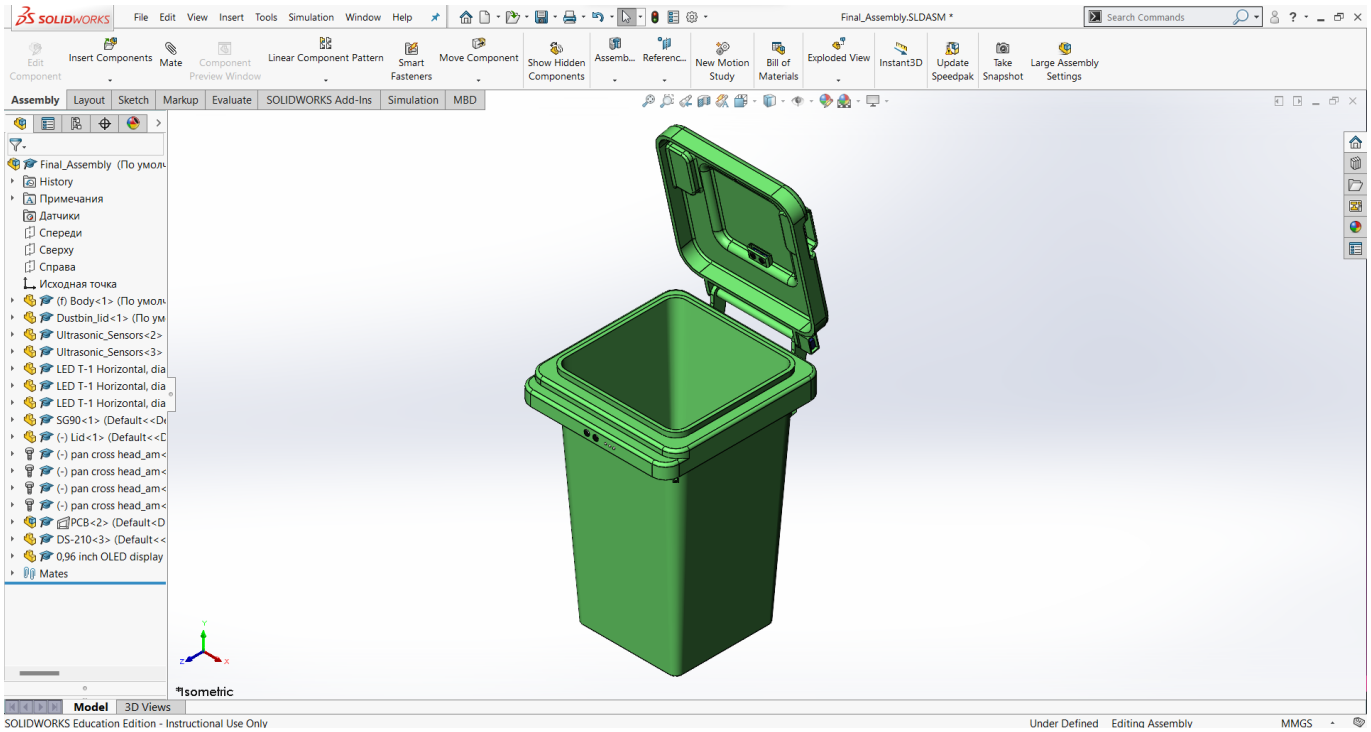
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Linear Component Pattern
Smart Fasteners
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New Motion Study
Bill of Materials
Exploded View
Instant3D
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Large Assembly Settings
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3D Views
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MMGS