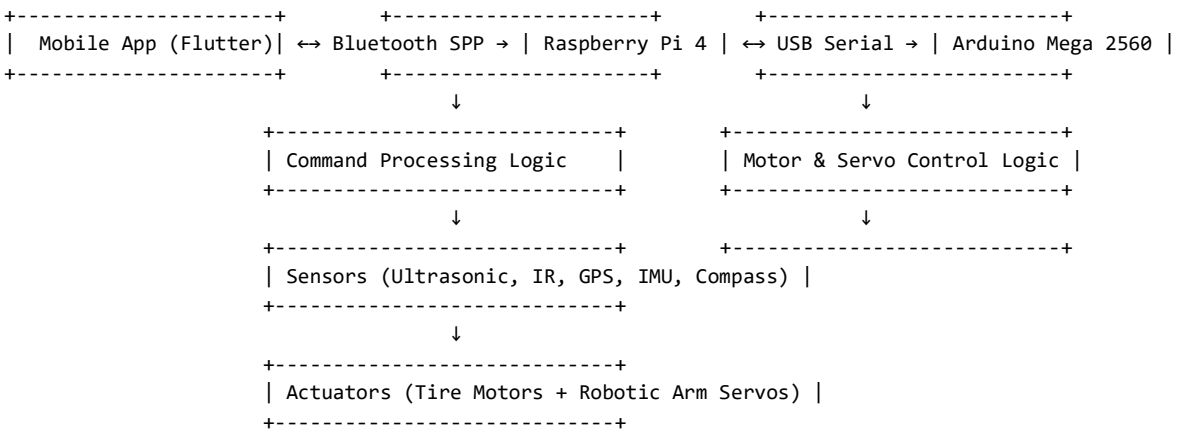
☑ Step 1 – 4.1 Basic Modules Design

✔ What It Should Contain:

A clean **block diagram** showing high-level system modules and data flow.

It must show how the major parts interact, making the whole system design clear.

☑ Suggested Block Diagram Structure (High-Level View):



☑ Explanation (to add to documentation):

1. **Mobile App (Flutter)** –
2. User interface on a mobile phone that allows the user to manually control EcoSweep or select predefined modes.
3. **Bluetooth Classic (SPP)** –

Communication channel between the mobile app and Raspberry Pi, transmitting user commands in real time.

4. **Raspberry Pi 4** –

Acts as the high-level processor. It receives commands from the app and forwards them to Arduino Mega via USB Serial. Also responsible for logging and further processing.

5. **Arduino Mega 2560** –

Manages hardware-level control. It controls tire motors and servo motors, and processes sensor inputs for basic obstacle avoidance.

6. **Sensors** –

Ultrasonic, IR, GPS, IMU, and Compass sensors provide data regarding obstacles, location, and orientation.

7. **Actuators** –

Tire motors enable movement, and the robotic arm with servos performs cleaning operations.

☑ How to Design the Diagram:

Use tools like:

- **draw.io (diagrams.net)** – Simple drag & drop for clean diagrams.
- **Lucidchart** – Easy to use for professional diagrams.
- **Microsoft Visio** – For professional formatting.