🔷 Step-by-Step Working Process

1️⃣ System Power ON & Initialization

When the device is powered on, the Arduino begins by initializing all connected components such as:

- **RFID Module**
- **LCD Display**
- **Servo Motor**
- **Load Cell (HX711 Sensor)**
- **Buzzer/LED (Output Pin)**

The LCD turns ON and the servo is moved to a **closed position (160°)** so no rice is dispensed at the start.

2️⃣ Calibration of Load Cell (Weight Sensor)

The system runs the calibrate() function. During this process:

- The load cell takes **100 sample readings**.
- The average of these readings is stored as the **baseline (tare value)**.
- This ensures the weighing scale starts from **zero**.

The LCD displays **"Calibrating..."** and after completion shows **"Calibration OK"**.

3️⃣ Waiting for RFID Card

Now the system asks the user to scan their RFID card:

📌 LCD displays: **"Scan RFID Card..."**

The code continuously checks for the presence of a card.

4️⃣ RFID Authentication

Once a card is detected, the system:

- Reads the **UID (Unique ID)** from the RFID tag.

- Compares it with stored authorized UIDs.

✓ **If the UID matches:**

- LCD shows **"Access Granted"**
- LED/Buzzer blinks once

❌ **If not authorized:**

- LCD shows **"ACCESS DENIED"**
- Alarm/Buzzer blinks multiple times
- System restarts waiting for another RFID scan

5️⃣ Detecting Rice Container

After successful authentication, the system waits for a container to be placed on the weighing platform (load cell).

📌 LCD shows: **"Place Container"**

The system checks weight continuously.
If the detected weight is greater than **3g**, it assumes a container is placed.

6️⃣ User Enters Required Weight

Once a container is detected:

📌 LCD shows: **"Enter Quantity:"**

The user now enters the desired rice amount (for example: 100, 250, 500g) through the **serial monitor**.

The entered weight is stored in variable **y**.

7️⃣ Rice Dispensing Process

The system now starts dispensing rice:

- The servo motor rotates to **90° (open)**.
- Rice starts falling into the container.
- Load cell continuously measures weight:

LCD shows two values:

Display Line	Meaning
Current: X g	Current rice weight
Target: Y g	Weight user requested

8️⃣ Automatic Stop of Servo

Once the current weight **reaches or exceeds** the target value:

- The servo returns to **closed position (160°)**.
- The buzzer/LED signals the user.
- LCD shows **"Collect Rice"**

9️⃣ System Reset

After dispensing is complete:

- The target weight resets to **0**
- The system restarts from the **RFID scanning stage**
- Ready for next user

✅ Summary of the Process Flow

Step	Action
1	System initializes
2	Load cell calibrates
3	User scans RFID card
4	Authentication check
5	System waits for container
6	User enters required quantity

Step	Action
7	Servo dispenses rice
8	Automatically stops when target reached
9	System resets for next user