

AUTOMATED POTATO GRADING MACHINE

Presented by IT group 8

Meet The Group



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Problem Definition

Manual grading of potatoes is time-consuming, laborintensive, and error-prone, leading to inefficiencies and customer dissatisfaction. Current methods lack accuracy and contribute to suboptimal inventory management. Automating the grading process is essential to reduce labor costs, improve efficiency, and enhance customer satisfaction while ensuring hygiene standards are met.



Aim

Our primary aim is to develop an automated potato grading machine capable of efficiently grading potatoes into small, medium, and large sizes, catering to the diverse needs of customers. Additionally, we aim to optimize resource utilization and minimize wastage by accurately measuring and dispensing potatoes based on customer requirements.



Objectives



Objective 1

Develop a robust and reliable potato grading machine that accurately differentiates between small, medium, and large potatoes.

Objective 2

Implement user-friendly interfaces for easy input of desired potato size and quantity by customers.

Objective 3

Integrate sensors and motors for precise control and automation of the grading process.

Objective 4

Enhance efficiency and reduce operational costs for grocery shops and supermarkets.



Objectives

Objective 5

Ensure the safety and hygiene of the grading process to meet regulatory standards and consumer expectations

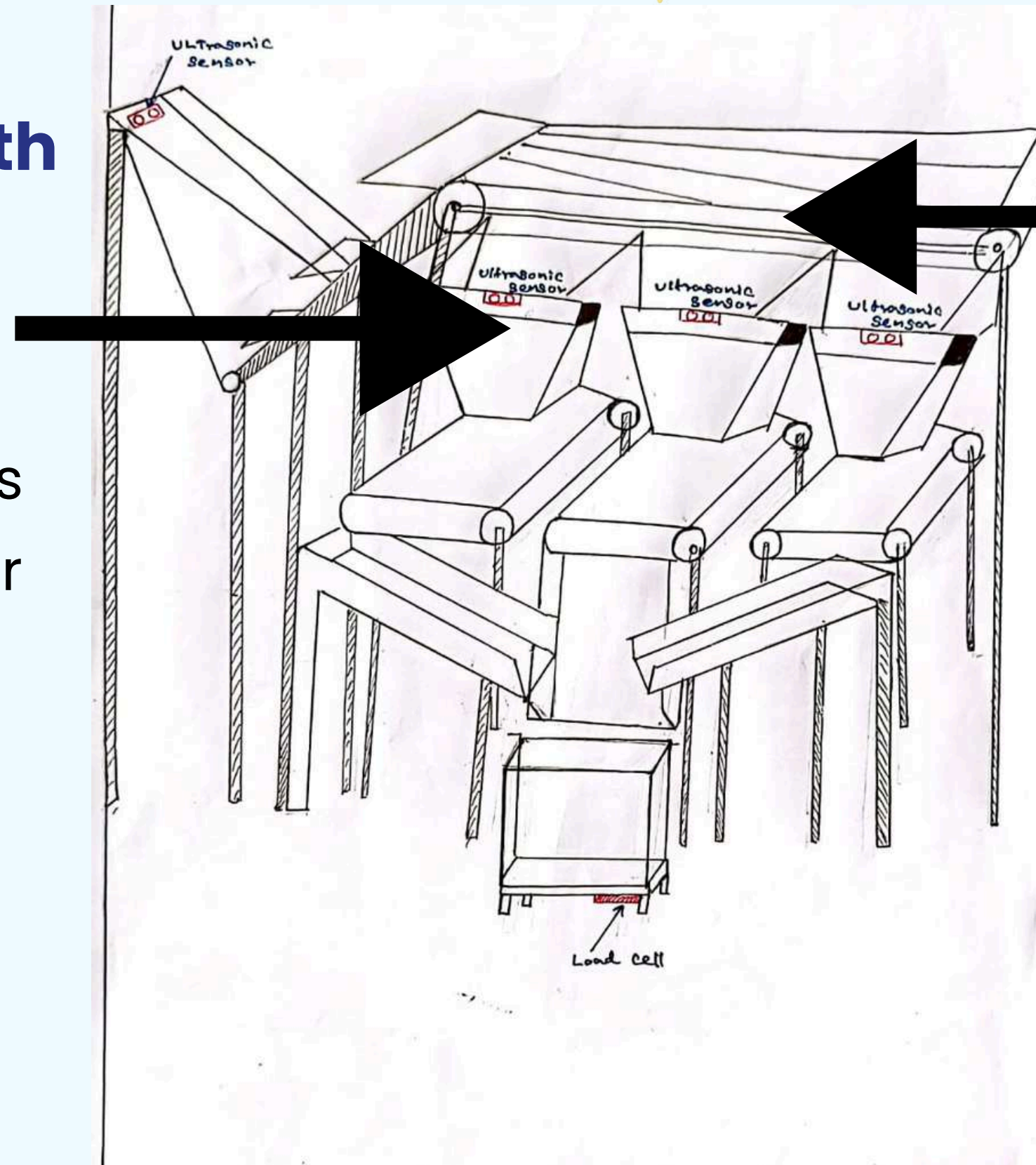
Objective 6

To develop a system for automatic fertilization and pest control that is safe for ornamental plants and does not harm the environment or human health.

Proposed Solution

Potato Container with Ultrasonic Sensor

Measures potato levels for precise control over dispensing.



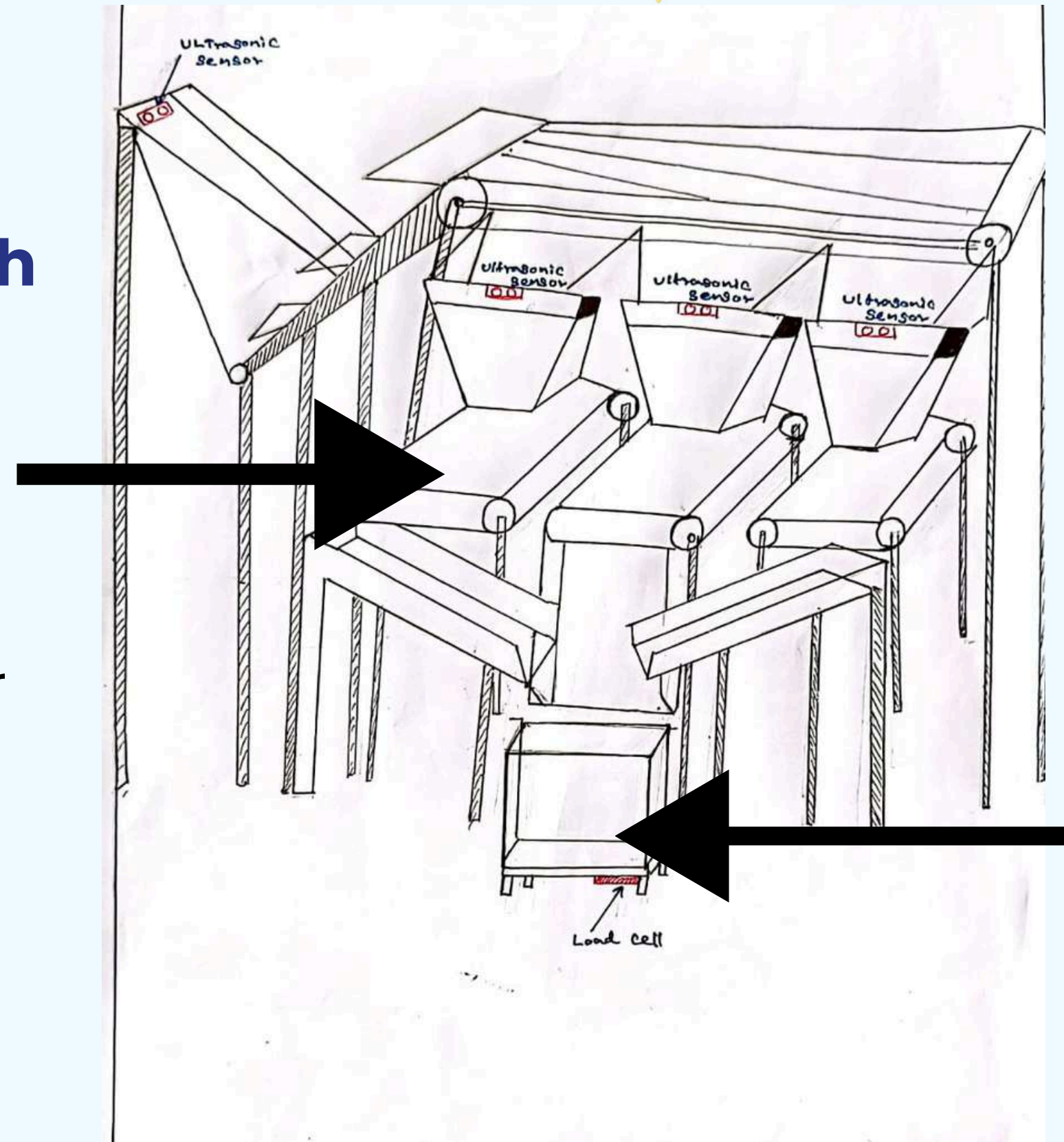
Grading Conveyor Belt

Utilizes a series of stacked conveyor belts with designated gaps for size differentiation.

Proposed Solution

Conveyor Belts with Stepper Motors

Transport graded potatoes to the weighting container for smooth and efficient movement



Load Cell for Weight Measurement

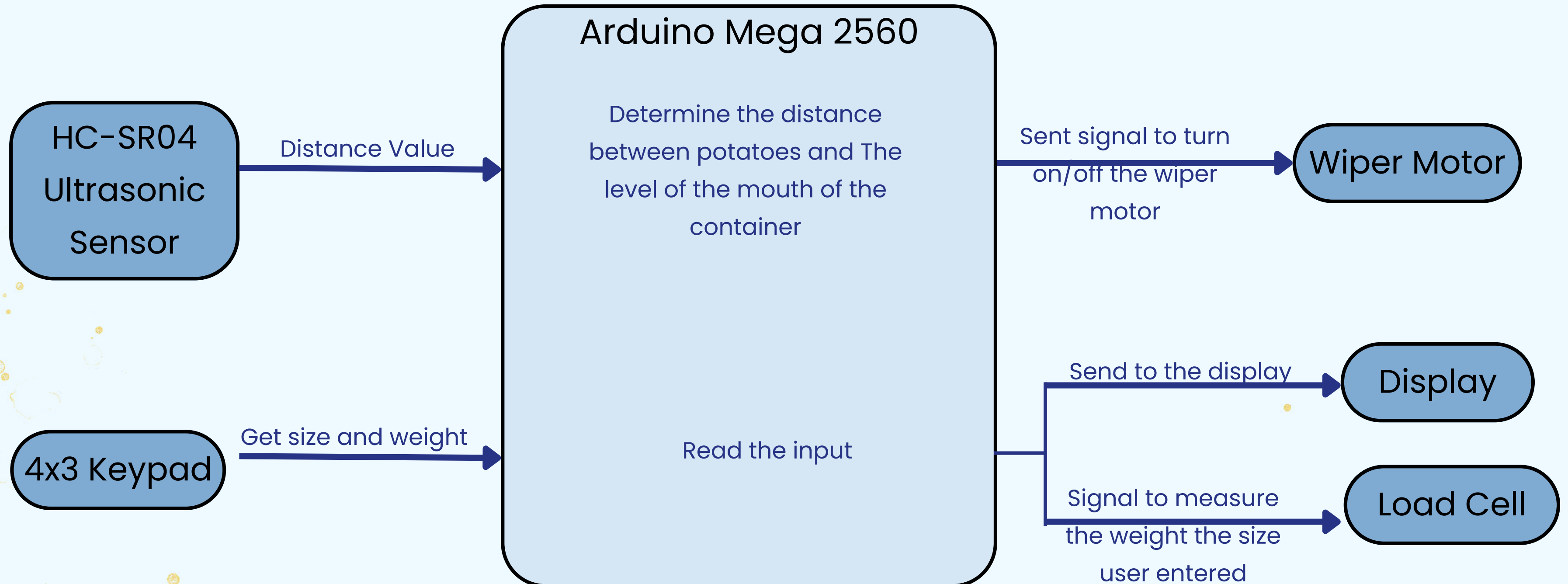
Measures the weight of graded potatoes for accurate inventory management and reduced

System Diagram

Input

Process

Output

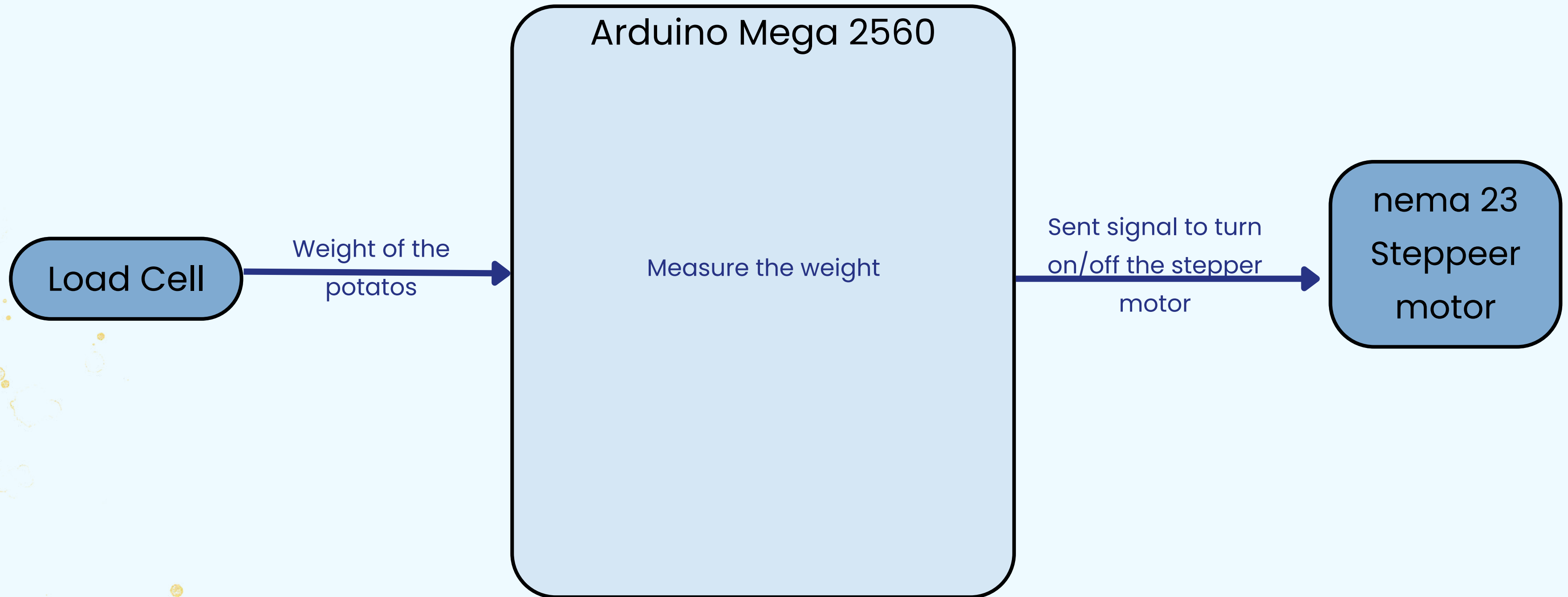


System Diagram

Input

Process

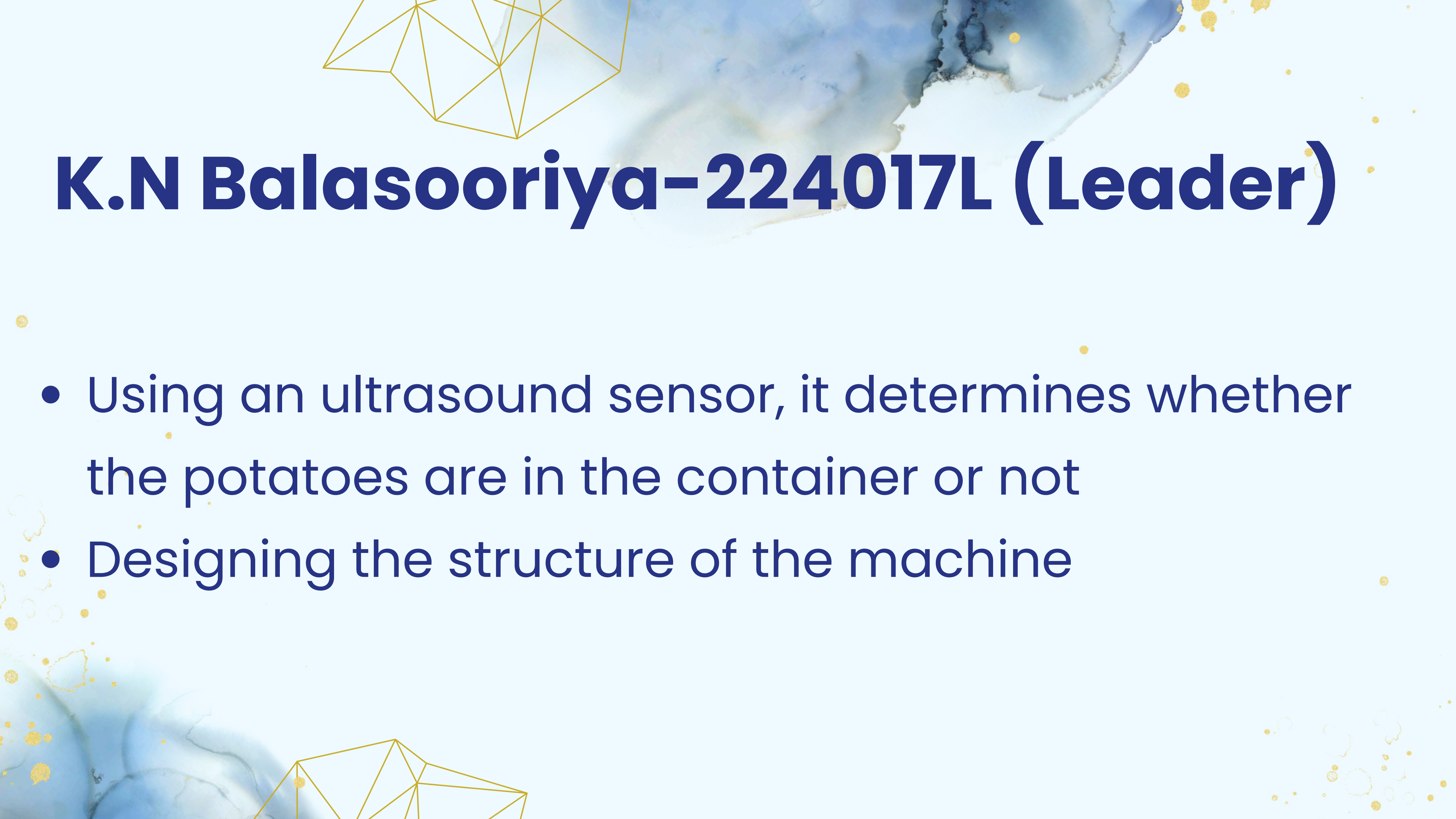
Output



INDIVIDUAL CONTRIBUTION

• source code:

<https://docs.google.com/document/d/181XIXU3dBxsesaeVOY-KU1SBclotmIKV2WNruw0-jmc/edit>



K.N Balasooriya-224017L (Leader)

- Using an ultrasound sensor, it determines whether the potatoes are in the container or not
- Designing the structure of the machine

HC-SR04 Ultrasonic Sensor

- Potato level measured by the HC-SR04 ultrasonic sensor.
- Allows the use to check the potato level using the admin panel.
- Send signal to the wiper motor when the level is low or high





W.G.C.W Bandara-224022X

- Identify the potato level and stop the grading system
- Potato Grading Mechanism
- Design the structure of the machine

process of the wiper motor and ultrasonic sensors



Wiper Motor with Relay Module

- Used to potato grading mechanism
- Send signal to the wiper motor when the level is low





S.A. Gamaarachchi-224054V

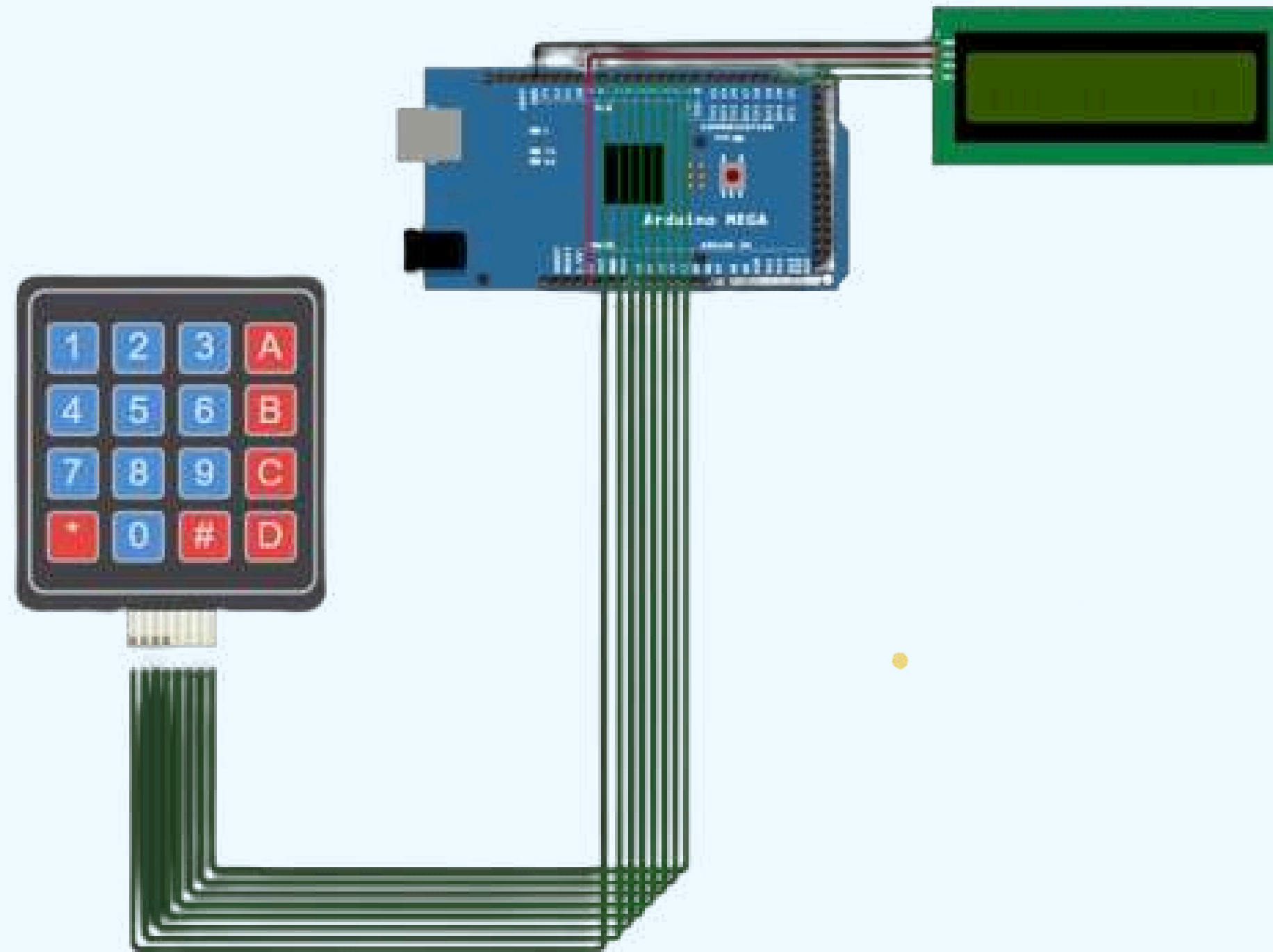
- Get size and weight of the potatoes and display the process
- Design the structure of the machine

4x4 keypad and 16x2 Display

- The user enters the size and weight of the keyboard
- Shows real-time information about the grading process, including the number of potatoes graded, and any operational alerts or errors.



Circuit Diagram

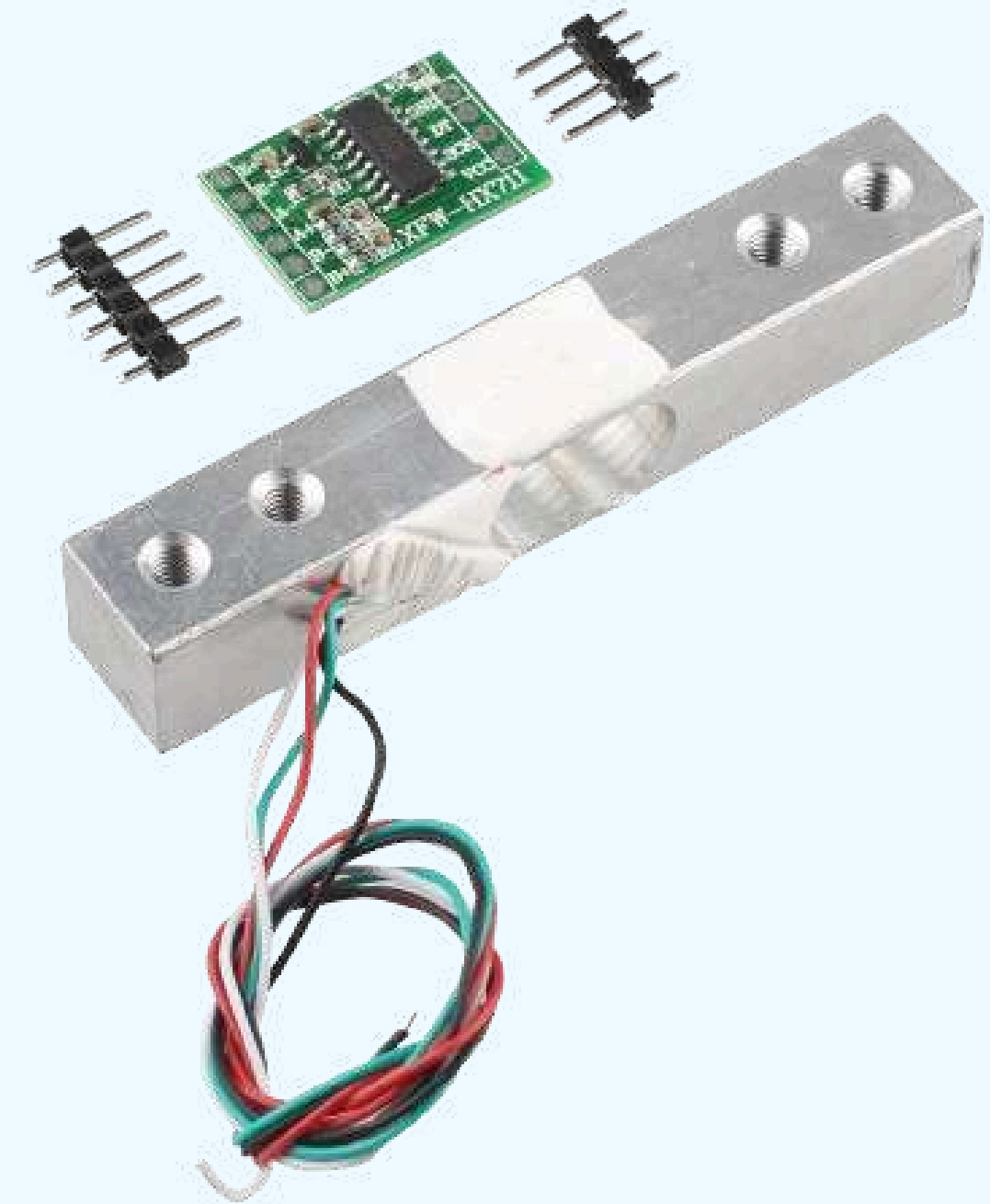


M.I Abdulla-224001H

- Stop the stepper motors after measuring the potatoes
- Design the structure of the machine

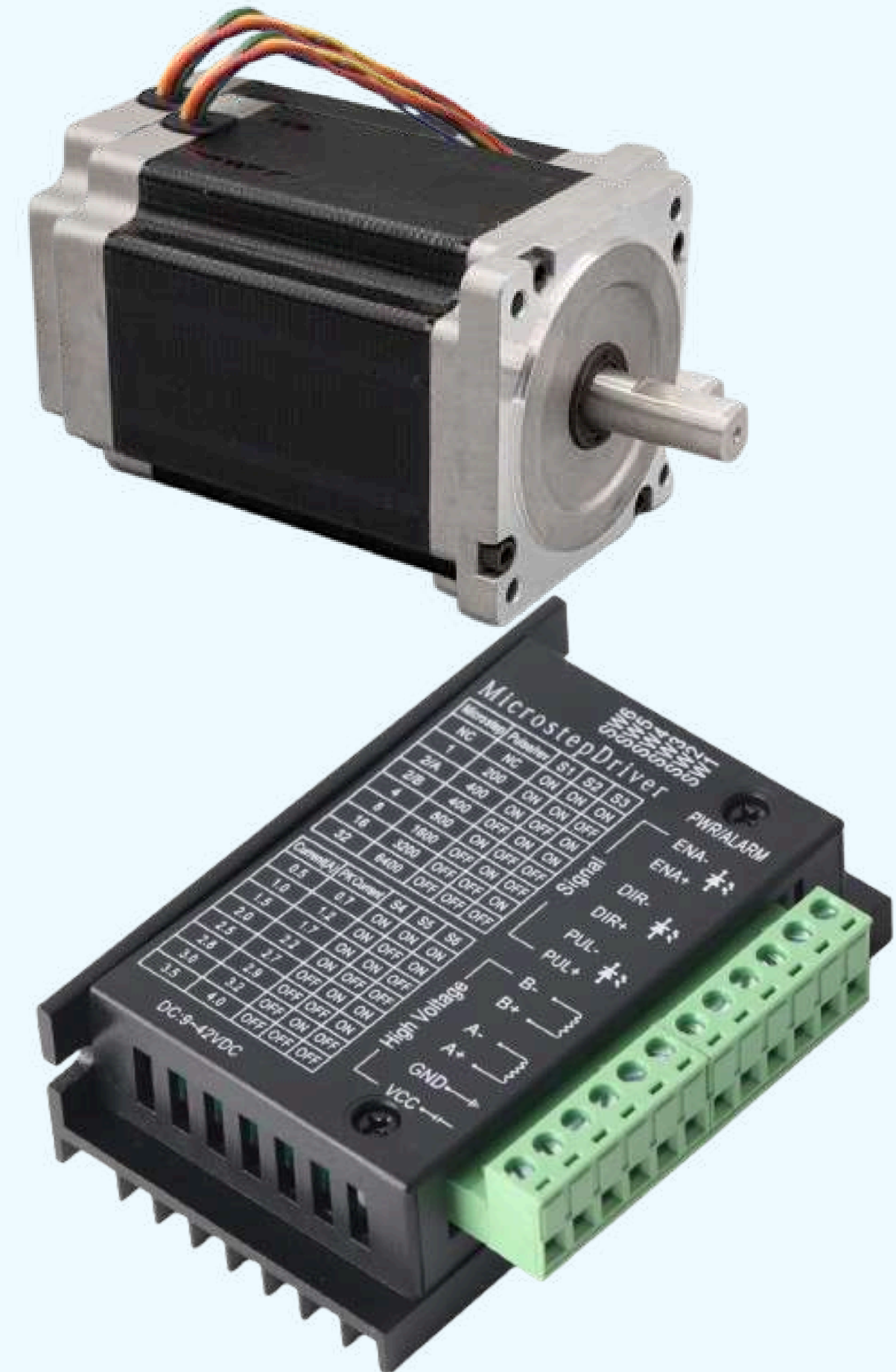
10kg Load Cell

- A load cell is a sensor used to measure weight of potatoes.
- This deformation generates an electrical signal proportional to the force exerted, which is then converted into a weight measurement.

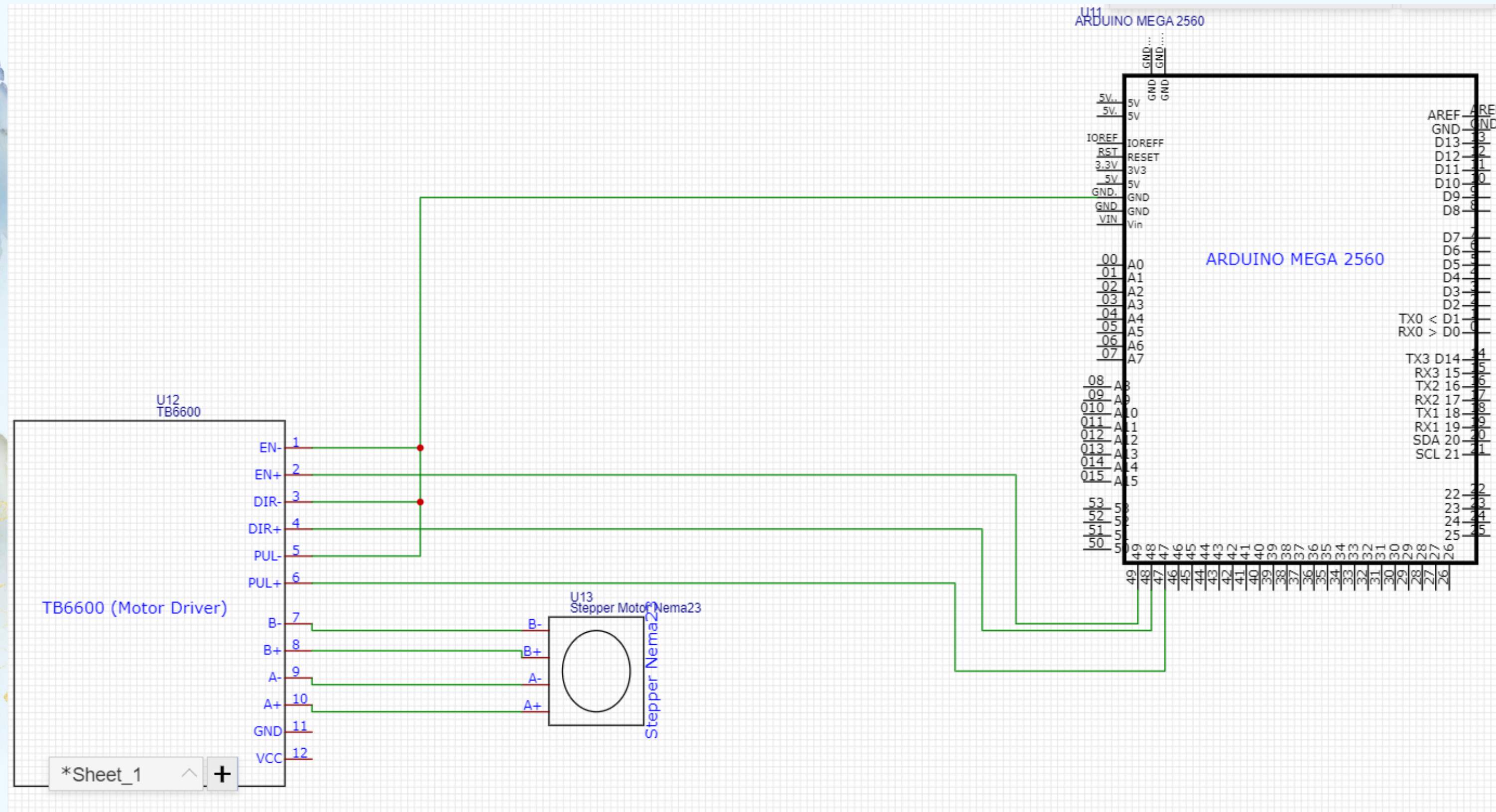


Stepper Motor and TB6600

- Turn on the conveyor and carry the potatoes for the weighting process
- Turn off the conveyor after measuring the correct weight



Circuit Diagram

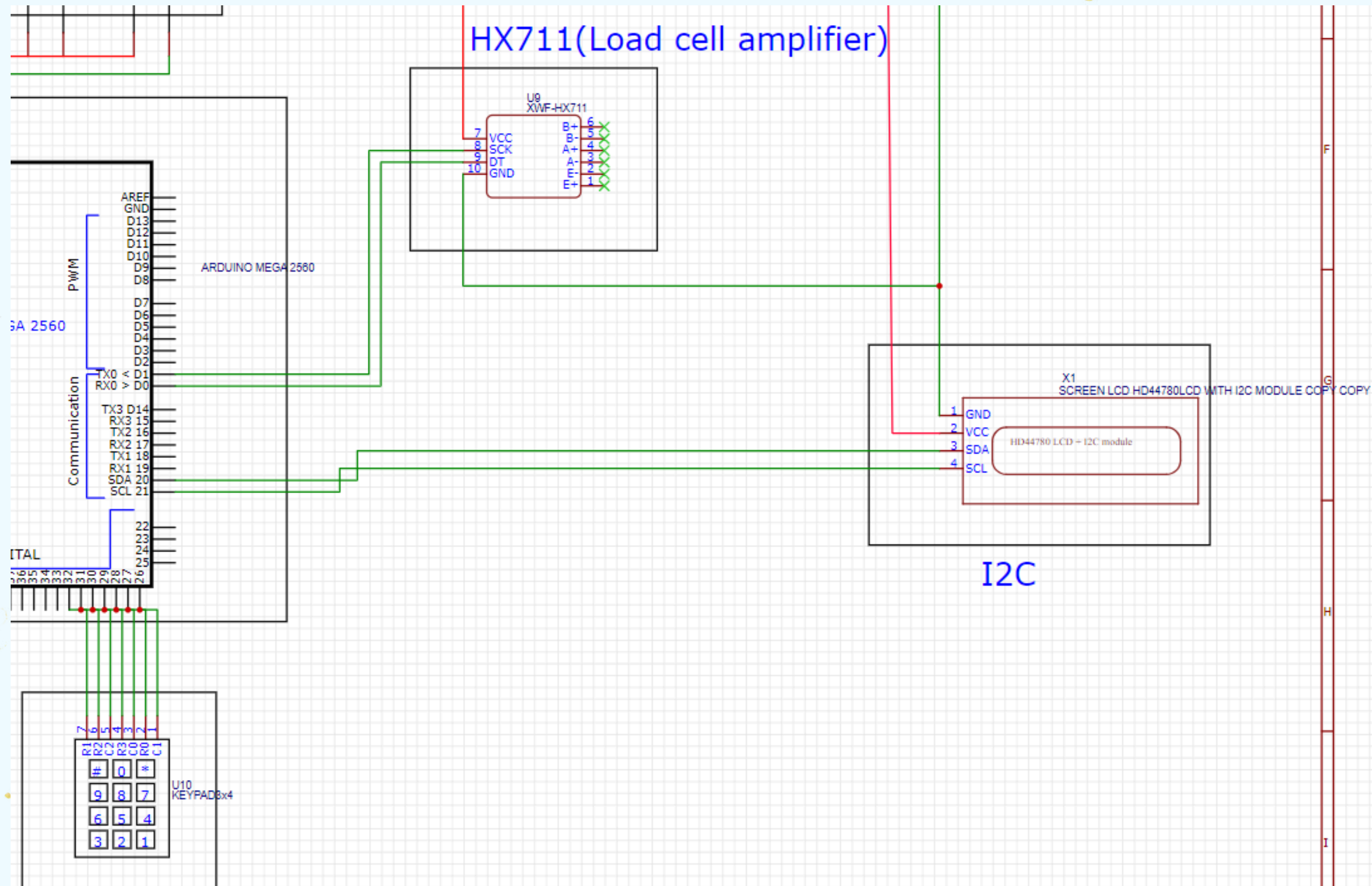




M.R.M Muadh-224127A

- After input the weight and size of the potatoes start to measure the weight
- Design the structure of the machine

Circuit Diagram



Budget

Component	Price(Rs)
HC-SR04 Ultrasonic Sensors	260/-
MG995 Servo Motor	990/-
Wiper Motors	15000/-
10kg load cell	520/-
Nema23 Stepper Motors	12000/-
4x4 Keypad	180/-
16x2 LCD Display	380/-

Component	Price(Rs)
HX711 Module	260/-
Arduino Mega	2000/-
Nema17 Stepper Motor	1750/-
Relay Module	350/-
TB6600 Motor Driver	2000/-
other	5000/-
<hr/>	
Total	43690/-



THANK YOU