MIE 1.0 ROBOLUTION 2025

INNOVATE - AUTOMATE -DOMINATE

TECHATHON

PHASE-01

PROBLEM STATEMENT

TRIPLE PLAYER

Submission Deadline

27 APR | 11 PM 59

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PROBLEM STATEMENT

BISTRO 92 CHALLENGE: TRANSFORM THE DINING EXPERIENCE

Evenings at Bistro 92 used to be pure chaos. The restaurant was always packed, especially during dinner hours. Customers endured long lines just to place their orders, while staff members rushed frantically from table to table, trying to keep up with the demand.

Then came a small change that made a tremendous difference—a smart ordering device placed on every table.

At first, customers were merely curious about the new technology. However, as soon as they began using it, the entire dining experience transformed. With just a few simple taps, diners could browse the complete menu, customize their items, select quantities, and place their orders directly from their tables.

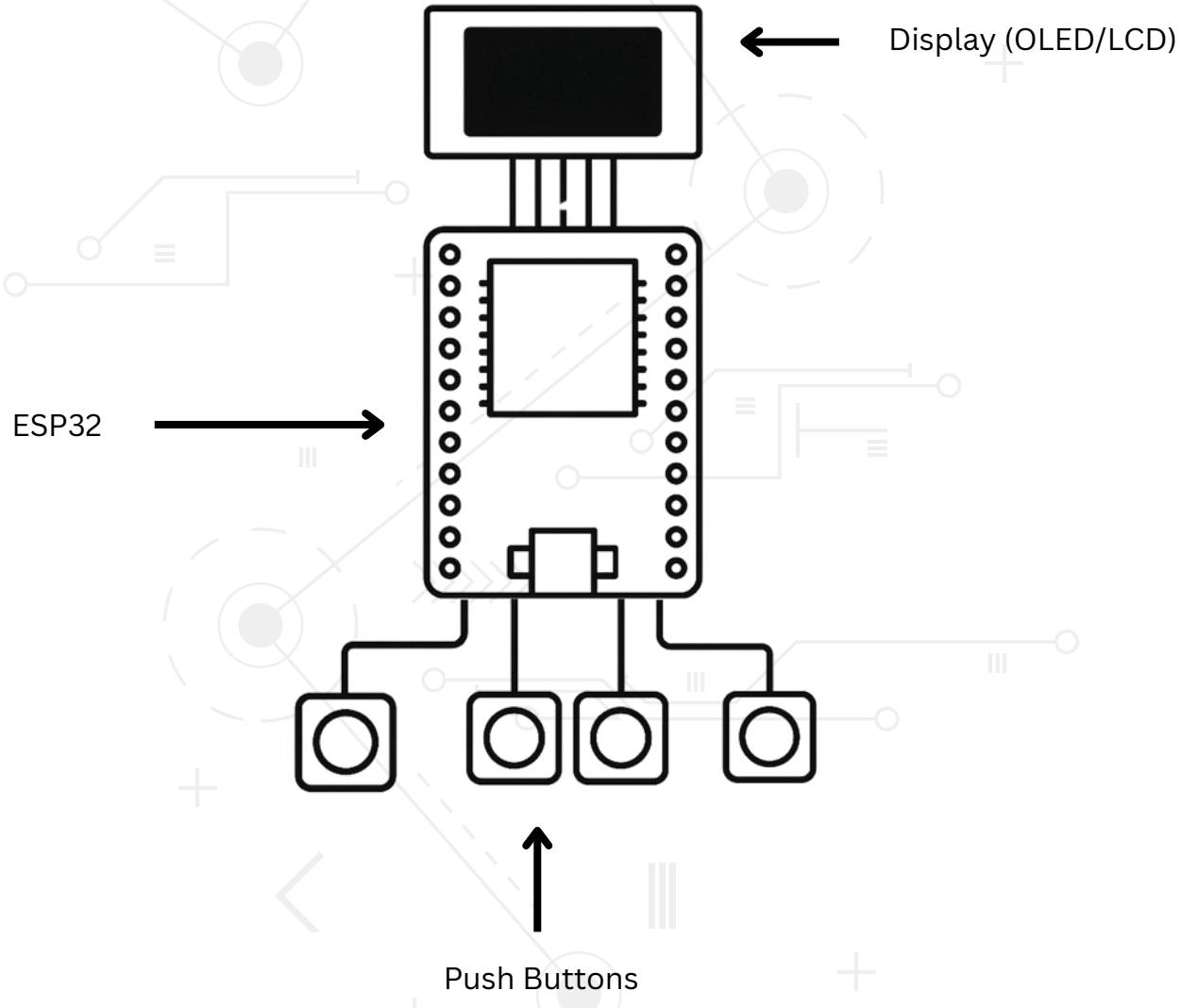
The frustrations of waiting in line and flagging down busy servers became things of the past.

Behind the scenes, the kitchen received orders instantly through a cloud-based system. Kitchen staff could see exactly what to prepare and when to start cooking. Managers monitored an admin dashboard that tracked each table's order status, completed meals, and total sales—all updated in real time.

The restaurant atmosphere became noticeably calmer. Food arrived at tables faster than ever before. The service team could focus on enhancing the dining experience rather than scrambling to keep up with orders. Most importantly, customer satisfaction soared.
What was once a stressful dinner rush transformed into a smooth, enjoyable experience for everyone involved.

All thanks to one small device placed on every table.

CONNECTION DIAGRAM



PROCESS FLOW OF HARDWARE SETUP

HARDWARE REQUIREMENTS

1. **Menu Access and Navigation:**
   - **Initial Interaction:** When the customer presses Button 1, the device immediately interrupts any ongoing process and opens the main menu on the OLED display.
   - **Menu Browsing:** The customer uses Button 3 and Button 4 to scroll through the menu items, ensuring a smooth and user-friendly navigation experience.
2. **Item Selection and Quantity Adjustment:**
   - **Selecting an Item:** Once a desired menu item is highlighted, the customer presses Button 2. This action brings up a quantity dialogue box.
   - **Adjusting Quantity:** In the quantity dialogue, Button 3 is used to increment, while Button 4 is used to decrement the quantity of the selected item.
   - **Adding to Cart:** After confirming the desired quantity, pressing Button 2 adds the item into the cart and returns the customer to the main menu for further browsing.
3. **Order Finalization:**
   - **Placing the Order**: When the customer has finished selecting all items and is ready to order, they perform a long press on Button 2. This long press action triggers the final submission process.
   - **Data Transmission**: The ESP32 then parses the complete order into a formatted data stream and sends it to the cloud.
   - **Cloud Integration**: The centralized system receives the order data, which includes details such as the table number, ordered items, and quantities. This data is then displayed on the admin dashboard, providing the kitchen and counter staff with a real-time overview of new and pending orders.
4. **Resetting the Order:**
   - Order Cancellation: At any time, if the customer wishes to cancel or restart their order, a press of Button 1 will clear the current cart and bring the interface back to the main menu, allowing them to start afresh.

This integrated system not only reduces wait times but also minimizes ordering errors, leading to a more efficient and satisfying dining experience for customers while streamlining operations for the restaurant staff.

APPLICATION CHALLENGES

Your Mission: Four Zones of Fun

We've split this challenge into four zones: Quick Fixes, Tech Tricks, Bonus Boosters, and the Big Idea. You can score up to 1400 points by tackling these problems. The easy tasks earn fewer points, while the harder ones offer bigger rewards. Here's the breakdown:

- Quick Fixes: Simple tasks to get you started—lower points.
- Tech Tricks: Trickier problems requiring more thought—higher points!
- Bonus Boosters: Tough, optional challenges for extra points.
- Big Idea: A creative opportunity to solve an unnoticed issue—huge points for innovation!

Let's dive into each zone.

A) Quick Fixes (150 Points)

These are straightforward tasks to warm you up—think of them as appetizers before the main course.

- **Q1 (25 points):** List three essential features Bistro 92's system needs for customer satisfaction and efficient order processing.
- **Q2 (25 points):** Describe two design principles to make the smart pad interface intuitive for all users, including tech novices.
- **Q3 (30 points):** Identify three potential security vulnerabilities in Bistro 92's system (e.g., theft, order tampering) and suggest one solution for each.
- **Q4 (30 points):** Explain two strategies to keep Bistro 92's system responsive and stable during peak hours.
- **Q5 (40 points):** Describe one method to integrate the existing inventory system with Bistro 92's new system without disrupting operations.

APPLICATION CHALLENGES

B) Tech Tricks (450 Points)

Time to step it up! These questions are more challenging and worth more points.

- **Q1 (70 points):** Design a database schema for Bistro 92 to track users, orders, menu items, tables, and payments, optimized for fast queries.
- **Q2 (80 points):** Write an SQL query to retrieve all orders from the last hour, including table number, items ordered, and order time, optimized for speed.
- **Q3 (90 points):** Implement a feature to notify kitchen staff in real-time when a new order is placed, and describe your tech stack.
- **Q4 (100 points):** Describe a cloud-based system architecture for real-time updates, data storage, and smart pad communication, ensuring low latency and high availability.
- **Q5 (110 points):** Design a real-time dashboard showing pending orders, average fulfillment time, and total sales, specifying tools and justifying your choices.

C) Bonus Boosters (500 Points)

These optional, extra-tough challenges are for those ready to push the limits—and earn serious points.

- **Q1 (250 points):** Design a RESTful API for order placement that handles high concurrency without errors, detailing endpoints, request/response formats, and concurrency controls.
- **Q2 (250 points):** Enhance your API to support extreme scalability, processing numerous simultaneous orders without data loss, and explain your strategies.

APPLICATION CHALLENGES

D) Big Idea (up to 300 Points)

- This is your chance to shine! Identify a hidden problem at Bistro 92 and propose a bold, tech-driven solution. For example: what if customers could use an augmented reality (AR) feature on the smart pad to see a 3D preview of their meal before ordering? This could enhance decision-making and excitement while reducing order regrets. Now it's your turn—spot an operational or customer experience issue we haven't noticed and bring your own innovative idea to crack it.

Points Breakdown

Zone	Points	Details
Quick Fixes	150	5 easy questions, 25–40 points each
Tech Tricks	450	5 tougher questions, 70–110 points each
Bonus Boosters	500	4 hard questions, 100–140 points each (optional)
Big Idea	300	1 creative idea, up to 300 points
Total	**1400**	

Total Points : 1400

- Quick Fixes: 150 points—quick and simple.
- Tech Tricks: 450 points—more effort, more reward.
- Bonus Boosters: 500 points—tough but optional.
- Big Idea: 300 points—unleash your creativity!

The Bonus Boosters are optional, but they're a great way to boost your score. For the Big Idea, think big and practical—the more innovative, the closer you get to 300 points.

Now, go transform Bistro 92 and make dining history!

SUBMISSION PROCEDURE

Submission Deadline:

Date: **27 April 2025**
Time: **11.59 PM** (UTC +6, Bangladesh Standard Time)

Submission Requirement:

Git Repository Link:
Provide a public repository link that contains your solutions and necessary documentation.
Documentation file can be a README (.md) or a Doc file.

Warning: Don't update or commit any changes after the submission!

Video Demo Link:
Provide a video demo of your hardware part working simulation.
Upload the video to Google Drive and share the general access with anyone using the link (Viewer).

Disclaimer:

The authority reserves the right to change any rule without prior notice.
The organizing committee has the right to disqualify or ban any team based on violations such as:
- Using a fake identity.
- Plagiarism/pre-made projects.
- Breaking competition rules
- Time violations (late submissions/presentations).
- Not following the player etiquette
- Previous accusations or misconduct
- The decision of the judges will be final in case of any disputes.

CONTACT

CONTACT INFORMATION

MOHAMMAD SAMI

Role: Event Manager

01581807566

u2009012@stundent,cuet.ac.bd

MINHAJUL ISLAM

Role: Event Manager

01991531982

u2009020@student.cuet.ac.bd

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ORGANIZED BY

Dept. of Mechatronics & Industrial Engineering

Chittagong University of Engineering and Technology