Spring 2023 ECE 445 Team Contract

Instructions: The content of this document should be specific to your goals and needs. Ideas for the content of each section are provided as suggestions.

Project No. and Name	**No.12 Bench Organizer**
Member Name, netID	Xiaohu Mu, xiaohum2
Member Name, netID	Liangcheng Sun, ls25

ECE 445 is a project-based course. The course includes both team and individual grades. Project teammates generally all get the same grade for team assignments based on the expectation that all team members do their fair share of the work involved. The purpose of this contract is to lay out the tasks needed for the successful completion of the project and distribute them in a fair and efficient way to the team members. It will also discuss how the teammates will work together during the project and address any issues that come up. A contract that promotes good teamwork that leads to a successful project should:

- Acknowledge that each team member has commitments and responsibilities outside of ECE 445
- Encourage open communication about challenges that team members are facing, both in and out of ECE 445
- Give team members the benefit of the doubt and the opportunity to explain themselves when something goes wrong and resist jumping to judgement

Project Description: *Short description of project*

The Bench Organizer is a computer vision-based tool tracking system designed for shared workspaces such as makerspaces, engineering labs, and workshops. It uses a Bluetooth-connected camera and Raspberry Pi 4 to monitor a tool rack and detect missing tools. The system provides real-time feedback via an LCD display and LED notifications, allowing users to keep track of tools efficiently. Users can manually set a reference frame, check for missing tools, and schedule automatic scans using physical buttons.

Project Goals: *If the team is successful in its purpose, what hardware and software achievements will attest to this?*

The Bench Organizer aims to develop a computer vision-based tool tracking system that helps users efficiently monitor tool usage in shared workspaces. A successful implementation will achieve the following:

Hardware Goals

- Bluetooth-connected Raspberry Pi Camera for capturing tool images.
- Raspberry Pi 4 processing unit for image analysis.
- LCD/OLED display for real-time tool status.
- Physical buttons for user interaction.
- LED notification system for missing tool alerts.

Software Goals

- OpenCV-based object detection to identify missing tools.
- Bluetooth-based image transmission from camera to processing unit.
- Database for tool tracking history and reference images.
- User interface with manual and automatic checking options.

Expectations (ground rules) for each member:

· **Active Participation** – Contribute to discussions, development, and decision-making.

· **Preparation & Responsibility** – Complete assigned tasks on time and be ready for meetings.

· **Timely Communication** – Respond to messages within 24 hours and notify the team of delays.

· **Constructive Feedback** – Share ideas respectfully and be open to suggestions.

· **Documentation & Knowledge Sharing** – Keep clear records of work for team accessibility.

· **Meeting Attendance** – Join scheduled meetings and participate actively.

· **Conflict Resolution** – Discuss issues openly and make decisions collaboratively.

· **Version Control & Organization** – Follow GitHub and documentation best practices.

Roles:

1 Project Manager & Documentation Lead (Liangcheng Sun)

- Ensures deadlines are met and tasks are progressing.
- Maintains project documentation, meeting notes, and version control.

2 Hardware Lead (Liangcheng Sun)

- Sets up the Bluetooth Camera Module and integrates it with the Raspberry Pi.
- Manages power supply design for different components.
- Designs and tests PCB circuits if needed.

3 Software Lead (Xiaohu Mu)

- Implements image processing algorithms using OpenCV on the Raspberry Pi.
- Develops and manages the database & logging system.
- Optimizes the system for real-time detection and responsiveness.

4 User Interface & Interaction Lead (Xiaohu Mu)

- Develops the LCD display interface for showing detected tools.
- Programs the button interactions for manual and automated tool checks.
- Ensures smooth communication between the display, Raspberry Pi, and user inputs.

Project Meeting Time(s): *The team will meet at the scheduled team meeting with TA each week. Can you also preset an ideal time for team meetings in the lab (your team may need to sign up for lab bench access)? Is your team interested in meeting to work on other aspects of the course together such as project research?*

Tuesday 3:30 PM – 6:00 PM (Lab Bench Access Required)

Thursdays **3:30 PM – 6:00 PM**

Agenda:

Agenda Setting: The Project Manager will set the meeting agenda, ensuring that all key topics are covered. Team members can suggest agenda items before meetings.

Staying on Track:

- Regular progress updates at each meeting.
- Assigning weekly tasks to ensure steady progress.
- Using a shared task tracker (Google Docs) to monitor deadlines.

Decision-Making Process:

- Technical decisions will be discussed and approved by team consensus when possible.
- If consensus cannot be reached, the team will proceed with a majority vote.

Record Keeping:

- Documentation Lead will keep meeting minutes, decisions, and progress logs.
- Meeting notes will be shared with all members for reference.

Process and penalties for dealing with team issues:

· Initial Discussion: If a team member breaks ground rules, the issue will be addressed privately and respectfully within the team.

· Team Intervention: If the issue continues, the Project Manager will facilitate a group discussion to find a resolution.

· Escalation: If unresolved, the issue will be brought to the TA or instructor for mediation.

· Final Measures: Persistent issues may result in task reassignment or reporting to course staff for further action.

End-of-term agreement on using final peer assessment for grade adjustment:

The team agrees that this contract should hold all members accountable to its contents. The final peer assessment should reflect each team member's contributions and impact their grade accordingly. This agreement ensures that all members remain responsible, engaged, and fairly evaluated.

Signatures: Iterate on this document until everyone is comfortable with its contents and signs (it is okay to type your printed name as your digital signature).

I affirm that I participated in generating this team charter and that I will abide by its contents to the best of my ability. Furthermore, I understand that failure to meet the expectations expressed here can lead to the stated consequences.

netID:	ls25	(digital) Signature:	Liangcheng Sun	Date:	2025/2/14
netID:	xiaohum2	(digital) Signature:	Xiaohu Mu	Date:	2025/2/14