

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	Tabletop Fantasy Football #54
Member Name, netID	Parthiv Adimulam, parthiv4
Member Name, netID	Nicholas Goo, ngoo2
Member Name, netID	Raahil Parikh, raahilp2

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:

Tabletop Fantasy Football is a battery-powered, self-contained interactive gaming system that enables two users to play a head-to-head fantasy football matchup using physical player cards while watching live NFL games. Each physical card incorporates a passive NFC tag mapped to an individual NFL player. When cards are placed onto designated roster zones on the playing surface, dedicated NFC reader circuitry identifies the active lineups and communicates player IDs to a central microcontroller. The microcontroller connects Wi-Fi to a live sports data backend to fetch real-time statistics, calculate matchup scores under configurable rules, and display results on an integrated LCD screen. Dynamic visual feedback via positional RGB LEDs and audible alerts through an onboard speaker deliver real-time reactions to live game events (ex: points scored by a player on the board) directly on the tabletop surface without requiring players to interact through phones or companion applications.

Project Goals:

Hardware Achievements:

- Design and assemble a custom Power Management Subsystem utilizing a rechargeable Li-Po battery and DC-DC converters to supply reliable, regulated voltage rails to all system components.
- Achieve continuous, untethered operation capable of sustaining simultaneous active loads, including Wi-Fi polling, NFC scanning, the display, lighting, and audio, throughout a standard gameplay session.
- Successfully integrate user-input buttons, an LCD screen, RGB LEDs, and an audio amplifier into a self-contained, tabletop playing surface.

Software Achievements:

- Develop a microcontroller architecture capable of orchestrating simultaneous communication across various hardware interfaces while maintaining active Wi-Fi operation.
- Implement wireless communication with a live sports data backend to consistently retrieve real-time player and team statistics.
- Process incoming statistics to efficiently update displayed fantasy scores and trigger synchronized visual and audio feedback in response to live game events.
- Manage independent physical rosters for multiple players, enforce lineup validity, and persistently maintain the matchup state during active gameplay.

Expectations (ground rules) for each member:

Communication Responsiveness: Every team member must acknowledge messages sent via team channels within a reasonable time.

Attendance and Punctuality: All members must attend the weekly scheduled TA meeting and scheduled lab bench sessions on time. If they cannot attend, they should notify other members beforehand.

Session Preparation: Teammates must arrive at lab sessions prepared with their individual sub-tasks completed, parts sourced, and test plans ready to execute.

Equitable Workload: Work must be divided equally across hardware prototyping, PCB layout, firmware development, systems integration, and course documentation.

Quality and Version Control: Code must be commented, modular, and committed using clear messages, while hardware files and schematics must remain properly organized in the shared repository.

Respect and Open Dialogue: Group members will give each other the benefit of the doubt, maintain transparent communication regarding external pressures, and address issues early without jumping to judgment.

Roles:

Parthiv Adimulam

- Designs the 13.56 MHz NFC readers and sequential polling logic for the 10 to 12 card positions.
- Programs the LCD screen and co-develops the audio amplifier feedback system.
- Routes PCBs to integrate the ESP32 and custom power management components.

Nicholas Goo

- Programs the RGB LEDs to provide visual feedback reacting to live football events.
- Implements the physical user interface buttons and software debouncing.
- Collaborates on the hardware layout to accommodate user controls and visual indicators.

Raahil Parikh

- Architects the ESP32 control logic, active lineup management, and score calculations.
- Develops Wi-Fi integration with the API to process statistics updates within 15 seconds.
- Co-develops the logic that maps incoming backend data to specific audio triggers.

Project Meeting Time(s):

Weekly TA Meeting: Preset weekly meeting slot with TA Xiyue Zhu.

Weekly Team Sync: Sundays at 7:00 PM via voice call or in-person to review progress against milestones, merge code branches, and set the agenda for the upcoming TA meeting.

Lab Bench: Scheduled when all team members are free and Lab table is available.

Agenda:

Setting the Agenda: The agenda responsibility will rotate weekly among team members; the assigned lead will post discussion points to the team chat 24 hours prior to each TA meeting.

Progress Tracking: Deliverables and action items will be tracked via discord and recorded on our Lab Notebook (Google Doc), mapped directly to ECE 445 deadlines.

Decision-Making Process: Technical and architectural decisions will be made by consensus whenever possible. If a block occurs after deliberate technical review, decisions will be resolved by a majority vote.

Record Keeping: All team members will act as the record keepers of their respective task, action items, design trade-offs, etc.

Process and penalties for dealing with team issues:

Step 1 (Direct Discussion): When a ground rule or deadline is missed, the team will initiate a private, direct conversation within 24 hours. Teammates will resist jumping to judgment, offer

the benefit of the doubt, and allow the individual to explain the circumstances while establishing an immediate recovery path.

Step 2 (Formal Team Action Plan): If an issue persists or unexcused communication lapses continue, the team will convene a dedicated meeting to draft a written recovery plan with explicit deadlines, signed by all three members.

Step 3 (Instructional Staff Escalation): If a member fails to meet the signed recovery plan or is unresponsive for more than 48 hours without justification, the team will escalate the matter directly to TA Xiyue Zhu for formal intervention.

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

The team agrees that this contract serves as a binding standard of mutual accountability. The first formal peer assessment will be utilized to provide transparent, honest, and constructive feedback to resolve workflow bottlenecks early. The second formal peer assessment directly influences individual grades. If a team member consistently neglects responsibilities, fails to deliver assigned subsystems, or fails to uphold the ground rules despite formal mediation, the team agrees that peer evaluations will accurately reflect individual contributions to justify appropriate grade adjustments by course instructors.

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: _____parthiv4_____ (digital) Signature: __Parthiv Adimulam__ Date: 9/22/2026

netID: _____ngoo2_____ (digital) Signature: __Nicholas Goo__ Date: 9/22/2026

netID: _____raahilp2_____ (digital) Signature: __Raahil Parikh__ Date: 9/22/2026