ECE4007 Project Summary

Project Title	Pokemon Card Coliseum: Using RFID Technology to Augment Card Game Play via PC Tablet
Team Members (names and majors)	Nanley Chery, CmpE Cameron Lewis, CmpE Pratima Narlajarla, EE Catherine Runyan, EE William Swinson, CmpE
Advisor / Section	Dr. Milor / L03
Semester	2012 Spring Intermediate
Project Abstract (250-300 words)	Team TableTop is requesting $309,250 in funding to develop Pokémon Card Coliseum, an interface between the traditional Pokémon Trading Card Game (TCG) mat and a tablet PC via an RFID reader. The Pokémon Card Coliseum provides players with a unique way to play the traditional Pokémon TCG, displaying real time animation based on game play using 2D graphics. The project engineers will design a Pokémon TCG mat with integrated RFID reader to interface with an Android tablet, specifically a Samsung Galaxy 10.1 tablet for the prototype. During game play, players will swipe Pokémon cards with RFID tags over the RFID reader and "into" the game, an Android application developed by project engineers. This will allow the tablet to track and animate game play. The design prototype will include a limited set of Pokémon cards to demonstrate game play. Five Pokémon, basic energy cards (Fighting, Fire, Grass, Lightning, Psychic, and Water), and three trainer cards will be used. The major components include an Android Tablet with 30-pin input, a USB-to-30-pin-input adapter, a USB-out RFID reader, and a standard Pokémon TCG mat containing spaces for: a bench, active Pokémon, prize cards, the player's deck, and a discard pile. The design team will demonstrate various aspects of play, showing the software cleanly handles varying aspects of the card game and displaying relevant information to the user easily. The design of our GUI has been streamlined to include as few buttons as possible, providing an immersive experience for users.

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List **codes** and **standards** that significantly affect your project. Briefly describe how they influenced your design.	1. The Parallax RFID Card Reader (#28340) will use industry-standard TDI FT232R device to provide connectivity to the tablet's USB port. It features: • Single chip USB to asynchronous serial data transfer interface • Data transfer rates from 3000 baud to 3 Mbaud at TTL Levels
List at least two significant **realistic design constraints** that applied to your project. Briefly describe how they affected your design.	1. The RFID reader is connected to the tablet through the 30-pin input, which is also used to power the tablet. Therefore, the user cannot play the game and power the tablet simultaneously. However, the tablet's long battery life minimizes the impact of this conflict. The team chose this design to eliminate the need for an additional power source for the mat. 2. Developing Pokémon Card Coliseum on an Android platform restricts the number of tablets on the market the game can be played with. Specifically, the game will not be compatible with iPads or Microsoft OS tablets. However, since Android is an open source platform, there is a wealth of code already available to jump start the programmer's game development. In addition, further development of Pokémon Card Coliseum could easily include versions for both iPads and Microsoft OS tablets.
Briefly explain two **significant trade-offs** considered in your design, including options considered and the solution chosen.	1. Camera-based image processing was considered as an alternative to using RFID tags and readers. This technology would allow trading card manufacturers to continue producing cards without the addition of RFID components. It would also allow players to use their current collection of cards, eliminating the need for players to buy a RFID tag add-on or new cards with embedded tags. While this technology would save money for current card owners and manufacturers, it would also limit the flexibility and increase the price of the product. Optical processing would require the user to have proper lighting conditions and would require technically complex software for image analysis - increasing the chance of bugs and card-detection failure. 2. Additionally, the team considered implementing the design with a wireless component to transfer data between the RFID reader and the tablet. While this would allow the tablet to be powered during game play, it would also require an external power source for the mat, making game play impractical in location without power outlets. Furthermore, the wireless protocol necessary to connect the reader to tablet would lengthen the design process and complicate the design schematic. Therefore, the simpler, more user friendly design was selected.

Briefly describe the **computing aspects** of your projects, specifically identifying **hardware-software** tradeoffs, interfaces, and/or interactions. *Complete if applicable; required if team includes CmpE majors.*	A tablet provides a display and touch input in a small and integrated manner. The portability of a tablet makes it preferable over a desktop or laptop, though due to the use of libGDX as our game development platform, the experience can be readily ported over to either platform. The user interface is modeled after the physical card game mat that the video game attempts to emulate. Due to some limitations of our hardware (we don't know how many cards are left in a player's deck), some game states cannot be triggered automatically – losing the game when running out of cards to draw for example. They must be selected manually within the user interface. The system will be processing as inputs: – Touch events – RFID Scans And outputting: – Audiovisual feedback – Information concerning game rules

ECE4007: International Program

(Only groups with one or more International Program participants need to complete this page)

Project Title	

Global Issues (Less than one page)	(10 point font, single spaced)