Pokémon Card Coliseum

ECE4007 Senior Design Project

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Table of Contents

Executive Summary

Team TableTop spent $248 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. Pokémon Card Coliseum is a unique concept—there are no existing products for any TGC that really compare to Pokémon Card Coliseum's design.

During game play, players can swipe Pokémon cards with RFID tags over the RFID reader and "into" the game, an Android application developed by project engineers. This allows the tablet to track and animate game play. The proposed design included a USB connection between the RFID reader and tablet. However, the design team discovered that the FTDI drivers for the USB reader were incompatible with the tablet's operating system. For this reason, an alternative hardware design was selected. Major hardware components include an RFID reader, an mbed microcontroller, a Bluetooth module and the host computer, a Samsung Galaxy 10.1 Tab tablet. The microcontroller is powered through a USB-rechargeable 5V battery. The design prototype includes a limited set of Pokémon cards to demonstrate game play. Twenty three Pokémon, basic energy cards (Fighting, Fire, Grass, Lightning, Psychic, and Water), and three trainer cards were implemented.

Although the design team has produced a relatively polished prototype, the team would recommend that before production, another prototype cycle should be implemented. A smaller RFID scanning device with thinner RFID cards as well as a re-constructed version of the software would be the primary goals of a second prototype cycle.

Pokémon Card Coliseum

1. Introduction

Team TableTop spent $248 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. Pokémon Card Coliseum enables players to keep score via the tablet, while enjoying animated game play.

1.1 Objective

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. Recently, video games have overtaken card games in popularity because video games provide dramatic play via game visualization. Pokémon Card Coliseum similarly dramatizes the Pokémon TCG, converting cards into animated Pokémon on-screen. This design combines the best elements of both playing cards and video games – players still have concrete cards to collect, but can also animate their play via a tablet display. This virtual platform provides current Pokémon card players with a new way to play their favorite game and also draw the interest of users who would otherwise choose video games over the more traditional TCGs. Moreover, with the popularity of tablets among every age rising rapidly, Pokémon Card Coliseum is ensured a continuously growing customer base over its lifetime.

1.2 Motivation

The design team's objective was to create a new experience for tablet users—merging real Pokémon cards with virtual gameplay. Although the current prototype only implements the game of Pokémon, the potential applications for this design include any number of physical items that can be augmented in some way with a tablet. Pokémon was chosen as a basis for the team's design since it provided an exciting, nostalgic project for the team and because implementation was relatively straightforward (as opposed to certain other card games with more complex rule sets).

The Pokémon TCG has remained unchanged for years, causing a decline in its popularity. TableTop's Pokémon Card Coliseum will bring a fresh perspective to one of the world's most popular TCGs by implementing a version of the game using tablet PCs [1]. The success of Pokémon Card Coliseum will hinge on the recent popularity of tablets and player's excitement at the opportunity to use new tablet technology to play Pokémon. Pokémon TCG players range in age from as young as six to players in their early twenties, providing a large target audience. By integrating a new technology into this popular game, the design team hopes to improve players' game experience.

1.3 Background

Pokémon is a global franchise that spans a number of market sectors. In addition to a Trading Card Game, Pokémon has also been featured in TV shows, movies, video games, fan merchandise, and conventions. Pokémon was widely popular in the 90's, and continues to have a large following today.

The Pokémon TCG in particular competes with a number of other TCGs, including Yu-Gi-Oh, Digimon, and Magic. However, Pokémon Card Coliseum is a unique concept—there are no existing products for any TGC that really compare to Pokémon Card Coliseum's design. A similar product, the

Academy Duel Disk, improves the Yu-Gi-Oh TCG. However, this Yu-Gi-Oh extension only functions as a display of game statistics (e.g. player's health points). The Pokémon Card Coliseum aims to not only track the status of game, but also provide real-time animation. Although this product is a more expensive alternative to the original Pokémon TCG, it offers a unique experience and will probably appeal more to today's youth and their technology saturated world.

2. Project Description and Goals

The prototype Pokémon TCG mat design includes an integrated RFID reader interfaced to an Android tablet—the Samsung Galaxy 10.1—via a Bluetooth connection. A picture of this prototype is included in Figure 1.

1. Playing Mat
2. Tablet
3. RFID Reader
4. Microcontroller
5. Bluetooth Modem
6. Pokémon Card

Figure 1. Prototype for Pokémon Card Coliseum.

During game play, players can swipe Pokémon cards with RFID tags over the RFID reader and "into" the game, an Android application developed by project engineers. This allows the tablet to track and animate game play. Table 1 includes a comparison of the proposed mat properties, and what was actually implemented for the prototype design. The proposed design included a USB connection

between the RFID reader and tablet, but due to incompatibilities between the tablet and USB port, the design team chose to implement Bluetooth connection between reader and tablet instead.

Table 1. Pokémon Card Coliseum Mat Properties

Proposed	Implemented
Integrated low frequency RFID reader able to…	
output to USB	Output to microcontroller interfaced with Bluetooth module
Connection to Samsung Galaxy Tablet 10.1 from RFID reader via…	
USB to 30-pin input converter	Bluetooth module
RFID reader powered via…	
USB connection with tablet	5 V USB-rechargeable battery
Cost to cover materials and development…	
no more than $150	$150

Table 2 includes the software functionalities that were proposed for the final design. From the right column it's evident that all proposed functionalities were achieved.

Table 2. Android Application Functionality

Functionality	**Included in Prototype**
Display animations corresponding to players' game moves	✓
Keep score by tracking of each Pokémon's hit points (HP)	✓
Simulate die rolls and coin flips as necessary throughout the game	✓
Display each player's active and benched Pokémon, and associated energy and HP	✓
Allow players to add energy and trainer cards to Pokémon	✓

Traditionally, the Pokémon TCG requires damage counters to track damage to individual Pokémon from attacks executed by the opposing player. With Pokémon Card Coliseum's tablet interface, damage can now be tracked by the program, eliminating the need for extraneous energy tokens. Similarly, certain plays in the game require players to flip coins and roll dice to determine a move's outcome. The Android application eliminates the need for these items as well, as it will simulate both coin flips and die rolls as appropriate during game play. The only requirement placed on players is that as they put new cards into play, the card must be scanned over the RFID reader. From that point, all moves available in the game can be selected through the tablet interface.

The design prototype includes a limited set of Pokémon cards to demonstrate game play. Twenty three Pokémon, basic energy cards (Fighting, Fire, Grass, Lightning, Psychic, and Water), and three trainer cards are used. The code used for these cards can easily be extended to include the additional 250 Pokémon cards available to Pokémon TCG players today, but will require the allocation of supplementary funding to produce.

This design provides an easy, interactive way for players to play the Pokémon TCG, eliminating the need for peripheral items beyond Pokémon cards as well as providing a visual representation of the game's progression.

3. Technical Specifications

The design's major components are the RFID system, mbed microcontroller, Bluetooth module and the host computer, a Samsung Galaxy 10.1 Tab tablet. The microcontroller is powered through a USB-rechargeable 5V battery. As cited in Table 3, the reader can detect and read valid RFID tags that are within a range of 2 to 5 inches from the reader.

Table 3. ID-12 RFID Reader Module Specifications [2]

Parameters	**Values**
Read Range	12+ cm
Dimensions	26mm x 40mm x 9mm
Frequency	125 kHz
Card Format	EM 4001 or compatible
Power Requirement	5 VDC @ 30 mA nominal
Voltage Supply Range	+4.6V through +5.4V

The RFID system is activated at 125 kHz and has a reading range of 2-5 inches as shown in Table 4. Low frequency RFID readers such as the ID-12 are characterized by small reading radii, which will ensure that cards on the mat will only be scanned when a player intentionally swipes the card over the reader.

Table 4. RFID Tag Specifications

Parameter	**Specification**
Activating Frequency	125 kHz
Range	2 to 5 inches
Dimension	54mm X 85 mm

The mbed microcontroller facilitates communication between the RFID reader and the Bluetooth modem used to send data from the reader to the tablet. The specifications for the microcontroller are listed in Table 5.

Table 5. mbed NXP LPC1768 Microcontroller Specifications [3]

Parameter	Min	Typical	Max
Supply Voltage, V_{DD} (Volts)	2.4	3.3	3.6
Input Voltage, V_I (Volts)	– 0.5	-	+ 4.6
Supply Current, I_{DD} (mA)	-	-	100
Operating Temperature (^oC)	– 40		85

Table 6 lists the digital I/O and electrical characteristics of RN-42, the Class 2 Bluetooth Module. This device sends data received from the microcontroller to the tablet.

Table 6. RN- 42 Specifications [4]

Digital I/O Characteristics			
$2.7V \leq V_{DD} \leq 3.0V$	**Min**		**Max**
Input logic level LOW (Volts)	-0.4		+0.8
Input logic level HIGH (Volts)	$0.7V_{DD}$		V_{DD}+0.4
Output logic level LOW (Volts)	-		0.2
Output logic level HIGH (Volts)	V_{DD} - 0.2		-
Electrical Characteristics			
Parameter	**Min**	**Typical**	**Max**
Supply Voltage (DC) (Volts)	3.0	3.3	3.6
Radio ON (Discovery/Inquiry window time)	$0.7V_{DD}$	V_{DD}+0.4	
Output logic level LOW (Volts)	-	0.2	

The Samsung Galaxy tablet, whose specifications are listed in Table 7, receives data from the Bluetooth modem.

Table 7. Samsung Galaxy Tab 10.1 Tablet Specifications

Parameter	**Specification**
Size	256.7 x 175.3 x 8.6mm
Pixels per inch	149 ppi
Battery	7000mAh (built-in)
Operating System	Honeycomb

The data sent from the Bluetooth module is accessed by the Pokémon Card Coliseum software via a Bluetooth socket automatically assigned to the modem when it's connected to the tablet. The software can read data from this socket and use the data to create 'cards' in the game. As seen in Table 8, the software used for Pokémon Card Coliseum was developed with Java using an Android API.

Table 8. Pokémon Card Coliseum Software Specifications

Parameter	**Specification**
Programming Language	Java 1.6
Software Development Kit	Android 3.2 SDK (13 API)
Programming Environment	Eclipse + EGit plug-in
Source Control	gitHub Repository

Design Approach and Details

3.1 Design Approach

3.1.1 Components

The Card Coliseum is designed with consideration for user experience as well as technical feasibility. The major components include an Android Tablet, an RFID reader, a microcontroller, a Bluetooth module, and a standard Pokémon TCG mat containing spaces for: a bench, active Pokémon, prize cards, the player's deck, and a discard pile. Figure 2 shows this setup.

Figure 2. Playing mat with tablet interface.

3.1.2 Android Tablet

The Samsung Galaxy Tab 10.1 tablet, depicted in Figure 3, provides visual feedback on the current game status as well as an input method to perform game functions. The designers decided on this tablet because of its open and extendable Android platform. As this tablet runs Android 3.2, the programmed Android application targeted the 3.2 API.

Figure 3. Home display on the Samsung Galaxy Tab 10.1.

3.1.3 RFID Reader

The Innovations ID-12 RFID Card Reader pictured in Figure 4 reads RFID tags and transfers the information to the microprocessor.

Figure 4. Innovations ID-12 RFID Card Reader is 25x26mm.

Originally the design included a Parallax RFID Card Reader Module with USB (#28340). However, the Parallax reader was not compatible with the components necessary to implement Bluetooth

communication, so the new Innovation reader was used instead. Fortunately, both devices operate at low frequency and therefore the RFID cards were compatible with both readers.

Every tag has a unique 10 digit ID. These tags activate at an operating frequency of 125 kHz, classified as a low frequency RFID system. The range within which a tag is detected and read by the reader is two to five inches.

3.1.4 Mbed Microcontroller

The LPC1768 Mbed microcontroller provides a connection between the RFID reader and the Bluetooth module. The actual setup for this system can be seen in Figure 5. Note, the battery directly powers the microcontroller, which feeds the reader and Bluetooth module.

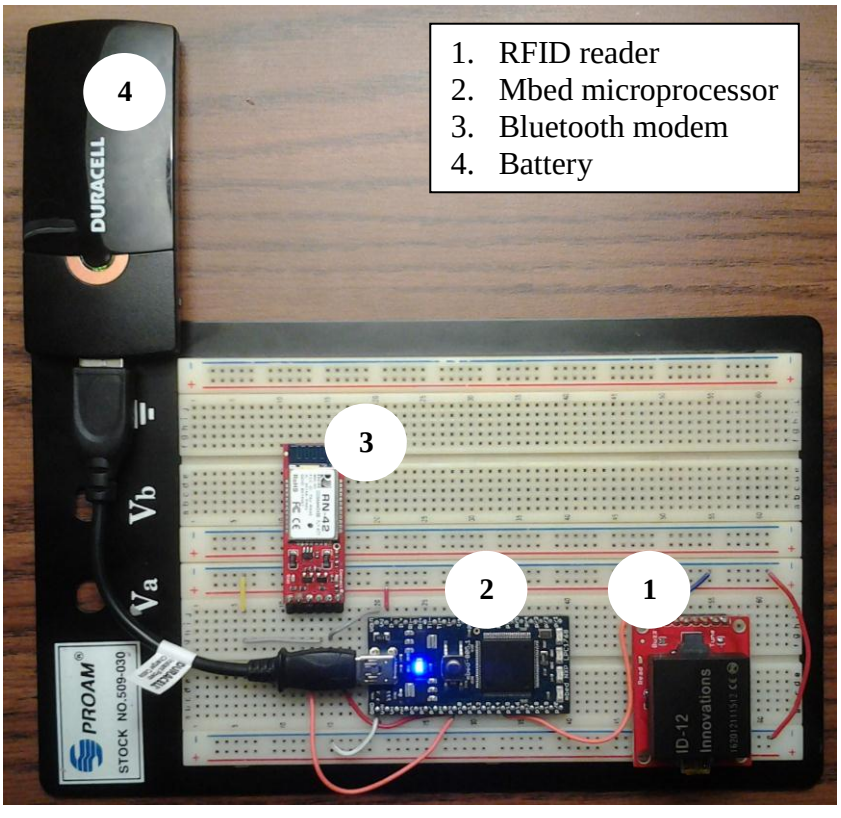


Figure 5. Hardware design for Pokémon Card Coliseum prototype.

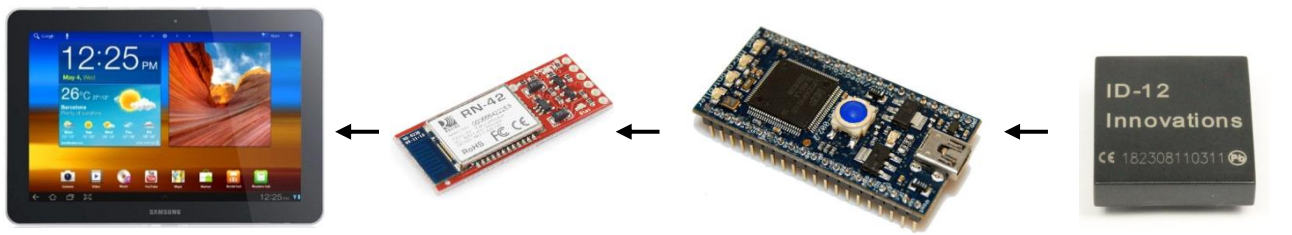
The battery is a 5V DC USB-rechargeable Duracell battery. Used to power the device, the design team thought that a USB-rechargeable battery was an optimal design choice since customers can easily re-

charge their system through any USB port as opposed to needing to buy battery replacements throughout the life of the device.

The microcontroller takes the last eight bits of the ID and appends a line character before sending the data on to the Bluetooth modem.

3.1.5 Bluetooth Module

The Bluetooth module, a BlueSMiRF Bluetooth Modem, receives the ID's of scanned cards from the microprocessor and transmits this data wirelessly via Bluetooth to the tablet in the form of a serial stream of bits. Figure 6 shows the flow of information beginning with a new RFID card being swiped near the reader.



Samsung Galaxy Tab 10.1 | BlueSMiRF Bluetooth Modem | LPC1768 Mbed Microcontroller | ID-12 Innovation RFIDCard Reader

Figure 6. Connection between RFID reader and tablet.

The information sent by the Bluetooth modem can be accessed via a Bluetooth socket when connected to the tablet. The software monitors data sent to the Bluetooth socket and adds cards to the game as they are swiped.

When the RFID Card Reader is active and a valid RFID tag is placed within range of the activated reader, the tag's unique 10 digit ID will be transmitted as a 12-byte ASCII string serially to the tablet in the following format:

Digit 1	Digit 2	Digit 3	Digit 4	Digit 5	Digit 6	Digit 7	Digit 8	Check Sum	Check Sum

The eight bytes of digits are the RFID tag's unique ID. TableTop's Android application will decode this string of bits to determine which card has been swiped. For example, a Pikachu Pokémon card might be represented by the ID "12354387."

3.1.6 Deviation from Proposed Hardware Design

The proposal initially included the hardware design shown in Figure 7.

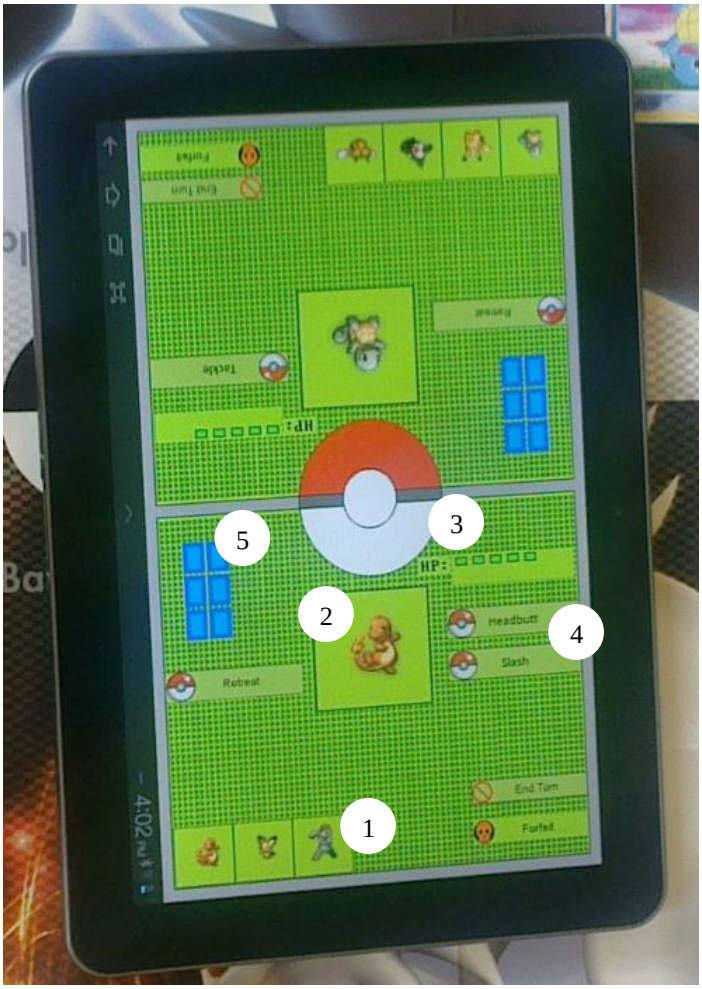
Samsung Galaxy Tab 10.1 | Samsung Galaxy Tab USB Adapter | Parallax RFID Reader Module

Figure 7. Connection between RFID reader and tablet.

However, half way through the hardware design process the design team discovered that the FTDI drivers for the USB reader were incompatible with the tablet's operating system. More specifically, the tablet's kernel did not have these drivers. Although it would have been possible to re-define the tablet's kernel, it could potentially cause harm to the tablet and would also not be feasible for the finished product implemented with customer tablets. For this reason, the aforementioned alternative hardware design was selected. This eliminated the original design constraint of restricting power to the tablet, but posed an additional problem—the RFID system now required an exterior power supply. For this reason a USB-rechargeable 5V battery was also added to the prototype design.

3.1.7 GUI

Figure 8 shows a screen shot of the game user interface (GUI) main screen.



1. Benched Pokémon
2. Active Pokémon
3. Remaining HP
4. Possible Moves
5. Prize Cards

Figure 8. GUI main game screen.

The screen displays the active Pokémon in the center with counters to represent the Pokémon's remaining HP points to the left. Buttons to the right of the Pokémon represent a player's possible moves. The bottom of the display shows the benched Pokémon and their associated energy. On the top left side of the field is a count of the Player's remaining Prize Cards. Each time a player defeats an opponent's Pokémon, they are allowed to select one Prize Card set aside at the beginning of game play. When a player has no remaining Prize cards, she has won the game.

3.1.8 Organization and Testing

The Android application was cooperatively developed by team members. Groups were formed to separately develop input, audio, graphics, and logic.

The groups in charge of audio and graphics used a combination of freely available media as well as manually generated media for the game. Both groups define the specifications of each file as well as the specifications needed to interface with media.

The group in charge of the game logic defined an API for each of their classes. This allowed each member within the group to work on separate parts of the whole game.

The modules created by each group were uploaded to gitHub, a server containing an online Version Control System (VCS). Such systems allow developers to see the history of changes that occur during development and provide the ability to revert to earlier versions of code to erase unwanted changes. The distributed VCS, Git, was chosen by the design team due to its speed and ability to work offline. Nanley acted as an integration manager, reviewing the changes uploaded by each member and making sure there are no inter-module conflicts.

The software developed for the game, as well as the code used to interface with the RFID reader, was written and tested prior to uploading the code into the central server. Nanley, the integration manager, routinely tested the code in the central branch and make sure each module was performing as specified. This methodology quickly caught newly introduced problems.

3.2 Codes and Standards

The RN-42 chip (Class 2 Bluetooth ® Module) has the features [4]:

- Baud rate speeds: 1200bps up to 921Kbps
- Class 2 radio, 60 feet distance, 4dBm output transmitter, -80dBm typical receive sensitivity.
- Frequency 2402 ~ 2480MHz.
- FHSS/GFSK modulation, 79 channels at 1 MHz intervals.
- Secure communications, 128 bit encryption.
- Error correction for guaranteed packet delivery.
- UART local and over-the-air RF configuration.

The frequencies 2404 ~2480MHz are the standard frequencies for wireless Bluetooth communication.

5. Schedule, Tasks, and Milestones

The TableTop team designed and implemented a Pokémon Card Coliseum prototype over the course of three months. Figure 10 contains an overview of the design process. Refer to Appendix A for a complete list of project tasks and major milestones in the form of a Gantt chart. Pratima headed the hardware design team and checked periodically to ensure hardware design was on schedule. The team projected a March 4th deadline for a preliminary mat prototype to be constructed. Because of the hardware re-design however, this deadline was extended.

Nanley headed the software team. Application design was completed, as expected, by April 28th. The final presentation on May 4th marks project completion.

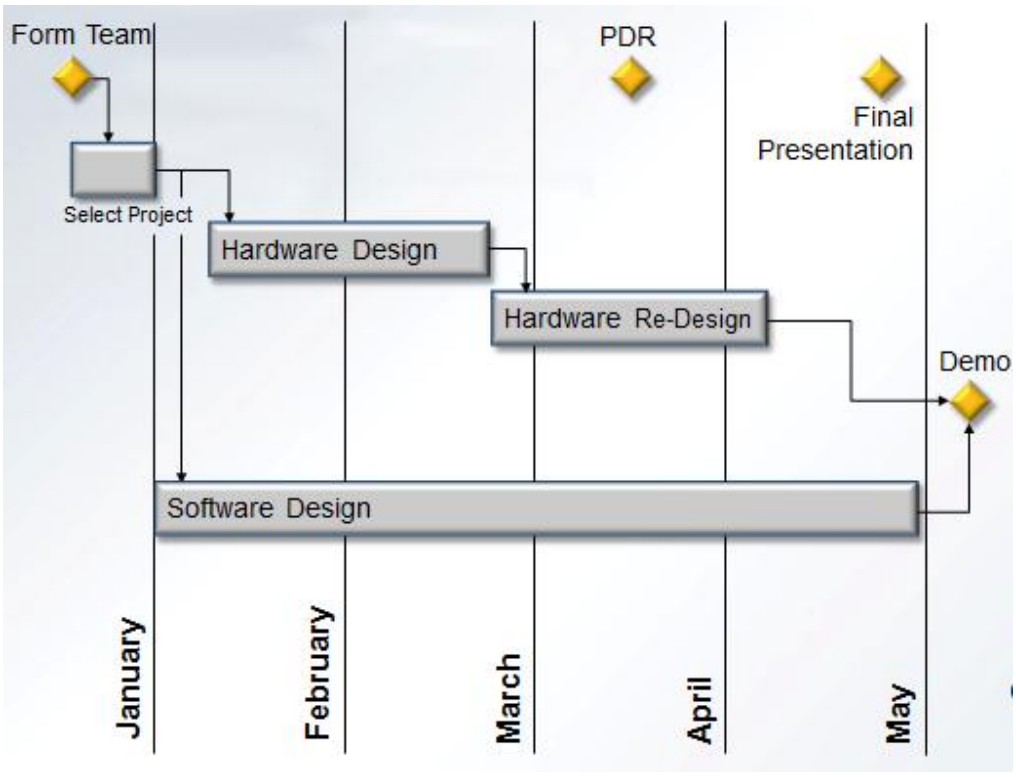


Figure 10. Pokémon Card Colesium was developed over the course of four and a half months.

6. Results and Expectance Testing

Although our demonstration will not be until Thursday, May 3rd, the prototype design, shown in Figure 1, is essentially complete. Players can smoothly progress through gameplay, swiping cards "into the game" and seeing their battle played out on the tablet's display. Table 9 includes the various aspect of gameplay that the prototype has successfully demonstrated.

Table 9. Proposed Functionality for Design Prototype

Functionality	Included in Prototype
Cleanly handles varying aspects of the card game	✓
Displays relevant information to the user easily	✓
Ensures adherence to the rules of the game	✓
Reduces clutter during play by removing certain cards and counters from the field of play	✓

The simplest method of design testing used was playing trial games with the prototype. The design team also ran specific tests for most major game functionalities with test code to make sure the program was running smoothly.

The final game prototype can actually handle more Pokémon cards than were originally proposed in the design specification. And Figure # contains a screen shot demonstrating that when players attempt an invalid move, the game politely explains why the rules will not allow that action.

In terms of hardware, the software loaded onto the tablet is able to automatically connect to the device, which can then send data to the tablet to be processed by the code and put "into the game."

7. Budget and Cost Analysis

At the beginning of the semester the design team was allocated approximately $400 to develop a prototype. Table 10 breaks down the cost of the team's design. Note, the asterisk next to the Samsung Galaxy tablet indicates that it was already available for the project and was not considered part of the $400 budget.

Table 10. Breakdown of Cost for Team Tabletop's Project

Included in Final Design		**Not Included in Final Design**	
Item	**Cost**	**Item**	**Cost**
Samsung Galaxy Tablet*	$400.00	USB to 30-pin Converter	$13.99
ID-12 RFID Reader	$29.95	Parallax RFID Reader	$39.99
Mbed Microcontroller	$59.00		
BlueSMiRF Bluetooth Modem	$39.95		
RFID Tags (55tags*$0.50)	$27.50		
Pokemon Mat	$11.99		
Rechargable 5V Battery	$25.99		
(* not included) **Subtotal**	$194.38		
(* included) **Subtotal**	$788.76	**Subtotal**	$53.98
		(* not included) **Total**	**$248.36**
		(* included) **Total**	$842.74

As seen in Table 10, the design was actually under budget. Of the original $400 budget, approximately half was spent to design the team's prototype.

8. Conclusions and Future Work

The design team studied the game of Pokémon and developed a prototype that was true to the original game, but also incorporated new technologies to improve play. However, a completed version of this design would be capable of handling each one of the some 500 Pokémon cards that are currently manufactured and would be compatible with multiple tablets' operating systems. Table 11 contains a list of suggesting for future work to produce a finalized product design.

Table 11. Recommendations for Future Work with Pokémon Card Coliseum

Hardware
Minimize design cost for hardware…
…by exploring alternative components with less features that satisfy design criteria
…by re-examining possibility of hardwired connection between RFID reader and tablet
Reduce size of device…
…by selecting smaller components
…by putting elements closer together and using smaller board
…by selecting a smaller battery

Software
Add more functionality…
…by implementing more Pokémon and Trainer cards
…by making more game stats available to players, including stats displayed to player when they touch benched Pokémon
Improve display and graphics by…
…changing the battle field based on Pokémon elements
…adding more animations for Pokémon attacks, etc.
…including different screen modes for players to use (e.g. old school Pokémon graphics, 3D Pokémon)

Although the project was completed successfully, there were a number if things the team might have done differently if they were to start the project over. Although the hardware required a re-design, the team's design approach proved effective. However, for the hardware design, it would have been beneficial to do more research on Android game development. The team needed to redesign software

components a number of times. Often this was simply because the team was unfamiliar with how to structure Android games. The team especially ran into trouble getting graphics to display correctly on the tablet. A more educated approach probably would have led to a more efficient software design. In addition, the team encountered problems committing code to and merging code in the repository. This significantly hindered design progress at times, and having a better understanding of how Git and Eclipse handled these items would have been helpful. Lastly, a more defined architecture for the software design should have been constructed at the beginning of the design process. This would probably eliminate unnecessary redundancy in the code and in general make it more neat and efficient. Part of this would have been to thoroughly understand the rules of the Pokémon TCG before starting to code.

Although the design team has produced a relatively polished prototype, the team would recommend that before production, another prototype cycle should be implemented. A smaller RFID scanning device with thinner RFID cards as well as a re-constructed version of the software would be the primary goals of a second prototype cycle.

9. References

[1] B. David-Marshall, et al. “Trading Card Game Industry White Paper,” August 2009. [Online]. Available: http://www.top8magic.com/audio/2008q4/Trading%20Card%20Game%20Industry%20White%20Paper.pdf [Accesses Feb. 3, 2012].

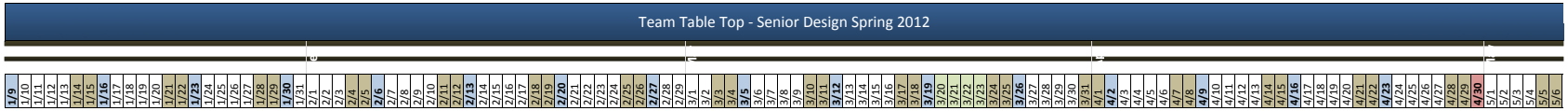
[2] ID Innovations, “ID Series” datasheet, March 2005.

[3] NXP Semiconductors, “LPC1769/68/67/66/65/64/63” datasheet, August 2010.

[4] Roving Networks, “RN-42/RN-42-N” datasheet, June 2011.

Appendix A: Gantt Chart

Special Events	Start	End
Spring Break	3/19	3/24



	Start	End	% Compl.
GUI Interface	1/30	4/28	100%
Select Platform	1/30	2/3	100%
Set Up Code Repository	2/2	2/10	100%
Build Storyboard	1/30	2/15	100%
Build GUI interface	2/9	4/28	100%
Draw game screens	2/9	3/30	100%
Program rules	2/13	4/28	100%
Build sprites	2/18	4/18	100%
Generate sounds	2/18	4/18	100%
Integrate graphics and sounds	4/18	4/28	100%
Interface with hardware input	2/27	3/2	100%
Hardware Device	1/25	3/21	1/1
Design hardware schematic	1/25	2/8	100%
Select Parts	2/8	2/13	100%
Order Parts	2/13	3/4	100%
Old hardware design	2/13	2/17	100%
New hardware design	3/10	3/15	100%
Interface RFID reader with tablet	3/1	3/7	100%
Setup	3/1	3/6	100%
Test	3/6	3/7	100%
Build reader into playing mat	3/15	3/21	100%
Writing Assignments	1/13	5/4	
Technical Review Paper	1/13	1/25	100%
Assign Topics	1/13	1/15	100%
Write Papers	1/15	1/25	100%
Proposal	1/26	2/13	100%
Assign Sections	1/30	2/3	100%
Write and compile draft	2/3	2/8	100%
Meet with advisor	2/9	2/9	100%
Produce Final Draft	2/9	2/13	100%
Project Summary	2/24	4/8	100%
Write draft	2/24	3/5	100%
Meet with advisor	3/5	3/5	100%
Turn in draft project summary	3/7	3/7	100%
Meet with advisor	4/2	4/2	100%
Compile final project summary	3/25	4/8	100%
Final Project Report	4/23	5/4	100%
Compile rough draft	4/23	5/1	100%
Produce finl draft	5/1	5/4	100%
Presentations	3/7	5/4	0%
PDR Presentation	3/7	3/16	100%
Compile Slides	3/7	3/14	100%
Practice Presentation	3/14	3/16	100%
Deliver Presentation	3/16	3/16	100%
Final Presentation	4/28	5/4	100%
Compile Slides	4/28	5/1	100%
Practice Presentation	5/1	5/4	100%
Deliver Presentation	5/4	5/4	100%
Misc	1/9	1/25	100%
Form Project Group	1/9	1/13	100%
Select Webmaster	1/11	1/13	100%
Select Project	1/9	1/25	100%