Initial Project Document: Divide and Conquer

Increasing Immersion and Interactivity in Themed Entertainment Environments Through the Usage of RFID Technology

Group 15

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PROJECT NARRATIVE

The world of Pokémon has long been a staple in the entertainment industry. Being evaluated at a rough estimate of $92.1 billion, it is the most valuable franchise in existence. Their products and stories range from card trading to graphic novels, movies, video games, television, and more. Not yet have they breached into the world of themed entertainment, and physical immersive experiences. This project serves as a proof of concept for how the world of Pokémon could theoretically breach into this industry. The background of this project lies in a fictitious themed land corresponding to the world of Pokémon, and serving as a celebration for all this property has to offer. This themed land would feature various attractions that would include a high level of immersion and interactivity from the guests that enjoy them. How they immerse the guests, and request the interaction of the guests is where this project plays in.

The core idea is to create an interactive physical Pokéball that allows for certain low level control from guests throughout this fictitious land, and on the interior of the varying attractions. The varying attractions could consist of a gym battle based experience, where guests get to utilize their own acquired Pokémon on the 'inside' of these Pokéballs. Then proceed to battle with computer controlled Pokémon on the back-end of this attraction to earn "gym badges". The following is a breakdown of how a guest can acquire their first Pokéball, and utilize it throughout this fictitious land.

The guests would enter a merchandise location called the 'Pokécenter', where they can purchase their first Pokéball. On the completed purchase, the operator of the sale would initialize the Pokéball with key information that would be necessary to interact throughout the themed land. The initialization would be completed through RFID means, and would write to an embedded memory element located on a PCB on the interior of the Pokéball. The information held on the Pokéball would consist of a unique guest ID (string of characters designated by the company operating the themed land), Pokémon ID (each Pokémon would be given a set ID designated by the company operating the themed land), and ID equated to the Pokéball itself. These three pieces of data would be initialized on a database privately controlled by the company operating the themed land, along with initializing it to a set memory element embedded on the Pokeball as previously stated.

Once this initialization is complete, and both database and Pokéball are stored with the proper data, the guest is then escorted through the process of gaining their first Pokémon. This would update the database to notify the attractions of what pokéball ID is being utilized, what guest ID is equated to it, and what Pokémon ID is embedded in this specific Pokéball. The Pokéballs would be limited to one Pokémon per unit. After this, the guest is free to utilize the Pokéball at the differing experiences the land offers.

When entering the gym battle attraction; the guest would follow through a set queue, and enter the specific gym room they are instructed to by the operator. Once inside of the set gym room, an RFID reader would send a power and message signal to the Pokéball to retrieve certain data. The pieces of data that have previously been stored on the Pokéball would be used to initialize a certain battle scenario based on set parameters by our team. Some parameters could include the type of Pokémon that can be used to battle against the Pokémon the guest has selected to battle with. Once the battle has concluded, the guest can be rewarded a certain progression level to evolve their Pokémon of use during the battle. This progression system allows for the land to always be evolving alongside the guests, and the Pokéballs to be the key figure in the guests' interaction with this land.

The only other product that features a similar level of interactivity would be the Disney MagicBand system, and the Universal Studios Wizarding World Wand system. The levels of interactivity of these products are utilized in different means, and through different subsystems than what group 15 is portraying. The audience is a broad range of guests from numerous generations. Those who enjoy the world of Pokémon in any facet would find joy and excitement in this advancement of immersion and interactivity to the themed entertainment industry.

This project is meant to act as a proof of concept for how portable handheld RFID based products can be used to increase immersion and interactivity in the themed entertainment industry. This will be a challenging design to accommodate for aspects such as: weight, reliability, environmental consciousness in choice of material, longevity, and ease of use. This goes to show that RFID can also be used in more than one property. The use of property in this project is for academic purposes only, and will not be used in any commercial sense.

Design aspects in weight and reliability come majorly into play with the casing in which our PCB and RFID tag will be embedded in. Systems will need to be in place to assure that mishaps such as dropping the handheld RFID device won't break, and still operate. Longevity will be crucial from a themed entertainment perspective. Guests who utilize and purchase these items will ideally be traveling from around the world to interact and immerse themselves in the environment in which they can interact with. Ease of use is needed on both front and back ends of this project. Guests of all ages will be interacting on the front end, and operators of the themed environments will be initializing systems while potentially troubleshooting on the back end. These aspects will need to be in mind while approaching the design and build of this project.

Project Requirements

- Must run a minimum of 12 hours

- Must be able to transmit data wirelessly

- Must be portable

- Must not exceed 5 inches in diameter

- Must be able to initialize with 3 unique identifiers

- Must be able to access all unique identifiers from the database

- Must only identify with one Pokémon at a time

- Must be able to interact with another Pokéball unit

- Must be able to determine winner of a battle and award appropriate progression

- Must be able to calculate progression for eventual evolution

- Must be able to withstand minimal destructive behavior

Project Constraints

- Design

  - The project's design must be relatively light, portable and reliable. It also requires a PCB and RFID tag embedded inside. Also the design must withstand possible droppings so the weight should be light and durable.

- Price

- As this project is not sponsored, one of our constraints is the price. We do not require too many parts. For the parts we will use, we will split the cost and the project will be self funded.

- Time

  - This project is still in the beginning stages and will require a lot of time dedication.We will individually prioritize this project and its requirements.
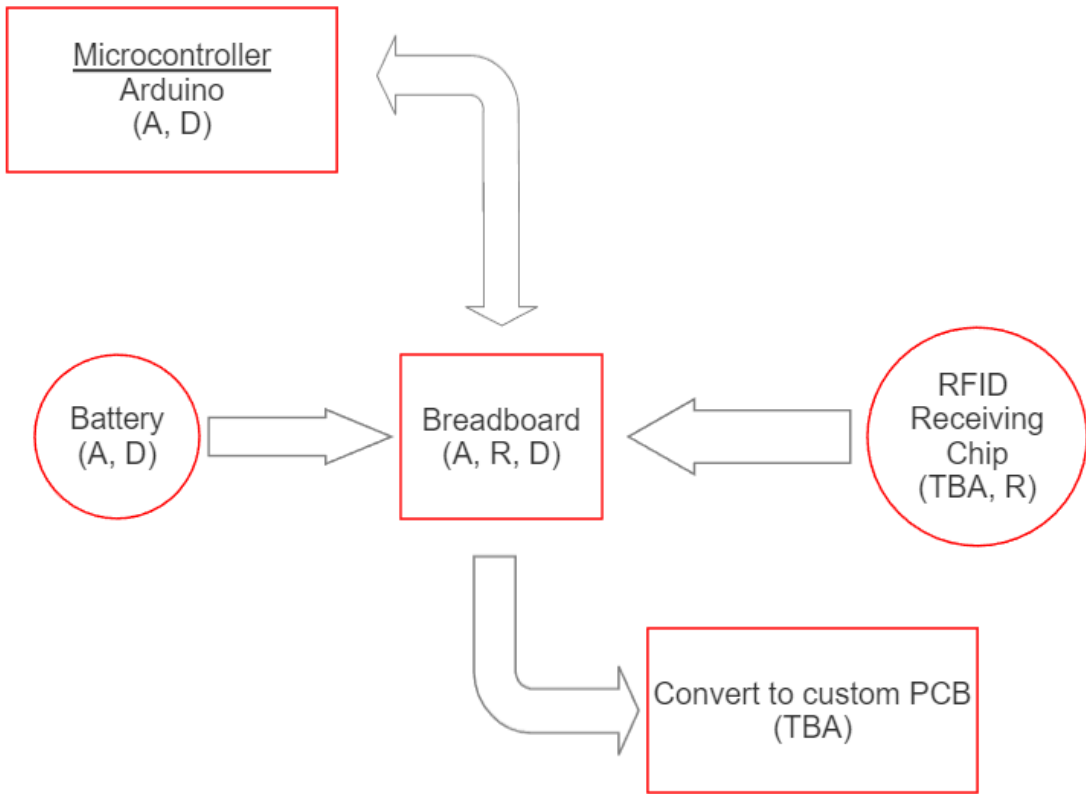
Project Prototype Illustration

Pokeball Interacting with RFID Reading Device
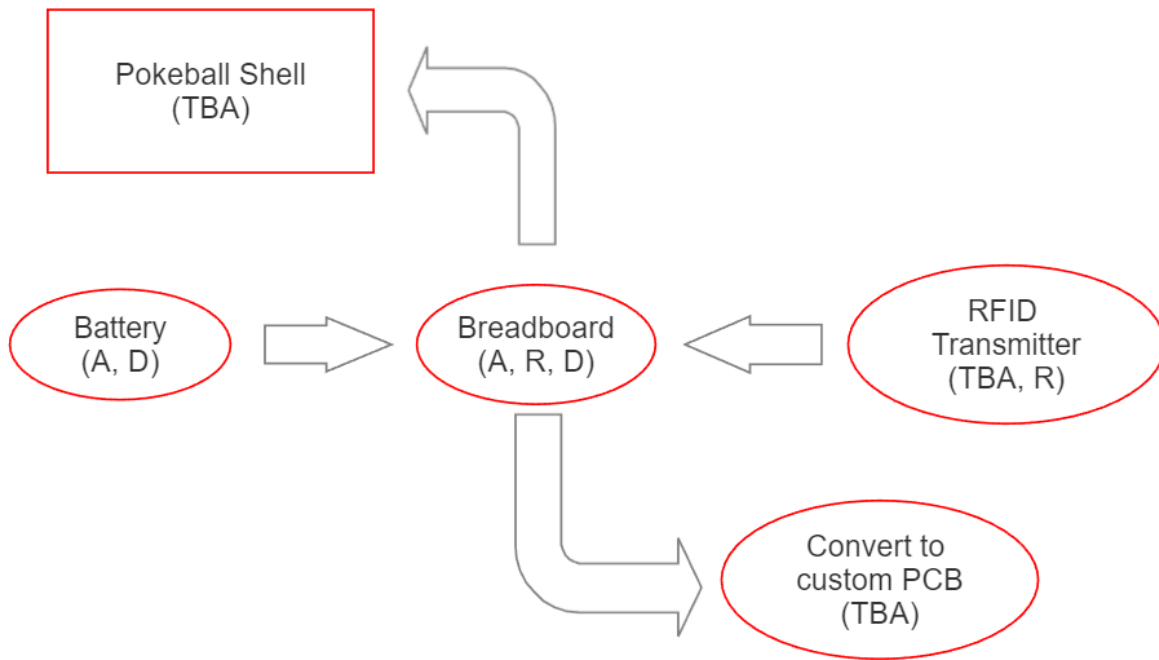
Project Hardware Block Diagram

Legend

Assigned Members
Trey and Darren
Kalindi and Rebecca

Block Status
To be acquired (TBA)
Acquired (A)
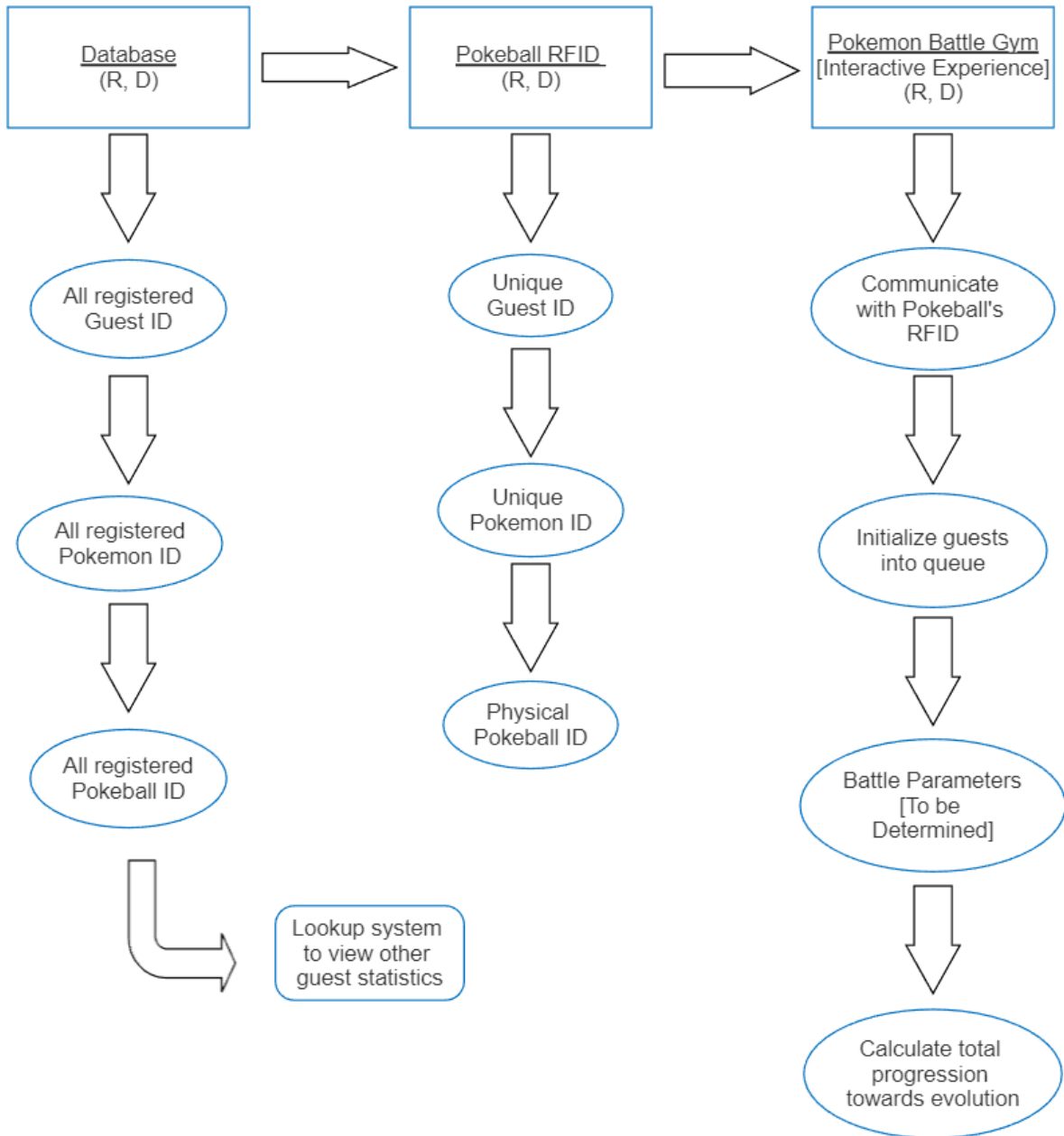Research (R)

Design (D)
Prototype (P)
Completed (C)

RFID Device Design

Pokeball Design

Project Software Block Diagram

Budget Estimate

Item	Quantity	Cost Estimate
RFID Reader	1	$20=<
3D Printed Shell	1	$0
Additional Programming Software	TBD	$0-$20
Microcontroller	1	$20=<
Battery	1	$5-$10
BreadBoard	1	$0
PCB	1	$10-$50
LCD Display	1	$12-$50
Buttons	1-3	$5-$10
Brother & Sister wiring	TBD	$0-$10
Total Estimate		**$92-$190**

Project Milestones
Senior Design 1

Brainstorm and Project Selection	**Week 1 & 2**
Divide and Conquer	**Week 3**
Technology Research and Material Requests	**Week 4 - 9**
Rough Draft	**Week 9**
Revise and include missing Pieces	**Week 10**
Final Draft	**Week 11-12**

Senior Design 2

Order Materials	**Week 1 & 2**
Build ⅓ of Prototype	**Week 3 - 5**
Test and adjust	**Week 5**
Build ⅔ of Prototype	**Week 6-8**
Test and adjust	**Week 8**
Build completer Prototype	**Week 9-13**
Test and adjust	**Week 13**
Add any additional elements & create framework of report	**Week 14**
Final Report at presentation	**Week 15-16**