

Cow Chips 4 Charity

DESIGN DOCUMENT

Group 8

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Executive Summary

Development Standards & Practices Used

- Agile Methodologies
- Daily Standups
- Biweekly Client Meetings

Summary of Requirements

- Update Administrator Screen
- Design animation for the Game Screen
- Improve Data Analytics
- Modernize User Interface

Applicable Courses from Iowa State University Curriculum

- COM S 363
- COM S 336
- COM S 319
- COM S 309

New Skills/Knowledge acquired that was not taught in courses

- VueJS
- Unity3D
- Blender

Table of Contents

1	Introduction	5
1.1	Acknowledgement	5
1.2	Problem and Project Statement	5
1.3	Operational Environment	5
1.4	Requirements	5
1.5	Intended Users and Uses	6
1.6	Assumptions and Limitations	6
1.7	Expected End Product and Deliverables	6
2	Project Plan	7
2.1	Task Decomposition	7
2.2	Risks And Risk Management/Mitigation	8
2.3	Project Proposed Milestones, Metrics, and Evaluation Criteria	8
2.4	Project Timeline/Schedule	9
2.5	Project Tracking Procedures	10
2.6	Personnel Effort Requirements	10
2.7	Other Resource Requirements	11
2.8	Financial Requirements	11
3	Design	11
3.1	Previous Work And Literature	11
3.2	Design Thinking	12
3.3	Proposed Design	12
3.4	Technology Considerations	12
3.5	Design Analysis	12
3.6	Development Process	12
3.7	Design Plan	13
4	Testing	13
4.1	Unit Testing	13
4.2	Interface Testing	13
4.3	Acceptance Testing	14
4.4	Results	14

5	Implementation	14
6	Closing Material	14
6.1	Conclusion	14
6.2	References	14
6.3	Appendices	14

1 Introduction

1.1 ACKNOWLEDGEMENT

We would like to thank Ken Johnson, Daniel Lev, and Ben Meeder for their help with this project. Because of their concise feedback, introductions, and guidance, we were able to get a great start with the design and workflow of this project. Our team also thanks Professor Lotfi Ben Othmane for volunteering his time to be the faculty advisor for this project.

1.2 PROBLEM AND PROJECT STATEMENT

The Boo Radley foundation is a non-profit organization created to promote research for diseases that are common to humans and animals. Being a non-profit organization, funding for the organization is acquired through donations and events. One of the most important events for funding is CowChips4Charity. CowChips4Charity is currently held as an in-person fundraising event, where participants select one of many squares in a pasture. If the cow roaming the field selects a participant's square, they win, and are given a prize. Any funds collected during this event contribute to The Boo Radley Foundation charity. Presently, while beloved as a state fair event, CowChips4Charity lacks the outreach it could have to acquire more funding for the charity. On top of this, the current need for drones (and other management equipment) ends up costing a sizable amount, lessening the total funds used for the charity.

To reach a wider audience and cut down on unnecessary expenditure, we seek to create a fully functional digital version of CowChips4Charity. To create this digital version, we plan on expanding the existing codebase with features such as an animated UI and accessible menus for a wider audience, as well as running a web service with virtually non-existent maintenance costs.

1.3 OPERATIONAL ENVIRONMENT

Our application will be run on the cloud, so there are no physical risks. While there are still possible outages, they will be minimal due to the use of a major company's servers. As for the client application, little processing power will be needed, as the game itself can easily be handled by modern smartphones. As well as limited graphical use, network usage is also minimal, limited to sending account and guess information. This is especially important, given the unpredictability of client connections.

1.4 REQUIREMENTS

- Use of Predefined Languages:
 - MongoDB (Database)
 - Vue.js (Visuals)
 - Node.js (Website)
- The Administrator Panel must be upgraded to include data analytics
- The UI of the game must be easy to understand and use
- Menial tasks should be more automated (winner selection, prize email sending)
- The game should be fully functional in a virtual environment
- Analyzed data should be highly customizable
- Network connections/usage should be brief

- Application visuals should follow the given template

1.5 INTENDED USERS AND USES

For use of this application, there are two core groups of users. The first group are the clients. Clients will access the application through the website, playing the game after creating an account, registering payment methods, and finally selecting an active game. The other core group is the administrators. The administrators consist of Boo Radley Foundation members, and as such will be able to create games, change game settings, and look at a comprehensive set of data analytics. By dividing these two groups we can separate the systems completely, into an administration website, and a client website, simplifying the development process.

1.6 ASSUMPTIONS AND LIMITATIONS

Assumptions:

- Users will have a smart phone with internet access
- Users will have a valid payment method
- Users will be residents of the United States (excluding California)
- Clients and administrators may not have extensive technical knowledge
- Creation and management of events will be handled by the administrators

Limitations:

- This application cannot be used outside of the United States (or in California) due to privacy laws

1.7 EXPECTED END PRODUCT AND DELIVERABLES

Due to use of an agile workflow, as well as a pre-existing codebase, design deliverables are not a core aspect of our project. Rather, our deliverables generally take the form of implementations of functional requirements.

Tech Stack Documentation (Due: 10/25/20)

Information regarding the technologies to be used on the various ends of the project will be detailed here. By this point in the project, all members will be familiar with the existing code, and will be able to select/justify use of further technologies. New technologies will particularly be used for animations on the client, data aggregation on the server, and card verifications on the server.

First Game Prototype (Due: 1/1/21)

The first prototype of the Game will include a fully functional (playable) game, as well as an initial implementation of the visual style requested by the client. The playable game will allow control features from the administrator panel, simplistic menus, and contain a rough look of the final game to be shortly tested.

First Administrator Panel Prototype (Due: 1/1/21)

The first iteration of the admin panel will include all required functions for administrators, with rough visuals to focus more on functional elements. Requirements, mainly revolving around data aggregation will be in place, with customization options in place for future testing.

Beta Testing (Due: 2/1/21)

Beta testing will begin shortly after the completion of the first prototypes. This beta testing will involve the use of a plethora of testers from a variety of backgrounds to test both usability and reliability. By recording the feedback gained from these testers, we will be able to fix any oversights as to the usability of our system to an average user. On top of this, we can get closer insight to the power needed by this application to handle users in the real world

Final Game Prototype (Due: 4/10/21)

The final prototype for the game will commence directly after the combined beta testing taking place until February. This final prototype will build on top of the previous prototype, using the data gathered from the beta to offer a more understandable and tested system. To achieve those objectives, minor focus will be placed on animation and design, while the core focus will be on testing, ensuring the product will be consistent upon completion of this project.

Final Administrator Panel Prototype

The final prototype of the administrator panel will also begin directly after the beta testing. While the core functionalities of data aggregation will have already been completed, based on the feedback from the beta, changes will be made. These changes include minor design alterations to be more understandable, as well as more aggregation options to offer better control to administrators.

2 Project Plan

2.1 TASK DECOMPOSITION

We will have 4 main subtasks each with their own requirements:

Design an CowChips Animation to be embedded into the website: This task can be further broken down into Creating the environment for the animation, Animating the environment to the specifications of the client, and Embedding the animation at the correct place in the website. This task is dependent on the UI sending a signal to start the animation and the Results screen to distribute rewards effectively.

Update the Administrator Panel for hierarchical privileges and increased data: This task can be broken down into Creating a User Hierarchy, implementing more usage statistics, and redesigning the look of the existing screen for these new features. This task is also dependent on the UI as well as the new Data Analytics framework.

Modernize the UI for Cleanliness and Conciseness: This task can be broken down into updating the start screen UI, updating the admin panel UI and updating the result screen UI. This task is dependent on all of the existing elements as each new and old feature will need to be accessible to

certain tiers of users.

Create a framework for Data Analytics: This task can be broken down into Gathering and Storing appropriate data, Analyzing the newly grabbed data, and Displaying the data to the appropriate users. This task is dependent on the UI, the Admin panel and the Results screen as all of these pages have worthwhile data to collect.

2.2 RISKS AND RISK MANAGEMENT/MITIGATION

Design an CowChips Animation to be embedded into the website: None of us have experience with animation. This presents a risk of meeting our deadlines, because we may have a larger learning curve than expected. Risk Factor: 0.4. We can buy pre-built models with animation rigging set up off sites for \$100-\$400 if we are unable to become competent in the required skills on time.

Update the Administrator Panel for hierarchical privileges and increased data: The only risk for this is the interdependencies of this with other parts of the project, such as the backend systems, and data analysis. We have competent programmers on our team who have built similar things before. Risk Factor: 0.1.

Modernize the UI for Cleanness and Conciseness: This task should be simple as the elements already exist, and just need to be updated. This will require competency in Vue.js framework, which none of have past experience with. Risk Factor: 0.3

Create a framework for Data Analytics: Similarly, to the admin panel, this task has a heavy reliance on the backend data systems to function properly. Also, there is not much test data to create visualizations from and perform analysis. Risk Factor: 0.5. Our risk mitigation plan is to generate our own synthetic test data to perform analysis on.

2.3 PROJECT PROPOSED MILESTONES, METRICS, AND EVALUATION CRITERIA

Based on the task decomposition above, we have proposed the following milestones, metrics and evaluation criterias

Design CowChips Animation to be embedded into the website

This milestone is going to be measured by the Usability metrics for effectiveness which will be calculated by completion rate. Meaning, how long a user will take to complete the task when navigating the animation that is embedded into the website. we will use 80% completion rate as our goal metrics. Which is Number of tasks completed divided by Total number of tasks undertaken.

Update the Administrator Panel for hierarchical privileges and increased data

For updating the Administrator Panel for hierarchical privileges and increasing data, we will be measuring the response time as metrics and evaluation. Since, this part of the project is the core backend system of the project metrics and evaluation will depend on overall efficiency and usability of the Administrator Panel. Which shouldn't be longer than 10 ms per request (This is a guess).

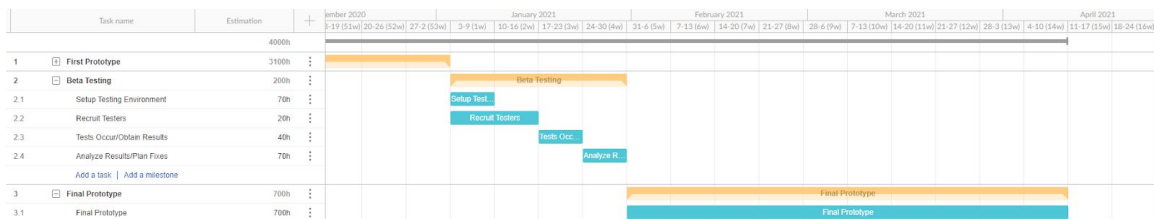
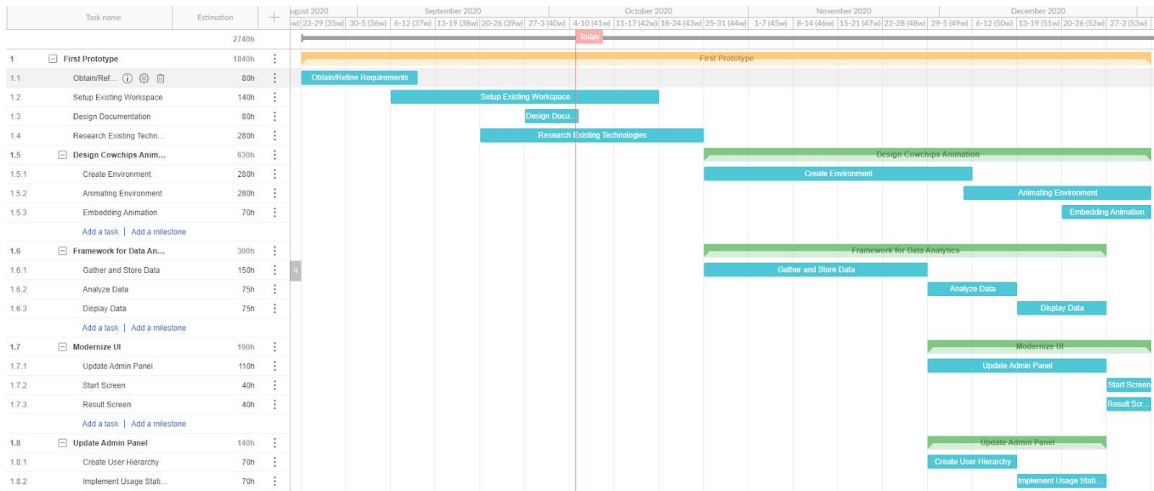
Modernize the UI for Cleanness and Conciseness

For modernizing the UI, we will be measuring this milestone by using Usability metrics for the time it takes to finish a task. Meaning, how long a user takes to navigate to a specific dashboard or link. This can be calculated by subtracting the End time from the start time. Finally, we'll average out the data based on how long each task is supposed to take. We will aim for an 80% completion rate.

Create a framework for Data Analytics:

For the Data Analytics, since our core functionalities are Gathering and Storing appropriate data, and Analyzing the newly grabbed data, and Displaying the data to the appropriate users. we will be using the search result success rate as our metrics and evaluations criteria. Meaning, we will look at the usefulness and quality of our search result as it tells us the quality of the data we gathered. We'll use a 90% search result success rate as our metrics and evaluation. We will update it as we go into our next agile development process.

2.4 PROJECT TIMELINE/SCHEDULE



2.5 PROJECT TRACKING PROCEDURES

Our group will be using Jira, Github and Miro to keep track of tasks. We will keep the repository in Github, we will keep track of stories and required tasks on Jira, and lastly, we will use Miro during team meetings as a group whiteboard style. Progress will be assessed upon completed stories and successful implementation of features in the repository.

2.6 PERSONNEL EFFORT REQUIREMENTS

Main Task	Sub tasks	Project Effort (person-hours)
Design Cowchips Animation	Create Environment	280
	Animating Environment	280
	Embedding Animation	70
Total		630
Update Admin Panel	Creating User Hierarchy	70
	Implement usage statistics	70
Total		140
Modernize UI	Update Start Screen	40
	Update Admin Panel	110
	Update Result Screen	40
Total		190
Framework for Data Analytics	Gather and Store Data	150
	Analyze data	75
	Display data	75
Total		300

We have 13 weeks till 1/1/2021 which is our deadline for having our first game prototype complete. Assume each person works at least 10 hours per week for 13 weeks that is 130 hours per person, for 7 people that is 910 hours. We are also assuming during the 5 weeks of no school until the deadline each person works at least 20 hours per week or an additional 10 hours per person per week or 50 hours per person total. So total hours until deadline is $910 + 50 * 7 = 1260$. We figure that 50 percent of effort should be put into designing cow chips animation due to it being the most complex. 35 percent should be put into updating the admin panel and the framework for data analytics. And the last 15 percent should be spent on modernizing UI.

The design cow chips animation main task is divided into three subtasks create environment, animate environment, and embed animation. Creating the environment and animating the environment we expect to be of equal complexity, so we have allotted them both about 45% of the time allotted to designing the animation. And embedding the animation should be a smaller task so we allotted about 10% of the allotted design animation time.

The update admin panel main task is divided into two subtasks creating user hierarchy and implement usage statistics. Both are of about the same difficulty, so we allotted 50% of the time allotted to update admin panel for each.

The modernizing UI main task is divided into three subtasks start screen, admin panel and results screen. The start screen is one of the simpler screens so modernizing should take the least amount of time, so we are assuming about 20% of time that is allotted for modernizing UI. Result screen is also a fairly simple screen, so we also allotted about 20% of time that is allotted for modernizing the UI. And the admin panel is one of the more complex screens, so we allotted 60% of time to update admin panel screen.

The framework for data analytics main task is divided into three subtasks gather and store data, analyze data, and display data. We expect gathering and storing data to be the most complex requiring 50% of the allotted time for the framework for data analytics. And analyze data, and display data to be of equal complexity requiring 25% of the allotted time each.

2.7 OTHER RESOURCE REQUIREMENTS

We do not require external hardware or other resources to complete our project.

2.8 FINANCIAL REQUIREMENTS

The only financial requirements we may run into are for the animation. We need either a 3D artist to make the models or we need to purchase models from outside sources.