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CLAW Credit Checker Application - Requirements Analysis

1. Introduction

1.1 Purpose of the System -

The purpose of this new implementation is to increase the productivity of checkouts at chapel events, decrease the costs of credit checking equipment, decrease the work needed to upload information, and add on more features to the new checking devices. The current credit checking system is expensive, outdated, slow, and it also causes lots of added work for the chapel office. This application could save the college money and time and reduce the unnecessary traffic in chapel events, which would also improve the student morale when attending chapel. For our proposal, we will lay out the motivation of the project, the details of the project itself in terms of the environment, issues, deliverables, and a timeline.

1.2 Scope of the System -

Documentation for the project will be stored on Google Drive in the form of google documents so our team can easily access and update project documents. The project language and software to use has not been determined yet and will be updated when the decisions are made. Upon meeting with Jay Whitehouse we will determine the best language and software for development of RFID scanning software.

Hardware for the project includes USB attachment RFID scanners that can be plugged into a variety of devices leaving flexibility in device choice. The devices used for the project will likely include either tablets or smaller laptops to allow portability for chapel checkers to easily carry and move around the devices.

The biggest issue in our development process will likely be our inexperience in development with RFID scanners and inexperience with uploading and securely uploading to the Go Gordon server. However, these challenges can be overcome with the help of Jay Whitehouse who has more extensive experience in system development and knowledge of current languages Gordon uses in uploading information. We will find resources that will help us with RFID implementation. Seeing how prox readers on campus check student information would also be a helpful resource in the development process.

The final product that the project will produce is a new chapel checking system that will use RFID scanners to quickly get student information from student IDs and seamlessly upload the information to a Gordon server.

The user interface will be very user-friendly, simple, and easy to use. This is important to us and the chapel office so chapel checkers can easily pick up the system and understand it well while using it. We will develop the interface first before the functionality so we can confirm what features are wanted in the system before we develop the functionality of the system.

The RFID scanning feature of the system will likely be the hardest to develop due to our inexperience in this area. We are hopeful that there will be resources to assist online, but we need to grab the prox number from the Gordon ID, find the student information attached to the prox number, put the student information on a text list, and upload the student information on the text list to the Go Gordon server that holds student chapel attendance information.

After developing the system, testing it with the hardware and ensuring it works reliably and performs well is just as important as the functionality of the system. We will likely have to rework the system to accommodate all the non-functional requirements that the system needs to fulfill. Having well commented and structured code is essential for easily patching and upgrading the system for future versions. These are all deliverables that we intend to produce in the CLAW credit checking system upgrade.

1.3 Objectives and success criteria of the project

This application has to achieve the following success criteria:
1. Login for chapel checker by tapping card to authenticate user – or password lock
2. Select an event from the current time slot to give credits for
3. Quick processing of students – tap, beep, and go
4. Indication of successful scan with nice beep and code displayed
5. Blacklist button for late students to block credit for the student (needs confirmation)
6. Done button to end credit checking for the specific event
7. Automatic syncing and backup of stored student attendance for the chapel event

1.4 Definitions, acronyms, and abbreviations

RFID - Radio frequency identification (RFID) is the wireless use of radio waves to transfer data, for the purposes of automatically identifying and tracking tags attached to objects. The tags contain electronically stored information.
CLAW - Christian Life and Worship

1.5 References

1. Development team meeting with CTS staff and Chapel Office
2. Bi-weekly project meetings with development team and lead developer/advisor Jay Whitehouse

1.6 Overview

The current CLAW credit checking system is outdated and in need of an overhaul being slow and over 10 years old as well as using more expensive and slower technology. An upgraded CLAW credit checking system that our team will develop will utilize faster modern technology that also happens to be cheaper to improve costs and efficiency of chapel checkouts. Using RFID attachments to prox read Gordon IDs will

drastically increase checkout times and new devices will have a Wi-Fi connection to automatically upload student information to the Go Gordon server. The development process should be fun and challenging and provide a great benefit for the chapel office and the Gordon College student body.

2. Current System - The current system that Gordon College has in place is to scan the barcode on the back of the student id using Pocket PC's. This is very slow because the id needs to be handed to the chapel checker, then they have to hold the id at an angle that can be read by the scanner. Some id's have a faded barcode that causes the scanner to take a while to read the barcode, if it reads it at all. Also the Pocket PC's are expensive to upkeep and tend to not be as reliable as they should be.

3. Proposed System

3.1 Overview - The newly proposed system will speed up the scanning of students ids. We will be using laptops/tablets (2 in 1 systems) that have an RFID USB plug-in. The student will just tap their card to the RFID sensor. The sensor will read their hexadecimal id, which will then be converted into a decimal number which will match up with their id on the server.

3.2 Functional Requirements -

- The chapel checker must be able to log-in to the system in order to access the events page, as well as the scanning window.
- The students should be able to tap their card to the RFID scanner and have the information read correctly.
- After the scanning of the card there should be both a visual and audio confirmation that the card was read.
- The chapel checker should be able to access the blacklist to scan an id
- The "done" button should be able to be accessed by the checker and should also save the file of ids locally
- The files should also be set up to upload automatically to the server

<u>3.3 Nonfunctional Requirements</u>

- The color of the interface is going to be the school colors
- The user should see a green or red light if the card was scanned and the audio confirmation will be a simple beep

3.3.1 Usability - Anyone should be able to quickly learn how to use this application, it will be as simple as a mobile application, and there will be a user manual in case the user needs it. If time allows we can add help in the application itself.

3.3.2 Reliability - The application should successfully store and upload card information. Restarting the system should not yield any problems in the event of a failure.The system will be robust enough that if it is terminated halfway through scanning, it will still store previous scans.

3.3.3 Performance - The system should be very responsive since the goal of the application is an increased speed of checkout. The most critical section is in the scanning of IDs, the application should be able to capture it and store it in hopefully under a second. If it takes a few seconds for each card, then we need to speed up the system.
3.3.4 Supportability - If the chapel office needs to add any functionality later in the systems life cycle, CTS will have the code and will be able to add functionality. The current plan is to make the system runnable on any windows 10 device.
3.3.5 Implementation - The only constraint is that the application should run on any windows 10 device. These constraints were placed by the development team because it resulted in the best performance and development environment for the system.
3.3.6 Interface - The system's only interaction with the previous system is in uploading the student information to the same server and grabbing student information from the same database. The system should continue to use this model.
3.3.7 Packaging - The system will be installed by our development team since we are also going to do the testing, we can prepare the system. We intend there to be somewhere around 12 of these devices so they can be used at multiple events that could be going on at the same time.The system should be fully installed and in place by the Fall of 2016.
3.3.8 Legal - The system will be licensed by Gordon College, there are no liability issues or licensing fees associated with this system that we know of.

3.4 System models

3.4.1 Scenarios -

Scenario	sign-in
participating actor instances	checker
flow of events	1. Checker clicks on the icon "Chapel Checking" 2. The checker then scans their id 3. The system verifies that it's a valid id and proceeds to the next window.

Scenario	select event
participating actor instances	checker
flow of events	1. Checker clicks on the correct event 2. After the event has been selected a new window will load

Scenario	scan card
participating actor instances	checker, student
flow of events	1. Checker clicks "scan now" and the RFID will begin to scan cards

	2. The student will then tap his/her card to the RFID 3. There will be an audio and visual confirmation that the card was scanned 4. The RFID will read the hex code 5. The system will convert the hex to decimal. 6. Once converted that value will be saved onto a text file
Scenario	end event
participating actor instances	checker
flow of events	1. Checker clicks on the icon “Finish Event” 2. The app will bring you to a new window 3. The new window will show the event that was just scanned, where the file was saved locally, and if the file was uploaded to the server.
Scenario	sign-out
participating actor instances	checker
flow of events	1. Checker clicks on the icon “Sign-out” 2. The app will have a pop-up asking if they are sure they want to sign-out 3. The app will then go to the home screen

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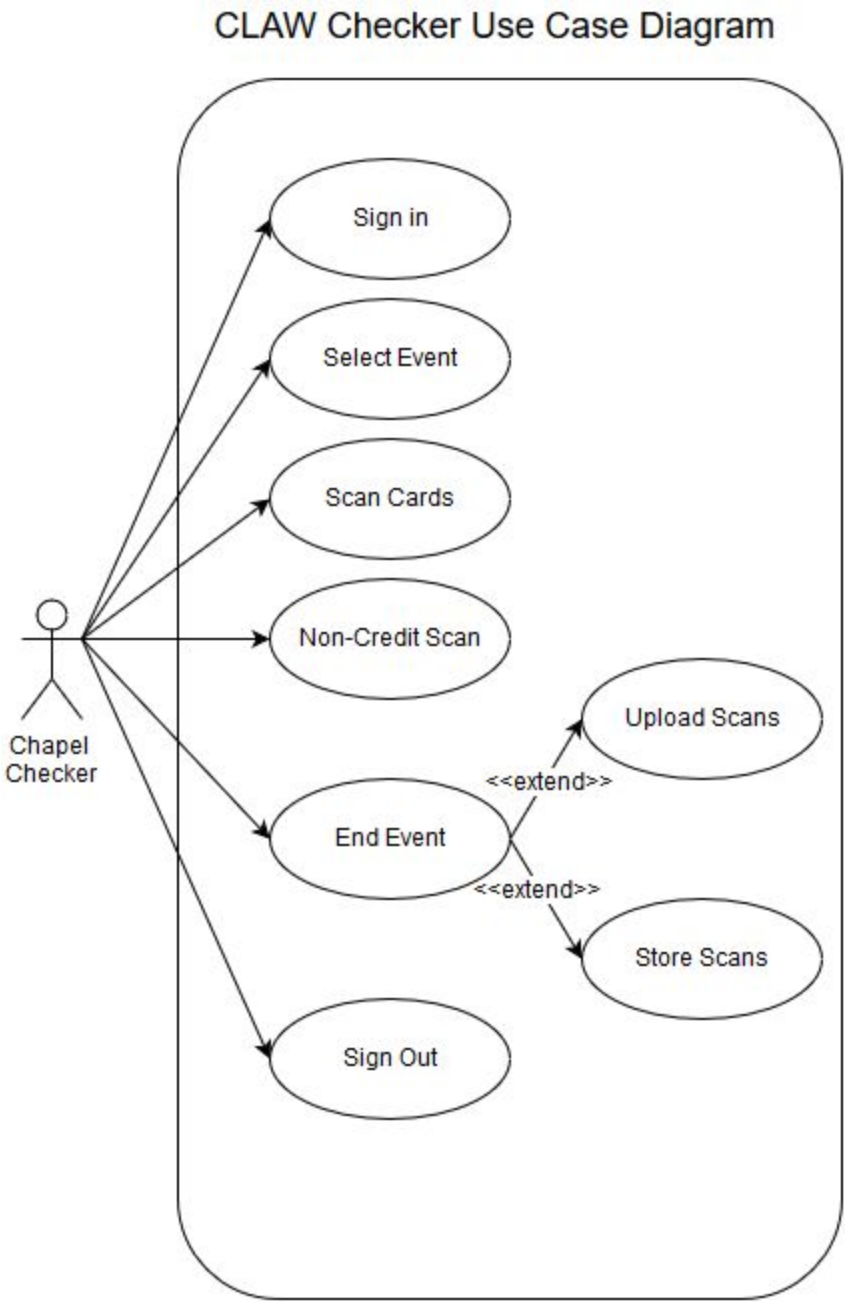
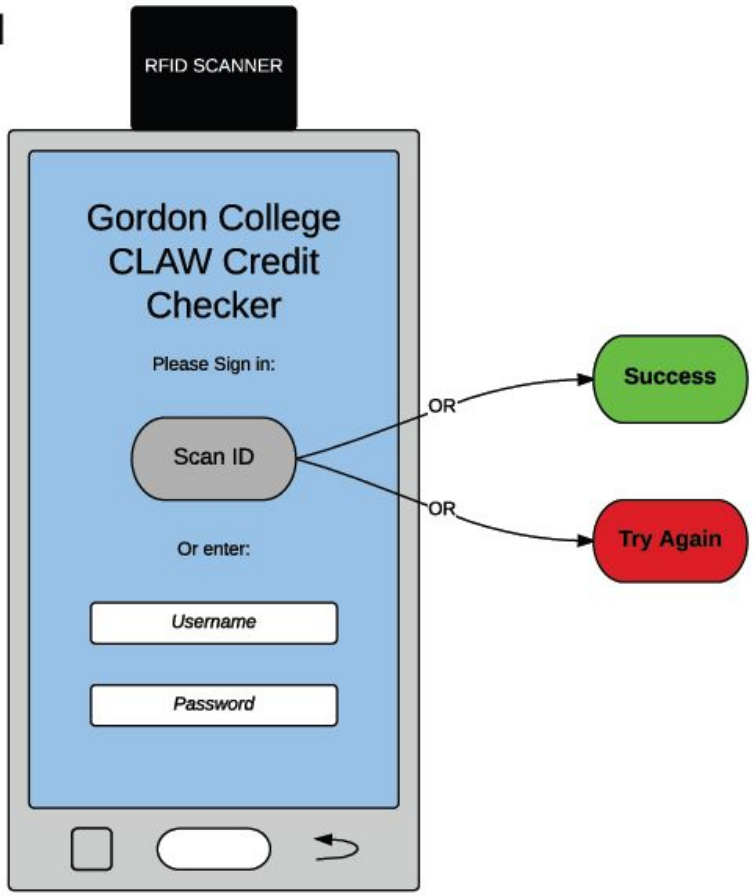
3.4.2 Use case model -

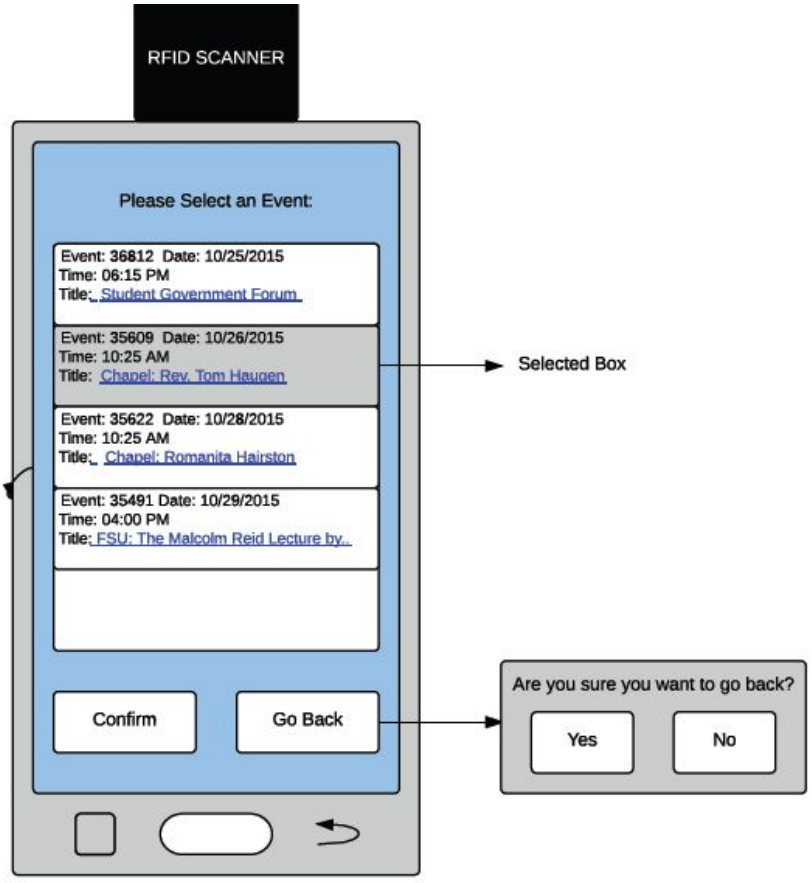


3.4.5 User interface - navigational paths and screen mock-ups (On following Pages)

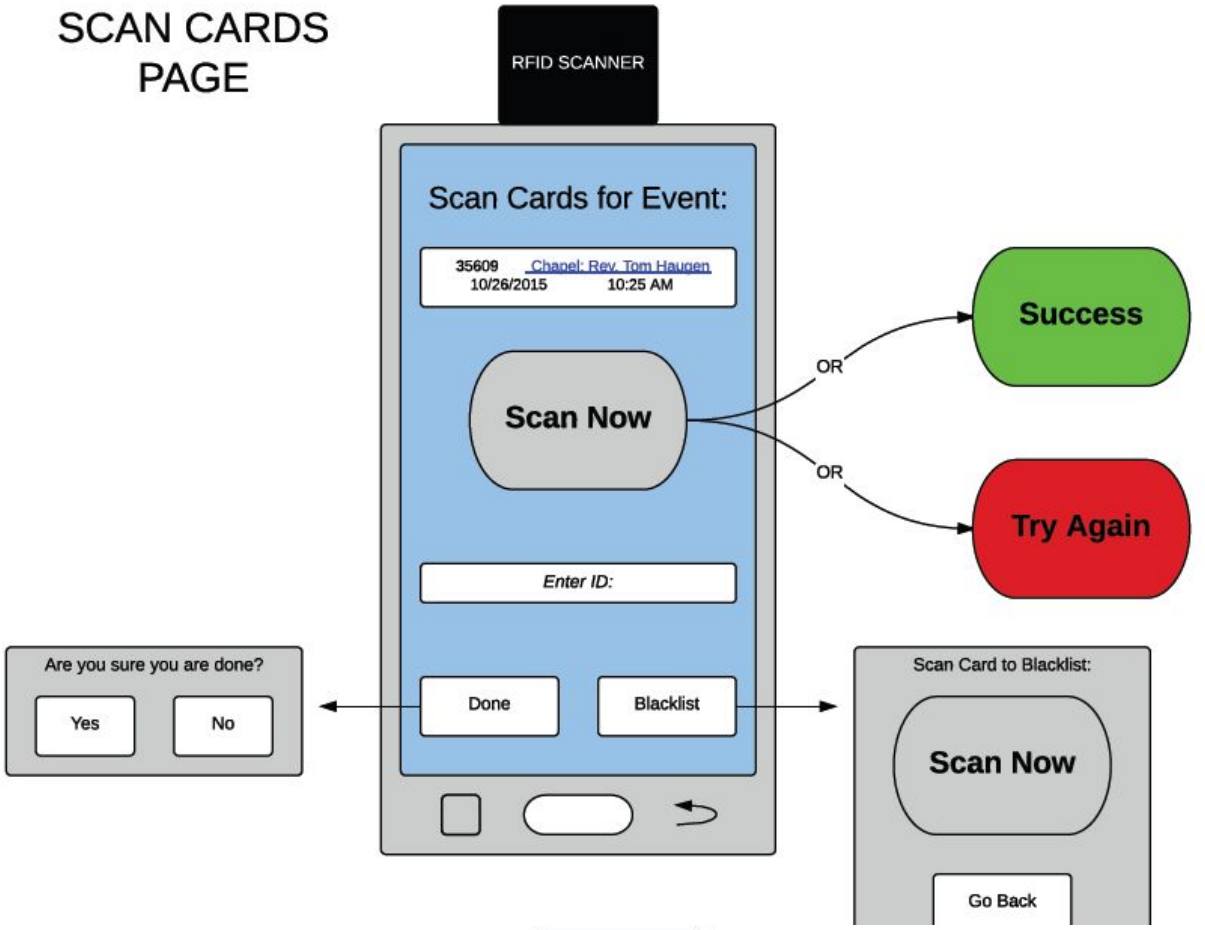
CHECKER SIGN IN PAGE



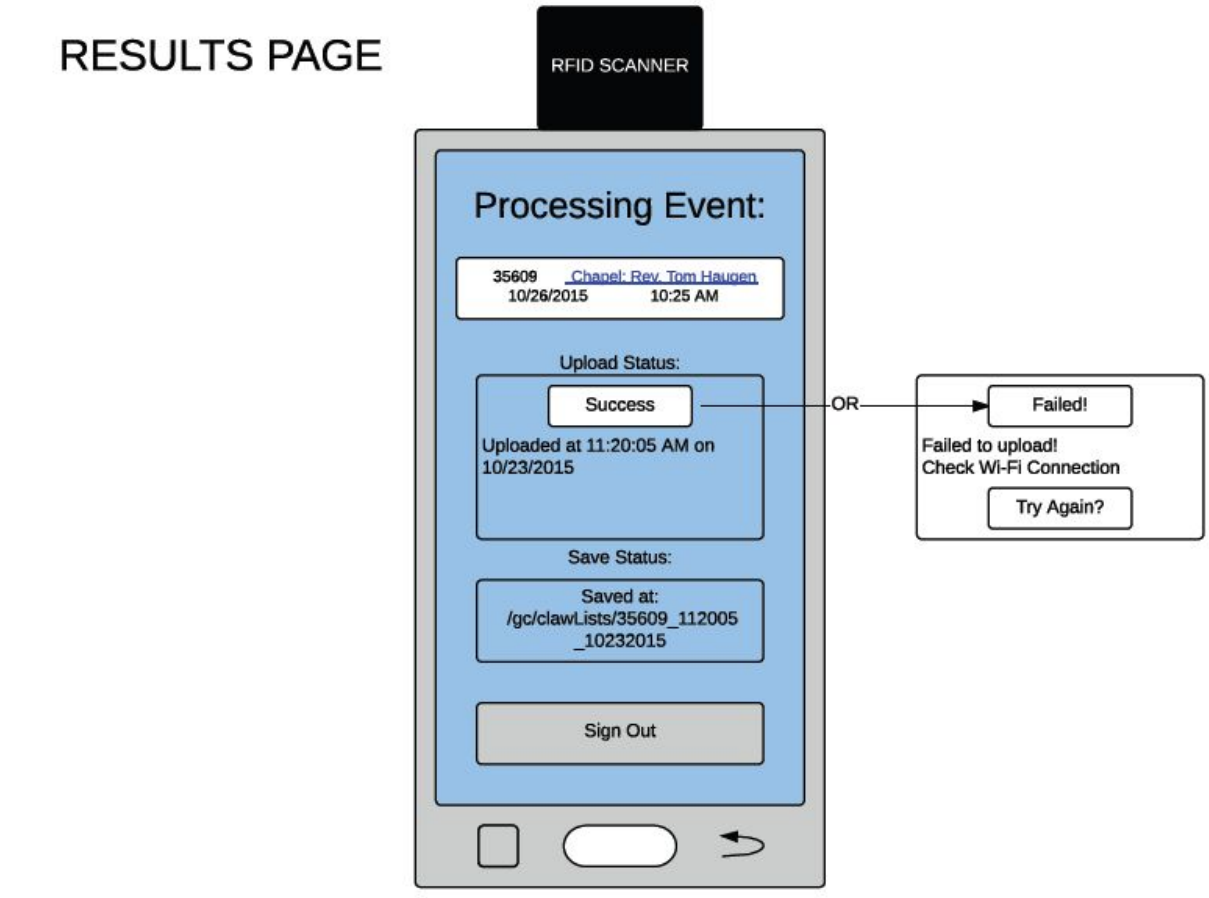
SELECT EVENT PAGE



SCAN CARDS PAGE



RESULTS PAGE



4. Glossary

a.RFID - Radio frequency identification (RFID) is the wireless use of radio waves to transfer data, for the purposes of automatically identifying and tracking tags attached to objects. The tags contain electronically stored information.
b. CLAW - Christian Life and Worship
c. CTS - Center for Technology Services