Requirements Specification

Group 10

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Table of Contents

1 *List Of Figures*

2 *List Of Tables*

3 *Change History*

Version	Date	Author	Comments
-	-	danik, elsonbd, quachsh, paramab	Original Content
0	Oct 10 2014	danik, elsonbd, quachsh, paramab	Initial check In
1		danik	Added List of tables, figures, and project issues.

Table 1 Change History

4 *Introduction*

4.1 PURPOSE

- The purpose of this document is to present a detailed description and all required functionality of the application, which is introduced to improve McMaster's current meal plan system. This document will explain the intended purpose and features of the application, what it shall do, the constraints under which the simulation model must operate, as well as introduce some of the requirements for usability and compatibility applied by McMaster University's staff members.

4.2 SCOPE

- MacGo, is a mobile application being introduced to help improve McMaster's current meal plan service. The ultimate goal for MacGo is to eliminate the need for McMaster student cards for meal purchases around campus. MacGo will provide extra security on today's current meal plan service where students and staff may lose their student card and have money stolen from it. It will be the ultimate solution for security, and ease of use. MacGo is trying to eliminate the need for students and staff members to always have their card on them whenever they are trying to make a purchase on campus. Whether it is a small cup of coffee or dinner, it frustrating to not have the ability to make such a purchase when the student card is forgotten back at home. MacGo will be a mobile application for all smart phones which provides easy access to making purchases, checking account balance, and keeping track of all transactions.

4.3 SYSTEM OVERVIEW

- The main purpose of this project is to store this student card in a mobile application where students and staff members can access easily on their smartphones. This provided the ability to be able to make purchases through your smartphone across campus with ease. We're aiming at improving the way student card is being used today. MacGo will be exceedingly beneficial to those who have their smartphones around with them everywhere, however are forgetful of their wallets.

4.4 DEFINITIONS

- Student card - a physical card given to each student which is used to pay for meals on campus, take books out of the library, be checked into the school gym and more

- MAC ID - a term given to each student at the start of their undergrad, consisting of parts of their first and last name.

4.5 REFERENCES

- For information on the current meal plan system: **http://mealcard.mcmaster.ca/**

5 *Functional Requirements*

- Student can connect current (physical) student card number to mobile app
- There is only one card number assigned to each student
- Each card number identifies one student
- Each student card number can be connected to at most one device at a time
- App asks for authentication before access is allowed
- Authentication includes pin code and/or fingerprint sensor (or another form of authentication)
- Shows balance of the student card

5.1 WORK PARTITIONING

R#	Event Name	Input and Output	Summary
R1	Login	IN: User's credentials OUT: Success/Failure	User will need to login with their account credentials and will be redirected to the home page if logged in or prompted to reenter their credentials if login failed.
R2	Logout	IN: Button Click OUT: Login page	User will be redirected to login page once logged off and all user's information will be wiped from the app.
R3	Check account balance	IN: Request OUT: Account Info	Account balance page will be displayed once the user requests the current balance.
R4	Check transactions history	IN: Request OUT: Account Info	Account history page will be displayed once the user requests the account history.
R5	Setup 4 digit pin password/thumbprint	IN: Request OUT: Prompt to initialize password	User will be prompted to enter and verify a 4 digit pin once he/she requests to setup one.
R6	Request barcode	IN: Request OUT: Display barcode	A token will be initialized and used to create a barcode once the user prompts to display the barcode.
R7	Scan barcode	IN: Scan OUT: Student card information	Student card information will be fetched once the McMaster personell scans the barcode.
R8	Make a purchase	IN: Req OUT: Status message	Once the request is made, if successful a message is sent to the user, otherwise an invalid balance error will be displayed to both cashier and user.

Table 2 Work Partitioning

5.2 THE SCOPE OF THE PRODUCT
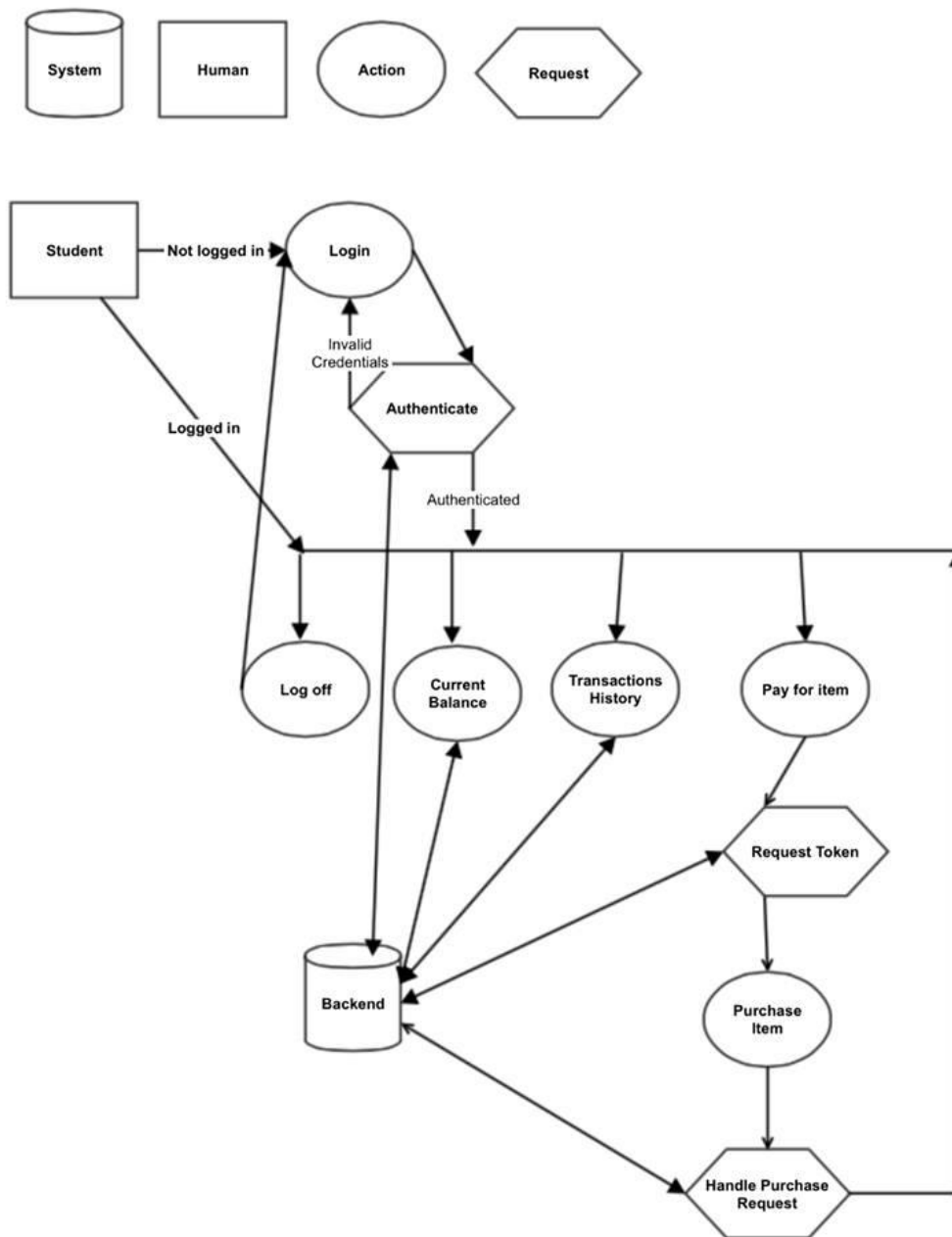
5.2.1 Product Use Case

Figure 1 Product Use Case

5.2.2 Product Individual Use Case

1. Use Case #1: Student login
   Trigger: Sign in page
   Stakeholder: Students
   Precondition: Student has an activated McMaster ID and password
   Course of event: Students will enter in their credentials (ID and password)
   Post condition: Student will be logged onto system
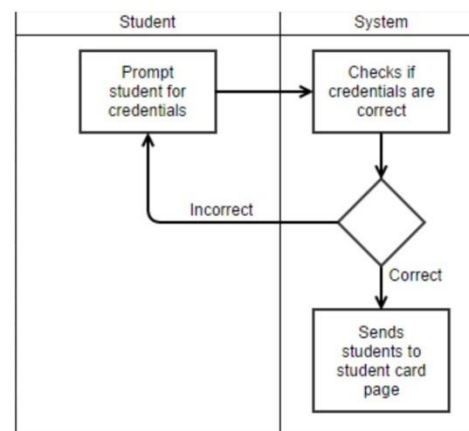
Figure 2 Use Case 1 - Student Login

2. Use Case #2: Show student card
   Trigger: Student card showing page
   Stakeholder: Students
   Precondition: Student has successfully logged into their account, and is able to access their student card information
   Course of event: Student can now view their student card information
   Post condition: none

3. Use Case #3: Pay for meal
   Trigger: Student card showing page
   Stakeholder: Students, cashiers
   Precondition: Student has successfully logged into their account, and is able to access their student card information
   Course of event: Students will show their card to cashier and will have their card scanned by the machine. Machine will then send information through the system into the web module.
   Post condition: Student will be logged onto system
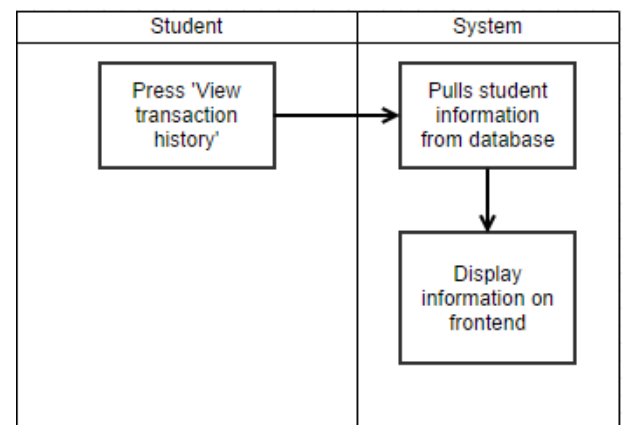

Figure 3 - Use Case 3 - Pay for meal

4. Use Case #4: View transaction history
   Trigger: Transaction page
   Stakeholder: Students
   Precondition: Student has moved into the transaction history directory
   Course of event: Student will direct them to the transaction page where they can check all transaction history to date
   Post condition: none

5.3 FUNCTIONAL AND DATA REQUIREMENTS

Name	Authenticate User
Summary	To access the application, the user will need to provide some form of authentication.
Rationale	User confidentiality is important, and protecting that information is necessary.

Requirements	• **If** application supports fingerprint authentication, users fingerprint required to access the application
	  • **If** no fingerprint in database, ask user to setup or **create passcode**
	  • **else if** user fingerprint matches existing fingerprint on device, allow access
	  • **else** user fingerprint is incorrect, no access
	• **else** passcode (i.e. 4 pin) required
	  • **If** passcode does not exist, ask user to create passcode
	  • **else if** passcode user enters matches database passcode allow authentication
	  • **else** passcode is wrong, no access

Table 3 Authenticate User

Name	Connecting Student Card Number to Mobile
Summary	The student will be required enter their student number to the app.
Rationale	The student card number information will be required to use the features of the app.
Requirements	• Authentication is required to enter the application • In the mobile app, the student must provide their student number to the app to gain access. • Student number must exist in database (existing information) • By default the app will ask the user to provide a student number • There is only one card number assigned to each user • Each card number identifies one user • Each student card number can be connected to at most one device

Table 4 Connection of Student Number to Mobile

Name	Display Payment Option and Transaction History
Summary	The application will provide a clear UI of the user's payment options and transaction history.
Rationale	The user will use their device to pay for items and view previous transactions.
Requirements	- The user must be authenticated before the application allows access to the information - Existing information of user is in database - At most one user information may be displayed on each individual device - If user data exists, displays transactions of most recent history by pulling information in database - If no user data exists, display no transaction history - If user data exists, display payment information (i.e. their existing balance) - If no user data exists, display option to set up mobile payment option

Table 5 Payment Option and Transaction History

Name	Perform Payments and Transactions
Summary	The application will allow the user to pay for items using their student card number.
Rationale	The main purpose of the application. Users should be able to drop the physical use of their student cards and be able to perform the same actions through their mobile devices.
Requirements	- The user must be authenticated before the application allows access to the information - Existing information of user is in database - Balance on student card must be greater or equal to the item(s) being purchased - If balance equal to zero (0) or less than item(s), error message, transaction cancelled

Table 6 Performing Transactions

6 *Non Functional Requirements*

6.1   LOOK AND FEEL REQUIREMENTS

6.1.1 Appearance Requirements
- The user interface for the app will be simple minimal interface that will display student card and an option to pay all over campus. Also students will be able to view their past transactions.

6.1.2 Style Requirements
- The style of the app will be user friendly, keeping amount of pages as short as possible. So that user can easily surf through the app without any frustration.

6.2   USABILITY AND HUMANITY REQUIREMENTS

6.2.1 Ease of use Requirements
- The MacGO app will be easy to use for any student out there.

6.2.2 Personalization and Internationalization Requirements
- Since each student has their own student card, they will have their virtual card on their phone which will be similar to their original card. The app will be in English.

6.2.3 Learning Requirements
- The learning curve will be minimal as possible. The user will be able to understand how the app works in not more than 5 minutes.

6.2.4 Understandability and Politeness Requirements
- Any user can use the app easily.
- There will be no inappropriate or any kind of grammar mistake with the app.

6.2.5 Accessibility Requirements
- The source code of the MacGO app is open source. The user will be able to compile the code through Github and run the app.
- The app will be supported on Android and IOS devices (with Internet connections).

6.3   PERFORMANCE REQUIREMENTS

6.3.1 Speed and Latency Requirements
- Accessing each feature for the app will take no longer than 10 seconds to process. There will no lags in acquiring any information through the app.

6.3.2 Safety Critical Requirement
- Each student data will be kept confidential.
- The app will make sure that it's only accessible by McMaster students.
- For payments the app will provide its own random generated barcode to make sure that student is only able to pay using the app.

6.3.3 Precision or Accuracy Requirements
- Each student will have their own access.
- The app will validate authenticity of McMaster students.

6.3.4 Reliability and Availability Requirements
- If accepted by university it will be available for students to try and make real time payments all over the campus.
- Robustness or Fault- Tolerance Requirements
- MacGO will be robust enough to recover from errors such as trying to register some random student card.

6.3.5 Capacity Requirements
- The app should be easily scalable depending upon the current hardware which used to store current student data.
- While Prototype, the app will easily support tens of millions of users.

6.4   OPERATIONAL AND ENVIRONMENTAL REQUIREMENTS

6.4.1 Expected Physical Environment
- MacGO will only be applicable for payments in campus or off-campus restaurants where they accept student card as their mode of payment.

6.4.2 Expected Technological Environment
- If accepted by university this app can lead to future modification of using your smartphone to unlock doors and accessing different locations inside university.

6.4.3 Partner Applications
- Not Applicable

6.5   MAINTAINABILITY AND PORTABILITY REQUIREMENTS

6.5.1 Maintenance Requirements
- Periodic patches might be required to make the app bug free.
- Special Conditions for Maintenance
- Support from university will be required if the app has to link to the existing data of students.

6.5.2 Portability
- The App initially will be running on all Android (above 4.0) and IOS Devices.
- In future, it can be easily ported to devices such as Blackberry, Windows since it will be linked to same database.

6.6 SECURITY REQUIREMENTS

6.6.1 Access Requirements
- Each student should only access their own account.
- Student should be able to make payments only via MacGO.

6.6.2 Integrity Requirement
- In order to ensure security a random generated barcode will be provided while making each payment.
- Apple finger print touch ID will be added in order to ensure in order to authenticate the user into the system.

6.6.3 Audit Requirement
- Not Applicable

6.7 CULTURAL AND POLITICAL REQUIREMENT

6.7.1 Cultural Requirements
- Not Applicable

6.7.2 Political Requirements
- Not Applicable

6.8 LEGAL REQUIREMENTS

6.8.1 Compliance Requirements
- MacGO is open-source and will follow free-BSD license.
- App should not cause any patent issues.

6.8.2 Standard Requirements
- No confidential information will be shared or released to anyone except the authorized individuals.

7 Project Issues

7.1 OPEN ISSUES
- We are not sure if McMaster will allow us to use real data of students with the app.
- We are not sure if McMaster will agree on replacing the current payment system of card swiping by barcode.

7.2 OFF-THE-SHELF SOLUTIONS
- Not applicable for making payments via smartphone.

7.3 NEW PROBLEMS
- Not Applicable.

7.4 TASKS
- Gather missing requirements.
- Prepare mock student data.
- Develop Prototype.
- Get feedback for the prototype.
- State the importance of the prototype and argue why current prototype is ideal by comparing it to current of-the-shelf products.

7.5 MIGRATION TO THE NEW PRODUCT
- Not Applicable.

7.6 RISKS
- The major risk involved with the app is to maintain security of student data and prevent it from leaking.

7.7 COSTS
- Not in the requirement.

7.8 USER DOCUMENTATION AND TRAINING

7.9 WAITING ROOM
- Using the app in library, gym instead to physical student card.
- Using the app outside campus in nearby stores which accept student card as their mode of payment.

7.10 IDEAS FOR SOLUTIONS
- Using the NFC instead of barcode for making payments.
- Using barcode or NFC to unlock doors of labs.

8 Requirements Timeline

Requirements	Projected Month Deadline
R1. Login	November
R2. Logout	November
R3. Check account balance	November
R4. Check transactions history	December
R5. Setup 4 digit pin password/thumbprint	December
R6. Request barcode	January
R7. Scan barcode	January
R8. Make a purchase	February

Table 7 Requirements Timeline