DECEMBER 2022

INFORMATION SYSTEM:

UW-Madison's Starship Food Delivery

LIS 615: SYSTEMS ANALYSIS AND PROJECT MANAGEMENT FOR INFORMATION PROFESSIONALS

PREPARED BY

Team "Not Fast, Just Furious"

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| EXECUTIVE SUMMARY |

Information System Overview

The information system selected for this project is the University of Wisconsin-Madison's Starship Food Delivery. This system was selected due to its popularity among UW-Madison community members; an analysis and observance of such a system would indubitably result in more efficient, easier-to-use methods of ordering food and our team aims to be a part of that impact. The highlight of the system is its use of robot delivery to deploy orders. The primary focus of our analysis was from the perspective of the Robot Coordinators who are tasked with packing and sending off orders to the delivery robots. During our contextual inquiry, we observed the whole process of how the system works from this interaction within the system. Robot Coordinators await an order on the app from customers, pack the order, share information with the customer with updates, and seal and deploy to a robot which would complete the order.

Primary Problem and Selected Solution

Within our observation of the system, we found that among the communication breakdowns, one was of prime importance – when a user makes an order, there is no communication for whether that item is available prior to making the order. Robot Coordinators communicate with users when an item is "Out of Stock," and will not be included in the delivery. This makes the process longer for the staff as well as leaves the customer dissatisfied. Because of its negative impact on several system users and its detriment to efficiency, this problem was selected. The following solutions were considered: 1- forming a team of kitchen staff that would update the online menu, 2 - creating an online inventory system on the app, 3 - improving the accuracy of the robot's live location, and 4 - condensing information sent between the Robot Coordinator and the user. The second solution, creating an online inventory system was selected. This was because it was the most efficient way to make an impact in the current communication gap along with improving communication between several users of the system; it also improves the application design.

Project Overview

The key business value this project will achieve at completion is to 1 - improve user experience within the application and 2 - increase the number of Starship customers. The project timeline is 4 months, with a projected end date of January 16th, 2023. The budget to be allocated is between $4,500 and $6,000. Key stakeholders (LIS 615 Team, Robot Coordinators, App Developers, and App Customers) will be updated weekly with the status of the project, as well as considered for their input. Communication methods include email, app messages, and hybrid meetings. Various risks such as 1: a team member falling ill, 2: pandemic, 3: app crashes, and 4: low kitchen staff, are considered among others. The project team has a contingency plan and divides tasks among remaining members for risk 1. We opt to accept risk 2. With app crashes, we aim to transfer responsibility to software consultants responsible for app maintenance. And staff are dealt with a contingency plan of well-executed training with targeted consideration for staff shortages.

| FULL REPORT |

Introduction

The system our team has selected is that of the Starship Food Delivery System. This was selected because of our team's interest and fascination in this aspect of UW-Madison community's food culture. It provides a means of efficiently attaining food across campus, and our team aims to be a part of the solution which would improve such a system as it affects users all across campus.

Data Models

Each of the offered data models was designed from the vantage point of a robot coordinator operating inside the Starship Delivery system. The procedure includes receiving the order, preparing it at the various lunchroom stations, and putting it on the delivery robot. The ultimate objective is to have a robot precisely create a customer's order based on their requirements and then deliver the item to the customer in a manner that results in the maximum level of customer satisfaction possible.

Consider the convenience of having robots bring your meals. The consumer puts in an order, food is cooked and packaged, a QR code is generated, the robot scans the code, and food is placed on the robot for delivery. There are four external entities present: the chef, the order-making clients, the robot coordinator, and the delivery robot. When placing an order, clients submit their meal selections and delivery information into a central database. The information about the meals is subsequently sent to the "obtain food order" and "print QR code" processes. The primary purpose of the food storage facility is to notify the robot coordinator's external organization of any anticipated food shortages.

A flowchart has been created to better illustrate how Starship Food is delivered to college dormitories. This flowchart breaks down the process of food distribution into its component phases. When the robot returns to the dining room after delivering the order, the computer system is activated. The robot's controller will retrieve each order made at one of the stations.

*See Appendix II for full Information System data models

Primary Problem and Solution

Within our observations we found the key issue to be communication issues, most generally. Our observations led us to notice some alarming issues:

- Slow food delivery rate
- Robot door closing before customer can retrieve food
- Robot's live location inaccurate and a sparse number of delivery robots available
- Customers unaware of "out of stock" items in order until after food is packaged

Each posed a threat to order efficiency and user experience. With calculated estimation of the benefits of improving each issue, the final one, stock communication was selected as our key problem we chose to focus on. It would help both Robot Coordinators and app customers, as well as would manage several efficiency and communication issues.

For our primary problem of having an updated food stock inventory, the following solutions were considered:

- Improve information relay between users of the system
- Improve the accuracy of the Starship Robot's live location
- Create a page on the Starship Delivery app to show the real food stock
- Create a team of individuals responsible for updating stock on the current pages of the app

To best combat the generalized issue of communication improvement, the third solution, an online inventory was selected. From our observations as well as closer research into communication issues, we found this solution to be most encompassing and yields the highest number of benefits in efficiency and in user experience. Even in the early stages of this selected solution, we projected business value improvements as well such as more users as the UX would improve within the mobile application.

Project Overview

For the implementation of this solution, we have made detailed planning stages for this project. The following provides a synopsis of all we have outlined for its completion.

Time & Budget

Estimated project duration: 4 months

The estimated time for the project to be completed is around 4 months. The project plans to initiate September 26th 2022.After one month from the project's start, a brainstorming session and finding a solution for the problem statement marks our first milestone, along with a clear project outline (October 29th). After another month, a team of developers will be consulted and then deployed according to the solution the LIS 615 has constructed(November 27th 2022). After a month has passed since the second milestone (December 27th 2022), the intention is to commemorate the third milestone by putting our project into action. After this is done, training will need to be engaged along with the creation of a team for which the inventory can be updated. The consumer can now clearly view the food that is offered at the restaurants because we have completely fixed all of our solution's bugs at this point. Along with this, the restaurant

personnel may monitor their stock and update the app with the availability of food. Our project is projected to be completed by 26th January 2023.

- Project initiation – 09/26/2022
- 1st milestone (Solution-problem finding) – 10/29/2022
- Software developer consultation – 11/27/2022
- 2nd milestone (App development) – 12/27/2022
- 3rd milestone (Testing and training) – 01/09/2023
- Final milestone (Fixing and updating) – 01/21/2023
- Project completion – 01/26/2023

Total Estimated Project Budget: $4,500-$6,000
It is probable that if we decide to employ a team of app developers to work on this project, we will end up spending a significant amount of money. When considering the cost of employing app developers, it is important to factor in how much money developers expect to make from implementing changes and addressing issues. A software developer who can create an iOS app can often expect to make between $50 and $85 per hour. Their degree of expertise informs this spectrum. Therefore, it is directly proportional to the time invested in creating mobile apps.

Students will be compensated with free food and other perks for their time testing the app during its beta phase. After customers have tried out the app and given us feedback on how to make it better, the price of each meal order will go up to more than $10.

We will round up all the kitchen and cafeteria staff and give them a crash course on the new software. This will be done after the app's developers have finished completing all of the necessary fixes and enhancements. The program's employees are also likely to expect financial compensation. It's likely that if we stick to this plan, our money will be used up very quickly. Price estimates for arranging a crash course come in at about $500.

Key Stakeholders

The communication strategy has been maintained very simple and effective for all stakeholders involved. The communication strategy may change depending on each stakeholder's availability. They can communicate via a variety of tools, including emails, social media platforms, mobile phones, and in-person meetings when necessary. As our project moves forward, we intend to keep all stakeholders updated to maintain transparency and serve their best interests. To provide more effective delivery, there will be different communication plans for the culinary crew, robot controllers, and app developers.

Key stakeholders (LIS 615 Team, Robot Coordinators, App Developers, and App Customers) will be updated weekly with the status of the project, as well as considered for their input. All

other stakeholders are listed in the appendices for their level of involvement, communication plan, as well as consideration of their input, if applicable. This

Communication Strategy

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Risk Strategy

We identified ten risks when conducting our project. Some of them are related to the App itself, some are related to Starship company or UW-Madison, some are related to our team, and some are related to social emergencies.

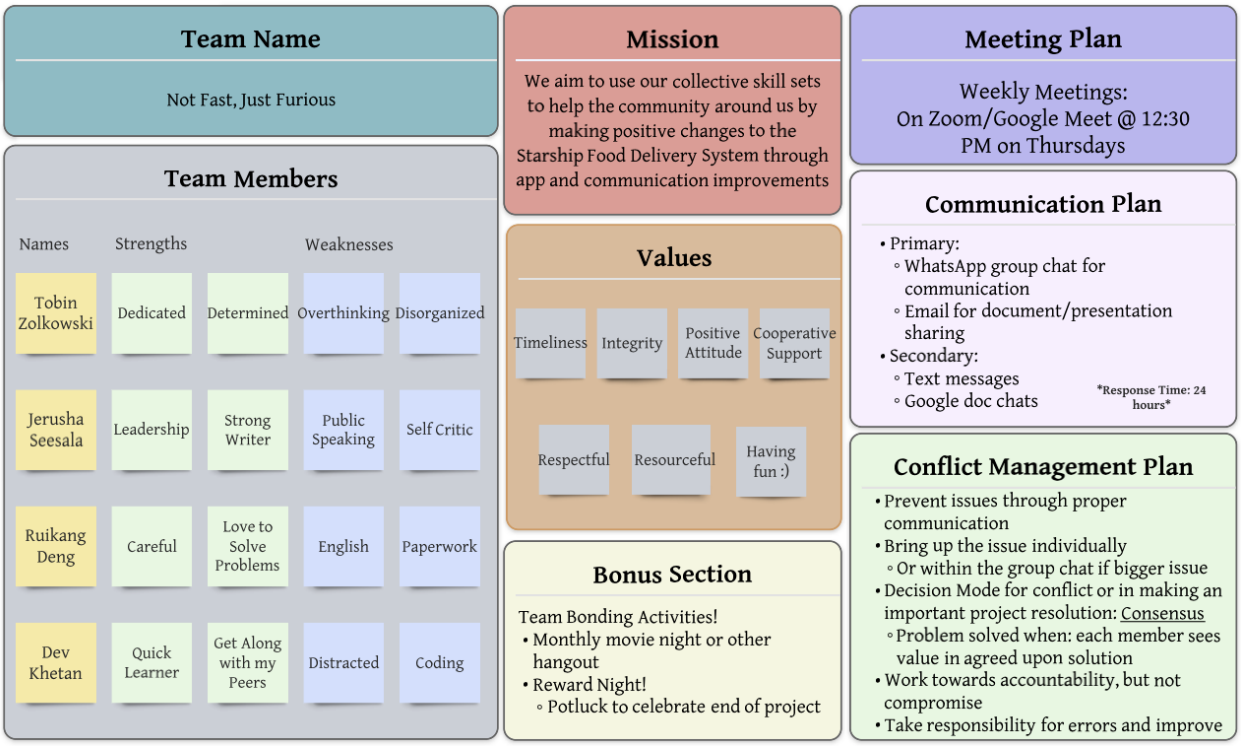
- The Starship Delivery App may crash due to bugs. After making the virtual inventory available, users may encounter bugs, brought by the new change, leading to trouble with end-user experience. This risk will affect the scope and business value of our project. The probability of this risk is high and the impact is medium. New bugs can not be avoided totally, but they can be fixed during the follow-up maintenance procedure. Therefore, we plan to do a transfer response to this risk. After the project's completion, find a team or an organization to continually monitor for glitches and fix bugs accordingly.

- The campus dining hall of UW-Madison may not have enough staff members to upkeep the virtual inventory. This leads to inventory maintenance issues after its implementation. It also suggests a lack of updated information or even misinformation on the kitchen supplies. This risk will affect the scope and business value of our project. The probability of this risk is high and the impact is medium. Because of the high probability of happening, we will plan a contingency response. The training offered for new employees would equip individuals to prepare for staff shortages. Moreover, team members falling sick and leaving the team is also a possible risk. The probability of this is low but it will have a high impact on the time and scope. So we make a contingency plan in advance for each individual's contributions so they may be split evenly.

*This provides an outline to the methods of management for risks. For the full risk list and plan of engagement, please refer to the full risk register in the appendices.

Appendices

I. Team Charter + System Selection



Information System: Starship Food Delivery System

A variety of food-ordering applications are available nowadays. The proliferation of mobile applications that facilitate the ordering of meals has made it challenging for eateries to keep up with client demand, particularly on college campuses. Within the ordering systems located at the University of Wisconsin-Madison, the Starship Food Delivery System is one of such ordering systems involving a mobile application. This is our system of interest, and we aim to improve the user experience and communication relay between system users such that the mobile application is optimized, and all parties are satisfied with its usage.

This information system analysis observes Robot Coordinators who use the online application to make an order, which may include students, staff, or other members of the UW-Madison community. They interact with this system by packing and deploying orders into robots. This information system was selected by our group to focus on a relevant aspect to the daily lives of residents in Madison. As Madison residents, we want to consider an analysis of the Starship Food Delivery System and see which improvements can be made. Such improvement would allow other community members to have a better customer experience and smoother ordering process.

Contextual Inquiry Plan:

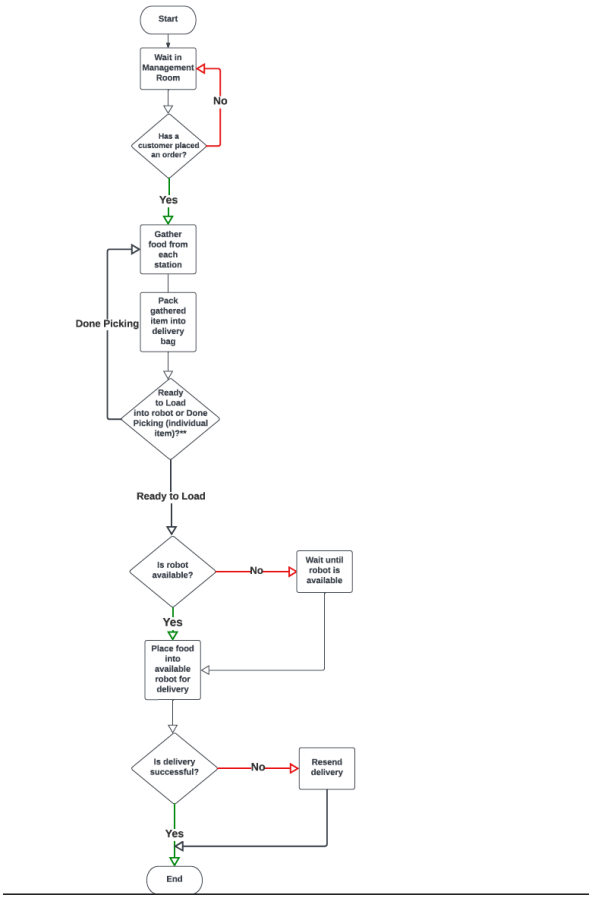
Our team aims to observe four or more people interacting with the information system by finding time for us to visit Gordon Dining and Event Center as a team or in groups of two. We would conduct our observations over the course of one week to diversify our observations and ensure we have a proper range of various activities for the observations.*
The following list describes the types of observations we would make (along with any we come up with while on the field):

- Observing customers who use the application to make orders
    - Involves asking questions on application use as well as observe their interaction in real time
- Observing the employees who manage the system (Team and Shift Leads)
- Observing Robot Coordinators and their role throughout the ordering process
- Observing the kitchen staff involved with packing food orders
- Observing our own orders and taking notes on the speed of each delivery phase (order, cook time, order pick up) → this may bias results?
- Observing the complexity of orders (more items mean longer wait time)
- Observing robot packing and tracking the robots on their way to the customer

*For Robot Coordinators, permission is required from Shift Lead which will be attained prior to making observations

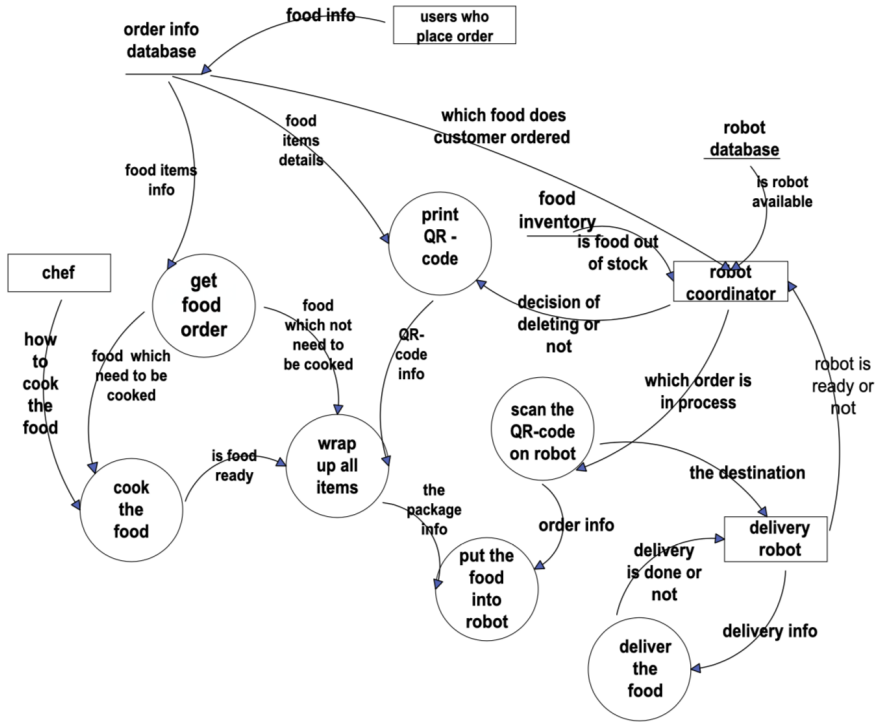
II. Process & Data Flow Models

Flowchart:



*Interaction of Robot Coordinators within the system;
involves packing and deploying food to delivery robot

Data Flow Diagram:



The following descriptions illustrate the details of each data model created from our data. They also serve as a reference point for ease of understanding.

Data Flow Diagram:
This model describes the flow of information inside a robot delivery system for meals. Order food, prepare it, package it, print a QR code, scan it with the robot, load it onto the robot, and send it on its way. That is seven steps.

- The “acquire food order” procedure retrieves information about food items from the order information database and then transmits that data to the procedures responsible for preparing the food and packaging it.
- “Cook the food” gets information about the food and the food items from the chef process and the “obtain food order” process, respectively. The finished meals are then sent to the “complete all items” procedure for wrapping.
- “Wrapping up all the items” requires information from the “obtain food order” process, the “cook the food” process, the “get food item information” process, and the “print QR code” process. The information about the foodstuffs is then sent to the “robot preparation” procedure.
- The “print QR code” procedure is fed data about food products from the “order info” database and “out-of-stock” food information from the robot coordinator. The data from the QR code is then sent to the “whole wrapping” procedure.
- The “put food into robot” process and the delivery robot external entity get information about the customer's food and delivery instructions, respectively, from the “scan QR code on robot” process, which in turn receives this data from the robot coordinator external entity. The “put food

into robot" procedure gets customer address and item data from the "scan QR code" on robot procedure and food data from the wrap up all items procedure.The food-delivery procedure communicates with an external entity, the delivery robot, by exchanging information about the food and the customer's location. This scenario involves four people or things from the outside world: the cook, the people who place orders, the robot coordinator, and the delivery robot.

- The "cook food" procedure receives data about what to prepare from an external entity known as the chef. Users who make orders externally provide information about the foods being ordered and the addresses of their customers to a database storing order information.
- The robot coordinator is a third-party organization that gets client address and robot availability data from the robot database data store and food information from the order info database data store.
- "Scan QR code" (located on the robot) process transfers food information and customer address to an external entity;" deliver food" process transfers delivery information to an external entity. After that, it notifies the food delivery procedure about the customer's order and their address. Database of orders, database of foods and customers' addresses, and inventory of foodstuffs are the three data stores.
- Users who make orders submit their meal preferences and shipping information to a central database. The information about the food products is then sent to two more procedures: "obtain food order" and "print QR code". Food data and the customer's address are also sent to the robot coordinator.

*The food warehouse's primary function is to inform the robot coordinator's external entity of any impending food shortages.
*Information about which robots are now available is sent to an outside robot coordinator organization mostly through a database storage system.

Flowchart:
The Starship Food delivery method at the student housing is depicted in a flowchart. This flowchart outlines the mechanism for delivering food step-by-step.

- The process of the robot entering the dining room after delivering the order triggers the information system.
- The system then confirms that an order was placed using the app.
- The robot controller collects the order from each station if one is placed.
- The RC also determines if a robot is accessible for delivery.
- The robot coordinator also gives the robot the order and loads it.
- The robot is then dispatched to deliver the order to the consumer.
- The robot returns to the university dining hall after delivering the meal to prepare for the subsequent delivery.
- The information system is finished in this manner.

Summary of Activity:
The activity described in the data models above is from the perspective of the Starships Delivery system and its preparation process starting with an order being placed until it is deployed via delivery robot. Through either focusing on the particular steps or the exchange of information involved in this process, each data model informs the viewer of the workings within this system,

from the point of view of a robot coordinator. The robot coordinator's role within this system is the primary focus of our project, and so this activity focuses on data gathered in this aspect of the system. While more can be expounded upon, such as the customer's perspective, or what steps the robot takes, this data is limited to all that the robot coordinator sees. This includes receiving the order, preparing via lunchroom stations, and finally loading it into the robot for delivery. The ultimate goal is to prepare a customer's order as per their liking and quickly and efficiently deploy it via robot such that the customer optimizes their satisfaction with the system.

III. Project Charter

Purpose of the Project:

The purpose of this project is to create a virtual inventory on the Starship Deliveries app for observing real-time updates indicating available food and drink items. This inventory will be worked on over the course of four months beginning September 30th, 2022 and ending January 26th, 2023, in time for full use the following Spring 2023 semester. This is to be done to improve user experience for student and staff users such that items are labeled "available" or not prior to ordering, as well as to bring in more users across the Badger community to engage with the Starship Food Delivery system.

Scope	Deliverables
This project is responsible for adapting a new page on the Starship delivery app to display available food and drink items to customers. Specifically, this project will: - Recruit app developers to implement inventory - Document all virtual inventory needs. - Buy equipment for each food preparation station so staff can update online inventory. - Detail adjustments needed to integrate this inventory (a team to manage it, etc.). - Oversee development team for inventory progress. - Oversee any kitchen staff changes, including extra work stations or modifications. - Create a UX interface checklist to measure project success. These tasks are crucial to the project's success but beyond its scope: - Train workers on new app inventory feature - Recruiting trainers and keeping track of training participants (the staff is responsible for undertaking after receiving inventory management training) - Change robot coordinators' workstations (including assigning different roles to kitchen staff members)	Key Deliverable: New page on the current app Starship delivery service which will display a real time virtual inventory Other Deliverables: Database on the back-end to store a real-time inventory of food products and add real-time inventory information to the front-end app page Instructional training for staff as well as team creation for inventory maintenance The intermediate deliverable of this project is the complete UX design of the new page in the Starship app, which can show customers and staff the foods' stock information. The end deliverable will be a whole new page in the improved app.

Cost	
- Software developer - Student meal promotion compensation - Crash course arrangement	$50–$80/hr. +$10/meal $500
Total Estimated Project Budget	$4,500–$6,000
Project Schedule	
Estimated project duration	Approx. 4 months
- Project initiation - 1st milestone (Solution-problem finding) - Software developer consultation - 2nd milestone (App development) - 3rd milestone (Testing and training) - Final milestone (Fixing and updating) - Project completion	09/26/2022 10/29/2022 11/27/2022 12/27/2022 01/09/2023 01/21/2023 01/26/2023
Success Measures	
The project is complete when the online inventory is available for system users. Criteria elements: - Easy to use, well-functioning interface for virtual inventory (to be measured by adapted UX Checklist). This criterion handles the business value of user experience. - Faster processing/preparation of orders by kitchen staff and robot coordinators (to be measured by improved times on average from current → 25-35 min). This criterion handles the business value of user experience through improved efficiency - More Badger Starship Food Delivery users (to be measured by increase from current number of users). This criterion handles the increase in the number of users and aims to improve the business value of increased use.	

Stakeholders:

Name	*Engaged/ Affected*	*Expected Benefit*	*Assumptions*	*Power*	*Interest*
Customers (includes	Affected	Accurate accounts of food	The project will take a very long time	Medium	High

students and faculty)		inventory prior to making an order			
LIS 615 Team Members	Engaged	Better communication between all system users	The project will also take work with maintenance (no way of knowing if this will happen)	Low	High
Robot Coordinator	Engaged	This helps with efficiency of order prepping	It may take a lot of work on our end to update the page created	Low	High
Shift Lead	Affected	The availability of the food stock inventory	The food inventory will be accurate	Low	Medium
Starship Delivery Company	Engaged	Better e-devices for communication with the robot and the restaurants	They can communicate better with the robot and cafes	High	High
App Developers	Engaged	Accurate information on the food availability on the app	Better user interface for the food availability	High	High
Culinary Staff Members	Engaged	Efficiency of work	The project will increase their workload	Low	Medium
UW-Madison	Affected	The satisfaction of faculties and students	The project will take a long time and increase the cost	High	Low

UW-Madison School Cafeterias	Affected	The rise of profits	The project will lead to a increase of their customer amount	Low	Medium
Other Schools	Affected	A rise in the institution's standing	As a result of this work, delivery robot systems will become more uniform	Low	Low
Other Delivery Systems	Engaged	An improvement in the standing of the firm that makes delivery robots	The company's success will serve as a model for competitors to emulate	Low	Low

Communication Plan:

Each and every one of our program's participants has our unwavering commitment to transparency and honesty. If we give our stakeholders more information in a way that is clear, accurate, and easy to understand, they will be more likely to take the time to learn about our goals, their position, and how it might affect them.

We will keep careful records of every conversation we have with anybody who may have an interest in this topic. There have been several get-togethers, phone calls, emails, and verbal assurances made. It may be challenging to keep in touch with all of the parties engaged in a project that will take weeks or months to finish, especially if new representatives are constantly being brought in to take their place. So that we always know what's going on, we will collect and organize information about how the projects might affect the places where they are happening.

Stakeholder	Communication Frequency	Method of Communication
LIS 615 Team	Weekly (or by scheduled meeting)	- Google Meets - Regular updates on each project update
Students/Faculty	Monthly	- Updates on progress provided via email - Invites sent out for

		beta version trial
Robot Coordinator & Shift Lead	Weekly	- In-person meeting + meeting minutes shared on project progress
System Customers	Weekly	- Updates shared on the app → easily seen to app viewers - Emails sent out at key milestones
UW-Madison Community	Every three weeks	- Online conference provided for interested parties on newest features of project - Also used as feedback
App Developers	Weekly	- In-person meetings to ensure milestones are accomplished
Kitchen Staff	Monthly	- Ideas shared in-person for feedback and early training
Other Universities	One time at project's completion	- Improvements shared via email for UW-Madison clout and for providing inspiration
Other Delivery System	One time at project's completion	- Email shared for future reference and to offer methods

IV. Risk Register

Risk ID	Risk Name	Date Identified	Condition	Consequence	Probability	Impact	Severity	Response Strategy	Response Details
1	Starship Delivery App crashes due to bugs.	11/03/2022	Consistent bug crashes after making the virtual inventory available, leading to trouble with end-user experience.	Scope: with bad user experience, the project's desire for more users as well as easier use would not be met. Business Value: this risk could even lead people to not engage with this application, or lead current system users to opt out for a different system.	3	4	12	Transfer	The responsibility would be given to an individual consulting organization (not individual team consulted on project) after project's completion, whose task is to continually monitor for glitches and fix accordingly. This may also include receiving permissions for access to the Starship Deliveries app, and maintaining communication.
2	Low staff number to manage inventory.	11/03/2022	There are not enough staff members across campus dining locations to upkeep the virtual inventory. This leads to inventory maintenance issues after it's implementation. It also suggests a lack of updated information or even misinformation on the kitchen supplies.	Scope: this risk would deter the project's objective of effective communication relay within the app. It would be a difficult situation to manage, and may even throw the project completely off scope. Business Value: without the app's inventory being updated, the value this project offers would be diminished, leading to less use by users or by tarnishing the app's reputation as	2.5	4	10	Contingency Plan	The training offered for new employees would equip individuals to prepare for staff shortages, meaning it would allow them to be knowledgeable to handle inventory alone at an incentive of higher pay. Among the plans for the new project, one aspect to include would involve spreading the word on finding new employees to have on the stock updating team. If this project risk occurs, along with these preventions, the contingency plan would seek to have kitchen staff workers (along with robot coordinators) trained and ready to take the wheel on updating the stock.

				well by spoiled plans for this new update.					
3	New project overtakes current project.	11/03/2022	Project gets cut short due to new project for Campus or Starships Food Delivery needing more urgent attention.	Scope: all work on the project must immediately cease temporarily. Once project is taken back up, all schedules will be thrown off scale, including objectives as they may change with time for user needs. Time: project would be thrown off the intended schedule, or if needed, cancelled completely. Business Value: stakeholders who depend upon the completion of this project would be disappointed and may lead to a bad business outcome if users do not wish to wait, or move onto another delivery system.	2	5	10	Accept	Because of the unlikeliness of this project risk, it is not within the project team's interest or time capabilities to pursue a risk strategy.
4	Large economic recession leads to project developer layoffs.	11/03/2022	Due to wage cutbacks and other cost-cutting measures enacted in the wake of the economic collapse, several of the	Time: with this risk in mind, it would mean the project's schedule is pushed back after new developers need to be consulted and	2	4	8	Contingency Plan	Have a backup consultant agency to speak with in regard to new developers being put onto the task of developing the inventory. This backup would be paid for their "on-call" nature, and would be compensated further if the risk occurs and they are asked to

			project's developers were let go. This led to a disparity among the inventory preparers, and throws the project off balance.	prepared for this task. Scope: new developers and other new stakeholders invites further risk of miscommunication from what had been left off from the project, and may direct the project in a different direction.					continue the project. This would require funds from the emergency reserve.
5	Kitchen across campus are shut down due to E. Coli food contamination.	11/03/2022	An E. Coli breakout occured in multiple kitchen locations across campus, after fresh ingredients got infected. This led to the cafeterias no longer being in service to faculty and staff.	Safety: this runs the risk of being unsafe, as well as users feeling unsafe beyond the contamination period. Business Value: this risk leads to no user being able to user the app, along with no employees to run the app updates, and would not allow for the projected value to be demonstrated.	1	3	3	Accept	The issue is not likely to occur, and should not take up effort from the team to prepare for. And if this does occur, it would likely only be temporary, and the kitchens would be available after the contamination has passed.
6	Students on campus sent home after COVID-19 outbreak.	11/03/2022	Strict COVID-19 pandemic lockdowns at the last minute forcing the dismissal of all non-essential personnel, including students who may use the new, improved app.	Business Value: project's value no longer met as there are no customers or staff to maintain/use the app after it has been improved. Scope: this would change the timeline for project's update along with its use by users, in	1	3	3	Accept	The issue is not likely to occur, and should not take up effort from the team to prepare for. And if this does occur, it would likely only be temporary, and the app has opportunity to be used again after the pandemic smoothes over.

				which the objectives may change over time.					
7	Team member falls sick and leaves the team	11/03/2022	Project team is short-handed due to illness, leading the project's burden to be placed on the remaining team members.	Time: depending on the stage of project in which this occurs, the project's timeline may be delayed beyond what was planned for. Scope: the obejctives may change, as lesser group members may mean more work on individuals.	1	5	5	Contingency Plan	Each member of the team must be prepared to put in more effort and shoulder additional responsibilities. There should also be a plan made inadvance for each individual's contributions so they may be split evenly.
8	A new building is in schedule and reduces project's budget in the middle of project	11/03/2022	Administrators shift financial priorities once again, leading to a new project on a building requiring more attention and monetary resources.	Time: the project is greatly impacted in its timeline and is pushed back for a new project to have more attention, time, and effort. Business Value: over time, the need for the app improvement may decline, leading to less popularity once it is completed.	2	4	8	Contingency Plan	Think ahead and strategically re-allocate resources to get the most out of the reduced budget while still meeting project goals. Also, have enough money in the emergency reserves to account for much of the money involved.
9	UW-Madison stop working with Starship company	11/03/2022	UW-Madison decides to cooperate with another delivery company.	Scope: project must be cancelled due to new application and system involved.	1	5	5	Avoid	The new app may be applied to the new application if necesary. But no further comitment can be made, and project will need to be cancelled.
10	Starship company is not willing to update	11/03/2022	Since the original app is still working, the Starship company is	Time: it may take time to convince stakeholders to keep pursuing	1	5	5	Mitigate	Have the software's shift leader or robot coordinator update the kitchen staff on new food orders as they come in.

	the app		reluctant to waste manpower and resources on improving app	this project.					