1802ICT – Software Development

School of ICT

Griffith University

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The Rostering System

Project Planning, Analysis and Design Report

Task Allocation Table

Section Number	Allocated Author/s	WEEK	Completed by Author/s
1	Jack, John	6	Completed by John (80%), Jack (20%)
2a	John	6	Completed
2b	John	6	Completed
2c	John	6	Completed
2d	John	7	Completed
3a	Jack	7	Completed
3b	Jack	7	Completed
3c	Jack	8	Completed
3d	Jack	8	Completed
4a	John	8	Completed
4b	John	9	Completed
4c	John	9	Completed
5a	Jack	9	Completed
5b	Jack	10	Completed
6	John	10	Completed
7	Jack	10	Completed
8	John	11	Completed
9	Jack	11	Completed
10	John	11	Completed
11	Jack	12	Completed
12	John	12	Completed
13	Jack	12	Completed

14	John	13	Completed
15	Jack	13	Completed
16	John	14	Completed
17	Jack	14	Completed

Alteration and Completion Table

Date	Allocated author/s	Author/s	Question Number	Addition/Alteration
1/11/16	Jack	John	5	Completely changed.
2/11/16	Jack	John	11	Edited and added some sentences.
4/11/16	Jack	John	15	Edited and added more sentences.
4./11/16	Jack	John	13	Added some information.

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1. Identify the problem

System Vision Document

Rostering System

Problem Description

Hungry Jacks continues to grow its business and revenue. However, a slowly increasing amount of employees calls off work on the day they are supposed to work. A majority of these employees are teenagers and young adults. This frustrates the managers of the business as they would have to keep calling in another person to take their shift. Teenagers and young adults can be unavailable at times because they either attend school, don't want to work or have other commitments. Hungry Jacks generate their rosters by creating a word document, allocate shifts, and then sending it as a pdf to their employees.

By having the new software, the rostering system, it will be an important element in the growth and success of the company as it will be able to manage rosters better and can decrease the amount of employees calling off work. The rostering system can be used on a touch screen desktop monitor and be placed in the staff room. This system can be placed in all Hungry Jacks stores. If each Hungry Jacks staff member had the software, there would be concerns about the system getting hacked and how stable it is. Even so, staff would need to be trained and shown how to get the software. The system can be manageable for the manager and accessible for every staff member. This software is exclusive to Hungry Jack stores.

System Capabilities

This system will provide many features that users can interact with. The many features include:

- Allowing employees to message people especially the manager.
- At the end of a school semester or term. Depending on the manager's decisions. The system will allow employees to choose suitable times for the upcoming term or season.
- Allowing employees to pick certain dates they cannot work on.
- Employees have a two-week period to indicate their unavailable dates.
- Firewall security.
- Fingerprint scanner which will be attached to the system.
- Manager as the admin/s and is able to manage the system.
- Clock employee's shift and break times
- Manager setting the roster.
- Employee's username and fingerprint password to access the system.

Business Benefits

The primary business benefit of the capabilities will increase the sales by connecting staff members and improve their service. Reasons are:

- By having this software, it will manage roster times.
- Increased company revenue by increased certainty of worker's time and roster forecast.
- Staff's available times visible to manager making it easier to allocate shifts to workers.
- Decrease the amount of employees calling off work.

2. Quantify Project Approval Factors

a. Estimated Time for Project Completion

Table one shows the estimated time needed for each subsystem along with its number of functional requirements and iterations. It has been estimated that the project is being worked on about 8 hours, 5 days a week from Monday to Friday. Each subsystem will be worked on from top to bottom of the listed subsystems on the table. The estimated time also includes final testing of a subsystem.

Time estimate for the retail configuration system			
Subsystem	**Functional requirements**	**Iterations required**	**Estimated Time**
User account subsystem	3	2	2.5 weeks
Account management system	3	2	3 weeks
Cloud server subsystem	12	5	1 weeks
Security and Privacy Subsystem	1	1	2 weeks
Messaging subsystem	2	1	1.5 weeks
Clock subsystem	4	3	1 week
Calendar subsystem	6	5	1 week
Fingerprint database subsystem	2	1	2 weeks
Total development time			9 weeks
Final hardening and acceptance testing			2.5 weeks
Total project time			**16 weeks**

Table 1 - Time estimate of configuration system

b. Development Cost for the project

Table 2 breaks down the costs of processing the rostering system. This table does not calculate the total cost of the whole project.

Summary of development costs for Rostering System	
Expense Category	**Amount**
Salaries/Wages (1 project manager, 1 graphic designer, 2 programmers)	$25,520
Equipment	$8,000
Training	$5,000
Licenses	$5,000
Hardware	$6,200
Total	**($AUD) $49,720**

Table 2 - Sum of development costs

The project manager will be in charge of the whole project. Planning and executing part by part of the project and also will be able to do a bit of programming and analyzing every part of the project. It is better to have a project manager do more than just manage a project. In order to stay within the budget, the project manager will do an addition role of being a programmer and a software analyst. We don't have to hire a software developer or add another software analyst. This helps the project stay within the budget limit. The graphic designer will decide how the screen should be presented. Deciding where the text boxes, images etc will go. The programmer writes the computer software, writes codes, configures devices.

Equipment includes purchasing certain devices or gadgets for workers to use.

Licenses include a subscription for MySQL, flash, Javascript, python, C++.

Hardware includes touch screen monitor to output the rostering system. 4 Computers for workers to use.

c. Estimated Annual Operating Costs

An estimated yearly cost of maintaining and operating the rostering system is shown in table 3 below. Maintenance may be required if software and server get hacked. The developer has full control of the system. An admin, which will be a manager of a workplace, can only manage accounts. The workplace would have to call in a computer repair technician. The system would be considered as part of a new series of iterations if there are any modifications.

Summary of estimated annual operating costs	
Recurring Expense	**Amount**
Cloud Server hosting/connectivity	$2,100
Security & privacy	$100

Computer Repair Technician	$250
Total	**($AUD) $5,450**

Table 3 - Sum of estimated annual costs

Cloud server host/connectivity stores every staff member's messages and availability timesheet.

Security & privacy is having a yearly subscription to prevent hackers getting into the system.

The computer repair technician will repair the system if it gets hacked or damaged.

d. Cost/Benefit Analysis

i. Anticipated Benefits

Below is a list of the tangible and intangible benefits of deploying the rostering system into Hungry Jacks stores.

Tangible Benefits

- Time worker's shifts and break times.
- Manage availability and rosters.
- Employees become more organized with a more advanced roster.

Intangible Benefits

- Decrease the amount of workers calling off work.
- Use of the new system is simple and easy to learn.

ii. Estimated Annual Benefits

The table below shows how the business can tangible benefits or cost:

Estimated Annual Benefits	
Benefit or cost saving	**Estimated amount**
Time worker's shifts and break times	$10000
Manage availability and rosters	$1500
Employees become more organised with a more advanced roster	$1000

Table 4 - Estimated annual benefits

Timing the worker – Would save the business more money as they would be able to see a more accurate clocked shift. It prevents employees from forging their hours.

Manage availability and rosters – The amount time spent creating the rosters manually will be minimized with the new system. Managers can create rosters faster and will be able to work on other things especially paperwork. The faster they get their job done, the more revenue.

Employees become more organized with a more advanced roster – The rostering system decreases the amount of employees calling off work. With having all employees present at

certain times it will help the business create more revenue and the projected weekly expenses or wages given to employees can be more accurate.

3. Risk and Feasibility Analysis

a. Organization Risks and Feasibility

Hungry Jacks will be given a manual for the system, with this new system the following risks may occur:

- The interface may be hard for some managers to use and understand, which may put them off using it and may want a refund.
- Managers and workers may be worried about how reliable the system is to use and may not use it because they don't trust it.
- Some managers and workers may choose not to use the machine because they believe the old way is better than the automated, new way.

The following procedures will be put in place to stop or lower the chance of these risks occurring:

- There will be a customization option for any managers that want to change anything on the interface.
- There will be a manual for workers and managers if any get confused.
- There will be a helpline if any workers and/or managers still does not know what to do.
- We will nominate a champion and train the champion to use the software and will be the main contact for Hungry Jacks to use this software.
- There could be a chance of hackers taking sensitive information about staff
- There will be a video demo of how the technology works and how to use it

b. Technological Risks and Feasibility

The technological risks are:

- Workers may become confused on how to use technology and technology may malfunction.
- Viruses could affect the whole system
- Hackers could attain information about Hungry Jacks employee.
- New technology evolution.

To stop or lower these risks occurring these procedures have been put in place:

- Managers and workers will be given a course of how to use the system by a trained speaker who will give a demonstration of how to use it.
- All workers will then be made to practically try the device out, they will be shown how to use it and how to not use it. If any workers and/or managers are still confused there will be a comprehensive manual.

- The system will be connected to a cloud database to access worker's names so if they book time off the system cross reference the code with their name and will be able to send the information to the manager.
- Ensure software is up to date with the technological evolution.

c. Resource Risks and Feasibility

Resource access risks:

- A virus affects
- Blackout
- Old hardware slows down access time
- Software may not work on current hardware
- Project team member with specific skills becomes sick and can't come to work.
- Team members who do more than one role could take more time to complete their task/s.

Managing the resource access risks and feasibility:

- The newest security software will be installed on all computers. Team members may take their work home by USB. If a virus affects their home computer, it is able to infect the USB. The security software on the office computer will be able to detect a virus on the USB and delete it. All USB must be scanned before granting access to the computer
- A blackout is impossible this is because the company has a backup generator if all power is lost so workers can continue working on the schedule.
- A full report will be made about all software on the computer. Some software can slow down the computer. Therefore, to reduce the buffering, all software will be updated to the new version.
- It is not necessary to get new/latest software for the project. All programs on the computer help generate the project. Team members can update software with the permission of the project manager.
- Each worker has a specific skill set. If a team member becomes sick, the project manager will have to cover the member's work. Any member of the team that is away will have to be covered by another member of the team. There is no need to call hire a new employee as it will break the project's budget.
- Identify a person with a skillset that can be mobilized in case there is a schedule conflict or risk.

d. Schedule Risks and Feasibility

The risks identified that could stop the system being built in time for a fixed deadline are:

- Uncontrollable events may slow down schedule e.g. virus infects system mainframe.
- Workers become unmotivated slowing down the production of a subsystem.
- Schedule overrun is possible due to the roles performed by the project manager covering multiple roles.

To cope with the risks above, these procedures have been put in place to stop or lower the chance of risks occurring:

- All staff will be highly motivated to finish tasks by brought on motivators, If the staff member(s) is/are not able to complete the task on time, an extra member will be brought onto the team to help complete task(s).
- If extra staff member and current staff member are unable to complete both will be relieved of service and new staff members will be brought on with the same or similar skill set to those that are leaving.
- If an uncontrollable event slows down or stops the production of the product workers will be asked to work later in the day and the deadline will be increased to accommodate for the event.
- Monitor the schedule very closely to prevent schedule overrun and mitigation can be resolved as early as possible.

4. Project Environment

a. Information captured

Table 5 shows the different mediums that will be used throughout the project to record, store and add to the information.

Information Repositories & Tools		
Information captured	**Medium**	**User Accessibility**
Analytics	Google Analytics	Executive, sales, marketing
Project Schedule	Microsoft project	Project manager
User database	MySQL database, python	I.T
Account management system	MySQL database, python	I.T, project team
Cloud server subsystem	Internet	I.T, project team
Security and Privacy Subsystem	Python	I.T, project team
Messaging subsystem	C++, Java, flash	Project team
Clock subsystem	C++, Java, flash	Project team
Calendar subsystem	C++, Java, flash	Project team
Fingerprint database subsystem	C++, MySQL, python	Project team
Team communication	Skype, email, phone, Bolste	Project team
Code version control	Bolste	Project team

Table 5 - Information repositories & tools

b. Work Environment

The work environment will be based in a closed office at the headquarters of Hungry Jacks. To keep costs down, Hungry Jacks has provided a small room where the project team will have access to MySQL, flash, Javascript, python, C++. The project team is to work with given programs. The project team will be registered and be able to access the given programs. Each employee will have a designated workstation along with computers with the installed programs, a work phone number, workplace email, a skype account. Any member of the project team will be able to request for a certain program if they require it within the budget

threshold. There will be no support staff as it will break the project's budget limit. If a team member is sick or away, another member of the team will have to cover their work.

c. Processes and Procedures

Reporting and Documentation

Every meeting, every feedback and design specification of the Rostering system will be stored in Bolste. All documentations done will be stored on Bolste where all team members will be able to access it which can help or remind them what to do in the processing of the software. The project manager will be responsible for making sure every part of the project and every member is on track. The project manager will have Skype calls with each team member every 2 days to informed and be informed of the member's progress. Results will also be recorded on Bolste.

Designing

The most important part of the project is seeing how the software should look. The graphic designer will have to come up with several ideas, create or draw them by hand or on the computer. The ideas will then be sent to the project manager for the executive to approve.

Programming

The programmers will be assigned with tasks given by the project manager. The programmers consist of a senior and a junior worker as the senior will be the one who will be in charge of the whole programming and be looking after the junior. These two will be working on almost every subsystem in the making of the program and will be contacted every two days by the project manager to attain results. The senior programmer will structure the tasks then give sections of the work to the junior programmer. The junior will work as a supporting role in helping the senior on the programming. The project manager can assist these programmers if needed.

Testing

The test-driven development (TDD) will be used for all programming tasks. After completing a task of the program, it will be tested. During the test, if it fails, the programmers will have to write a report about it, then make sure the code works, then eliminate the redundancy. The reports will be sent to Bolste.

Analyzing

An analyst has three responsibilities, review documents, tests and software specifications. The analyst plays an important role in keeping the project alive and properly working. The project manager will also play in this role and will go around every team member spectating, observing, give advice and review. The project manager will have to report every review which will then be sent to Bolste. There is no need to hire another software analyst as it will break the project budget.

Deliverables

Each project team member will be given username and fingerprint password details to log-in to their office computers. All computer program accounts will be controlled by the IT department. Project team members will be able to contact the IT department if there are any problems.

Code and version control

Every single work will be recorded and stored in Bolste. These records and files can be important for future use in case anyone wants to look back and investigate a problem. A set of files will be recorded over time so members can recall specific versions.

5. Schedule the work

a. Work Breakdown Structure

Rostering System

Initiation Phase (5 days)

a. Scope identification. Start to create a draft of the work breakdown structure with help from the team.
b. Identifications & Election of resource. Finish draft of work breakdown structure, give all team members a copy of the work breakdown structure

Development Phase

Account Management Subsystem (15 days)

a. The development of the project kicks off with creating the database for storage of accounts.

User account subsystem (13 days)

a. Develop few accounts with an admin and two users, making sure admin can create more users.
b. Develop a log-in phase leading to a blank screen and log-out phase returning to the log-in screen.
c. Make sure the whole account management subsystem and user account subsystem is combined and properly functioning. Accounts area accessible when database accepts.

Cloud server subsystem (5 days)

a. Develop a new server.
b. Connect the database to the server. The system asks the database cloud server if the user account is accepted.

Security and privacy subsystem (10 days)

a. Install a firewall into the system.

Messaging subsystem (13 days)

a. Implement screen design
b. Create an inbox, with the function of opening and composing messages.

c. Combine messaging subsystem to the database along with the other completed subsystems. Making sure everything is functioning correctly.

Clock subsystem (5 days)

a. Implement screen design
b. Develop a clock that records time with the four buttons of, start-time, end-time, start-break, and end-break.
c. Combine clock subsystem to the database cloud server along with the other completed subsystem. Making sure everything functions correctly.

Calendar subsystem (5 days)

a. Implement screen design
b. Create a calendar with the abilities to select the date and time. Allowing the user to highlight available and unavailable times.
c. Combine calendar subsystem to the database along with other completed subsystems. Making sure everything functions correctly.

Fingerprint database subsystem (10 days)

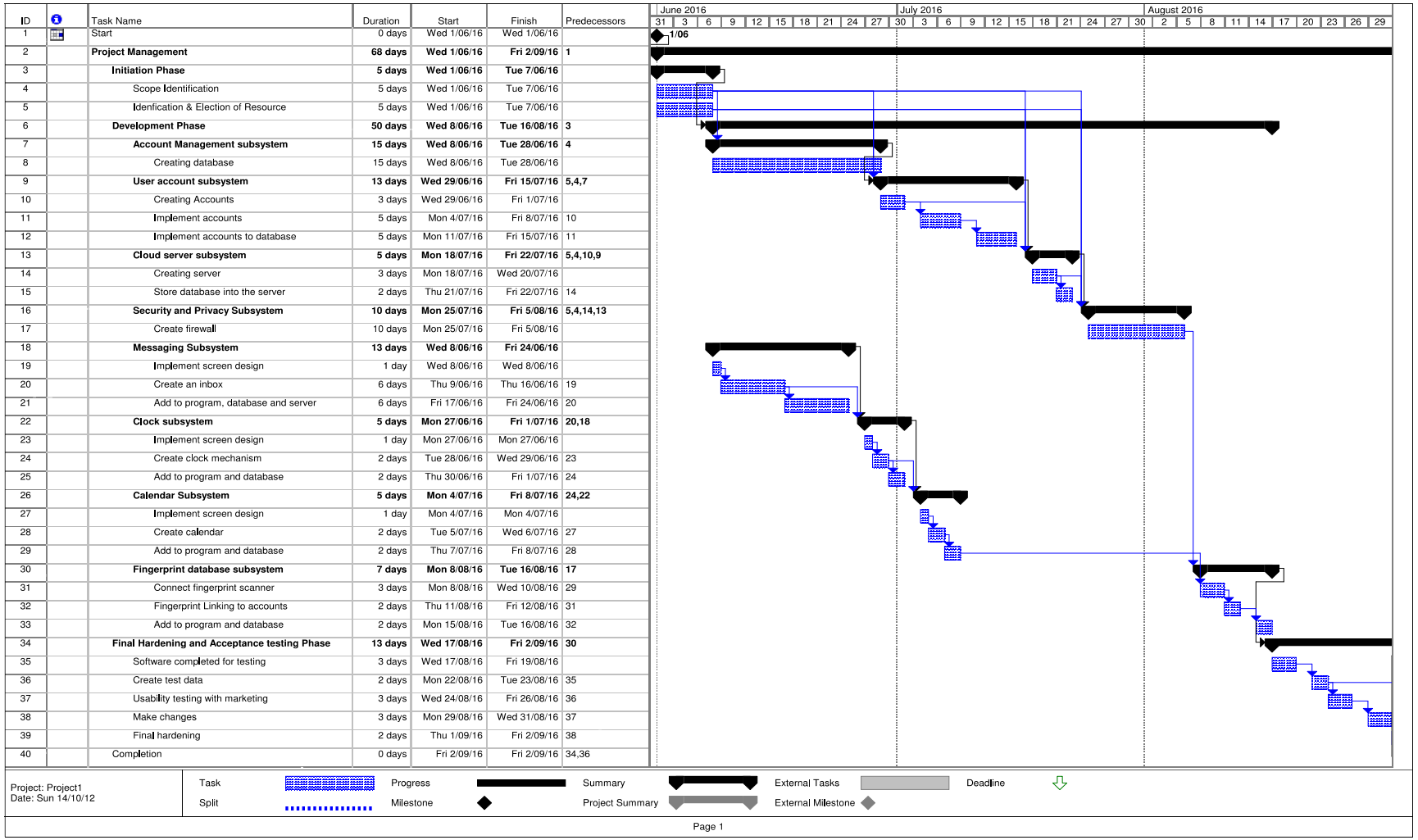
a. Connect the finger scanner hardware to the rostering system. Add to the log-in home screen.
b. Match fingerprint to user accounts.
c. Combine fingerprint database subsystem with the other completed subsystems on the cloud database server.

Final Hardening and acceptance testing phase (13 days)

a. Combine all subsystems into one. Making sure everything is functioning for testing.
b. Create test data for user testing.
c. Developer and user testing of the rostering system 3
d. Implement test results to the software making changes.
e. Final hardening, polish the software.

Completion of the Rostering System

b. Gantt Chart



ID	Task Name	Duration	Start	Finish	Predecessors
1	Start	0 days	Wed 1/06/16	Wed 1/06/16	
2	**Project Management**	**68 days**	**Wed 1/06/16**	**Fri 2/09/16**	**1**
3	**Initiation Phase**	**5 days**	**Wed 1/06/16**	**Tue 7/06/16**	
4	Scope Identification	5 days	Wed 1/06/16	Tue 7/06/16	
5	Idenfication & Election of Resource	5 days	Wed 1/06/16	Tue 7/06/16	
6	**Development Phase**	**50 days**	**Wed 8/06/16**	**Tue 16/08/16**	**3**
7	**Account Management subsystem**	**15 days**	**Wed 8/06/16**	**Tue 28/06/16**	**4**
8	Creating database	15 days	Wed 8/06/16	Tue 28/06/16	
9	**User account subsystem**	**13 days**	**Wed 29/06/16**	**Fri 15/07/16**	**5,4,7**
10	Creating Accounts	3 days	Wed 29/06/16	Fri 1/07/16	
11	Implement accounts	5 days	Mon 4/07/16	Fri 8/07/16	10
12	Implement accounts to database	5 days	Mon 11/07/16	Fri 15/07/16	11
13	**Cloud server subsystem**	**5 days**	**Mon 18/07/16**	**Fri 22/07/16**	**5,4,10,9**
14	Creating server	3 days	Mon 18/07/16	Wed 20/07/16	
15	Store database into the server	2 days	Thu 21/07/16	Fri 22/07/16	14
16	**Security and Privacy Subsystem**	**10 days**	**Mon 25/07/16**	**Fri 5/08/16**	**5,4,14,13**
17	Create firewall	10 days	Mon 25/07/16	Fri 5/08/16	
18	**Messaging Subsystem**	**13 days**	**Wed 8/06/16**	**Fri 24/06/16**	
19	Implement screen design	1 day	Wed 8/06/16	Wed 8/06/16	
20	Create an inbox	6 days	Thu 9/06/16	Thu 16/06/16	19
21	Add to program, database and server	6 days	Fri 17/06/16	Fri 24/06/16	20
22	**Clock subsystem**	**5 days**	**Mon 27/06/16**	**Fri 1/07/16**	**20,18**
23	Implement screen design	1 day	Mon 27/06/16	Mon 27/06/16	
24	Create clock mechanism	2 days	Tue 28/06/16	Wed 29/06/16	23
25	Add to program and database	2 days	Thu 30/06/16	Fri 1/07/16	24
26	**Calendar Subsystem**	**5 days**	**Mon 4/07/16**	**Fri 8/07/16**	**24,22**
27	Implement screen design	1 day	Mon 4/07/16	Mon 4/07/16	
28	Create calendar	2 days	Tue 5/07/16	Wed 6/07/16	27
29	Add to program and database	2 days	Thu 7/07/16	Fri 8/07/16	28
30	**Fingerprint database subsystem**	**7 days**	**Mon 8/08/16**	**Tue 16/08/16**	**17**
31	Connect fingerprint scanner	3 days	Mon 8/08/16	Wed 10/08/16	29
32	Fingerprint Linking to accounts	2 days	Thu 11/08/16	Fri 12/08/16	31
33	Add to program and database	2 days	Mon 15/08/16	Tue 16/08/16	32
34	**Final Hardening and Acceptance testing Phase**	**13 days**	**Wed 17/08/16**	**Fri 2/09/16**	**30**
35	Software completed for testing	3 days	Wed 17/08/16	Fri 19/08/16	
36	Create test data	2 days	Mon 22/08/16	Tue 23/08/16	35
37	Usability testing with marketing	3 days	Wed 24/08/16	Fri 26/08/16	36
38	Make changes	3 days	Mon 29/08/16	Wed 31/08/16	37
39	Final hardening	2 days	Thu 1/09/16	Fri 2/09/16	38
40	Completion	0 days	Fri 2/09/16	Fri 2/09/16	34,36

Figure 1 - Gantt Chart

6. Functional and Non-Functional Requirements (FURPS+)

Functional Requirements

The function requirements of the rostering system are the effects of the operation of the system. The table below shows the types of operations within the system. They include admin account management, navigations, calendar manipulation, inbox manipulation, Roster viewing. The table also lists the functions of the operations along with descriptions. The admin account management has the functions of creating, deleting and changing fingerprint password of user accounts. The navigation operations have the ability to move to different screens The calendar manipulation allows users to manage their availability times. The inbox manipulation includes showing messages, managing their messages, composing and sending to other users. Lastly, users can see the roster.

Rostering System Functional Requirements

Area of operation	Functions	Descriptions
Admin account management	• Create account • Delete account • Change fingerprint password	Users will need to have their own account to sign-in. However, designated admins are allowed to manage
Navigation	• Sign-in • Sign-out • Move to different screen • Go to previous screen	Navigation will be needed in the system for the user to proceed to different screens.
Calendar manipulation	• Add/edit/delete/save available times • Select available and unavailable time during the day.	The user can use the calendar to arrange their available times. They will select a date, and buttons will show up giving the user two options, state that their available, or unavailable. The user can also highlight what times of the day they're available or not.
Inbox manipulation	• View/reply/forward messages • Compose/send messages	Users will be able to view, respond to messages or forward it to other users. They will also have the ability to compose and send messages to other users

Roster manipulation	• Add/edit/save/publish • View	Admins are the only ones who can manage rosters and publish it to users. Users do not have the right to manage the roster, they can only view it.
Clock manipulation	• Start/stop timing shift • Start/stop timing break	Users can get their shifts timed including their breaks. The timing of shifts are more accurate.

Table 6 - Functional requirements

Non-Functional Requirements

The non-functional requirements are the criteria that can be used to judge the operation of a system, instead of specifying its behaviors. This table shows the non-functional requirements along with the FURPS+ (function, usability, reliability, performance, and security) framework. The design constraints and implementation list how the system will work and what the team members require to create the rostering system.

Rostering System Non-Functional Requirements

FURPS+ Category	Requirement
Usability	• The Rostering System must be able to run on Windows. The requirements for the system to support a touch screen desktop monitor is to have at least windows 7. • The user interface must be easy to use and navigate to operations can be performed without having any problems like adding or loading data. This can be accomplished with the use of buttons which makes things easier for the user to pick what they want to do next.
Reliability	• The rostering system must be effective and useful that Hungry Jacks would keep using it.
Performance	• The performance of the rostering system must be great. Meaning that navigation to each screen goes smoothly, or creating accounts etc. There are no delays and there is very minimal buffering.
Security	• There should be medium security. Although the rostering system stores data into a server and a majority of the data are important, there should be more security on the accounts, user's details and their inboxes. Rosters and calendars should not be a concern.
+Design Constraints	• With the system requirements of having windows 7 and above. The Rostering system will need to run smoothly on the project team workstations. All workstations need to at least have computers latest as 2011.

+Implementation	• The system will be built on a computer that is running all scripts. The programming will be done on MySQL database, python, C++, Java and flash.

Table 7 - Non-Functional requirements

7. Stakeholders

	Operational	executive
Internal	Marketing, sales support, administration, project leader, project team members,	Hungry Jacks executive
External	Customers, User Experience test subjects	shareholders

Table 8 - Internal and External stakeholders

Marketing sales manager

The marketing sales manager is an imperative worker for the project and the business development as he/she has the expertise to know whether the project being created will have a good chance at succeeding. The graphic designer will do the role of the marketing sales manager to stay in project's budget.

Sales Support

The sales support team is the team that helps the customers use the device is he/she becomes confused, this is an important part of the product as their help keeps the positive image for the company and the product. Again, the graphic designer will also have the role of being the sales support to stay in project's budget.

Project leader

Responsible for information System projects, the leader will use software to monitor the project schedule and progress and the team so to make sure it stays on course. The project manager is the leader.

Project team members

These are the people who will plan, design and build the project with help from external/internal stakeholders. The each member of the team is responsible for the development of the project.

Customer

The customer is the external stakeholder who buy's the product. The customer is the stakeholder that determines whether the product is successful or not.

User experience test subjects

An integral part of the product is the user experience test subjects, their feedback is imperative for the success of the product as how they react determines how the product will interact with the person their feedback determines everything from the functionality of the program to how the interface will look like and how it will interact with the product

Senior management
Senior management is not directly involved with the project itself but the senior management manages those (project leaders, project managers) who run the project.

Hungry Jacks Executive
The executive of Hungry is the investor of the project.

Shareholders
Not interested in the project directly but interested in positive financial growth for the company they have shares for which will allow them to get dividends.

8. Marketing Department Questionnaire

Front-end user experience

1. What are your expectations with the system?

   _____
   _____

2. What interests you or excites you about using the system?

   _____
   _____

3. How familiar are you with technology?

   _____
   _____

4. How secure do you want your information to be?

   _____
   _____

5. Is this system helpful and does improve the communication between yourself and the manager regarding the rostering?

   _____
   _____

6. What kind of messages would you want to see in your inbox?

   _____
   _____

7. Would messages from the headquarters sent to each employee be helpful to your work performance? For example, Hungry Jacks has released a new promo would like to inform employees by emailing them with information.

   _____
   _____

8. How would the new system impact on your personal and work life?

_____
_____

9. Are there any other rostering systems that you know of that you think the system should emulate and the layout would benefit from? If not, do you have any layout preferences perhaps with having big texts, features or more buttons etc?

   _____
   _____

10. What satisfaction or impressions do you expect from users when they use the system?

    _____
    _____
    _____

Back-end developer experience

1. Can you explain what you want to accomplish?

   _____
   _____

2. Do you prefer to work on this project alone or as a team?

   _____
   _____

3. What excites you about creating this rostering system?

   _____
   _____

4. What is your preferred working environment?

   _____
   _____

5. How easily do you expect users to learn the system?

   _____
   _____

6. Why should employees use the rostering system?

   _____
   _____

7. How do you prefer to layout the screen?

   _____
   _____

8. What features do you want or expect to be in the finalized product?

   _____

   _____

9. How often do you expect the employees of hungry jacks to use the system?

   _____

   _____

10. Do you have any suggestions to improve the system?

    _____

    _____

11. How do you contribute to the improvement of the Hungry Jacks food industry?

    _____

    _____

9. Domain Model Class Diagram

Product Configuration

The diagram below shows the domain model class diagram of a user logging into access information. The Domain model class diagram shows entities Account Management, Admin, user, clock, calendar, Inbox, Roster, and message. Admin and Account Management are unique entities that only one person per hungry jack's store (the manager) will have the authority have. The admin will have the power to create new accounts (CreateUser), Delete accounts (Deleteuser) and modify accounts (ManageUser).

The subclasses of the diagram are Clock, Inbox, Roster, Calendar, and Message. Each class has unique properties other than the ID they have from the parent subsystem Admin E.g. Calendar contains DateNo, AvailableTime, and UnavailableTime but also contains EmployeeID which is a foreign key located in all classes properties. Clock is different and contains the unique properties TimeStartShift, TimeEndShift, TimeStartBreak and TimeEndBreak. Clock's properties have no with no relation what so ever to the other classes.

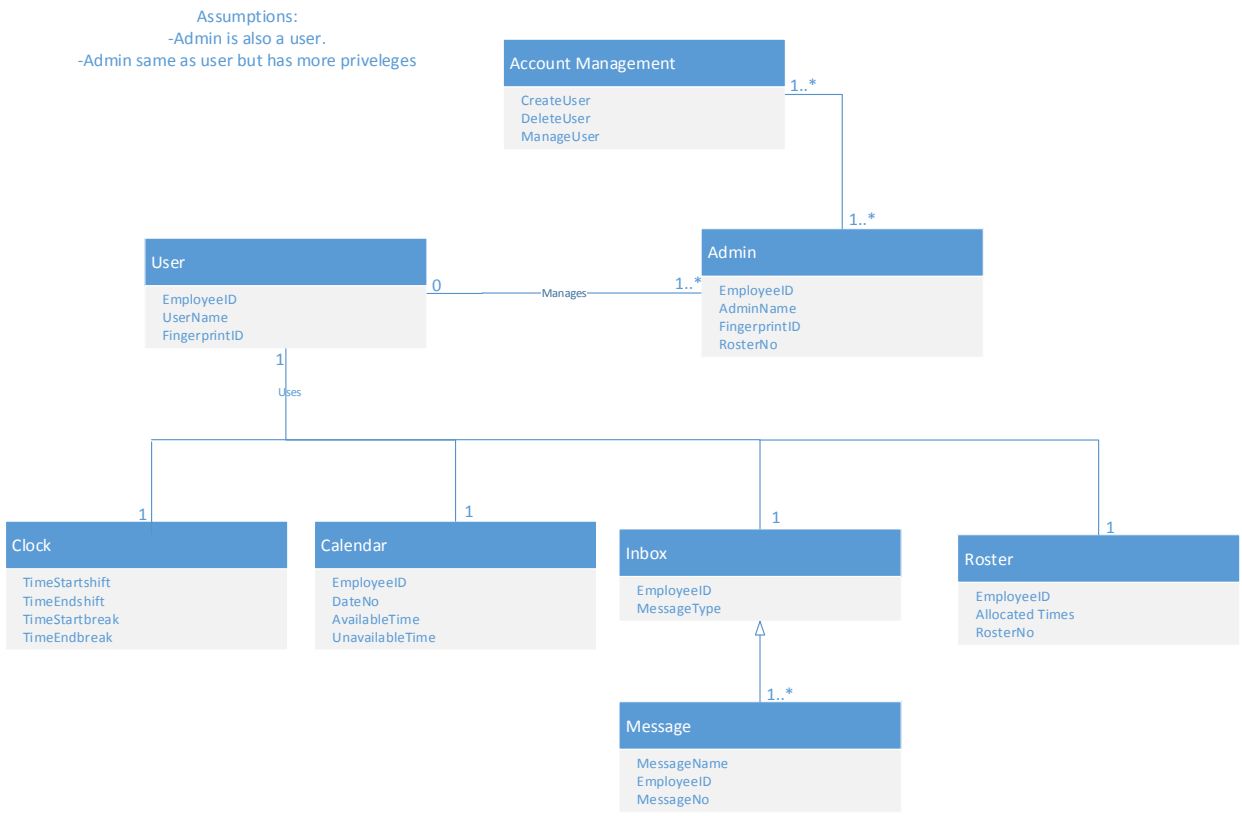


Figure 2 - Domain Model Class Diagram

10. Brief Use Case Descriptions

The table below shows the use cases where the users interact with the rostering system. At this point, an employee from Hungry Jacks will be defined as a user where they will create an account, log-in, navigate through and explore it.

User Use cases

Use Case	Brief Case description
Create account	The user will start off at the log-in screen. However, the user doesn't have an account. An admin will only have the right to create accounts. The admin will log-in then tap on the 'manage accounts' button on the screen. From there the user will add their store employee ID, and create a username and fingerprint password. The admin will then approve it by tapping the 'create' button at the bottom of the screen then log-out.
Log-in	Now that the user has an account, he/she will enter their username and fingerprint password then tap on the 'log-in' button. A little screen will pop up asking for the user to scan their fingerprint. Once the fingerprint is accepted, the user then proceeds to the menu of the rostering system with the many choices of picking, their inbox, calendar, roster or log-out.
Clock	Selecting 'clock' from the menu will take them to the clock screen where there will be two buttons. The 'Start shift' button and the 'Start break' button. The user cannot start break if they haven't started their shift. By starting the shift the button will turn to 'stop shift'. Same for the break time button.
Inbox	The user enters their inbox by selecting it from the menu. The inbox has a similar layout to google mail. The user can create and send emails but inbox is not accessible anywhere outside the business.
Calendar	The user can select dates to indicate the manager that they're available or not with a limit of two weeks in advance.
Roster	The user can view their assigned roster.
Log-out	The user taps on the log-out button to get the rostering system to return to the main screen, the log-in screen.

Table 9 - Brief use cases

11. Fully Developed Use Case Description

The use case description below fully details the subsystem user account i.e. Workers information is saved to an account. It is used when a worker books off time and all the user needs to enter is his/her code and the rest of the information will be sent to the manager. The use case diagram below comprehensively shows all actions down by a worker in relation to a user account.

Use case name	**Clock**	
Scenario	A Hungry Jacks employee wants to clock on so she can start her shift using the rostering system.	
Triggering event	Enter the username and get finger scanned to log-in taking her to the menu. Select 'clock-on' from the menu to start the shift.	
Brief description	The HJ employee will need to log-in to the system first before being able to clock-on. By entering her username, the system will then ask her fingerprint to be scanned. The fingerprint is her password. Once the system accepts the user's log-in, the user is taken to the menu screen. To clock on, she will select 'Clock-on' from the menu.	
Actors	Hungry Jacks Employee	
Related use cases	Roster, Calendar, inbox	
Stakeholders	Accounting, marketing, sales, customers	
preconditions	The user must be logged on having access to the system's menu etc.	
Post conditions	The Employee is logged in.	
Flow of activities	Actor	System
	1. The employee enters username and scans finger. 2. The employee leaves a finger on scanner and waits. 3. Selects 'clock' button from the menu. 4. Select 'start-shift'.	1. The system connects to the cloud to find matches with the username and fingerprint. 2. Username and fingerprint match with the cloud server database, system accepts user and takes user to the menu. 3. Display the clock screen. 4. Start timing of shift. 5. Display the option 'end shift'.
Exception conditions	The user is new and does not have fingerprint recorded or user has some skin damage to the finger which disfigures fingerprint and makes it un-scannable.	

Table 10 - Developed Use Case Description

12. Use Case Diagram

The diagram below shows the interactions of the user with the rostering system. The use cases include creating an account, login in, inbox, calendar, roster, and login out. An admin is included and will be able to manage, create and delete accounts. The managers of the each Hungry Jack store is the admin. Admins have the same abilities as the user and is the only one who can create and manage accounts. The diagram shows what the user and the admin does or can do on the rostering system.

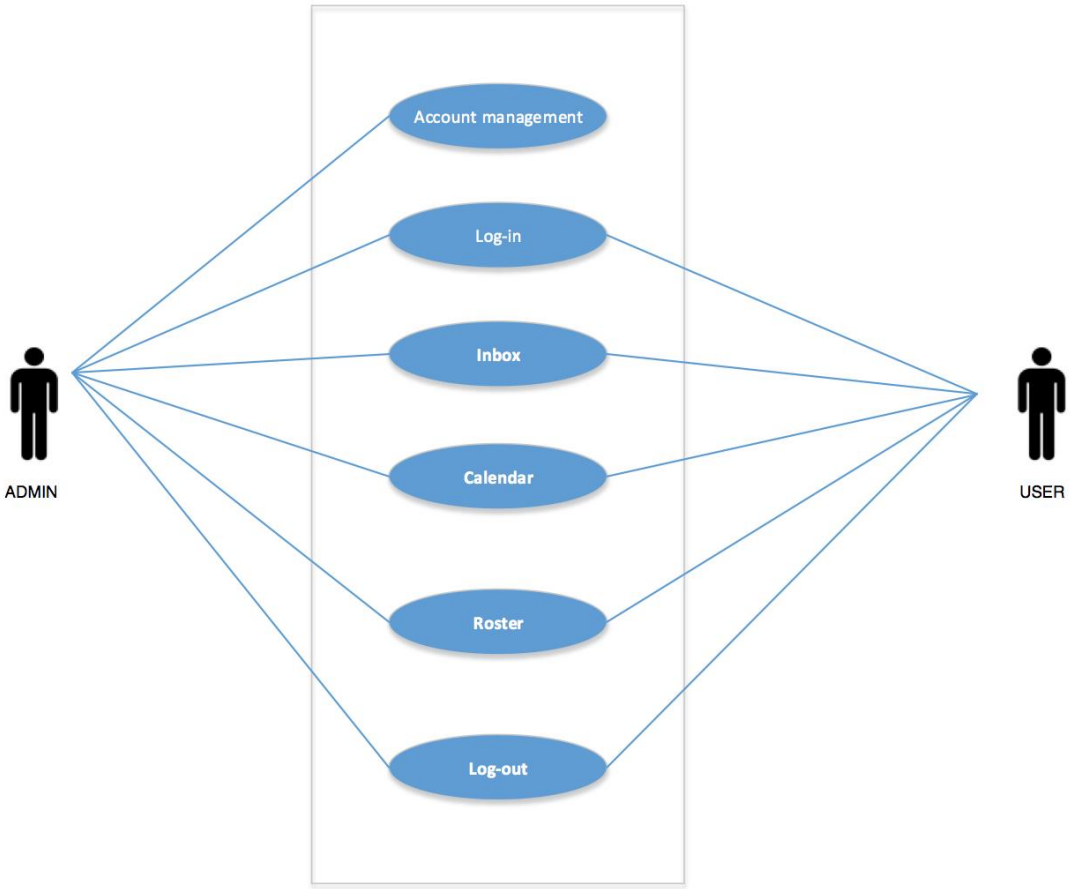


Figure 3 - Use Case Diagram

13. Activity Diagram

Product Configuration

The activity diagram below represents the actions taken place between the user, system, and database. The user enters their username, then scans their fingerprint. The system and database will determine if given log-in details are correct and match with the database. Once log-in has been accepted. The system will display the menu which gives the user five options. Inbox, calendar, roster, clock, or log out. The user first chooses to view inbox, views messages then composes a new message and sends it. The user goes back to the menu by pressing the 'back button'. The user now goes to the calendar, adds available and unavailable times then returns to the menu. The user then displays the roster and returns to the menu then start's the system's timing of the user's shift, goes back to the menu and logs off.

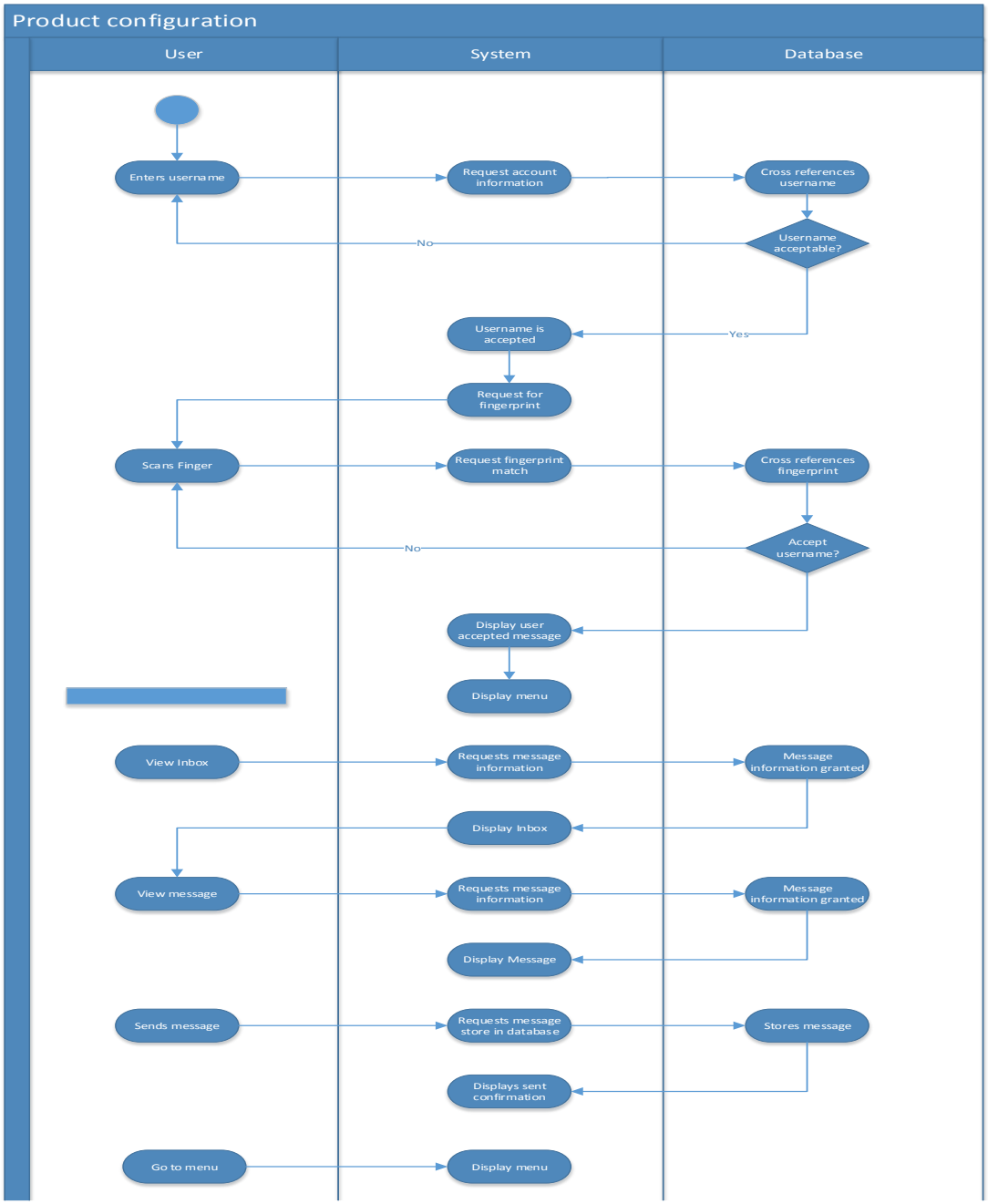


Figure 4 - Activity System Diagram

14. System Sequence Diagram

Product Configuration

The system sequence diagram below shows the user and admin's interaction with the rostering system and how it responds to the user's actions. The admin is also a user but has few more privileges. The admin can create accounts and manage the roster.

The user needs an account to use the rostering system, so an admin firstly creates an account for the user. With the account, the user does the following interactions with the rostering system:

- Log-in
- Scan finger
- View inbox
- Send messages
- Manage calendar
- Clock on
- View roster
- Log-out

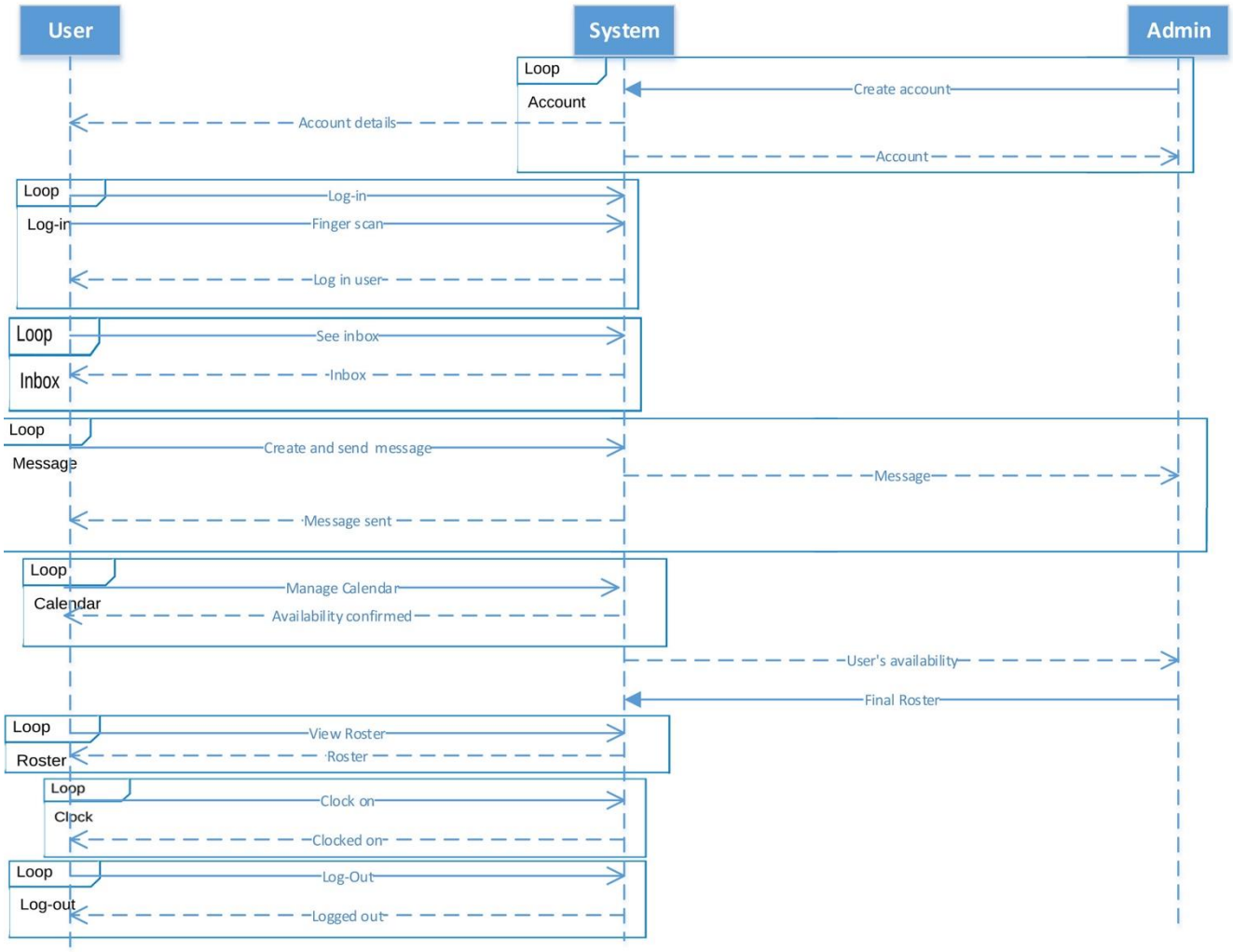


Figure 5 - System sequence diagram

15. Design the Environment

The new rostering systems high-level architectural diagram is shown below. The system works on a cloud infrastructure. The database of worker and manager information will be stored in a cloud server. The cloud server database will be stored in the company. The SSL encryption makes hacking extremely hard and makes hacking very hard to keep information safe if a hacking attempt was made, the website will be shut down to keep all sensitive worker information private. All the worker needs to do is to let the device read his/her fingerprint and the information will then be cross-referenced from the information on the cloud database.

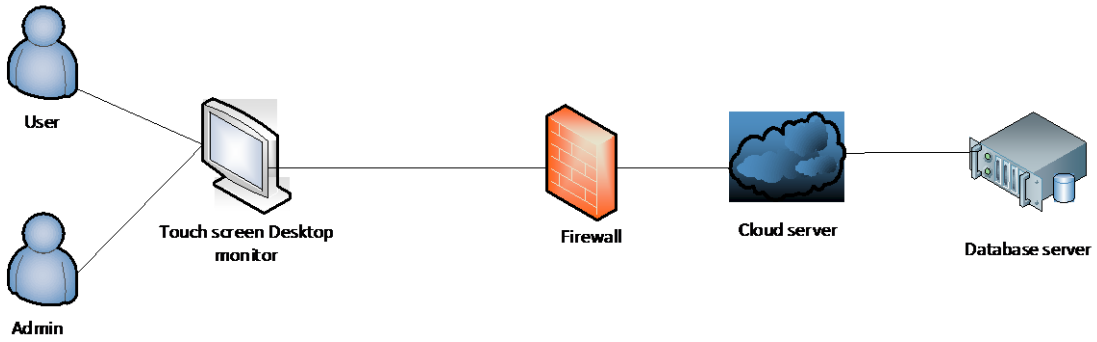


Figure 6 - High-level architectural diagram

A Hungry Jacks will not be able to access the roster system information from their computer. There will be high security on the cloud server database. By having the rostering system only accessible at a Hungry Jacks workplace, it will reduce the security risk and concern for the public getting information. A majority of employees at Hungry Jacks has a camera on their smartphone which they can use to picture the roster. The manager will be able to edit and publish rosters with administrative powers.

The manager will be able to connect to the cloud server database only at their workplace. There is no need to have any plugins to operate the cloud database as all the needed programming language is already implemented into the rostering system database to allow the user to access the information.

All rosters that the employee access and worker information i.e. password, username and fingerprint details are stored in the cloud. Due to the all of the employee's information being online this allows the employee flexibility if he/she decides to move store. The findmyshift is a secure cloud service with its simple interface which will be an easy way for managers to understand who is working at what hour. The service will be the perfect hosting service as it has backups installed in case data is destroyed.

16. Design the user interfaces

The following images show sample screens of the Rostering system and the program icon. The picture below shows the default home screen.

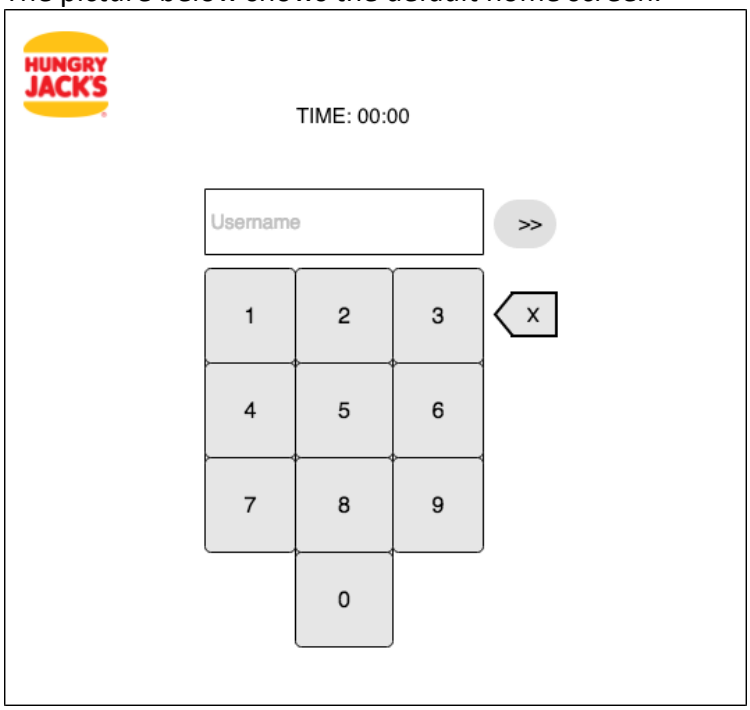


Figure 7 - Default home screen

No one will be able to access the program if they do not have an account. When a user types in their username, the system will ask the database if it is correct. If so, then the system will ask the user to scan their finger using the fingerprint scanner.

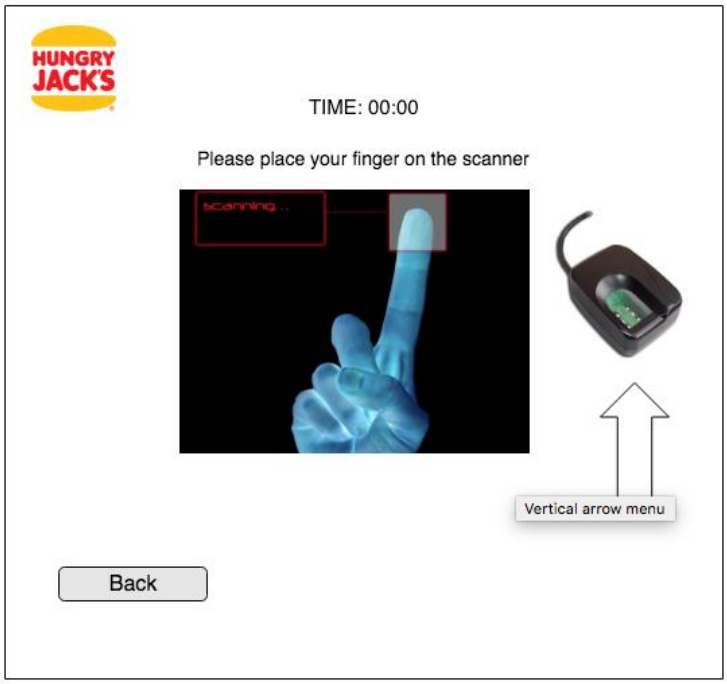


Figure 8 - Finger scan screen

Once their fingerprint matches with the database, the system will accept it and take the user to the menu. If the fingerprint does not match with what the database has, the user

can try again or go back to the home screen. The user does not have a scanning limit. The system does not lock out any user. Here in the menu screen, the user has many options. Clicking on of them will take them to a different screen. Another button called ‘Manage accounts’ will be shown only to the Admin, where they can create, delete, or change fingerprint passwords.

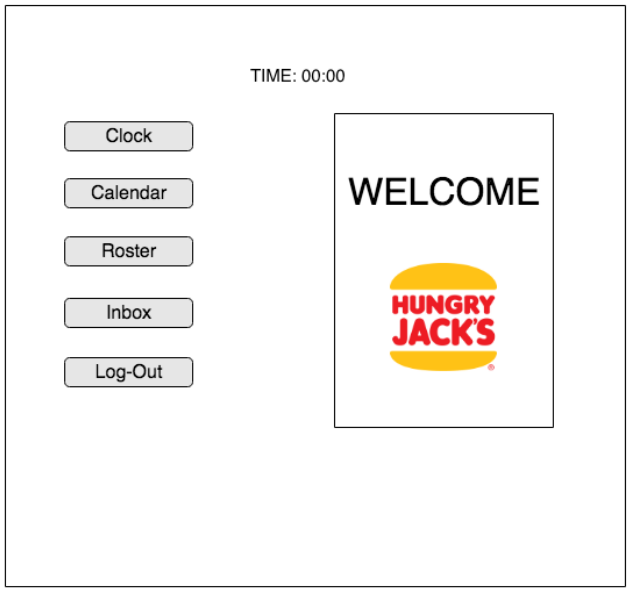


Figure 9 - Menu screen

When the user selects tap on the ‘Clock’ button, the system will take them directly to the clock page. The user now has two options, however, the start break is locked if the user hasn’t started his/her shift. By tapping on ‘Start shift’, the system will start timing and will return to the menu for the user to either select another option or just log-out of the system. During the user’s shift, these buttons can change. The ‘start shift’ button will turn into ‘finish shift’. If the user has started their break, the button will turn to ‘end break’.

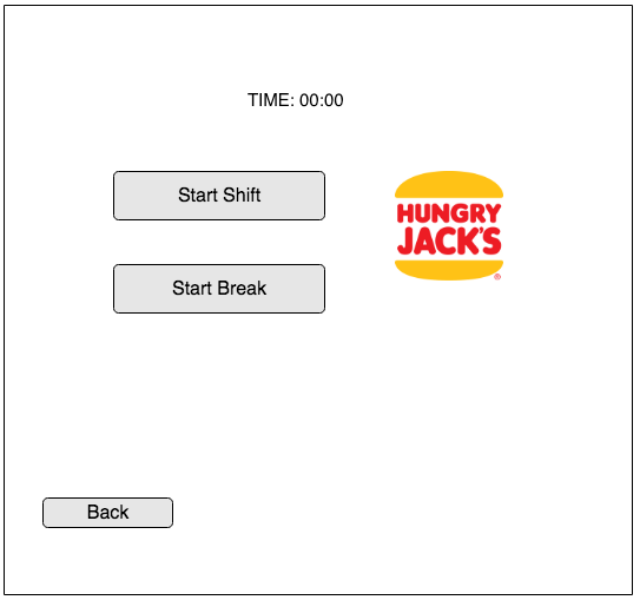


Figure 10 - Clocking screen

Here the user is able to tap on one date and update their available status. By getting to this page, the user will need to tap on the ‘Calendar’ button from the menu.

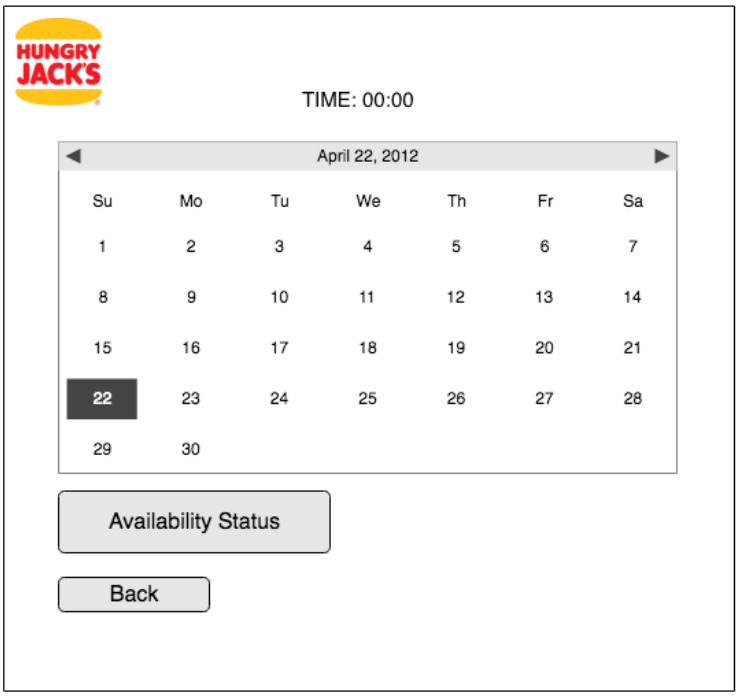


Figure 11 - Calendar screen

When the user selects a date on the calendar then taps the ‘Availability status’ button, this screen will show up for the user to use the slider at the top to highlight the time of the day and state it as either available or unavailable by tapping on one of the big buttons. The slider highlights the time of the day in between the two arrow sliders.

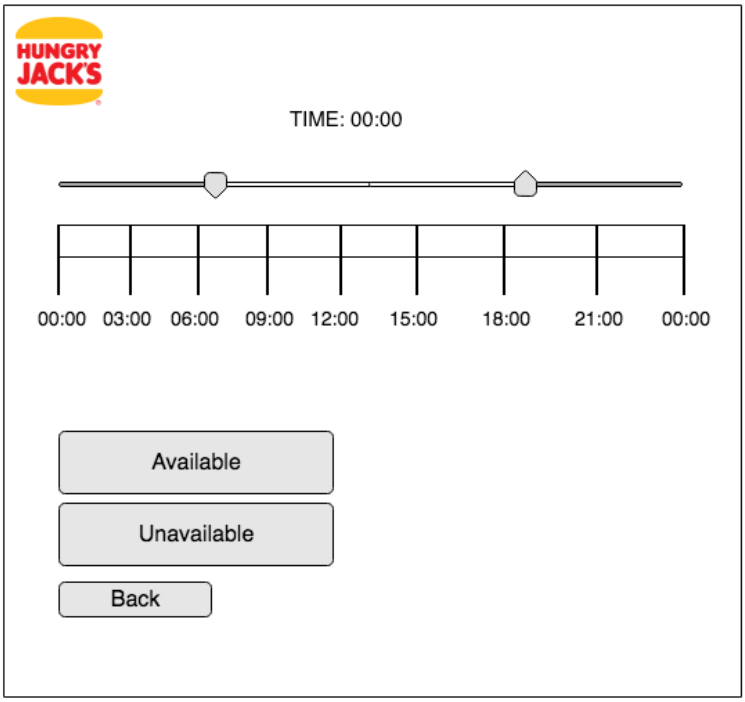


Figure 12 - Time scheduling screen

The Roster can be displayed by tapping on the ‘Roster’ button from the menu. The user will only be able to view this. Only the admin will be able to edit it and see another button on the screen called ‘Edit roster’.

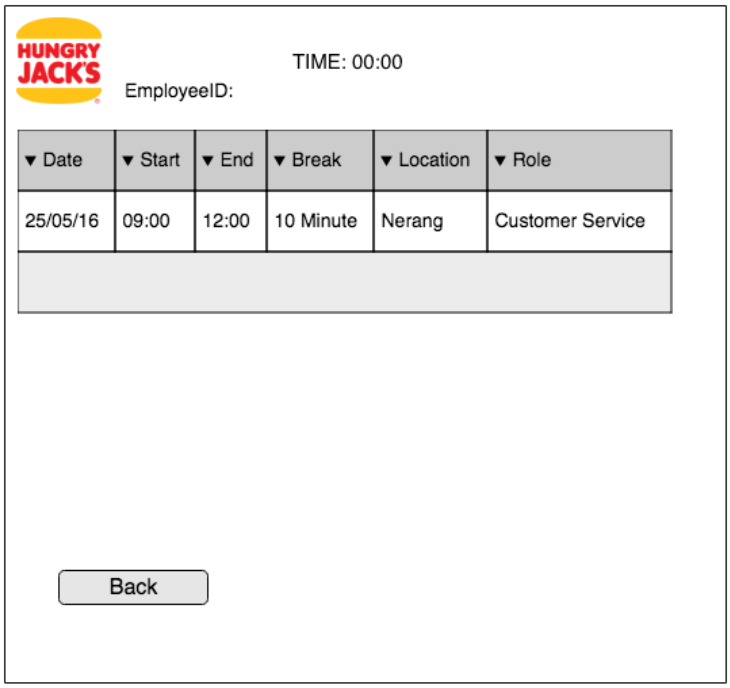


Figure 13 - Roster screen

By tapping on ‘inbox’ from the menu, the system will take the user to this screen. With three buttons, inbox, to view received messages, compose, to write a message to another user, and back button to go to the previous screen. Messages will be shown on the right side of the screen as a list. By tapping on the message, a window will pop up with more details about it. By tapping on the ‘compose’ button, it will take them to the screen below.

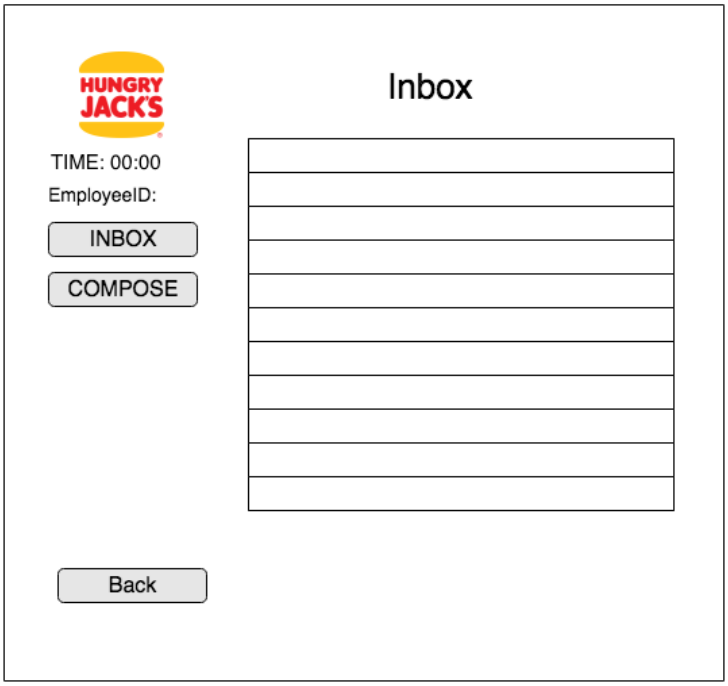


Figure 14 - Inbox screen

The compose message allows the user to send messages to other users especially the manager. As similar to an email, the user will specify the user's email address or system username, fill in a subject, their message then send.

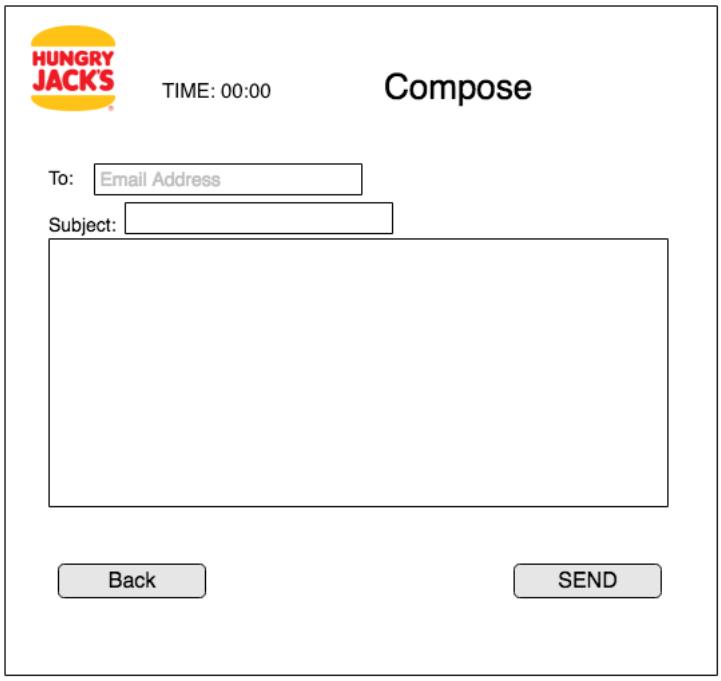


Figure 15 - Composing message screen

When the user logs out, the system will return to its default screen, the log-in home screen.

17. Deploy the solution

Planning and Managing Implementation

Training

In the deployment of the system, the system could still have failures in the first few weeks. The transition of the rostering system into Hungry Jacks stores would take some time for it to be fully reliable. If there are errors in the first few weeks or months of the system, a technician or champion can be called in for system servicing.

All users and admins of the device will be given training. Hungry Jacks managers have the option to get a free "Trainer" who will give a demonstration to the manager and to all the employees on how to use the device. This will allow users to get a hands-on learning experience so that using the device is easier and will allow them to learn quicker. A manual also comes complimentary with the device which full details on how to use it with user-friendly pages so the customer can never become confused. The project team is available to coach users through using the device for free if they don't understand the device.

The Marketing department, Hungry Jacks executive will be able to practically try out the device to see where their money is going and show that getting the rostering system is a very good option. It also allows the shareholders to see where their money is going.

Testing

To fully assess the system all tests will be implemented. The Unit tests are implemented to make sure that the software components of the device perform correctly. The devices chosen will be randomly selected to make sure that the unit test will give an overview of how well the device works.

The Integration tests will be implemented to assure that the devices modules. The type of integration testing that will be implemented on the modules will be once the Bottom-up approach. The Bottom-Up approach is where each subsystem will be pieced together to create a complex system. Once the modules are combined are able to communicate efficiently between themselves. This is to verify that the integrated modules function correctly together.

The Usability tests will be performed by representative users. The users will evaluate how well the system's interface interacts with them. The representative user's feedback with giving the project team an overview of what customers might find easy about using the device and what they might find hard to using the device.

The System/performance/stress tests are to understand if the system and subsystems all meet functional and non-functional requirements. This is an extremely important test to see if the system and subsystems work properly with the correct requirements.

The last testing required for the software was the Acceptance test. The Acceptance test was where the system must be tested to meet the needs of the users and business requirements. The system will also be tested in real life scenarios to see if it would be able to cope e.g. the fingerprint is scanned but the device does not access the database to see authorize the worker.

Deployment

Configuring the production Environment

The production environment will only be used by one type of software and hardware components. This makes the production of the device quicker and cheaper. As shown in the Architectural High-level diagram, the device which the user enters their username and password, connects to a cloud database where their information is authenticated. The device does not access a website but accesses a database directly through the internet.

Hungry Jacks will need to buy databases and servers to accommodate information if a device becomes extremely popular. An interview must be conducted with the I.T manager to check if the device has complied with all In-House technical regulations.

Packing installing and deploying components

Once the components are installed into the Hungry Jacks Business, it will not disrupt the company, this is because the Hungry jacks are running a fully automated system which is run by each Hungry Jacks manager, the quick installation will allow it to not disrupt the business. All Hungry Jacks workers and managers will need to learn how to use the device however it is extremely user-friendly which will make the learning process easier. If an error is located by a Hungry Jacks employee or manager, they will be able to contact the Rostering system project team, a computer repair technician or a programmer who will be able to get rid of the bug.

Deployment approach

The system deployment will most likely cause minimal to no disruption. This is due to fact that hungry Jacks was using a manual system and the device needs little setting up, this is where all workers details will be recorded this is a simple task that does not need that much time. The type of deployment approach used by the company is the direct approach as this is only possible because there is no other type of infrastructure stopping the quick installation of the system with little hindrance to Hungry Jacks

Converting and Initialising data

The database is extremely user-friendly and will be able automatically to create a new database for the manager once the device is verified and operating. Once Hungry Jacks managers buy the device they will be immediately able to easily fill the currently empty databases with files of worker's information. This will let the database become populated and will support the information. All databases have the option of reusing or modifying them if workers quit, the managers are able to delete their records from the system to reuse existing databases.

Version control and changes

The version control tool for this software will be Fossil. Fossil is a free open source software which allows many developers to interact with the software online but each of their changes or each of their version is saved in their own repository, or their own "Branch" this is to safeguard the source code if a programmer chooses to edit the source code but makes a large mistake, the mistake is only saved to the programmer's repository

The programming team will be the only ones available to edit the code due to the code will be private, on a private "branch" in the website. They will be responsible for all the versions; Alpha, Beta, production, and maintenance. If there are any more updates due to bugs or errors permission from the I.T. department must be sought first before any changes can be

made. If a customer finds an error the company must be contacted where all important information will then be sent to the project team and the I.T department where they will all collaborate together for a solution.

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