ASDA Stocking Support System (Xpire)

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Final Report

Submitted to

The University of Liverpool

in partial fulfilment of the requirements
for the degree of

MASTER OF SCIENCE

Abstract

The aim of the project is to create an application which enables ASDA colleagues to identify and inform colleagues of which items within their fresh departments are going out of date and need to be marked down or could potentially be provided to food shelters. This project will make use of mobile technology, backend web services and database stored procedures in order to analyse and inform colleagues which items are scheduled to go out of date on which date and then informs colleagues to go and reduce the products. This application will be used throughout ASDA stores by colleagues on a daily basis and could produce a significant cost saving and waste reduction.

The final products of this project will be a system of applications which will be ready for deployment into an ASDA store in the future. The requirements and periodic demoing of the produced solution will be provided to ASDA technology colleagues.

Student Declaration

I confirm that I have read and understood the University's Academic Integrity Policy.

I confirm that I have acted honestly, ethically and professionally in conduct leading to assessment for the programme of study.

I confirm that I have not copied material from another source nor committed plagiarism nor fabricated data when completing the attached piece of work. I confirm that I have not previously presented the work or part thereof for assessment for another University of Liverpool module. I confirm that I have not copied material from another source, nor colluded with any other student in the preparation and production of this work.

I confirm that I have not incorporated into this assignment material that has been submitted by me or any other person in support of a successful application for a degree of this or any other university or degree-awarding body.

SIGNATURE _____

DATE   September 3, 2020

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Chapter 1

Project Introduction

1.1 Summary of Project Proposal

1.1.1 Problem Statement

The aim of this project is to design an application and waste management system which is able to inform store managers and store colleagues on which items of stock are going out of date or are close to going out of date on the shop floor. This stock will then either be marked down on the shop floor in order to be sold on the day or will be identified as able to be donated to other charitable causes within the local community as part of the ASDA commitment to engage and assist in the local community.

The key goals of the developed system are to include:
- An application which will direct colleagues to which items need to be marked down.
- A reduction in store colleague hours spent in store manually marking down products.
- Stock which is wasted will be reduced and identified for redistribution.

These goals will be assessed by peer review of colleagues in ASDA. I am also aiming to deploy the application in a live ASDA store with the aim of it being used in a live environment. If I am able to deploy a POC into a live store then I will also assess the success of the application by comparing the product waste prior to usage in store against the wastage from the time that the application is used in store.

1.1.2 Project Methodology

The methodology that I have chosen to implement for my project was a scrum agile methodology which involved breaking the project down into smaller requirements which needed to be completed in iterations of development spread over the 8 weeks I developed my project in.

The project included the management and development of multiple application features. Each of the features were detailed and documented on a Trello [1] kanban board (See Figure 1). As can be seen in Figure 1 the kanban board is broken down into "To Do", "Doing" and "Done" swim lanes.
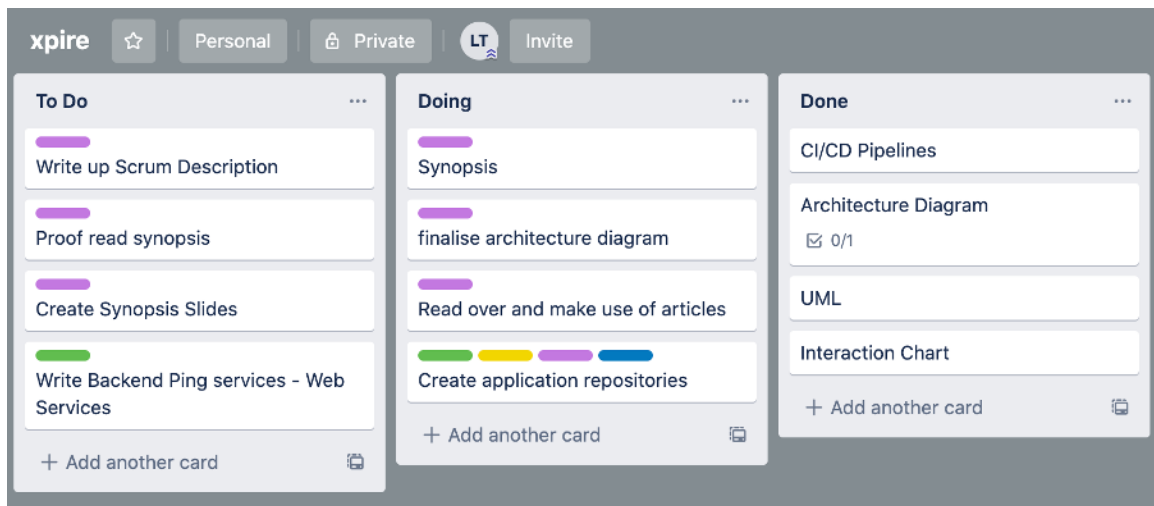
Figure 1: Xpire Kanban Board

In Figure 2 you can see the updated Kanban board as I have been working on the project and moving the different requirements across the board as they have progressed.
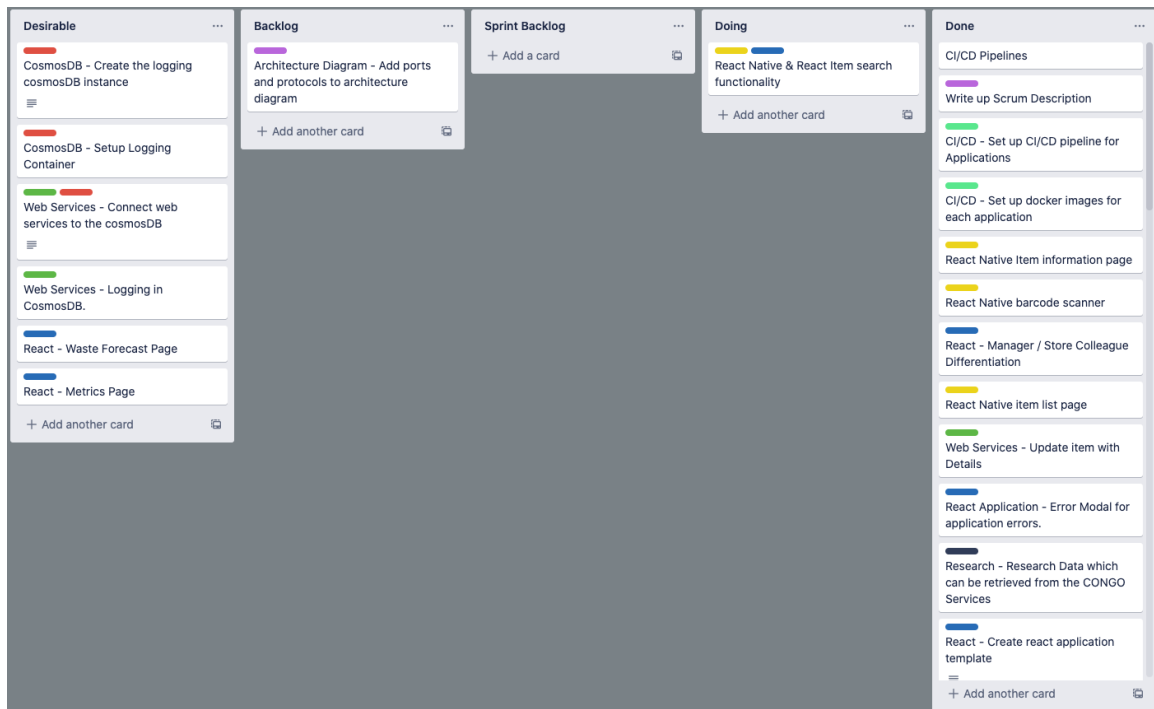

Figure 2: Xpire Kanban Board - Towards completion of project.

Since starting the project there have been some small changes to the way I used the Kanban board which are noticable in Figure 2. I have added a column to the board titled "Desirable", these are features that I have identified as being nice to have for the project which essentially means that they are not essential to the project but could potentially add benefit if I have time to develop them.

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I have also added labels to each of the cards so that I am easily able to identify which cards relate to each part of the application. This has made it easier to look up which cards need working on and which features still require development.

Chapter 2

Final Outcomes

The aim of this project from the outset was to create a software system which makes use of multiple applications to give the in store user a clean and easy to use way of managing in-store waste. In the following chapter I discuss what has been produced and what I will discuss in my dissertation.

2.1 User Interface Design

As part of the development of the system a key to ensuring the ease of use of the application was to take care and attention when designing the user interface of the different applications. In order to do this I made use of Balsamic [2] in order to design the user interface of both the mobile and web applications. Figure 3 shows an example of the interface design in Balsamiq and the final user interface that was produced. In my dissertation I will detail the design process further and explain the decisions that I made when designing both the web and mobile interfaces.
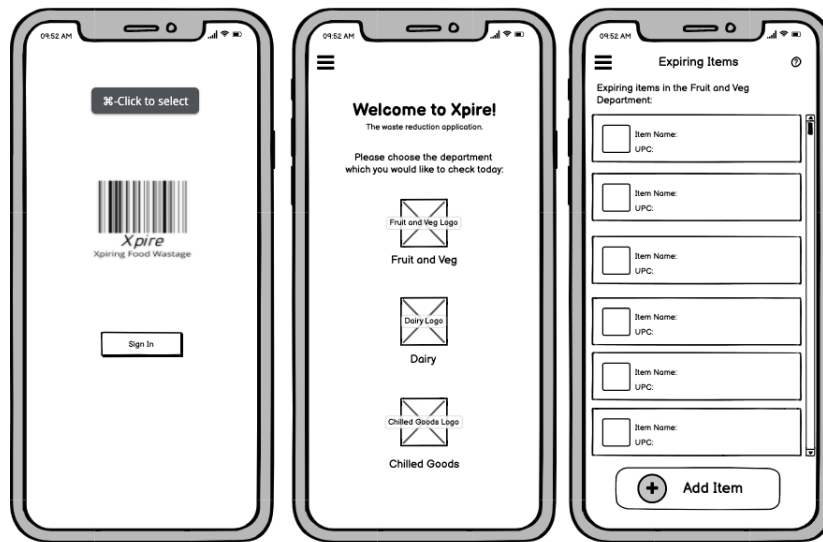

Figure 3: Example of the User Interface designs.

2.2 Database Design

One of the features of the system which probably took the most amount of time and research was the database. The database schema below (See Figure 4) shows the final design of the database including foreign key relationships, primary keys and tables.
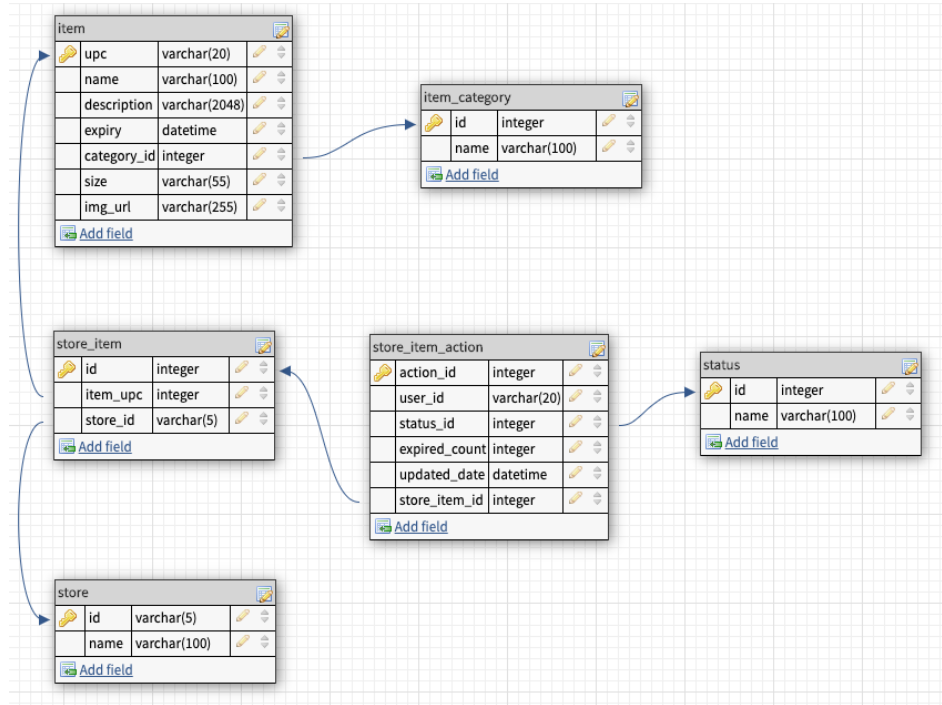

Figure 4: Final database schema.

In my dissertation I will go into more information about the challenges which arose whilst I was implementing the database and the considerations which I needed to make in order to ensure that the design was suitable for the software system.

2.3 Developed Applications

In the following sections I will discuss the applications which where developed as part of the Xpire system.

2.3.1 Mobile Application

The mobile application of Xpire is the main part of the system which is used by the front of house store colleagues who are working on the shop floor. The application has been written using the React-Native JavaScript framework which means that it is compatible with both android and IOs operating systems. This means the app can be used on both in store devices as well as colleague and managers personal devices as part of the BYOD (Bring Your Own Device) scheme.

The application is capable of communicating with the back end web services via Restful CRUD requests which ensures that all user data is as up to date as possible. The application also includes a barcode scanner which enables users to easily scan items rather than

entering relevant barcode numbers for items that they want to look up.

Figure 5 shows an example of the IOs version of the apps user interface. These screenshots can be directly compared against Figure 3 to show how the designs of the application have been implemented in the final versions of the application.

Figure 5: Screenshots of the IOs mobile application.

2.3.2 Web Application

The web application of the system has been written in the React JavaScript framework. The functionality of the application is largely the same as the mobile application however because the web view is available on a larger screen size I have used this to my advantage and included slightly more information for the user. The functionality for the web application also differs slightly by offering a different view for managers who are able to view the items and information of other stores as well as their own. Figure 6 is a screen shot of the application which includes the functionality to change stores.
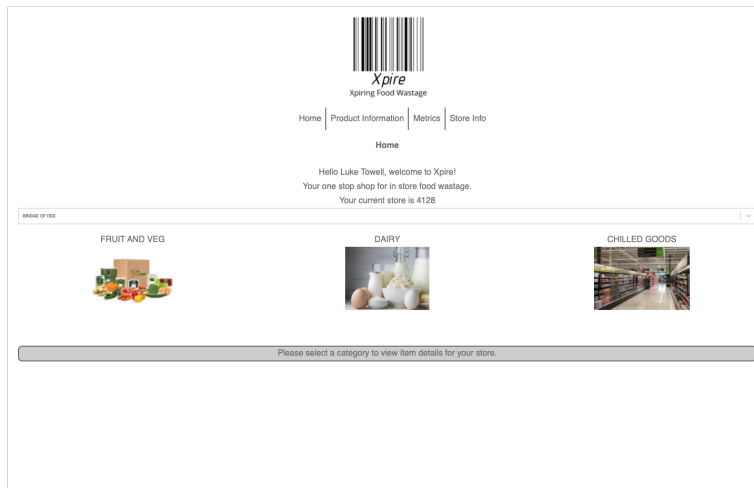

Figure 6: Screenshots of the initial landing page of an authenticated user.

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2.3.3 Web Services

In order to manage the communication between the front end applications and the database I have written web services in Java using the Spring Boot framework. The application has been designed using the "repository pattern" which is discussed in the Gang of Four Book, Design Patterns: Elements of Reusable Object-Oriented Software [3] which creates an interface between the front end user and the database.

In my dissertation I plan on describing how the web services have been written and the technology which has been used in order to ensure that the services are easy to use and deploy.

Chapter 3

Project Evaluation

3.1   Successes of the project

Overall based on the aims of the project I believe that the project has been a success. I have produced a system which comprises of several different applications whilst making use of several different programming languages and design concepts. Whilst there have been issues over the course of the project I have received positive feedback from the Project Manager colleagues within ASDA who have been overseeing the project. I believe that with more time to go through the correct security checks that are mentioned in the challenges section of this report that the project would demonstrate a reduction in colleague time spent checking waste stock and an overall increase in colleague performance.

In the dissertation which will follow this report I plan on going through the individual aspects of the project and identifying how I believe that they have been positively addressed.

3.2   Challenges of the Project

Throughout the project there have been issues which have arisen an the solution has been developed. In the early stages of the project it was identified that due to data security and authentication security utilised by ASDA I would be unable to make use of data and Authentication systems. This has presented various different issues which include:

- Data availability

- User Authentication

- Application and Database hosting

- Store Usage

All of these issues have been over come or worked around in order to produce a working software system. Each of the Issues listed above will be discussed in more detail along with the relevant work arounds in the dissertation of this project.

3.3 Colleague Feedback

Unfortunately due to the limitations that have been mentioned above and will be expanded upon in my dissertation I was unable to place the system into a production ASDA store. Because of this I have had to re-assess how I will gather feedback on the system. The project will now be assessed by ASDA colleagues and managers based on demonstrations of the application within different user scenarios. In my dissertation I will discuss the feedback which I receive and summarise the positives and potential improvements that the ASDA colleagues raise in their feedback.

Bibliography

[1] Atlassian. Trello project management software, 2020.

[2] Balsamiq. Balsamiq user interactive design software, 2020.

[3] E. Gamma, R. Helm, R. Johnson, and J. Vlissides. *Design Patterns: Elements of Reusable Object-Oriented Software*. Addison-Wesley Professional Computing Series. Pearson Education, 1994.