

# **E-Scratch Cards App & Dashboard**

**(Q – Lotto)**

A Web & Mobile Platform to demonstrate  
operationalisation of electronic lottery management.

## **Final Report**

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**B.Sc. (Hons) in Software Development**



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## 1.0 Abstract

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*The pervasiveness of modern-day computing has to a very large extent affected the way users interact with technology in the request and delivery of day to day business services. Lottery systems which had before now mostly relied on physical interactions between users and organizers for its operationalization can benefit from this technological paradigm shift.*

*This project is aimed at exploring the utilization of web and mobile technologies in the running of an e-scratch card system for electronic lottery platforms, accessible to users conveniently from their wide range of computing devices including mobile phones, handhelds, laptops etc. With the developed system in place, users will be able to register, purchase scratch card tickets, claim winnings in a convenient but with industry standards on security.*

## 2.0 Introduction

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This document is developed to highlight & discuss the implementation and development of q-Lotto, an online suite of application for managing electronic lotteries. Q-Lotto is a suite of software application, web & mobile, conceived to provide secure automation of the management and operational rules of e-scratch cards as it relates to running of on-line lotteries.

In the relevant sections of this document, an overview of the project will be presented, the motivation/ inspiration behind the project, the methodologies & technologies used in achieving the project as well as screen-dumps from the project output. Thereafter, the modifications made to the initial design as well as reasons behind these implementation changes, learning outcomes from personal & technological standpoints will also be discussed. Lastly, a review of the entire project highlighting things that went wrong, those that went right as well as changes that would be made if the project was to be undertaken afresh will also be presented.

## 3.0 Project Description

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### 3.1 Project Inspiration

Lottery systems have existed as far back as the early 90s. Over time, they have become a significant source of revenue for states and individuals with many states/ countries running states & national lotteries programs. Despite a lot of these platforms operational and in place, there exist a gap in how they customer-centric they are. We observed that most of these systems only reward customers' tickets with jackpot winning entries, do not allow ticket entry modifications and nor allow customers to make entries from the comfort of their homes but only from designated kiosks and Point-of-sale stations.

Our proposed system seeks to provide a more customer-centric platform that would mitigate these perceived short-comings.

### 3.2 Project Overview

Q-Lotto is a secure electronic scratch card application that is developed to help users participate in online lottery. Conceived as a multi-faceted application system and to reach as much clients as possible, Q-Lotto will offer functionality across web and mobile platforms.

With the application suite, users will be able to purchase electronic scratch cards over diverse payment channels and register lottery entries conveniently. The system will allow for the generation of lottery draws as well as the determination of winnings. The system also features extensive usage of data protection and security algorithms including but not limited to encryption strategies in the protection of sensitive system and user data. On completion of draws, users will be communicated on their winnings for possible claim.

Overall, the system is intended to provide ease of use for users, while enforcing and guaranteeing high levels of system and data security.

#### 3.2.1 Unique Selling Points

1. Making as much people win as possible
2. Multiple channels of payment
3. Up-to one-hour change of entry

#### 3.2.2 Target Population/Market

(Emily Haisley et al, 2008) in their paper of 2008 on Subjective relative income and lottery ticket purchases, where they noted that gambling and lottery playing was predominant mostly amongst low-income earners. They noted that these categories of individuals engage in lotteries & gambling

primarily because of the financial returns and recognition Lottery systems portends. In the light of the above, our e-scratch card application will target young adults, low income earners as well as persons from the age of 18 and above who seek a change in their fortunes, satisfy their gambling urge or gain the recognition it attracts.

### 3.2.3 Our Project Competitors

Several lotto organizations are available and are in use by gamblers today. A study on [lotteryanalyst.com](http://lotteryanalyst.com) (an online analyst that comparatively studies lottery platforms) lists some of my competitors to include:

1. MultiLotto (<http://www.multilotto.com/>) - Multilotto is a lotto betting operator that gives players access to a whopping 56 international lotteries, including big-win games such as US Powerball, Mega Millions, and EuroMillions. In addition to great syndicate play and support for 15 languages and 12 currencies, the site also features dozens of online scratch cards that keep the excitement flowing between lottery draws.
2. lottoKings ([www.lottokings.com](http://www.lottokings.com)) -  
LottoKings allows players from all over the world to purchase tickets to over 20 lotteries worldwide using single play, syndicates, and discounted subscriptions. Featuring great welcome promos, scratch cards, a solid reputation and even a money-back guarantee, there's plenty to like about this great lotto agent.
3. WinTrillions (<https://pt.trillonario.com/>)  
Launched in 2005, WinTrillions offers access to 20+ of the world's biggest lotteries, live lotteries, syndicates, and some very entertaining scratch cards. Its UI is slick and intuitive, and the frequent promotions it holds offer players excellent value. On top of all that, the site has live support should you ever need assistance with anything.
4. TheLotto (<https://www.thelotto.com/>)  
theLotto is an online lottery messenger service launched in 2002 that allows visitors to buy commission-free official draw tickets to 50+ international lotteries. One of the biggest companies in the online lottery industry, theLotto offers excellent syndicate play, discounted bundle purchases, amazing 24/7 customer support, and a plethora of payment options.
5. Diamond Bingo Doubler ([www.lottery.ie/scratch-cards](http://www.lottery.ie/scratch-cards))
6. Bingo Multiplier ([www.lottery.ie/scratch-cards](http://www.lottery.ie/scratch-cards))
7. Congratulations ([www.lottery.ie/scratch-cards](http://www.lottery.ie/scratch-cards))

8. Cashword Doubler and Plus ([www.lottery.ie/scratch-cards](http://www.lottery.ie/scratch-cards))
9. Winning Streak ([www.lottery.ie/scratch-cards](http://www.lottery.ie/scratch-cards))
10. Lotto Direct ([www.theLotter.com](http://www.theLotter.com))
11. LottoSend ([www.LottoSend.com](http://www.LottoSend.com))
12. Play UK Internet ([www.PlayHugeLottos.com](http://www.PlayHugeLottos.com))

### 3.2.4 Our Project Advantages

1. Traditional lottery systems are targeted at only rewarding tickets with 100% success of bearing the jackpot numbers, our platform will target making all participants participate in the sharing of winnings as only as they bear minimum set levels of similarities with the winning entry. For a six-number series lottery, Entries with 3 out of the 6 winning ticket numbers will share certain percentage of winnings, same with entries with 4 out of the 6 winning ticket numbers, etc. thus making most participants winners in some way.
2. Our System will allow for up-to one hour before draws change for participants entry as this will further empower customers with rights to determine their winnability as close to the draw as possible. While this is put in place, care will be taken to ensure the security and integrity of submitted entries and winnings.
3. Most are POS and kiosk based, and fairly allows for tracking of history. Our platform will support all aspects of interactions – kiosk, mobile and web
4. In contrast to other systems where deposits are usually only through only accredited agents, our platform will allow for flexibility of payment platforms

### 3.3 Technologies

Several technologies, frameworks and development tools and libraries were used in the implementation/ development of our project. These are highlighted and presented below.

### 3.3.1 Frameworks



**Laravel** is an open-source PHP web framework, created by Taylor Otwell and intended for the development of web applications following the model–view–controller architectural pattern.



**React Native** is an open-source mobile application framework created by Facebook. It is used to develop applications for Android, iOS, Web and UWP by enabling developers to use React along with native platform capabilities.



**Bootstrap** is a free and open-source CSS framework directed at responsive, mobile-first front-end web development with capabilities (CSS & JavaScript templates) to build rich User Interface components.



**jQuery** is an open source JavaScript library designed to simplify HTML DOM tree traversal and manipulation, as well as event handling, CSS animation, and Ajax.

### 3.3.2 Languages





### 3.3.3 Tools & Integrated Development Environments (IDEs)



### 3.4 Application Screenshots

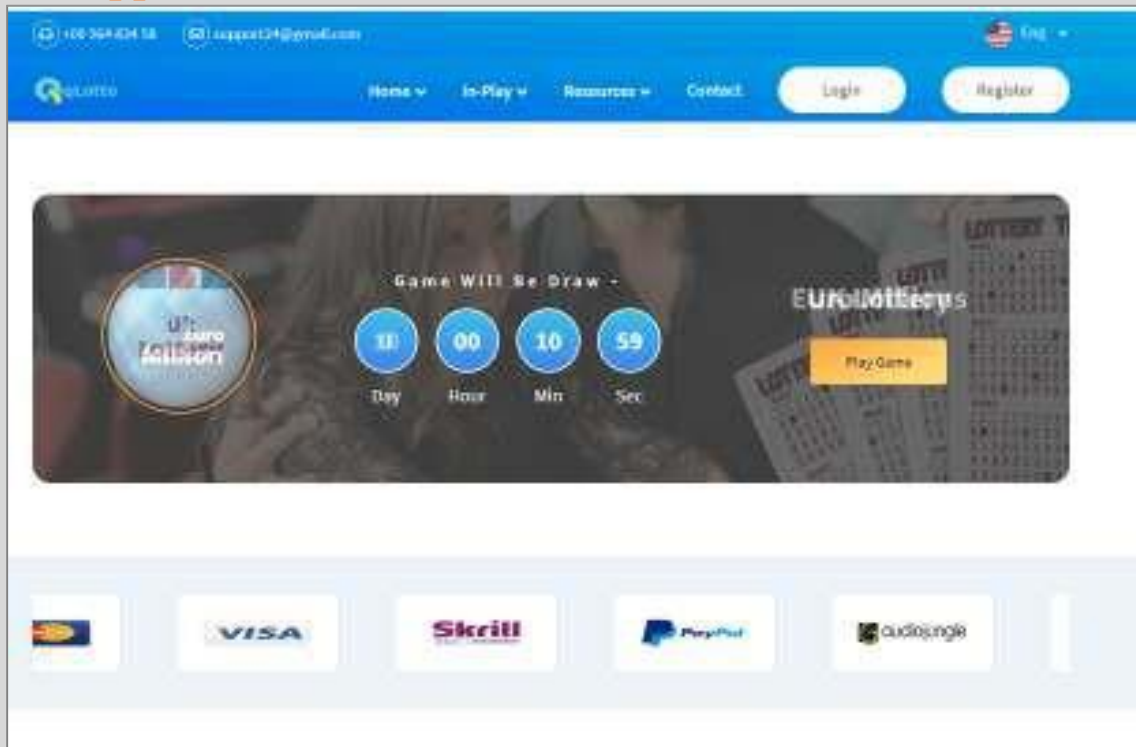


Figure 1: Welcome Page

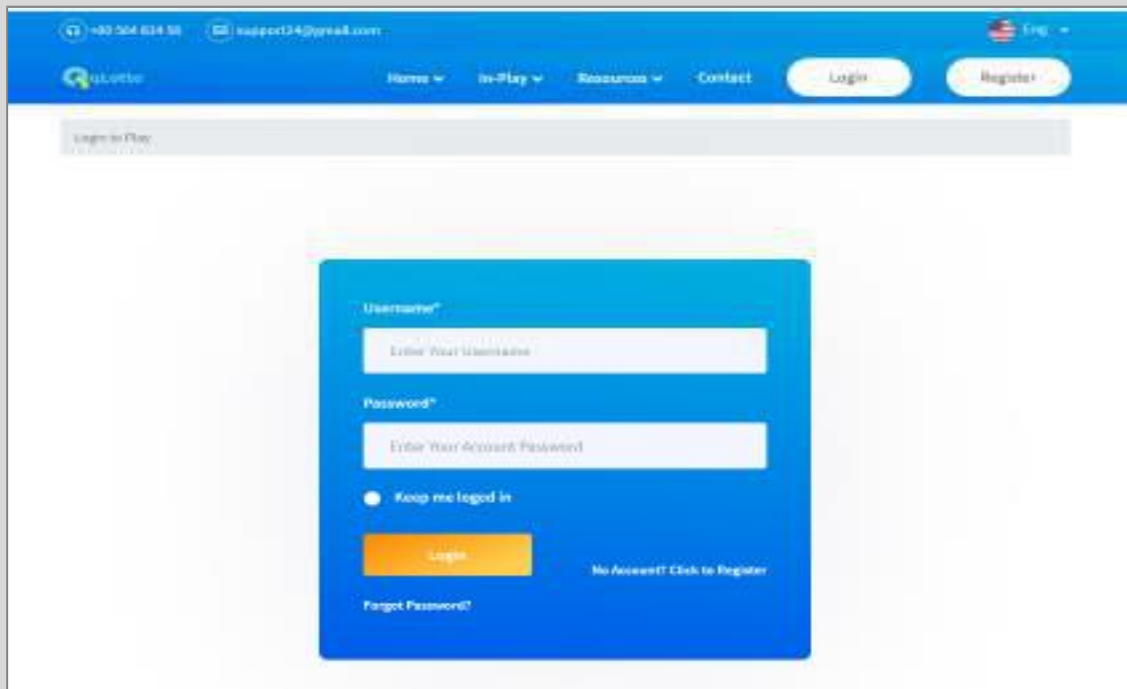


Figure 2: Login Screen

The image shows a web browser window displaying a customer registration page. The browser's address bar shows the URL "http://localhost:3000/register". The page header is blue and contains the following elements from left to right: a phone number "+99 564234 58", an email address "support24@gmail.com", a language selector "Eng", and navigation links for "Home", "In-Play", "Resources", and "Contact". There are also "Login" and "Register" buttons in the header. Below the header, there is a grey navigation bar with the text "Register To Play". The main content area features a white registration form with a blue border. The form is organized into two columns and contains the following fields:

First Name*	Last Name*
<input type="text" value="Enter Your First Name"/>	<input type="text" value="Enter Your Last Name"/>
E-mail*	User Name*
<input type="text" value="Enter Your E-mail"/>	<input type="text" value="Enter Your Username"/>
Password*	Re-type Password*
<input type="password" value="Enter Your Password"/>	<input type="password" value="Re-type Password"/>
Address Line 1*	Address Line 2
<input type="text" value="Enter Your Address"/>	<input type="text" value="Enter Your Address Line 2"/>
Date of Birth*	Phone Number*

Figure 3: Customer Registration Screen

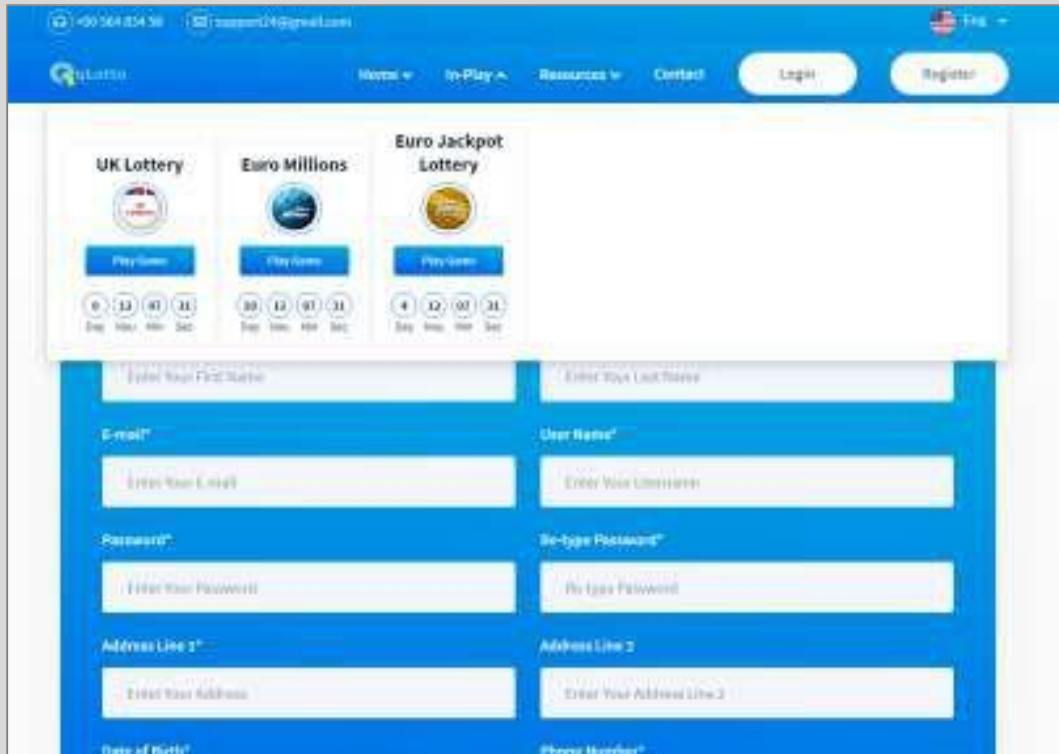


Figure 4: In-Play Lotteries screen

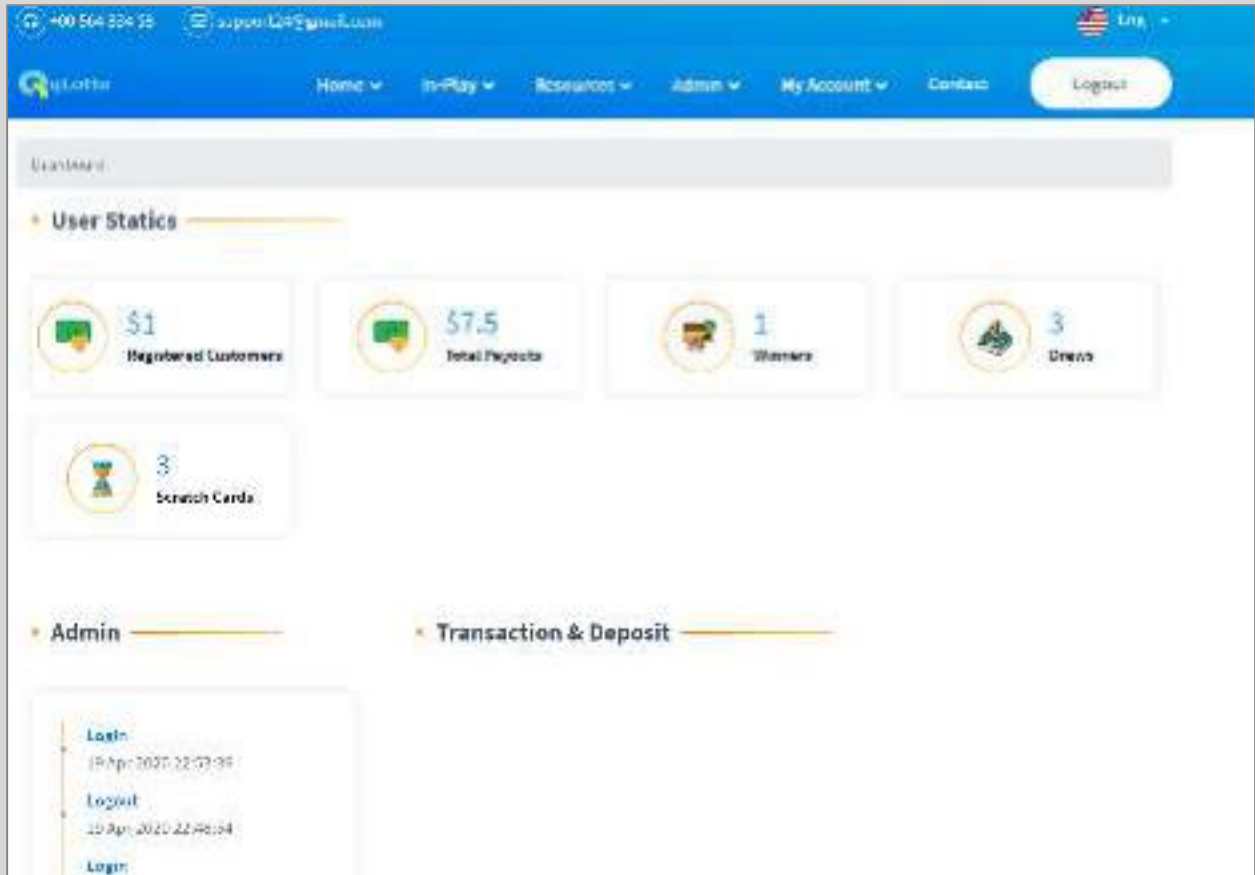


Figure 5: Admin Dashboard

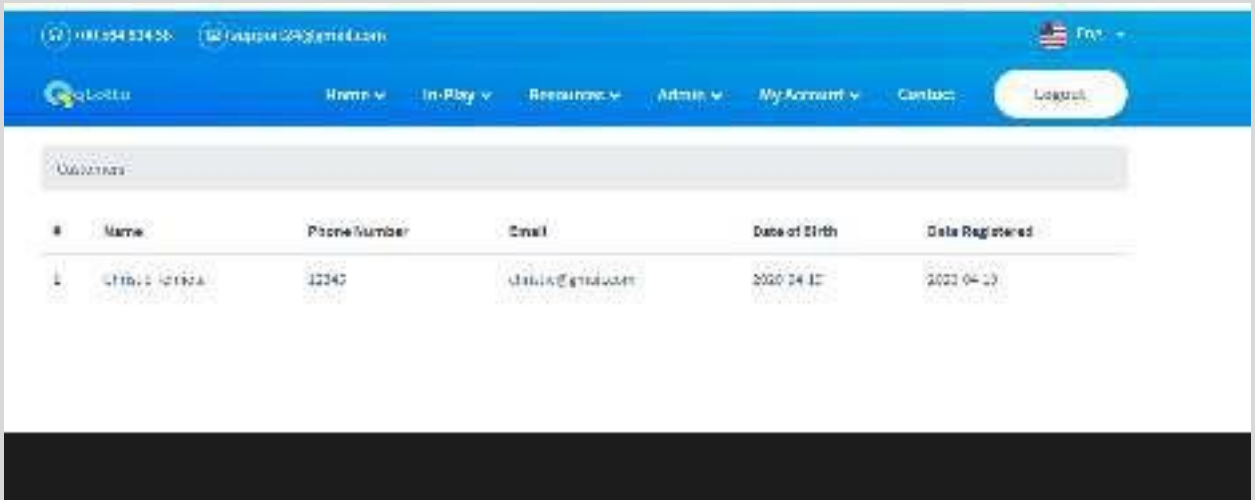


Figure 6: Customer Listing screen

#	Lottery Name	Lottery Logo	Date Created	Latest Draw Date	Action
1	NJ Lottery		19/04/2023 06:45:34	24/04/2023 06:55:00	Add Draw
2	Euro Millions		19/04/2023 06:55:07	24/04/2023 06:55:00	Update Draw
3	Euro Jackpot Plus		19/04/2023 06:55:17	24/04/2023 06:55:00	Update Draw
4	Euro Lotto		19/04/2023 06:55:39		Add Draw

Figure 7: Lottery listing screen

### Add new Lottery

Lottery Name:

Lottery Logo:

Figure 8: Add New Lottery screen

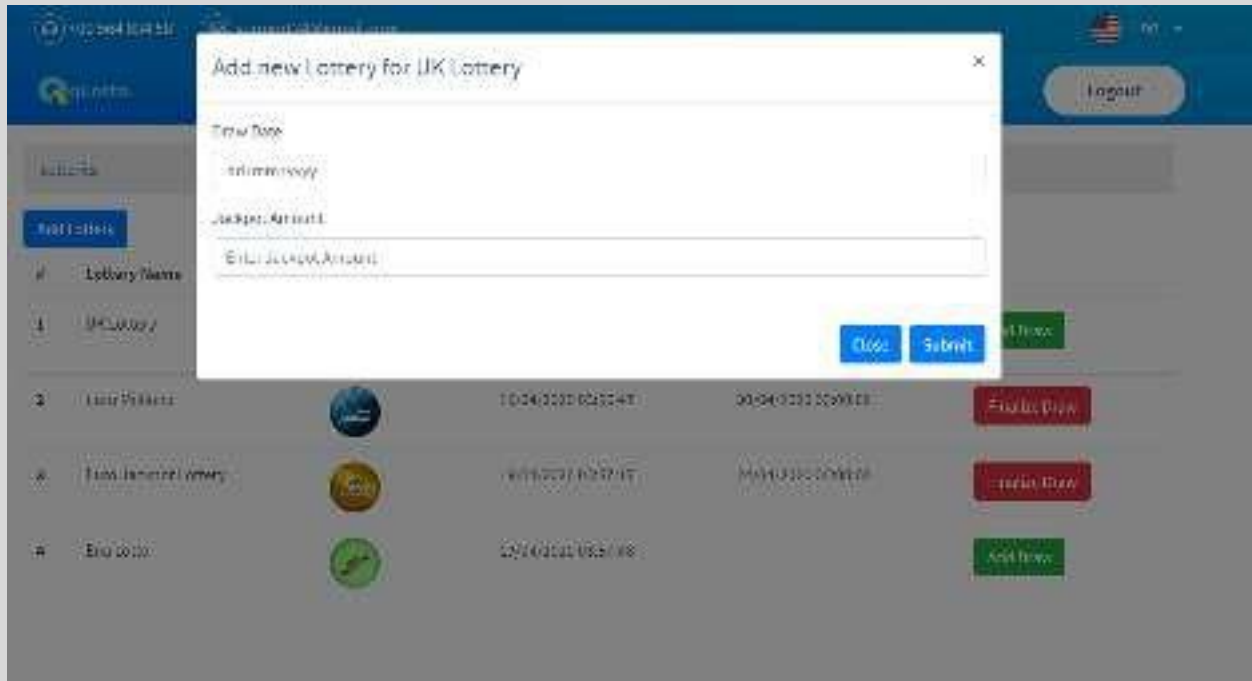


Figure 9: Create New lottery Draw screen

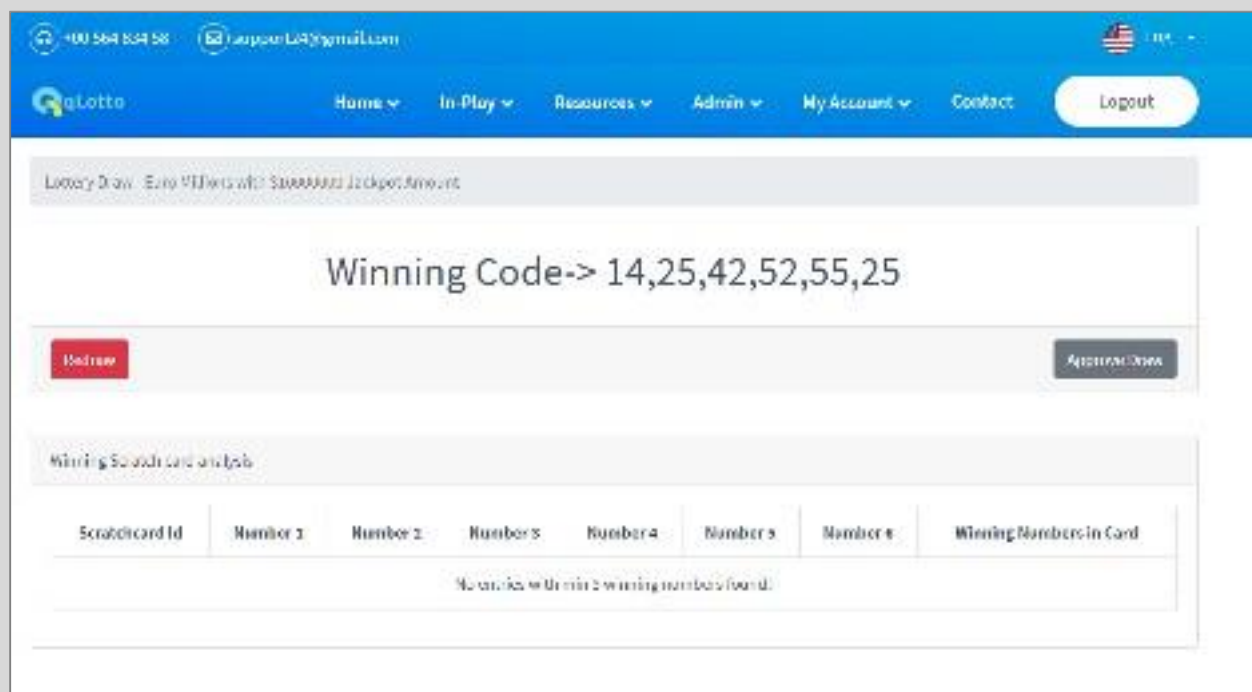


Figure 10: Finalizing Draw for Lottery

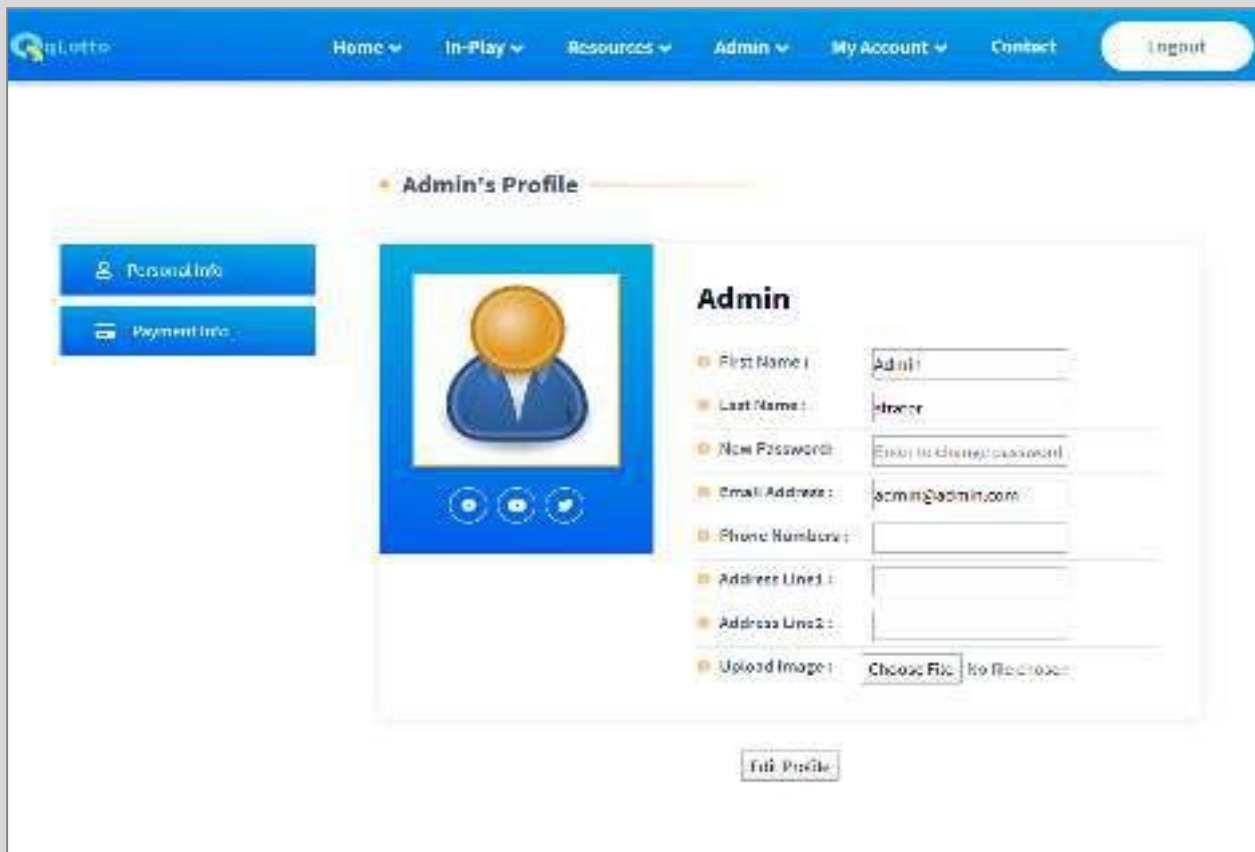


Figure 11: User Profile Screen



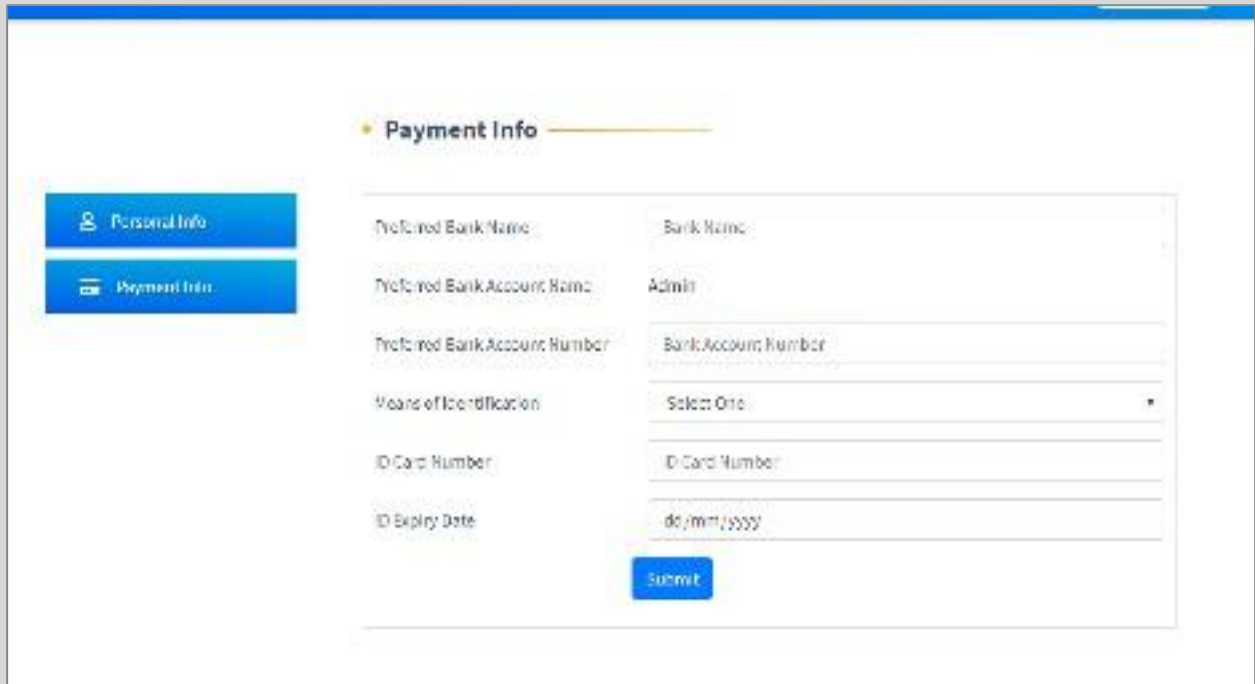


Figure 12: Payment Profile Screen

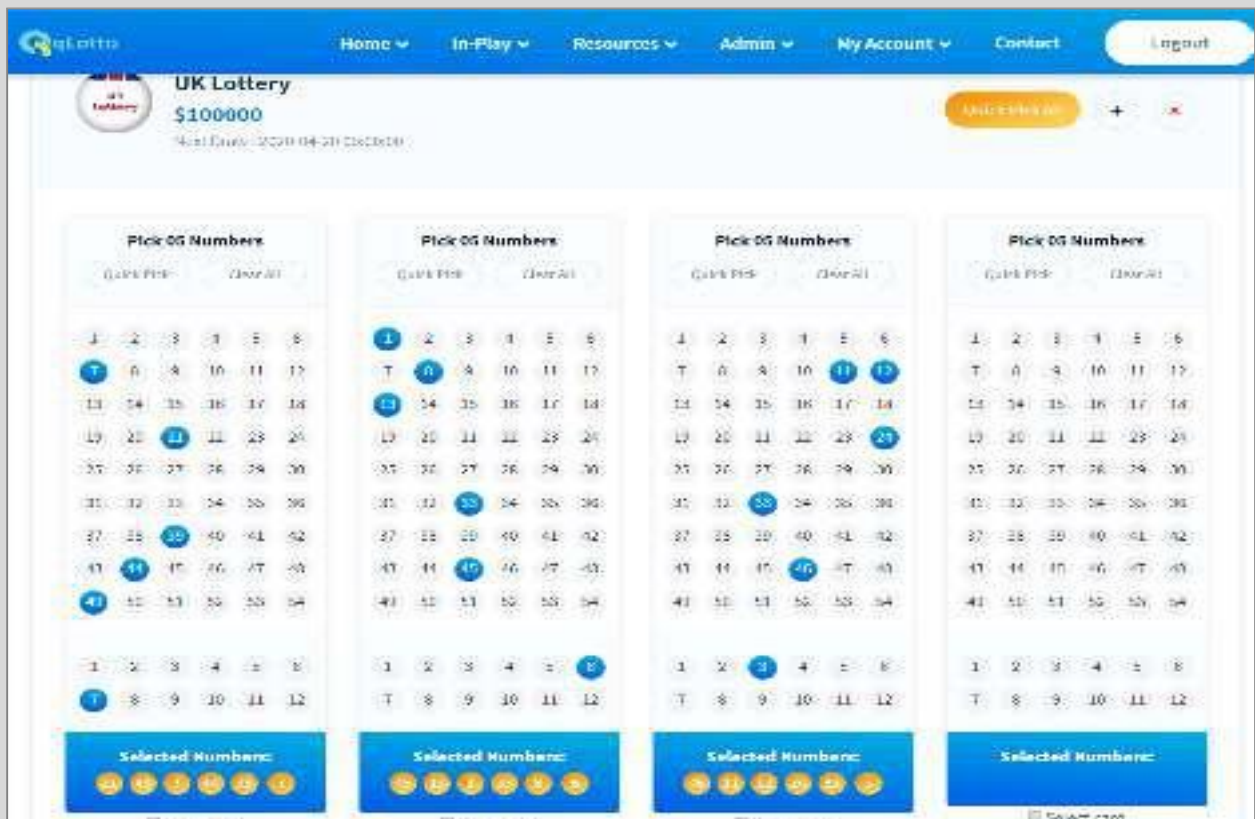


Figure 13: Lottery Scratch card play screen

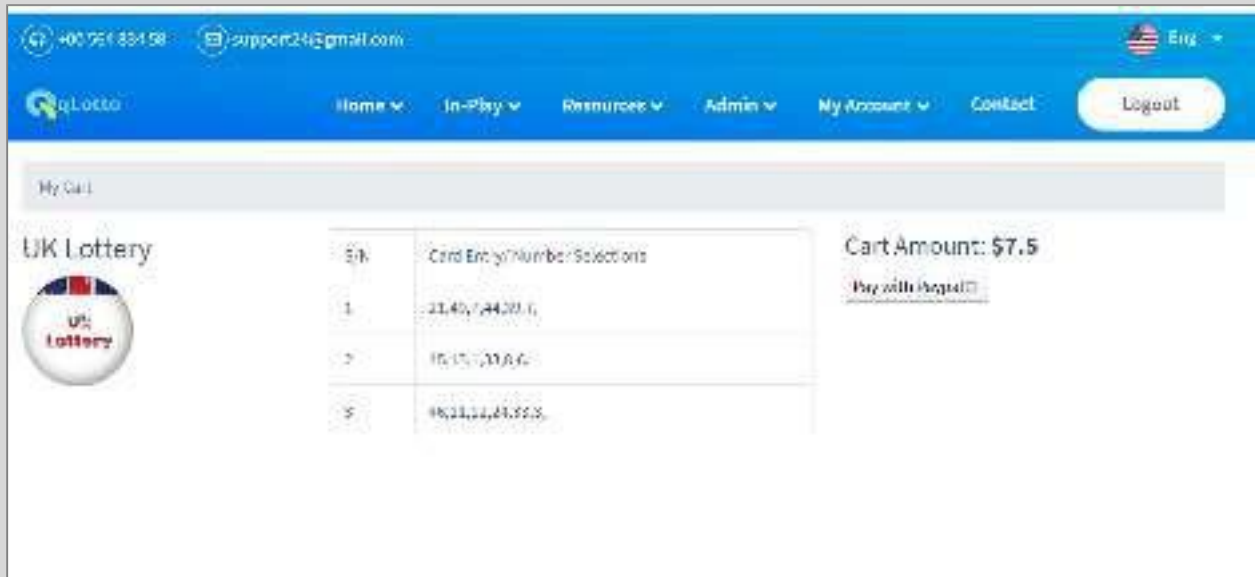


Figure 14: Scratch cards cart screen

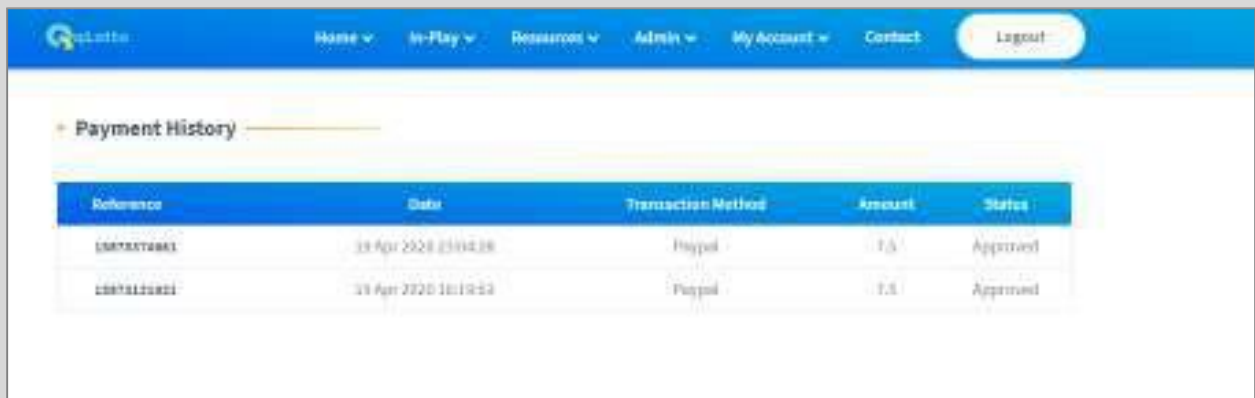


Figure 15: Scratch cards payment screen

## 4.0 Conformance to Specification & Design

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### 4.1 Early Prototype

In line with the specifications and program design earlier developed and the Agile software engineering / development approach which my project was based on, an early prototype of the scratch card lottery system was developed.

Some of the wins of my early prototyping for my project include –

- i. I was able to come up with a decent User interface / experience (UI/UX) for the project, that was responsive, and could align with the intended requirements for the system.
- ii. I was able to quickly identify certain potential issues and areas that could potentially demand a whole of my study and development time. The fact that I could potentially see these areas early allows me to adjust my initial schedule of work, as I could allocate more time to them.

Aside the above, the early prototype allowed me to accomplish the following:

- a. Have an understanding and explore the needs of the industry regarding the intended product.
- b. It allowed me to study, practice and appreciate the technologies & tools that would be utilized in the implementation of the project
- c. It allowed me to develop a better understanding of the requirements & product needs from the perspective of the end-users.

The early prototype was showcased & demonstrated during the mid-project term briefing to a selected panel of lecturers/ examiners. Opinions, advise and guides were sought and given.

### 4.2 Changes made to original specification & design

From the feedbacks gotten in the early prototype demonstration and use, it was obvious a couple of things had to change for me to effectively deliver on the expected goal of successfully completing the project. These changes include –

- a) I had to readjust to timings regarding all stages of the project, as it became clearer that more had to be done within the shortest possible time, to avoid last minute rush.
- b) I had to change my approach to satisfying fundamental requirements that would make my product stand out as against spending a lot more time on things considered trivial by my supervisor and lecturers.

- c) Security became a fundamental requirement at all phases of my implementation because I realized that for my product to be useful, beneficial and widely acceptable considering its purpose (financial gambling), my intended users must feel secure divulging personal and widely considered confidential information (e.g. Account details, identification information etc.) into the system. This warranted that I quickly look for and adopt a secure and highly adaptable Encryption algorithm & library to encrypt and protect the personal & sensitive information of my intended users. AES encryption, achieved using a symmetric key encryption strategy, was adopted and my implementation of it integrated well with the Laravel web application framework.

## 5.0 Description of Learning

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### 5.1 Personal

From a personal perspective, this project has opened my eyes to the conscious need to properly manage time at all stages of the project. Combining other school courses with the project in addition to my family responsibilities was quite tiring as wellbeing exhilarating and overwhelming at times. If I had prior knowledge that assignments from other courses would come thick and fast these last few months, I would have done many things differently. The pressure created from the demands of the other modules impacted the final project produced greatly.

As time went on, I found I was only capable of getting a lot of work done at certain points but this was to the significant disadvantage to husband and children who had to bear with me. I realized that the volume of work put into the final three weeks well and truly surpassed my already weak pace, showing that if I had properly managed time, the project would have been greatly and significantly better. That being said if I had the time back again, I would have ensured that I spent at least a certain amount of time per week on the project.

I also realized that communication is key at all times to successfully achieve projects of this nature. I learned the hard way that when you have a problem you should seek help earlier rather than later. The expectation to complete tasks superbly would sometimes take unnecessary time and attention as I would try to take it all alone without seeking for help. The experience has thought me not to let challenges drag on too long and to communicate better with people where challenges are encountered. With all of this in mind I am extremely proud of what I achieved alone.

### 5.2 Technical

This project has allowed me to fully and properly explore all aspects of the software engineering process. I have been able to understand and apply the Agile software development model where the goal/aim is to quickly and reasonably develop a fully functional software artifact at all times, that can be modified and tweaked as needed. Functionality can then be incrementally added as need in line with the agile development processes.

I was also able to learn and use various software development tools, libraries and frameworks. Prior to this project, I had not used Laravel before but only got to know about it when I was researching about my project. Based on the positive reviews and numerous learning materials with buzzing communities for Laravel, I opted to use it for the project and it was a very key and fundamental decision that enabled me to achieve this project. To fully utilize Laravel, I had to undertake various online courses and this took significant aspects of my time which was an investment I am happy I made.

Prior to this project I did not quite have a lot of experience with Bootstrap and CSS styling, and for these too, I had to scale up the learning and expertise. Online videos, books and advices from software buddies in the communities I later reached out to were very worthwhile for this project.

Security-wise, I also came to realize the importance security places in the use and adoption of software system. The OWASP top 10 web was an invaluable guide as it enabled to know what possible security vulnerabilities my solution could be exposed to and how to mitigate them. To maintain and enforce privacy protection for user sensitive data, I learnt how to use AES encryption routines to encrypt this category of data before persisting them in storage. This in addition to learning and imbibing other strategies for Cross site Scripting, Code Injection, and sundry areas of possible breach has really prepared me technically for live after school.

## 6.0 Project Review

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### 6.1 What went wrong

In the beginning of the coding phase the technologies chosen did not work out as expected. The integration of the utilized technologies was quite overwhelming. Laravel as a framework has grown and is still growing as a framework. Various versions of the framework are available with sometimes significant differences in how libraries function with each version. More so study materials are sometimes silent these underlying differences in the versions, and these was quite a problem for me in the early parts of the project.

Also Getting user requirements for this project wasn't quite an easy task as the internal business operations of lotteries are quite shrouded in some form of secrecy. I spent significant volume of time scouring the internet for information which would help me formulate these requirements.

As I had earlier stated, the volume of college work I had to face this final month of the project significantly affected the project deliverable. Attending to assignments while living up to my responsibility as a mother and wife at home while at the same time working on the project made me not have time to deliver on the mobile app component of the project. While the APIs were developed, I however didn't have enough time to complete the mobile app development.

### 6.2 What went right

As mentioned earlier in some sections of this report the templating and styling aspects of the application went very smoothly. Once I had passed the steep learning curves of the aforementioned program, development generally went very well. I discovered that things I had learned in other areas of the code could be applied to new components I was working on. One of the most difficult parts of the project was getting the different types of user accounts working together whilst only showing the appropriate information to the authenticated user. While it initially was difficult, I feel it went quite well especially when I became more comfortable with the technologies in use.

### 6.3 What I would do differently

If I was given the opportunity to start this project again, one of the things I surely would do is to ensure that I communicate problems earlier and not let things fester for long. In terms of the project code I would spend more time in the beginning ensuring that security is implemented ground up to ensure it is not an afterthought.

With regard to time management I would have spent more time on the project rather than allowing the demands of the other course modules affect the project delivery.

## 7.0 Conclusion

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Although it was slow to get this project off the ground, the project ran for almost all of the final year. This meant that it was overwhelming at times to satisfy deadlines, those of other modules as well as those of the project. There were many aspects I found very challenging, some of which were time pressures and lack of support. However, I am very proud with how the project turned out. I learned a lot about technologies I had never used before and even more about technologies I previously used or were exposed to. Once things got moving, I found the development of the project very enjoyable and satisfying.



## 8.0 Acknowledgements

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Firstly, I would like to thank God Almighty for seeing me through this project and giving me the strength to complete this course.

To my supervisor, Dr Greg Doyle for his support & guidance throughout the year and especially in the course of writing this project, thank you.

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To my children for their patience and understanding on why 'Mummy' had to stay behind at home and study instead of going with them on family outings, I promise to make it up to you, thank you.

To all my friends who supported me on this journey, I cannot begin to mention names because they are too numerous, thank you for believing in me and encouraging me always, I appreciate you all.



## DECLARATION

- I declare that all material in this submission e.g. thesis/essay/project/assignment is entirely my/our own work except where duly acknowledged.
- I have cited the sources of all quotations, paraphrases, summaries of information, tables, diagrams or other material; including software and other electronic media in which intellectual property rights may reside.
- I have provided a complete bibliography of all works and sources used in the preparation of this submission.
- I understand that failure to comply with the Institute's regulations governing plagiarism constitutes a serious offense.

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**Date:** 20/04/2020