



National
College *of*
Ireland

ReceiptRetriever App

IEEE Requirements Specification Document

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Course Name: BSc (Honours) in Technology Management

Course Specialisation: Business Analyst

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Declaration Cover Sheet for BSHTM4 Project Submission

SECTION 1 *Student to complete*

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SECTION 2 Confirmation of Authorship

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Signature: Lauren Lane

Date: 13th May 2018.

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- The requirement that a student to attend additional or other lectures or courses or undertake additional academic work.

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1. REQUIREMENTS ELICITATION & ANALYSIS PLANNING

1.1. Introduction

ReceiptRetriever is a mobile application to store and manage digital receipts using a more efficient process than paper or e-receipts. Many retailers provide a 12 or 36 month warranty on goods sold to customers. Should the product fail within the warranty period the customer is entitled to a repair, replacement or even a refund. However, shoppers must be able to provide proof of purchase and there-in lies the opportunity for ReceiptRetriever. Keeping paper receipts “safe” over this period of time is inconvenient and not secure. Paper receipts are fine as a short term solution but the ink is likely to fade or they get lost over a long period of time.

Digital receipts act as a long term solution. Due to paper receipts heading toward extinction there is a need for a more efficient process than the e-receipt. This app would provide a solution to this issue. This app satisfies a shopper’s need of keeping track of their purchases while at the same time satisfying retailer’s needs of saving money which in turn creates an environmental benefit of using less paper. This App satisfies both the need of shoppers and retailers (the customer) and creates many benefits for both.

This project is for the purpose of eliciting requirements so that the proposed app can be built. My role in this project is the Business Analyst. This project will use the business analysis approach stated in A Guide to the Business Analysis Body of Knowledge (BABOK). This project will show the process of gathering requirements from stakeholders through a number of business analysis techniques. This project will involve a significant amount of stakeholder input through a range of elicitation techniques. A Survey will be the first technique used. Surveys will help gather a large amount of desired features for the app as surveys are done on a wider scale as opposed to interviews which are much more focused and targeted on specific stakeholders. A brainstorming session will then be used and this will be held in the early stages of the project. The brainstorming session is vital in obtaining different views and potential ideas in the early stages. The brainstorming session will allow ideas to be elaborated on where they can’t be in the survey. Another important technique that will be carried out is interviews. Interviews will be held with stakeholders that are classified as critical to the project. Allowing important stakeholders to voice their opinions is crucial. Four interviews will be held in order to gain as many views as possible. The interview with the project sponsor will take place prior to the other interviews as it will provide me with more information in order to help create the interview questions for the other stakeholders. A requirements workshop will also be held with the primary objective of obtaining an understanding of the layout of the app. A second prototype will be created after the requirements workshop which will involve a number of modifications based on stakeholder’s opinions and critiques. Another important technique that will be carried out is an interface analysis. A use case diagram will be developed after all techniques are complete. The diagram helps illustrate the interactions between the stakeholders and the app and defines and clarifies what information is being exchanged through the interface.

When all requirements are gathered they will be then outlined in detail in a requirements specification document. This document will be formulated using the IEEE Requirements Specification template. The requirements will be prioritized using a MoSCoW analysis.

1.2. Business Need

From the shopper's perspective, a purse or wallet full of paper receipts or a box full of paper receipts stored at home is a familiar sight for many. However it is estimated that paper receipts are headed towards extinction. The paper receipt was always seen as practical however with the digital world continuously evolving, e-receipts are now emerging.

E-receipts are seen as easy and convenient with many benefits including cost reduction for a retailer and more environmentally friendly compared to paper receipts. Apple stores were the first to try e-receipts with other shops now slowly trying to also introduce them. Debenhams, Topshop and Argos are some of the latest shops to introduce digital receipts in the last year.

To push the emergence of digital receipts is proven difficult as some shoppers don't like change but people need to accept the evolving digital world and realize that all paper based processes will be soon digitalised just like how paper bills are now very rare.

There are many disadvantages of both paper receipts and e-receipts:

DISADVANTAGES OF PAPER RECEIPTS	DISADVANTAGES OF E-RECEIPTS
Bad for the environment	Users receiving too many emails
Costly for companies	Receipts get mixed up with other emails
Easily lost	Receipts can get caught by spam filters
Fade over time	Might be sent to the wrong person if the cashier enters the wrong email
Time consuming at the till if till roll needs to be changed	Time consuming at the till while the cashier takes the customers email address

This app addresses a major business need. Due to paper receipts heading towards extinction there is a need for a more efficient process than e-receipts. The app is suitable for all receipts but in particular it would be highly beneficial in the case of a 12 or 36 month warranty on a good sold to the shopper because generally people always seem to lose a receipt in that long period of time or if they do not lose the receipt the print fades off. The process of the digital receipt being sent directly to the app is more efficient as it saves time rather than the cashier typing in the email address which is a long process. The customer of the ReceiptRetriever app is retailers (shops/restaurants/hotels) and not the shoppers/buyers. The users of the app are the shoppers/buyers.

The benefits of this app to retailers (the customer) include:

- Efficiency as the process is quicker and involves no paper
- Reduced cost as the costs associated with paper receipts are eliminated
- Customer satisfaction through a shortened process

- Creates a new marketing channel by attaching offers to receipts and showing ads on the app

1.3. Business Case

The concept around the ReceiptRetriever application is to provide an EPOS application which benefits both shoppers and retailers by managing digital receipts and creating a more efficient process than e-receipts. My sponsor for this project is Gerry Concannon, the entrepreneur of a company called CBE. CBE are one of the leading innovators in retail technology in Europe and they specialise in the technological development of the EPOS sector. They are the leading supplier of EPOS solutions to the supermarket, convenience, forecourt, hospitality, pharmacy and general merchandise sectors. By continuously striving to exceed customer expectations they remain number one within the industry. As designers and developers of bespoke software solutions, CBE's strength lies in its capability to deliver systems for its clients that match their requirements yet exceed their expectations. CBE understand retail and they have been providing EPOS solutions since 1980.

Gerry is an enthusiastic entrepreneur and he has identified a gap in the market and has decided to develop this application. Gerry has asked me to take on the role of the business analyst for this project. The reasoning for developing this app is to create an application to replace the use of paper receipts. Gerry understands for this application to be built it requires the use of multiple techniques with various stakeholders to gain different viewpoints and opinions. We have arranged to meet regularly to ensure he is kept in the loop of the project progress. Progress reports will be presented to him during these meetings.

The app will be designed to make it easier for shoppers to receive and store their receipts and also creates a quicker process for retailers and sales assistants. Through the elicitation of requirements from various stakeholders we hope to include as many requested app features as possible.

Before undertaking this project, it must be understood that risks are inevitably associated with this project. It is extremely important that the stakeholder's needs are clearly understood. The selection of a correct vendor to develop the app is crucial to the success of the project as all projects are dependent on vendors. An incompetent vendor may create many issues for the business including misinterpreting stakeholder needs which means vital requirements can be missed which results in increased costs and efforts to fix.

1.4. Project Risks

Before undertaking this project, it must be understood that risks are inevitably associated with this project. There are various risks to the project sponsor, retailers and also app users.

Risks to the project sponsor:

- Risk of entering a potential highly contested industry.
- Risk of other technologies being more favoured in the industry.
- Risk of investing in technology that doesn't have a major industry presence at the moment.
- Risk of building an app that the target audience doesn't want.
- Risk of unstable user growth.
- Risk of choosing a wrong development partner.
- Risk of security breaches.

Risks to retailers:

- Risk of sales assistants not being able to use the technology.
- Security risks.
- Risk of business disruption due to poor technology.

Risks to the users:

- Risk of user information being lost or breached.
- Risks of system failure therefore having no access to receipts.
- Risk of losing a mobile phone which gives others access to personal information stored within the app.

1.5. Stakeholder List

1. Project Sponsor (Client)
2. Business Analyst
3. Developer
4. Users - shoppers
5. Retailers
6. Sales Assistants

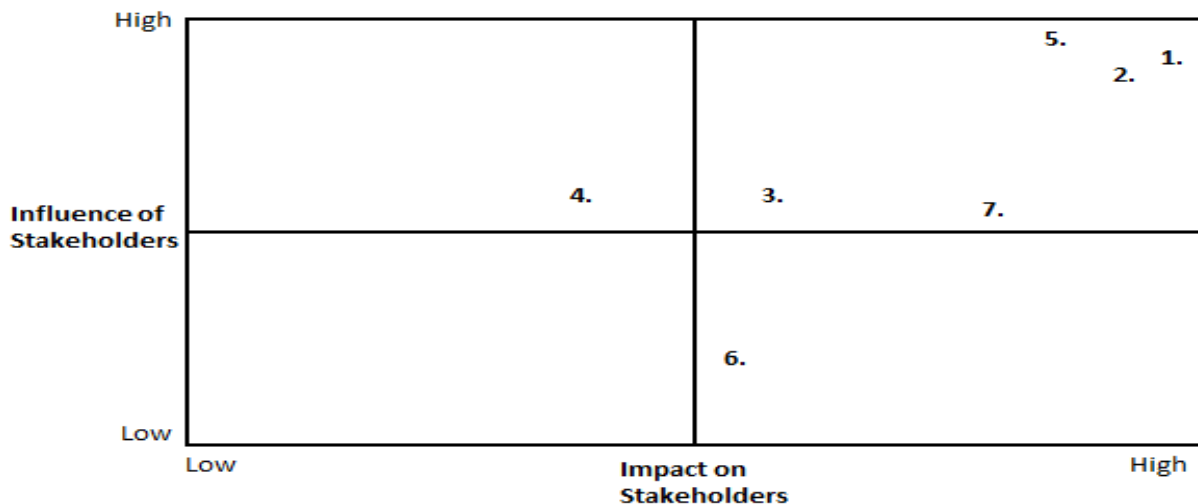
7. Subject Matter Expert (Device to Device communication or similar)

1.6. Power/Influence Matrix

KEY	
High	H
Medium	M
Low	L

STAKEHOLDERS	INFLUENCE	IMPACT
1. Project Sponsor (Client)	H	H
2. Business Analyst	H	H
3. Developer	M	M
4. Users	M	M
5. Retailers	H	H
6. Sales Assistants	L	M
7. Subject Matter Expert	M	H

Stakeholder Matrix



Stakeholder Matrix Explanation:

The stakeholders that are of low influence and low impact to the project lie in the bottom left quadrant of the matrix and the stakeholders that are highly influential and are of high impact lie in the top right quadrant of the stakeholder matrix. In relation to the ReceiptRetriever app, the stakeholders that are of high influence and high impact and lie in the top right quadrant are the

business owner, business analyst and retailers. The business owner (project sponsor) is the most important stakeholder in the project as they have the final say in the requirements list. The business analyst is vital to the project in order for it to be successful and retailers are an extremely important stakeholder as they are the customers of the ReceiptRetriever app. The business analyst should focus their efforts on the sponsor and retailers and engage most with them as they are the most important stakeholders in the project. The developers and users both hold medium impact and medium influence in the project. The sales assistants hold low influence and medium impact and the subject matter experts hold medium influence and high impact. The business analyst should also engage with these stakeholders for their input and should show interest in their needs.

2. Requirements Elicitation Techniques

2.1. Survey

Overview and Objectives:

The survey will seek to acquire a large amount of data by reaching up to a hundred people. It is impractical and too costly to attempt to interview or do a requirements workshop with this amount of people. The aim of surveys is to help gather a large amount of desired features for the app as surveys are done on a wider scale than interviews. The survey will also evaluate the demand for the app and will allow me to learn more about the target audience.

Distribution method:

- Emailed to relevant participants
- Survey link shared on Facebook

Survey questions:

<https://docs.google.com/forms/d/e/1FAIpQLSd9Ch0XL3ss-v36fA7sLkCRZKqAsFXLaVoiiZokCSaKn3empg/viewform>

Questions:

Please indicate your gender

- Male
- Female

What age are you?

- Under 18
- 18-30
- 31-42
- 43-54
- 55+

What is your current status?

- Student
- Employed full time

- Employed part time
- Unemployed
- Retired

Which of the following devices do you own?

- iPhone
- Android Phone
- I do not own a smart phone
- I do not own a phone

Have you downloaded apps for your devices?

- Yes – Always Free
- Yes – Always Paid
- Yes – Free and Paid
- No

What shops do you shop in regularly?

- Lidl
- Tesco
- Argos
- Topshop/Top man
- Penney's
- Debenhams
- Other

How likely are you to lose a paper receipt?

- Very likely
- Likely
- Maybe
- Probably Not
- Definitely Not

How often do you return an item you purchased?

- Very likely
- Likely
- Maybe
- Probably Not
- Definitely Not

How often do you have an unusable receipt due to the print faded?

- Never
- Rarely

- Often
- Sometimes
- Always

How often are you unable to return an item because you lost a receipt?

- Never
- Rarely
- Often
- Sometimes
- Always

How often do you receive e-receipts rather than paper receipts?

- Never
- Rarely
- Often
- Sometimes
- Always

On a scale of 1-5, 1 being the lowest how would you rate e-receipts?

- 5
- 4
- 3
- 2
- 1
- I have never used e-receipts

Would you be interested in an app to store and manage digital receipts?

- Definitely
- Maybe
- Probably Not
- Definitely Not

How useful would it be if a digital receipt was sent directly to an app at purchase?

- 5(Extremely Useful)
- 4
- 3
- 2
- 1(Definitely Not)

How likely would you be to recommend a receipt manager app to others?

- Very likely
- Likely

- Maybe
- Probably Not
- Definitely Not

2.2. Brainstorming

Overview and Objectives:

The aim of the brainstorming session is to produce a number of ideas from a variety of stakeholders in relation to the features and functions of the application. During the brainstorming session various stakeholders will be outlining their ideas for the app. The brainstorm will be drawn on a whiteboard. From listening to all stakeholders present I will get a clearer understanding of the features the app should include and also the functions.

Participants:

4 potential users of the app.

Date of Meeting:

Wednesday 17th January, 2018.

Time of Meeting:

14.00-15.00

Brainstorming Session Rules:

1. Participants are requested to avoid discussing their views prior to the brainstorming session on January 17th 2018.
2. Participants should arrive at least 10 minutes before the meeting to ensure it starts on time.
3. Participants must ensure their mobile phone is either switched off or on silent mode prior to the meeting commencing.
4. Each participant will be allocated a specific amount of time to put forward ideas and during the allotted time all other participants must remain quiet.
5. There will be a 10 minute recap at the end of the session to discuss ideas further in more detail.
6. This meeting is professional; therefore all participants should remain focused on the tasks outlined in the meeting agenda.
7. If a participant is late to the meeting they will take the last allotted time to put forward and express their ideas.

Brainstorming Final Deliverables:

- A list of ideas in relation to the layout, design and features of the application. This list should be emailed to all participants post brainstorming session.

2.3. Interviews

Interview One:

Participant:

Project Sponsor

Interview Location:

CBE, Straffan Road, Maynooth, Co. Kildare

Date of Interview:

Tuesday 12th December, 2017.

Time of Interview:

14.00-14.25

Objectives of Interview:

The aim of conducting an interview with my client is to understand the client's expectations for the app and what they expect of me throughout the process of the project. The interview will be structured with a set of 7 questions prepared before the interview. The interview will be informal since I am on a first name with my Client Gerry. This interview will be extremely beneficial as it may generate more ideas as I will be face to face with the client. It will hopefully encourage involvement and also offers the opportunity for the client to ask follow up questions. Also, it will provide me with more information in order to help me create the interview questions for the other stakeholders.

Interview Questions:

Q1: Could you please explain your initial thoughts on the app?

Q2. Describe what you would consider the main functions and features of the app to be?

Q3. Tell me a little about what you would like the app to do?

Q4. Why do you consider this app is worth building?

Q5. Describe what you consider the overall target audience to be.

Q6. What is the estimated project timeline?

Q7. Lastly, could you explain what features do you think are overambitious and could be potentially implemented in an updated version of the app?

Interview Two:

Participant:

Developer

Interview Location:

Ding, 3 Shelbourne Buildings, Dublin 4

Date of Interview:

Monday 19th February, 2018.

Time of Interview:

12.30-12.45

Objectives of Interview:

The objective of this interview is to gain a better understanding of what developing the ReceiptRetriever app may require from the point of view of a developer and what the app will be able to provide from a functional point of view. This interview will give me greater knowledge on the complexity of the app and will therefore give me the ability to prioritise requirements based on their complexity. A MoSCoW analysis will be used for analysing results.

Interview Questions:

Q1. From the brief description of the app given, would it be possible to make this app cross platform?

Q2. Could you please explain if it would be possible for the receipt to be sent directly to the app at purchase when a unique QR on the app is scanned by the cashier before they process the payment?

Q3. Would it be possible for a receipt to be forwarded from the app in an email?

Q4. How long would you estimate it to take to develop this app?

Q5. How much would you estimate this app would cost to develop?

Q6. Could you please explain the maintenance that would be required after the application is launched?

Q7. How much would you estimate app maintenance to be?

Q8. What sort of safety precautions can be implemented in the app to ensure users passwords and details are safe?

Q9. Could you please explain what you would suggest the best way to store user data is?

Interview Three:

Participant:

Sales Assistant – Use's e-receipts

Interview Location:

Lloyd's Pharmacy, Dublin 1

Date of Interview:

Friday 24th February 2018.

Time of Interview:

17.30-17.45

Objectives of Interview:

This interview is designed to gain a deeper understanding of the disadvantages of e-receipts from the point of view of a sales assistant who deals with them every day. This interview will hopefully identify features that could be utilised in the app and identify features that could improve the quality of receipts as a service. Sales assistants are key stakeholders who would be interacting with the app on a daily basis therefore their input is highly valued.

Interview Questions:

Q1: Can you please tell me a little about how you find the process of e-receipts?

Q2: From your experience, do you find e-receipts time consuming?

Q3: What features would you suggest for this app that would make the process easier for you as a sales assistant?

Q4: What would you suggest to attract people to this app?

Q5: Could you please tell me a little about if the returns process using e-receipts is any different to using paper receipts?

Q6: Is there any additional features not discussed in this interview that you would like to mention?

Interview Four:

Participant:

Head of IT for a major retailer

Interview Location:

Phone interview

Date of Interview:

Tuesday 27th February 2018.

Time of Interview:

17.30-17.45

Objectives of Interview:

This interview is designed to elicit many business and technical requirements. It is extremely important that business requirements are documented to ensure the agreement of all stakeholders involved and to ensure the final product meets the needs of the business. Technical requirements are technical issues that must be considered to successfully complete a project. This interview will aim to elicit as many business and technical requirements as possible from the perspective of the head of IT from a major retailer.

Interview Questions:

Q1. Tell me a little about the size of Tesco's operations in Ireland (In terms of number of outlets and types of outlets)

Q2. In terms of EPOS systems you are currently using, can you tell me a little about them please?

Q3. With regard to the "App" (which I briefly outlined above) can you tell me about your business requirements that the "App" must satisfy? For example – should the "App" fail at the checkout a paper receipt will be printed.

Q4. And the technical requirements that the "App" must satisfy? For example the "App" will provide both a visual and audible confirmation that the NFC data transfer has been successful.

Q5. Are there any other requirements that would be “nice” to have but are not crucial?

2.4. Prototyping

Overview and Objectives:

Prototyping is used to elicit requirements from stakeholders through the process of creating a model. Prototyping helps establish requirements and confirm expectations. Prototyping will help me give my stakeholders a clear visual representation of the potential end goal of the project and they can also provide feedback for any design changes.

The objective of constructing this prototype is to show a visual representation of the ReceiptRetriever app to stakeholders. This prototype is the first visual representation of the ReceiptRetriever application and it will involve my interpretation of each of my stakeholders needs. The requirements elicited from the brainstorming session, survey and four interviews will be used to develop this prototype. This prototype is very important and it will be used as part of the requirements workshop. The requirements workshop will be the first time stakeholders see the prototype. During the requirements workshop, stakeholders will have the opportunity to critique the prototype and suggest new features or request altering the prototypes design. All requested recommendations to the prototype made by various stakeholders will be documented and a second version of the prototype will be constructed.

Resources Required:

- Balsamiq will be used to construct the prototype.
- The requirements elicited from the brainstorming session, survey and four interviews that will be used to develop the prototype.

Prototype Development Checklist:

- ✓ Amalgamate requirements based on the results of the survey, brainstorming session and four interviews.
- ✓ Develop a comprehensive prototype using Balsamiq that will be used during the requirements workshop.
- ✓ Create a prototype version 2 by implementing any necessary modifications based on recommendations given by stakeholders during the workshop.

2.5. Requirements Workshop

Overview and Objectives:

The aim of the requirements workshop is to understand the layout of the app and also app features. The requirements workshop will involve the key stakeholders and it helps to promote trust and understanding among stakeholders. This workshop will involve evaluating the first prototype for the app. This is the first time stakeholders will see the prototype. During the requirements workshop, stakeholders will have the opportunity to critique the prototype and suggest new features or request altering the prototypes design.

Date of workshop:

Tuesday 6th March, 2018.

Time of workshop:

10:00 – 11:00

Workshop Agenda:

- 1) Define the purpose of the requirements workshop to participants.
- 2) Outline the rules of the requirements workshop.
- 3) Outline what needs to be accomplished during the requirements workshop.
- 4) Evaluate the prototype with all participants.
- 5) Researching competitor apps with all participants.
- 6) Identify new features for the application.
- 7) Identify design changes for the application.
- 8) Obtain an agreement among all participants relating to design, layout and features.

Workshop Rules:

- 1) Participants should arrive at least 10 minutes before the workshop to ensure it starts on time.
- 2) Participants can express their ideas but they must relate to the topic being discussed.
- 3) Participants must ensure their mobile phone is either switched off or on silent mode prior to the workshop commencing.

- 4) This workshop is professional; therefore all participants should remain focused on the tasks outlined in the meeting agenda.
- 5) Disruptive behaviour will not be tolerated.

Resources Required:

- Strong internet connection
- Table and chairs
- Laptop
- Mobile phones, tablet devices or laptops.
- Microsoft Word to document any comments made during the workshop.
- Balsamiq to display the first prototype of the app.

Workshop Final Deliverables:

- 1) A Microsoft Word document which contains a list of all participants' recommendations in relation to the layout, design and features of the application.
- 2) Throwaway prototype version two based on stakeholder preferences.

2.6. Interface Analysis

Overview and objectives:

Two UML use case diagrams will be developed after the completion of the app prototype and requirements workshop. The first diagram will represent the interactions that will exist during the process of paying for a product. These interactions will exist between the app users, retailers, sales assistants, database and the ReceiptRetriever application. The second diagram will illustrate the many interactions that will take place between the app user and the ReceiptRetriever application. On top of illustrating the interactions that will take place, interface analysis defines and clarifies what information is being exchanged through the interface, when and how frequent the information will be exchanged, where the information exchange will occur and why the interface is needed. The use case diagram will assist with the development of the app and will help avoid discrepancies.

Resources Required:

- 1) Lucidchart to construct the UML use case diagrams.

UML Use Case Diagram Development Checklist:

- ✓ Evaluate prior elicitation results from other techniques in order to identify potential interface types.
- ✓ Review the ReceiptRetriever prototype to identify possible interactions between stakeholders and the application.
- ✓ Develop UML use case diagrams for the ReceiptRetriever app.

UML Use Case Diagram Name:

- 1) Validate the purchase
- 2) Navigate application

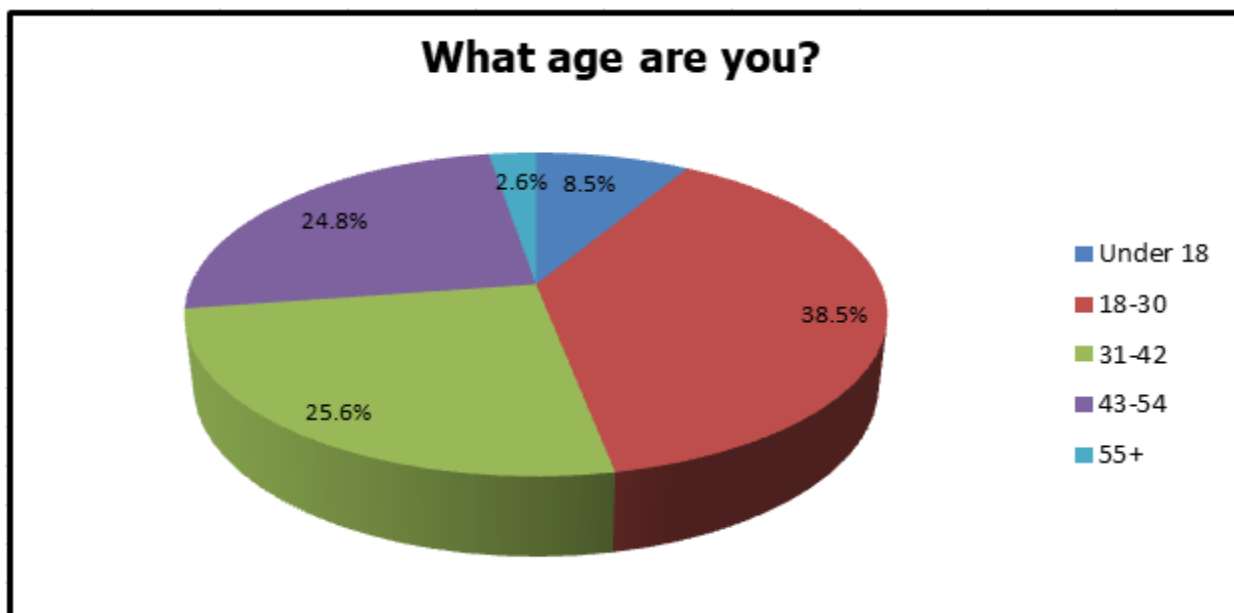
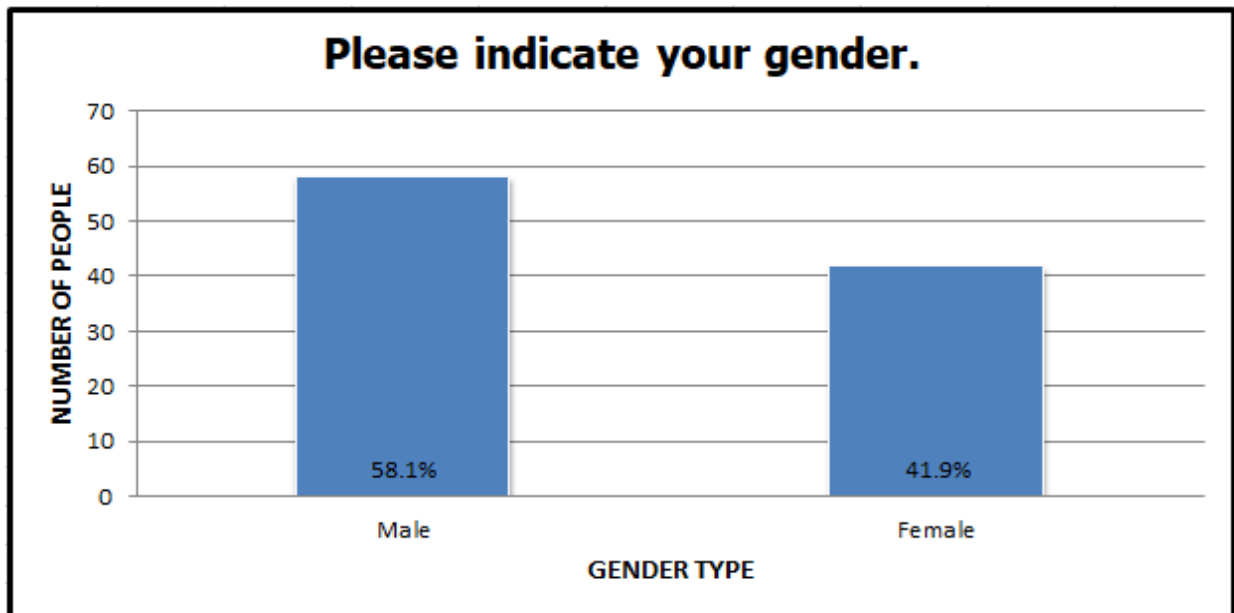
UML Use Case Diagram Actors:

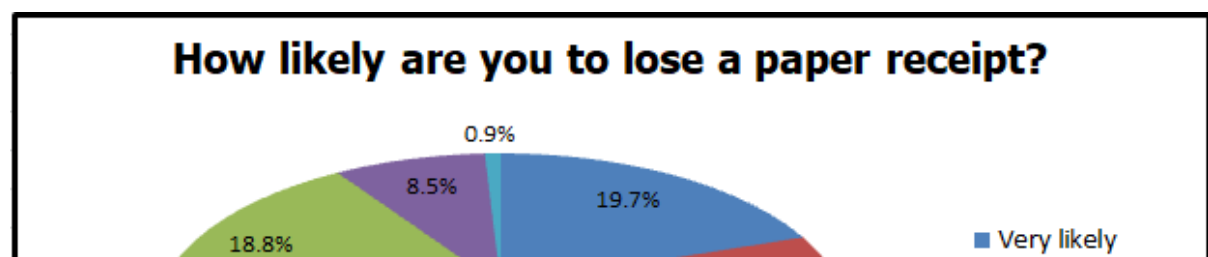
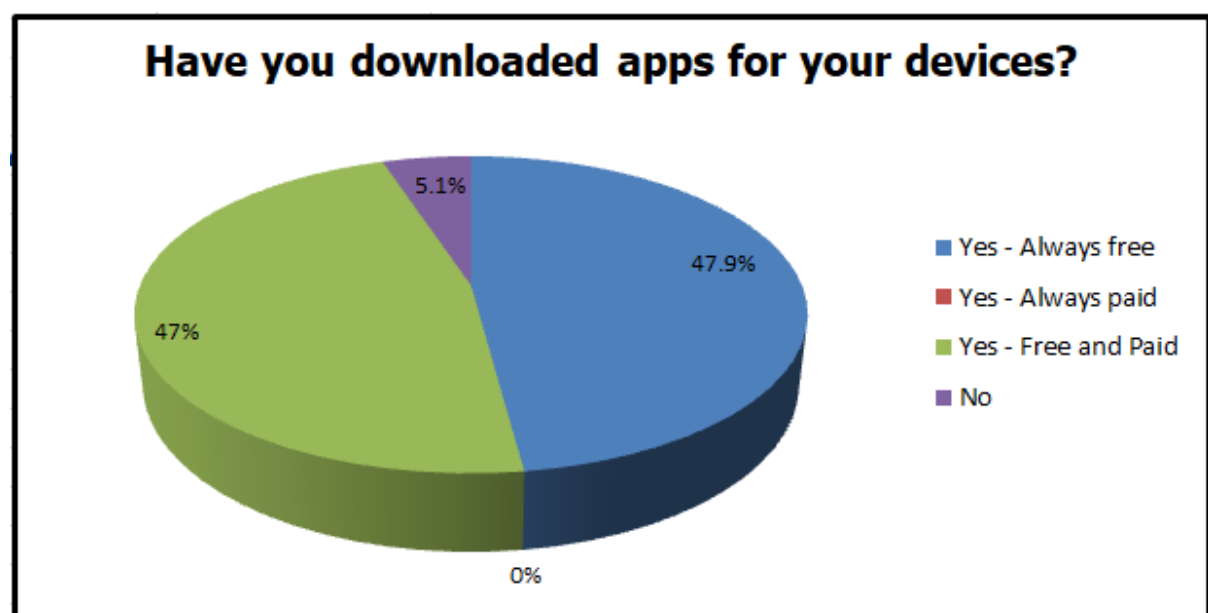
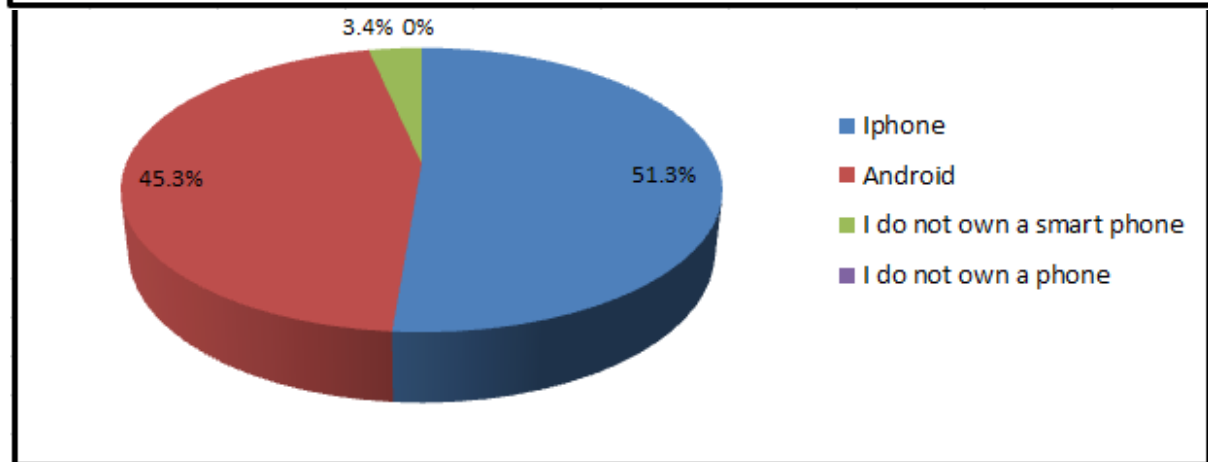
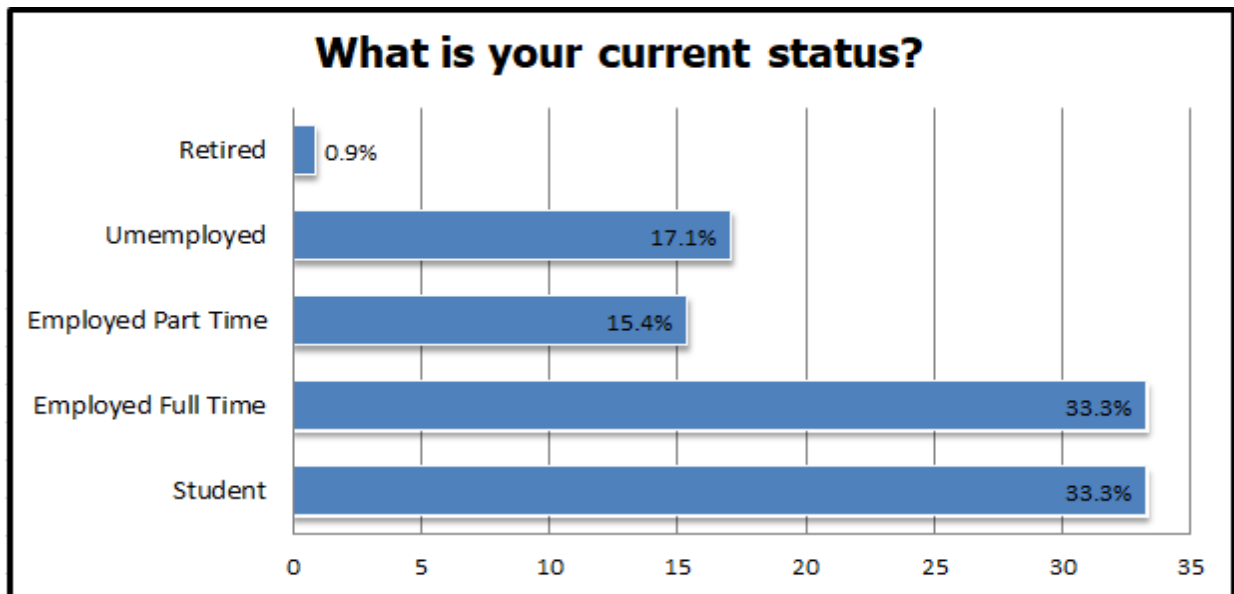
- 1) Users
- 2) Retailers

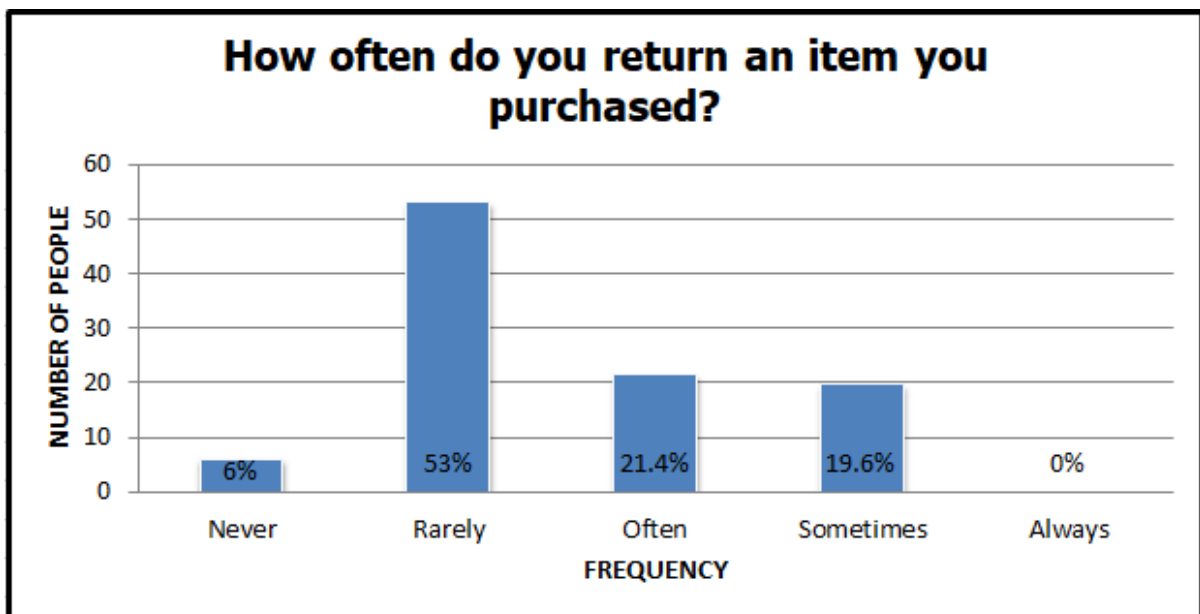
- 3) Sales Assistants
- 4) Database

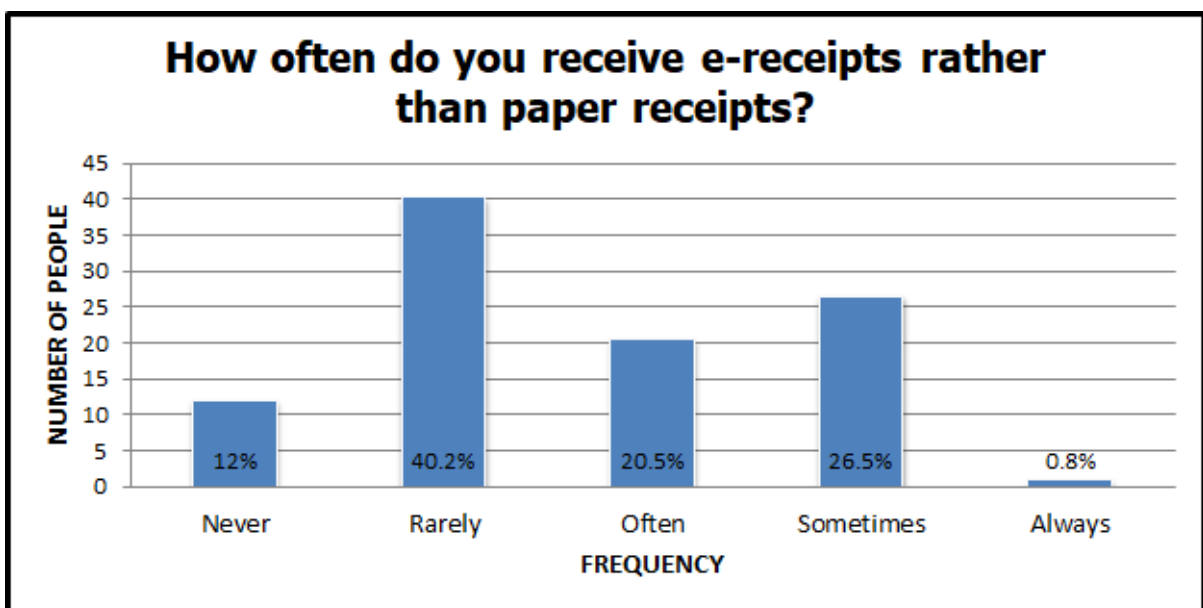
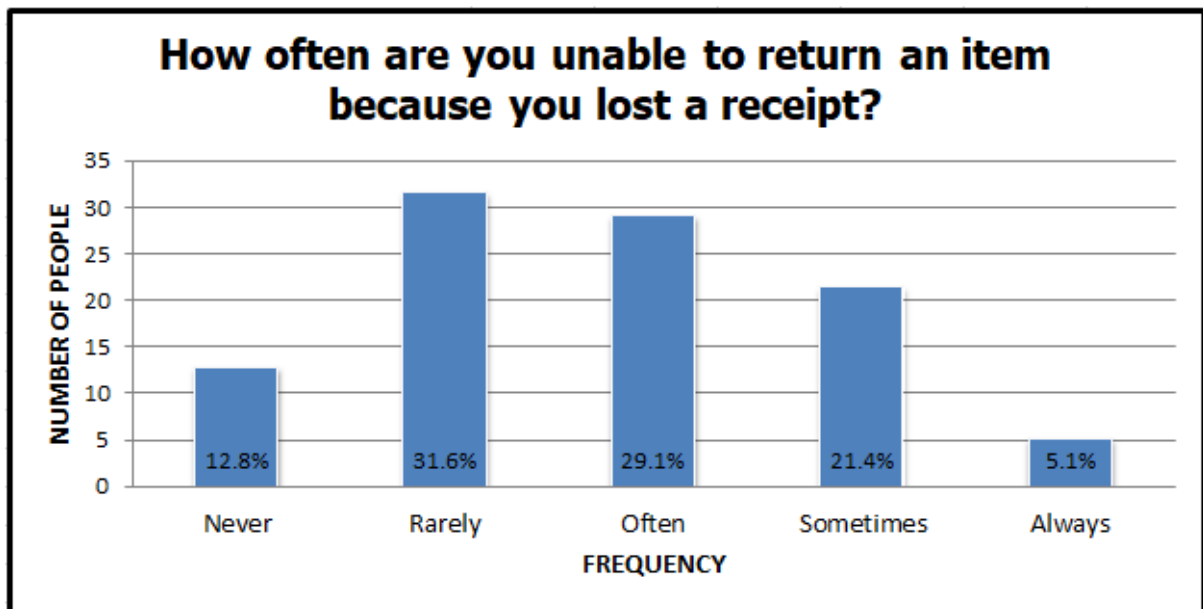
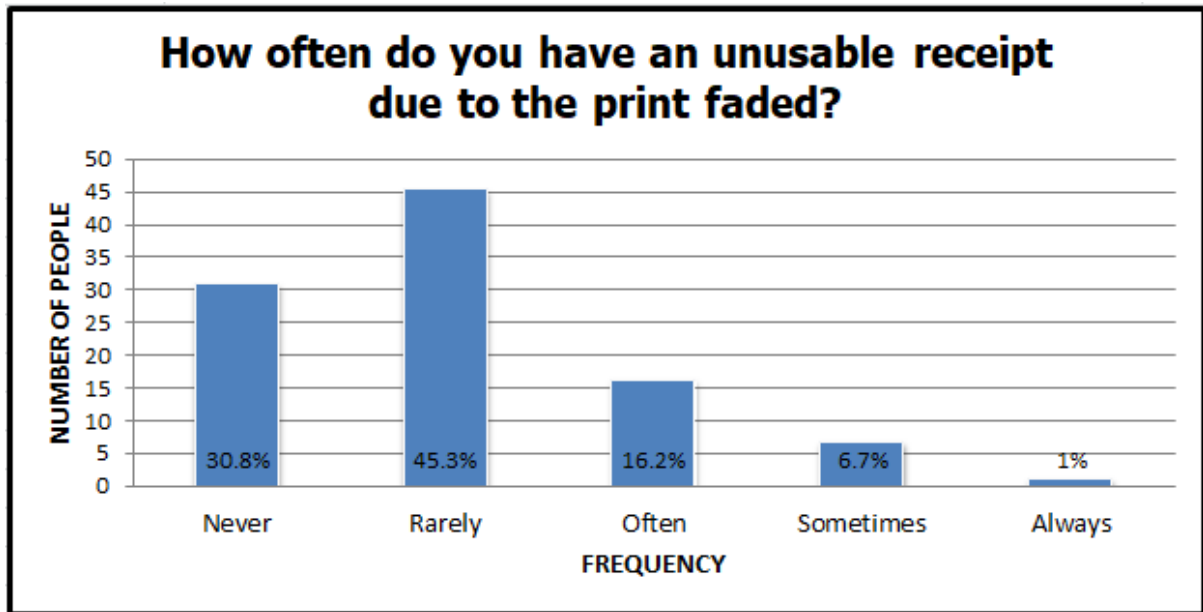
3. [Requirements Elicitation Techniques Results](#)

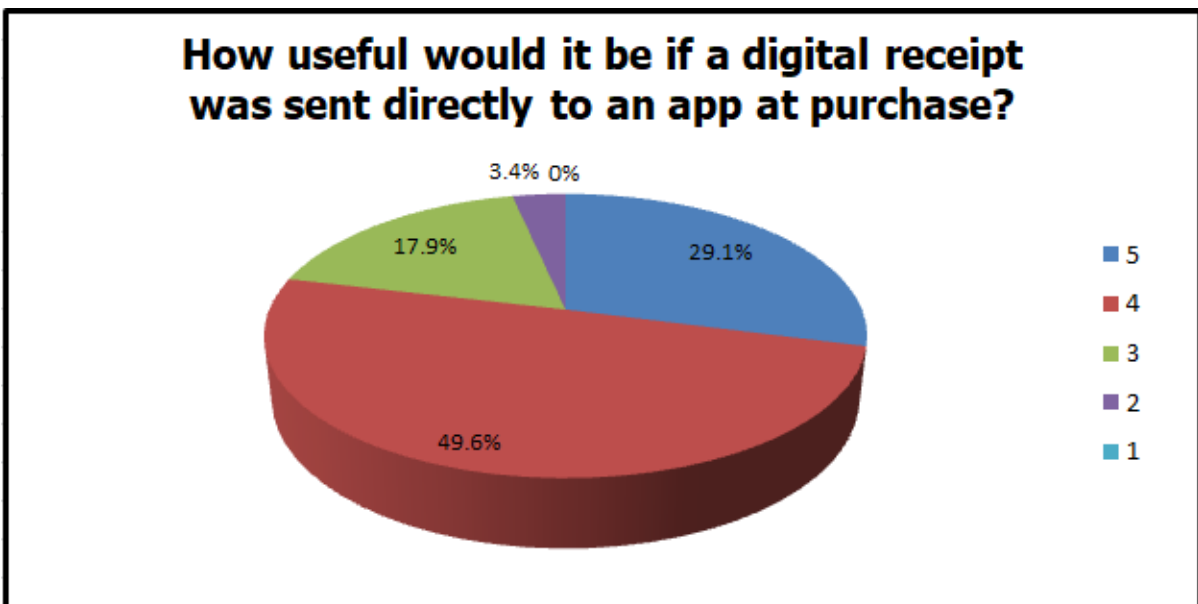
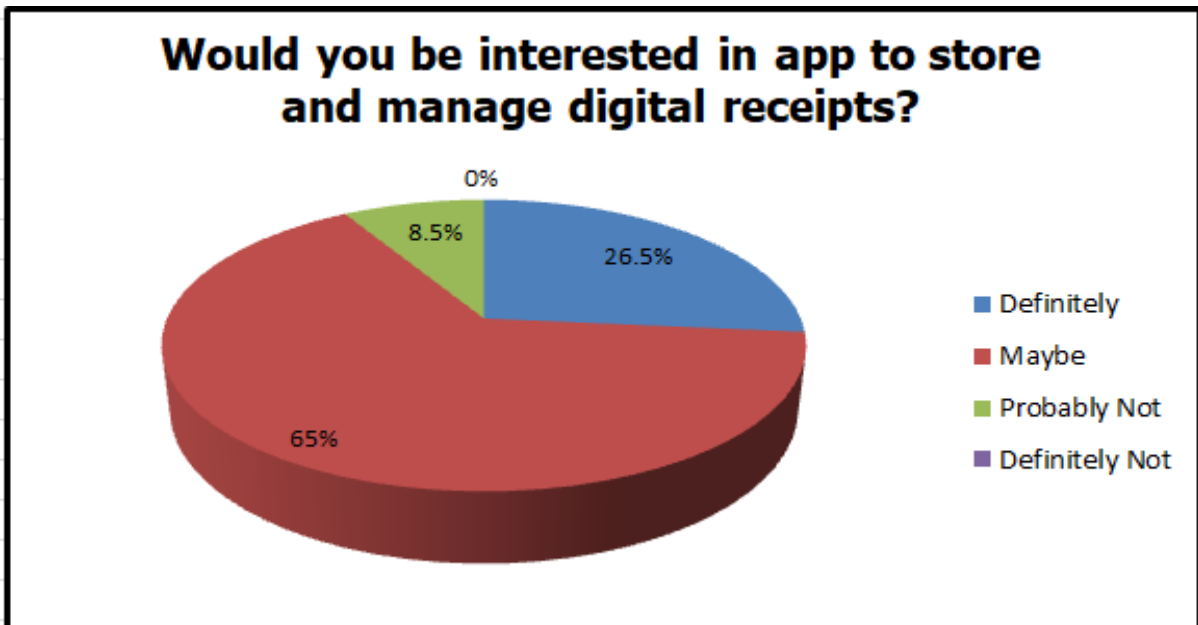
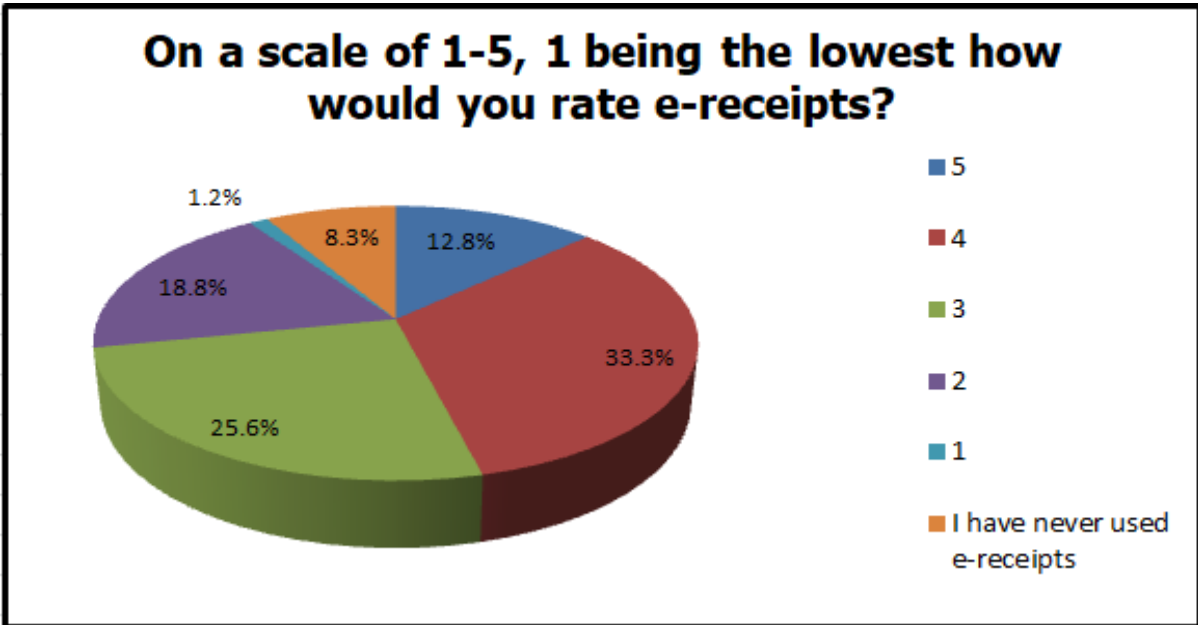
3.1. Survey

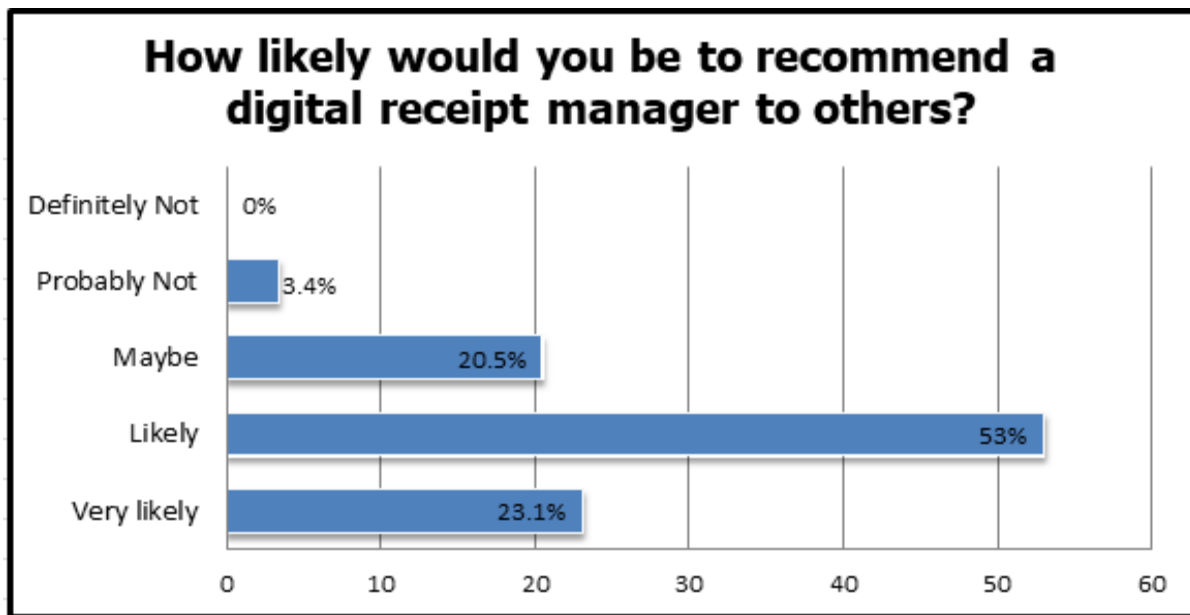












Survey Conclusion

With the use of the internet the survey was distributed. The survey was made through Google Forms and the results are displayed graphically through Microsoft Excel. The survey was conducted over the space of two weeks and in total 117 responses was received. A balanced viewpoint was the aim of the survey before it took place. The stakeholders that completed this survey vary in terms of their gender and age allowing a variety of viewpoints. The aim of the survey was to gather requirements and to survey potential users of the ReceiptRetriever app. The 117 responses were obtained through email to relevant participants and also through sharing the survey link on Facebook. The survey was completed by 58.1% female and 41.9% male, which is relatively even. In terms of age demographic, most participants were aged between 18-30 accounting for 38.5%. The least responses were from the 55+ age group accounting for 2.6%. There was an effort to get as many participants from this age group as their responses are deemed important. This age group would be less tech savvy than other age groups, therefore it is very important to gather as many requirements from them as possible. After establishing an overview of the demographic, questions related to the ReceiptRetriever app were asked. This was done with the aim of gathering as many possible requirements.

As the App is related to digital receipts, questions around paper receipts and e-receipts were asked. Questions 6-15 demonstrate the huge need, demand and interest in this app. 71.8% of participants are likely to lose a paper receipt and 29.1% often are unable to return an item due to losing a receipt. Also, 57.2% of participants would rate e-receipts 3 or below (1 being the lowest).

Of the 117 participants that took place in the survey when asked to rate how beneficial the ReceiptRetriever app would be, 91.5% of participants rated between 3 and 5 (1 being the lowest and 5 being the highest). Also, 91.5% of participants were in some way interested in the ReceiptRetriever app with 26.5% of students answering 'Definitely' and 75.1% of participants said they were likely to recommend a digital receipt manager app to others.

Overall the response to the survey has been positive and all responses will be used to determine requirements and they will be included in the MoSCoW analysis.

Requirements outcome from survey:

- App must be free to download
- App must be available on ios and android
- Supermarkets, retail stores and appliance stores must support the use of the app
- The receipt must be sent directly to the app at purchase of an item

3.2. Brainstorming

17/01/2018 14:03

PAGES

- Start Page
- Login Page
- Register Page
- My Receipts Page (main page)
- Receipt View Page
- Feedback Page
- Support Page
- MyAccount Page



LAYOUT

- User friendly
- Receipts listed newest to oldest
- Receipt highlighted if has not been opened
- Notification button as bell
- Deals attached to receipts

FUNCTIONALITY

- Ability to forward a receipt in an email
- Notification when a new receipt has been added
- Notification when a guarantee is near to expiry
- Option to delete receipts
- Ability to add comment with a receipt
- Popup if there is an error with login/register
- Ability to create labels example retail and separate receipts
- Logout button

The brainstorm was a success as it resulted in many requirements being elicited from potential users of the app. All participants remained focused on the tasks outlined in the meeting agenda and all participants were able to put forward and express their ideas while all other participants remained quiet. The first phase of the brainstorming session was the actual brainstorm that allowed the 4 participants to speak openly on what features would be a successful addition to the ReceiptRetriever app. Many ideas were shared, recorded and elicited. The ideas were recorded on LiveBoard, an interactive whiteboard application. The second phase of the session was a 10 minutes recap at the end. Ideas were evaluated and discussed further during this time. After the brainstorming session, the final idea list was distributed to all participants.

The completion of phase one and phase two resulted in different ideas and features being considered valuable to the ReceiptRetriever app. As seen in the actual brainstorm above, the requirements that have been gathered from the brainstorming session are:

- User login
- User registration
- My Receipts page link – main page
- Receipt view page link
- Support page link
- My account page link
- Start page
- Forward receipt
- Notification system
- Filtering receipts
- Delete receipt
- Pop up box
- Add comment to receipt
- User friendly navigation focusing on usability
- Receipts listed newest to oldest
- Receipt highlighted if it has not been open
- Discounts and deals attached to receipts

3.3. Interviews

Interview One:

Participant:

Project Sponsor

Interview Questions and Answers:

Q1. Could you please explain your initial thoughts on the app?

I think this is a very good idea and has great potential and there is a definite gap in the market for this app. As CBE is at the forefront of technological development in the EPOS sector, this app will be a great addition for us. This app has the ability to generate huge revenue.

Q2. Describe what you would consider the main functions and features of the app to be?

1. Simplicity for the user: It is very important to have an interface that focuses on usability and simple navigation.
2. Analytics: An analytics feature is crucial to track and identify user's experiences and actions and also, selling user data is one of the ways the app will make money, therefore an analytics feature will help to retrieve the data.
3. Sidebar: A sidebar that lists links to all app pages and also has a logout button.
4. Feedback system: The importance of having a way for users to provide feedback, suggestions and criticisms is critical. A banner should appear at the top of the app when a new receipt has been added asking the user to write a review. The user should be able to close this banner or click on it and it will allow them to send a review in an email which should be default addressed with the ReceiptRetriever email address for reviews.
5. Minimalistic: It is important to stick to the desired features for stakeholders and to not over crowd the app adding unnecessary features and functionalities. The app should be minimalistic while providing the necessary functionality.
6. Easy registration: A simple and easy registration process is a must to ensure users don't lose interest. A user only needs to enter their email address and password to make an account which ensures registration is extremely fast and won't take much time.
7. Login: Again the login process must be short with the user only needing to enter their email address and password.
8. Security: I would suggest looking into third party security agencies to help us secure our data. I would advise investing in security is of high priority as a data breach would be detrimental to the company.

Q3. Tell me a little bit about what you would like the app to do?

The app will store and manage digital receipts. The aim of the app is to make a simpler process than e-receipts. When a user registers an account they will receive a unique QR code. They simply produce this QR code to the cashier when they are purchasing an item and the cashier scans the QR code. When the payment is processed the receipt will automatically appear in the users account. When the user logs into their account all of their receipts will be shown.

Q4. Why do you consider this app is worth building?

ReceiptRetriever creates many benefits to users including allowing them to store, manage and keep a record of purchases while at the same time creates many benefits to the retailer including reducing costs.

Q5. Describe what you consider the overall target audience to be.

The target audience of the app is retailers. The app eliminates the use of paper receipts which saves retailers money which in turn creates an environmental benefit of using less paper. As well as saving money, retailers using the app create a more pleasant shopping experience for customers. This creates a better relationship between the shopper and the retailer, creating loyal shoppers.

Q6. What is the estimated project timeline?

I would love for the app to be completed in 6 months max if possible. That gives you roughly 1 to 2 months to complete the requirements specification that will be reviewed and then handed over to the developers to begin coding.

Q7. Lastly, could you explain what features do you think are overambitious and could be potentially implemented in an updated version of the app?

- I think a budget feature which allows users to create a personal budget within the app to easily manage their expenses would be a great feature but is overambitious at the moment due to the project timeline. This feature would definitely be a great addition to the app and I think could be implemented in an updated version.
- The aim of this app is to push the use of digital receipts and eliminate the use of paper receipts, however a feature allowing users to upload a picture of a paper receipt in the case they were unable to receive a digital receipt would be useful as it would allow the user to store all their receipts together. This feature is not of high priority therefore it could be definitely implemented in an updated version.
- I think definitely the long term goal of this app is to incorporate payment within the app rather than having payment separate as a separate process. This would make the process even simpler and shorter but it is definitely of low priority at the moment.

Interview One Conclusion

This interview with my project sponsor was very informative as it confirmed many important things with my client for example the project timeline and it also provided various different requirements. The objective of the interview was to understand the client's expectations for the app which was achieved and it also generated more ideas like additional features and functionalities as it was a great opportunity where I could be face to face with my client. I think this interview was extremely successful as I now have more information to create the interview questions for my other interviews with various stakeholders.

Q1: This question worked as an ice breaker for the interview and it helped to get an initial understanding on the client's thoughts of the app and their level of interest in the app being built.

Q2: Indicated some of the main features and functionalities of the app. This question generated many functional requirements like login and register and the need for both processes to be as short as possible was stressed. Also, equally as important non-functional requirements were elicited for example ensuring the app is simplistic and minimalistic. The selling point of this app is that it is a simpler and quicker process to e-receipts therefore the simplistic and minimalistic requirements are of high priority.

Q3: This question was extremely important as it requested information regarding the process in which the app would work. It was stated that the app would work using QR codes unique to each user that would be scanned by the cashier when the user is purchasing a product. This has generated a potential question for the interview with a developer to see is it possible for the receipt to be sent to the app using this process and also what is required for the app to follow this process.

Q4: Validated why this app should be built while providing further information on the background of this idea.

Q5: This question was used to request information regarding the apps target audience. The accurate identification of a target audience is vital to an apps success as it reduces the chance of wasting both time and resources. An app should be designed with the target audience in mind. The target audience has been identified as retailers.

Q6: This question helps to map and determine a project timeline and is an important question that a project sponsor must be asked before beginning a project. A similar question will be asked to the developer to ensure the app can be built in the timeline specified by the project sponsor.

Q7: Resulted in low priority requirements being gathered that could potentially be implemented in an updated version of the application.

Requirements from Interview One:

- User friendly navigation focusing on usability
- Analytics
- Sidebar
- Logout button
- Banner appears when new receipt is added
- Email defaulted with the ReceiptRetriever email for reviews
- Minimalistic
- User registration
- Short login process
- Security contract
- QR code generation
- Receipt sent directly to app
- All receipts associated with a user will be shown when they login
- Ads to be shown on the app
- Offers to be attached to digital receipts
- Budget feature
- Take picture of receipt
- Payment incorporated within app

Interview Two:**Participant:**

Developer

Interview Questions and Answers:**Q1: From the brief description of the app given, would it be possible to make this app cross platform?**

Yes, this app could be cross platform which is the best when launching a new app as it connects both markets simultaneously instead of launching ios first like some companies. However, when developing an app that's compatible with many different platforms issues arise when trying to address the unique needs of each and every platform. Making the App cross platform would mean either using technologies compatible with all device types, example JQuery, or making a separate app for web, ios and android which is common. It would certainly be possible. The main body of work is server side which is not device specific.

Q2: Could you please explain if it would be possible for the receipt to be sent directly to the app at purchase when a unique QR on the app is scanned by the cashier before they process the payment?

Yes, a unique QR would be generated when a user registers an account and there would be some API endpoint that would simply POST the data, which would be some sort of generated receipt model and the user ID that would be known on the device when signed in. When a receipt is scanned, the shop would have some sort of small device that would read it as well as having access to the receipt and send the receipt to the database linked to the user ID.

In theory on scan you would have something like:

```
var dataToPost = { receipt:{
                    total: 99,
                    companyName: "tesco"
                    date: "20/1/19"
                },
                userId: 1238123213 };
```

The server side would add this data to the database, when a user wanted to see their receipts, it would simply show them all receipts linked to their ID.

Q3: Would it be possible for a receipt to be forwarded from the app in an email?

Yes a simple POST call can be used to send an email to anybody you wish provided the server supports SMTP. Usually the client would post the data to an API endpoint; the server side will do the actual mail sending. This is provided the user has created an account and is signed up with an email of course.

Q4: How long would you estimate it to take to develop this app?

Time is hard to estimate but if we say it's on android and also on ios, the actual client side would take no longer than 3 weeks per platform. The server side does have quite a bit of functionality including emails, QR reading, some privacy and security work so I would say 3 months.

Q5: How much would you estimate this app would cost to develop?

Again, cost is hard to estimate, it really depends on the developer. Contracts are usually between 250 and 500 per day. For a contract of three months for a backend developer to build the server side, and 3 weeks each for the ios and android I would estimate around 35-40k for the server side and around 15k for the 2 platforms, this is at an average of 350 per day. Total cost 50-55k.

Q6: Could you please explain the maintenance that would be required after the application is launched?

Ongoing app maintenance is a must for the smooth running of an app. There are no set rules about the frequency of app updates however it is very important to maintain and optimize an app. Someone would need to maintain the odd update to each platform to improve performance, UI and so on, a more junior developer could probably do this. The server side would rarely need updates, probably someone once or twice a month to perform database backups and optimise the code base.

Q7: How much would you estimate app maintenance to be?

App maintenance costs are hard to estimate as they are solely based on the type of app, complexity and a lot on how it was built. I think 500 to 750 per month for a junior developer to spend 10-15 hours a month maintaining. Server side I would say a contract with some tech company for around 1k per month would suffice. You would also need a web host provider of course which would cost around 100 per month with support provided. In total it would be just under two thousand per month for app maintenance.

Q8: What sort of safety percussions can be implemented in the app to ensure users passwords and details are safe?

- To ensure that user's passwords are safe, passwords would never be stored in plain text, but hashed with a hashing algorithm such as MD5.
- I would suggest making the password requirements a minimum of 8 to 12 characters long with a minimum of one capital letter and one number or symbol.
- No user specific information should be stored in cookies.
- Ideally all data in the database would be encrypted; this would be decrypted on the server side when needed.
- CORS could also be implemented.
- Google's RECAPTCHA plugin could also be implemented. This would verify if the login was processed by a human or a bot. This would allow users to pass through with ease while keeping automated software from engaging in abusive activities on the app. Adding RECAPTCHA could prevent user login information being compromised.
- A limit on how many times a failed login is entered could also be implemented. If the user exceeds the amount of times they could either have to wait for a specified time before they can try login again or the account can be locked until the user is verified through clicking the verification link sent to them through their email account.

Q9. Could you please explain what you would suggest the best way to store user data is?

MONGO dB is commonly used. It is also multi-platform and quite easy to maintain with little experience. It can also be setup for incremental backup. I would recommend this.

Interview Two Conclusion

This interview conducted with a developer resulted in a large number of technical requirements for the ReceiptRetriever app. This interview was extremely useful as it has given me a better understanding of the complexity of the app and how exactly the app will work from a technical point of view.

Q1: The first question of the interview with the developer has indicated that it would be possible to make this app cross platform but it would require either using technologies compatible with all device types, example JQuery, or making a separate app for web, ios and android which is common.

Q2: Indicates that the requirement for the receipt to be sent directly to the app at purchase can be achieved by producing a unique QR code to the user when they register that they will then scan when purchasing an item. The receipt is then sent to the database linked to the user ID and all receipts linked to the user ID with be shown when the user is logged in.

Q3: Indicates that the requirement for a receipt to be forwarded from the app in an email can be achieved provided the server supports SMTP.

Q4: Specifies a timeline for the project which is roughly four and a half months to develop both the server and client side.

Q5: Provided an estimated cost for developing this app which is roughly around 50 to 55k.

Q6: Indicated that someone would need to maintain updates to each platform to improve performance and UI but it would not have to be very often. An update once or twice a month is required to update the server side.

Q7: This answer resulted in the requirement that a web host provider is needed and also that app maintenance would cost roughly 500 to 750 per month.

Q8: Provided a large amount of requirements to do with security features that could be used to protect user information in the ReceiptRetriever application. Examples of security features include passwords being stored with a hashing algorithm, all data in the database would be encrypted, CORS could be implemented, no user specific information should be stored in cookies and the use of google RECAPTCHA feature to ensure the user is genuine.

Q9: Resulted in the requirement of MONGO DB to used to store user data.

Requirements from Interview Two:

- Technologies
- Common app
- QR code
- QR scanned
- Viewing receipts
- Forward receipt
- Webhost provider
- Updates
- Encryption of passwords
- Password requirements
- No user specific information stored in cookies.
- Data in database must be encrypted
- CORS
- Google's RECAPTCHA
- Failed login
- MONGO dB

Interview Three

Participant:

Sales Assistant – Use's e-receipts

Interview Questions and Answers:

Q1: Can you please tell me a little about how you find the process of e-receipts?

I find the process of e-receipts to be straight forward and customers who receive e-receipts can always place them where as customers tend to lose the paper receipts very easily. However, they are not practical because the long process is too time consuming. A similar process that shortened the time taken to carry out the process would be ideal.

Q2: From your experience, do you find e-receipts time consuming?

E-receipts are extremely time consuming. Sometimes if I am extremely busy and I have a long que of customers I will not offer them the option of an e-receipt. My job is to keep the que moving and to serve customers promptly therefore it is impossible to take the time to take customers email addresses when the store is busy.

Q3: What features would you suggest for this app that would make the process easier for you as a sales assistant?

- I think it is important that the login process is extremely short or the user is able to permanently stay logged in, so if they are exchanging an item they can obtain their receipt quickly to avoid delaying the que.
- A sufficient help page where a customer can access support would be vital to ensure that customers having issues are not asking the sales assistant in the store for app support as they would not know.
- A set time in which the receipt would appear on the app should be set to avoid customers complaining to the store which they shopped because it is nothing to do with them and sales assistants would not be able to answer the customers query.
- Having social media pages and having them linked to the app would be great. A problem with e-receipts is they are still very new therefore customers are hesitant towards them. Advertising the app on social media would definitely make customers become familiar with the app.
- Discounts and deals would defiantly need to be attached somehow to the digital receipt. A big reason why people actually like paper receipts is because they receive discounts.

Q4: What would you suggest to attract people to this app?

The app must be highly reliable and secure. The customers who are normally hesitant in using e-receipts are people who are less tech savvy and do not fully trust technology. A reliable working app that works on all devices would help change people's opinion. Also, since customers love offers and discounts, in app offers would help attract users to the app. Social media logins could also shorten login/register time therefore it could be an attractive feature for the app.

Q5: Could you please tell me a little about if the returns process using e-receipts any different to using paper receipts?

No, returns are exactly the same with e-receipts the digital receipt is shown to the sales assistant just like how a paper receipt would be.

Q6: Is there any additional features not discussed in this interview that you would like to mention?

- Notifications when a new receipt has been added to the app
- Option to customize different settings, layouts and features to a user's own preference

Interview Three Conclusion

This interview was informative as it gave the perspective of a sales assistant that interacts with e-receipts on a daily basis therefore know the shortcomings of e-receipts well. Various different requirements were gathered from the point of view of making the process easier for sales assistants. These requirements are highly valued because retailers are the target audience of the app and sales assistants would be the people working up close with the system.

Q1: Answer gave more information on e-receipts as a process.

Q2: Showed the major downfall of e-receipts as being extremely time consuming and stresses the need for a similar but quicker process.

Q3: Validates the requirement for a short login process. This makes the sales assistant jobs easier by not delaying their que while a user logs into the app to get a receipt to return an item. The question also generated a requirement of being permanently logged in for convenience. The requirement for a support page was validated as the importance was stressed to ensure customers do not go to store sales assistants for app support. This question generated various other requirements including a set time in which the receipt should appear in the app, social media pages linked to the app and lastly discounts and deals attached to digital receipts.

Q4: Validated the requirements for security and stressed the fact that the app must be highly reliable. Also, indicated the need for in app offers to attract users and social media logins to also attract users with a short login/register time.

Q5: Indicated that returns work the same therefore no additional setup would be needed.

Q6: Validated the requirement for a notification when new receipts are added and generated a requirement for customisation.

Requirements from Interview Three:

- Short login
- Permanently logged in
- Support page link
- Time in which receipt appears in app
- Social media account links
- Discounts and deals attached to receipts
- Offers and ads advertised throughout the app
- Social media logins
- Notification system
- Customisation

Interview Four:**Participant:**

Head of IT for a major retailer

Interview Questions and Answers:**Q1. Tell me a little about the size of Tesco's operations in Ireland (In terms of number of outlets and types of outlets)**

Tesco falls below SuperValu and Dunnes Stores in terms of market share. Tesco has a recorded market share of 21.9% and 2.7 million sales per year in Ireland. Tesco has 152 stores in Ireland and 14,000 employees. Tesco is a large organisation in Ireland but it is also part of the three largest retailers in the world.

Q2. In terms of EPOS systems you are currently using, can you tell me a little about them please?

We use many hundreds of systems, even thousands. In order to support commercial, retail and finance, so many systems are required. We mainly use bespoke systems, Etalic in Israel develop our code. On self-scan we use NCR. This technology does not only boost customer service levels and overall store experience but also contain operational costs. All of our retail software is very much bespoke and developed for us. For example our tills must show product prices and need to be able to except vouchers and coupons etc.

Q3. With regard to the "App" (which I briefly outlined above) can you tell me about your business requirements that the "App" must satisfy? For example – should the "App" fail at the checkout a paper receipt will be printed.

- Speed – Important to have a set that the receipt goes to the app.
- Notifications – Allow users to receive popups when receipts are received.
- Receipt format – Important to decide if the receipt will be a screen print, file or other.

Q4. And the technical requirements that the "App" must satisfy? For example the "App" will provide both a visual and audible confirmation that the NFC data transfer has been successful.

- App should be look good and perform the same on all device sizes example tablets.
- The app should be provisioned by the app store.
- Data protection regarding app and data access – Securing data is important.

Q5. Are there any other requirements that would be "nice" to have but are not crucial?

- Email sent to user when new receipt has been added.
- Sending receipt in an email.
- Budget model – Allow users to see how much they are spending in each store.
- Exporting costs of various receipts to a spreadsheet to manage expenses.

Interview Four Conclusion

This interview was informative as many technical and business requirements were gathered from the point of view of a major retailer.

Q1: Question got the interview started while gathering a background on the company.

Q2: Gives understanding of the systems being currently used by the company.

Q3: This question elicited various business requirements for example the receipt format while also validated requirements for a notification system.

Q4: Indicates that the app should look the same on all devices and it should also be provisioned by the app store.

Q5: This question elicited the requirement of an email to be sent to the user to inform them of a new receipt being added. This requirement is not of high priority. This question also validated the requirement for the ability to send a receipt in an email and a budget model while also eliciting the requirement for the ability to export costs of various receipts to a spreadsheet to manage expenses.

Requirements from Interview Four:

- Exporting costs of various receipts to spreadsheet to manage expenses.
- Receipt format
- Set time in which receipt appears in app
- Budget feature
- Notification system
- App provisioned in app store
- App should be designed to look and perform the same on all device sizes
- Email sent to user to notify of new receipt being added
- Forward receipt

3.4. Prototyping

Prototyping Version One:

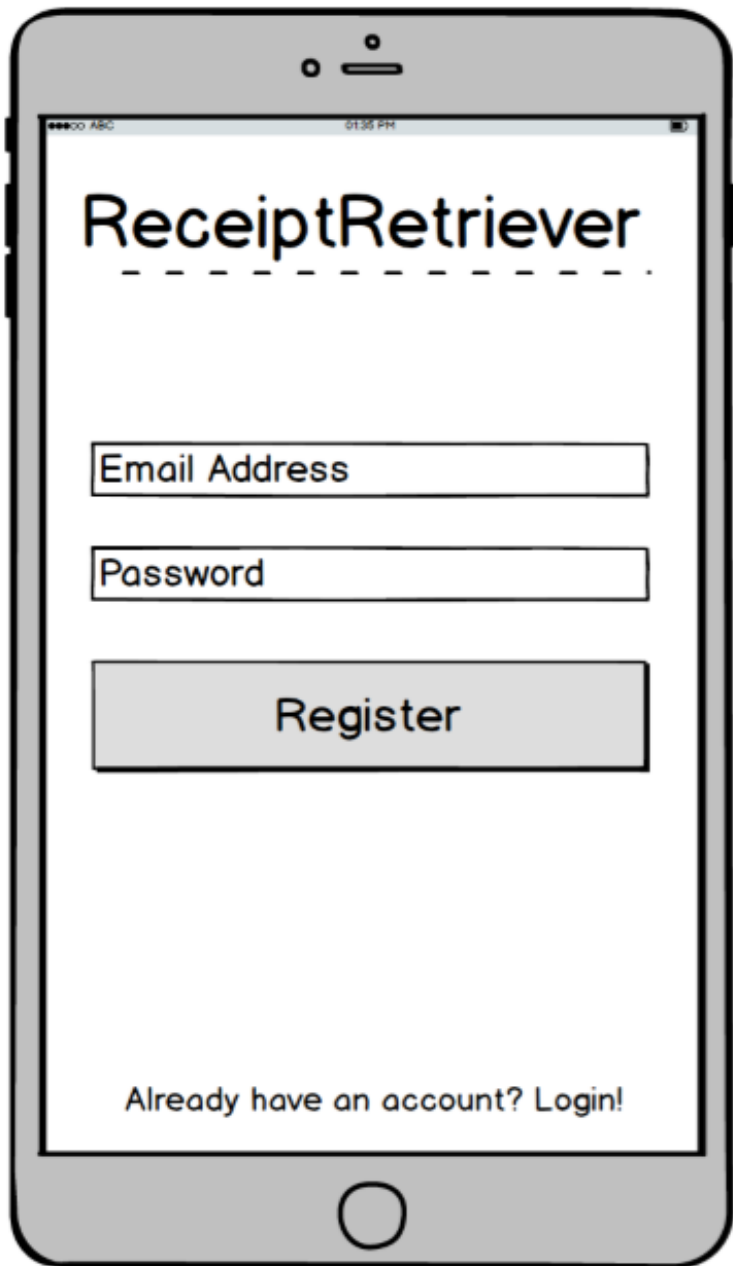
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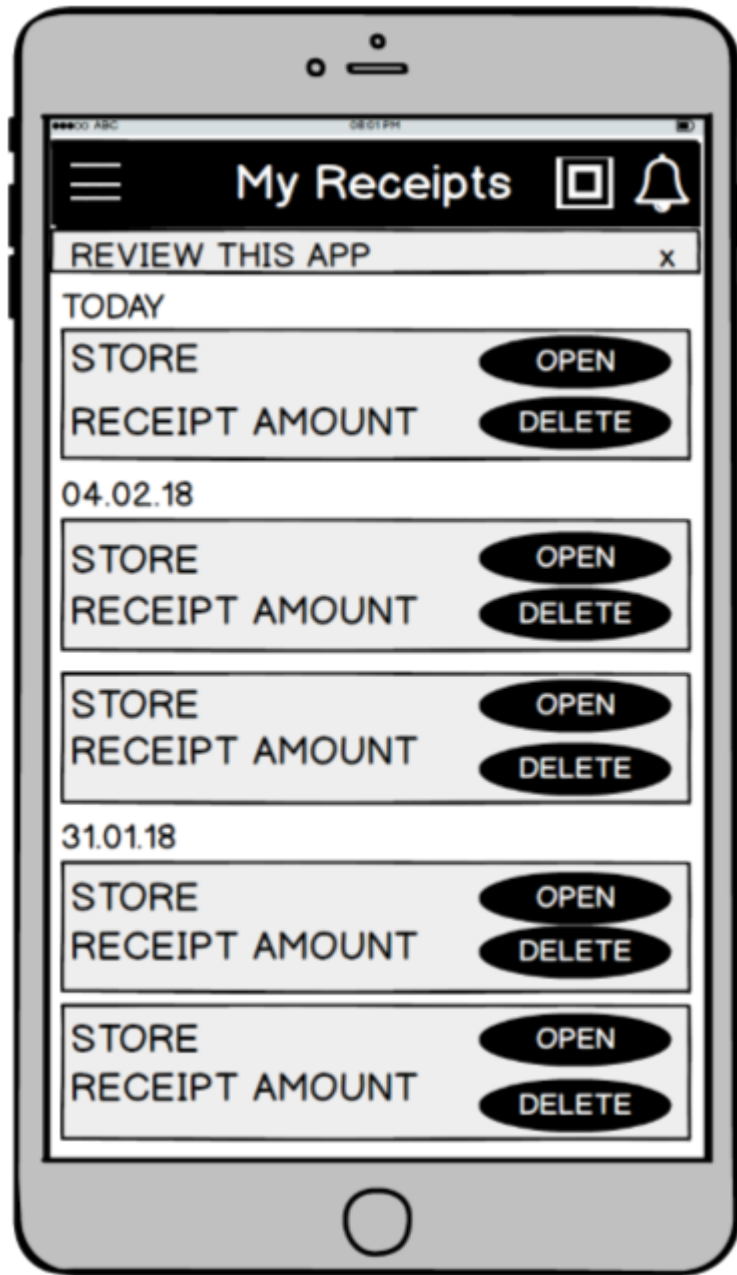
Login Page



Register Page



My Receipts Page



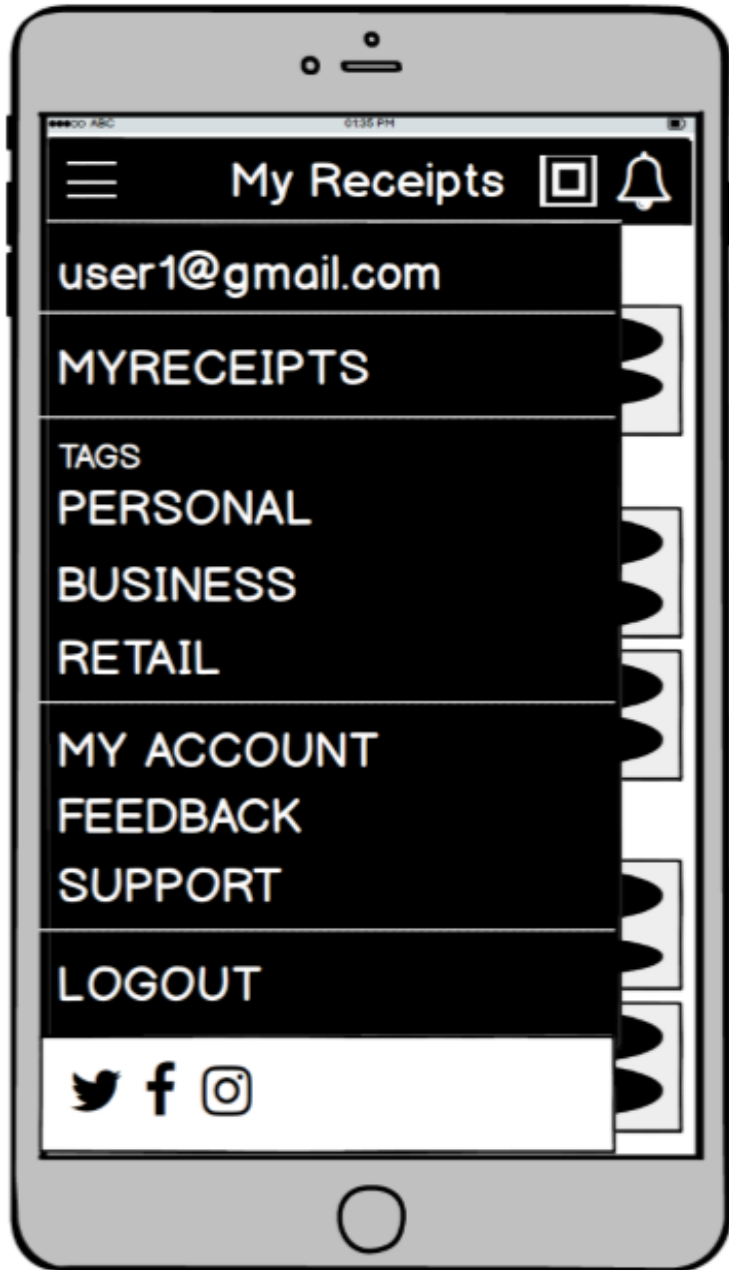
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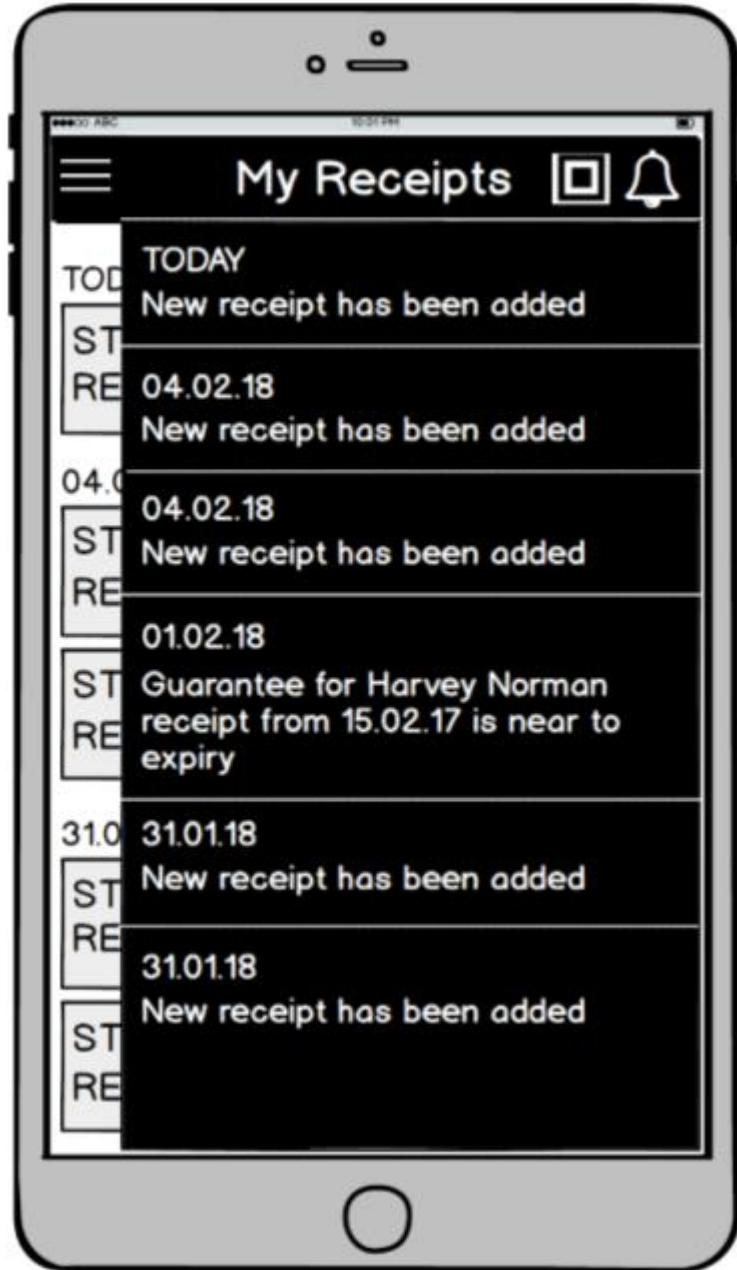
QR Code



Sidebar

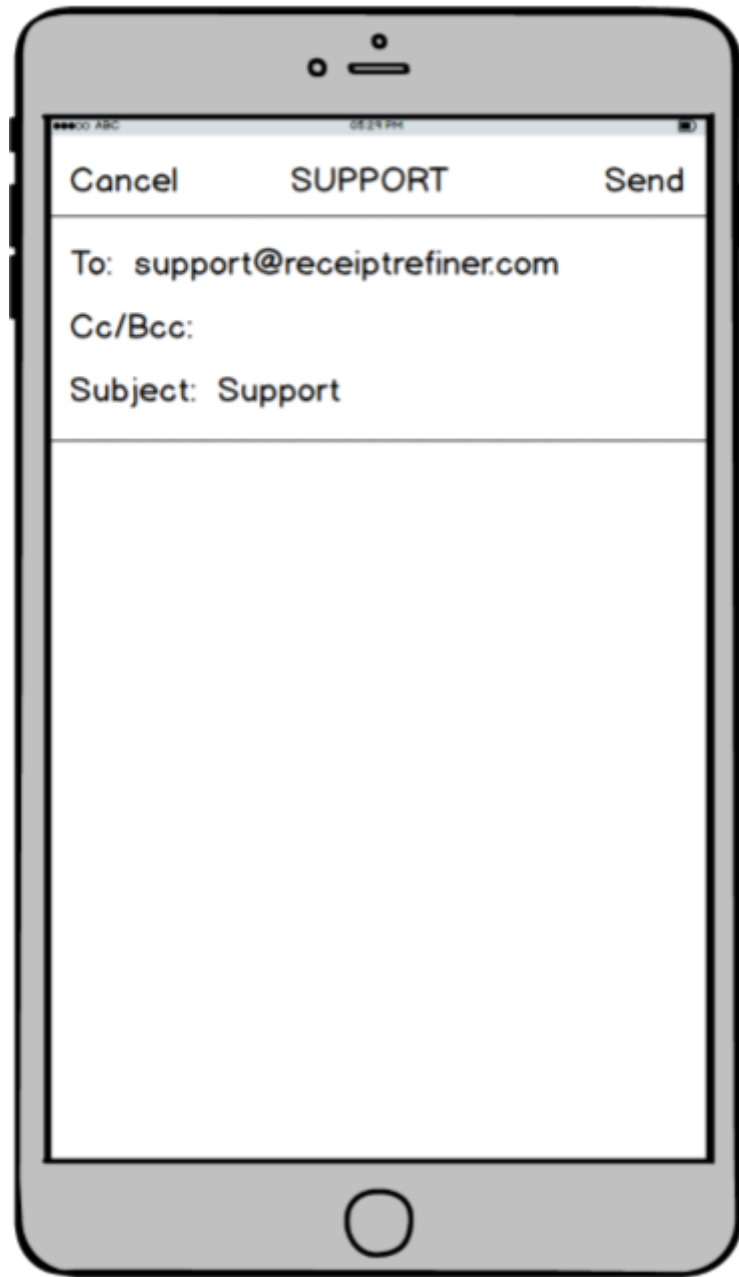
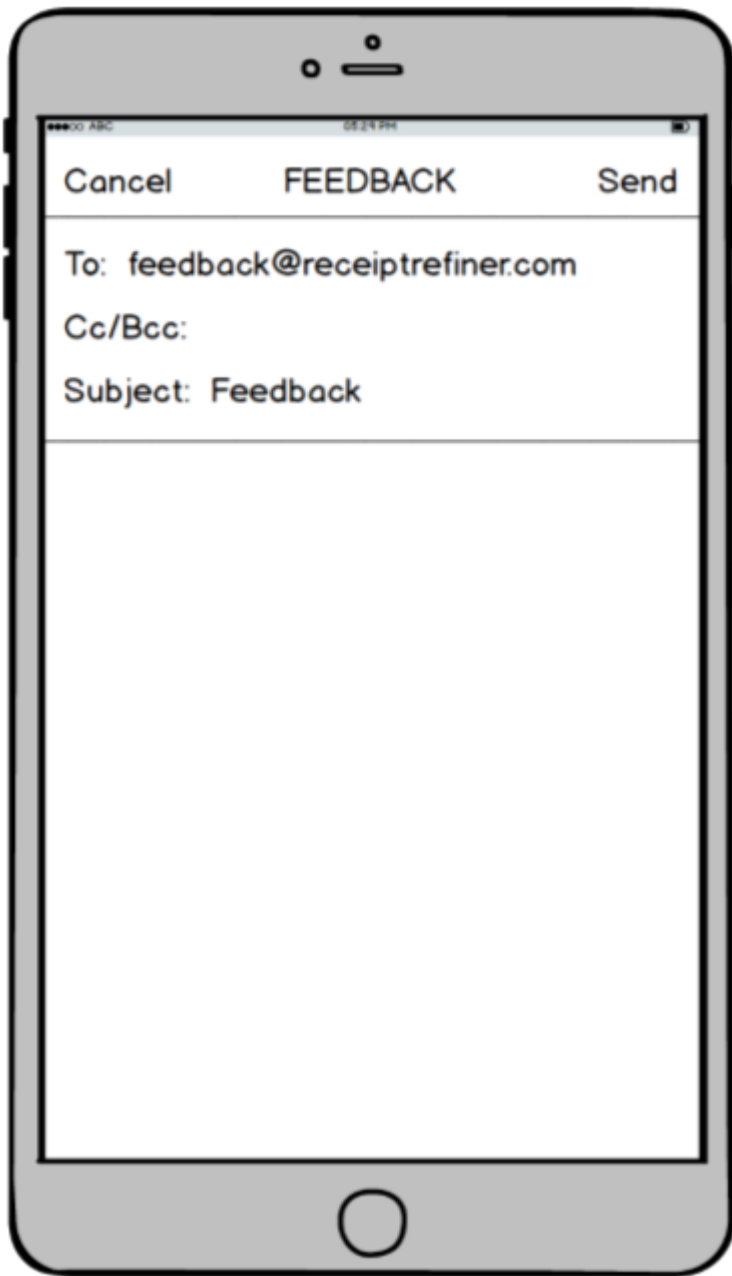


Notification View

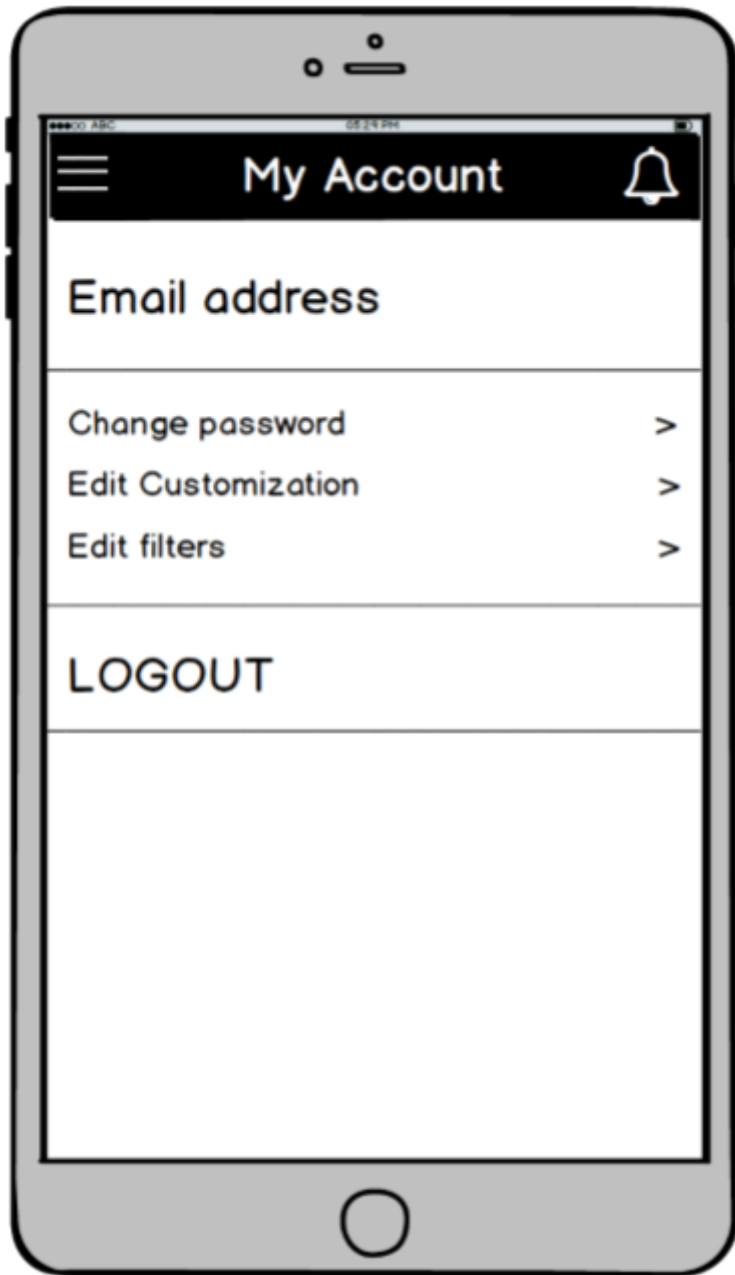


Feedback

Support



My Account



Prototype Version One Conclusion:

This prototype was developed using the requirements elicited from the brainstorming session, survey and four interviews that took place with various stakeholders. The requirements were prioritized using the MoSCoW analysis technique which then contributed towards the design and features incorporated into the first prototype of the ReceiptRetriever app.

This prototype of the ReceiptRetriever app contains 11pages which intend on complementing each stakeholders needs. It was important to only have a small amount of pages in this app which are deemed important and necessary. The selling point of the app is it is a simpler and quicker process than e-receipts therefore only features and functionalities deemed of important were included to ensure the app is kept minimalistic and straight forward to use.

This prototype will be evaluated during the requirements workshop on Tuesday March 6th 2018. This is the first time stakeholders will see the prototype and they will have the opportunity to critique the prototype. The design, layout and features of the prototype will be modified to match stakeholder preferences after successful completion of the requirements workshop. The requirements workshop provides the opportunity to identify both missing and improperly specified requirements in the first prototype. After the requirements workshop, a second prototype will be made to implement potential new requirements and to modify improperly specified requirements if necessary.

Prototype Version Two:

First Page



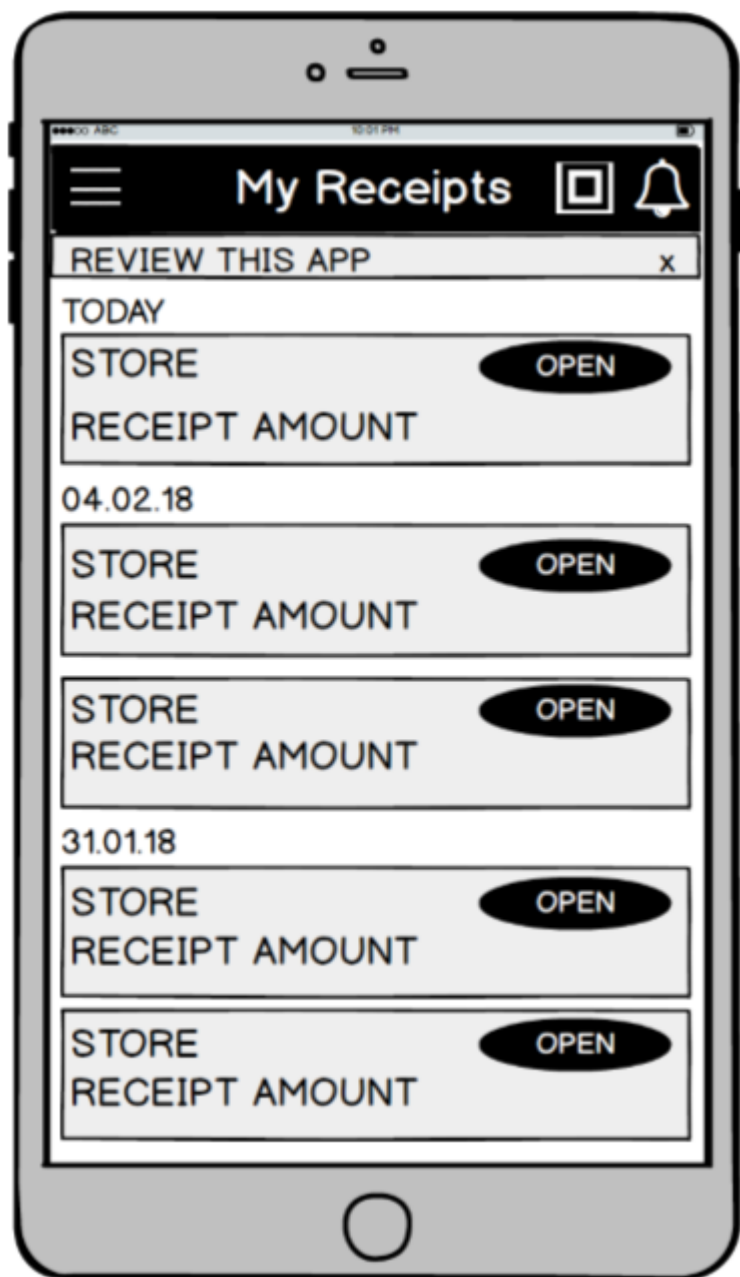
Login Page



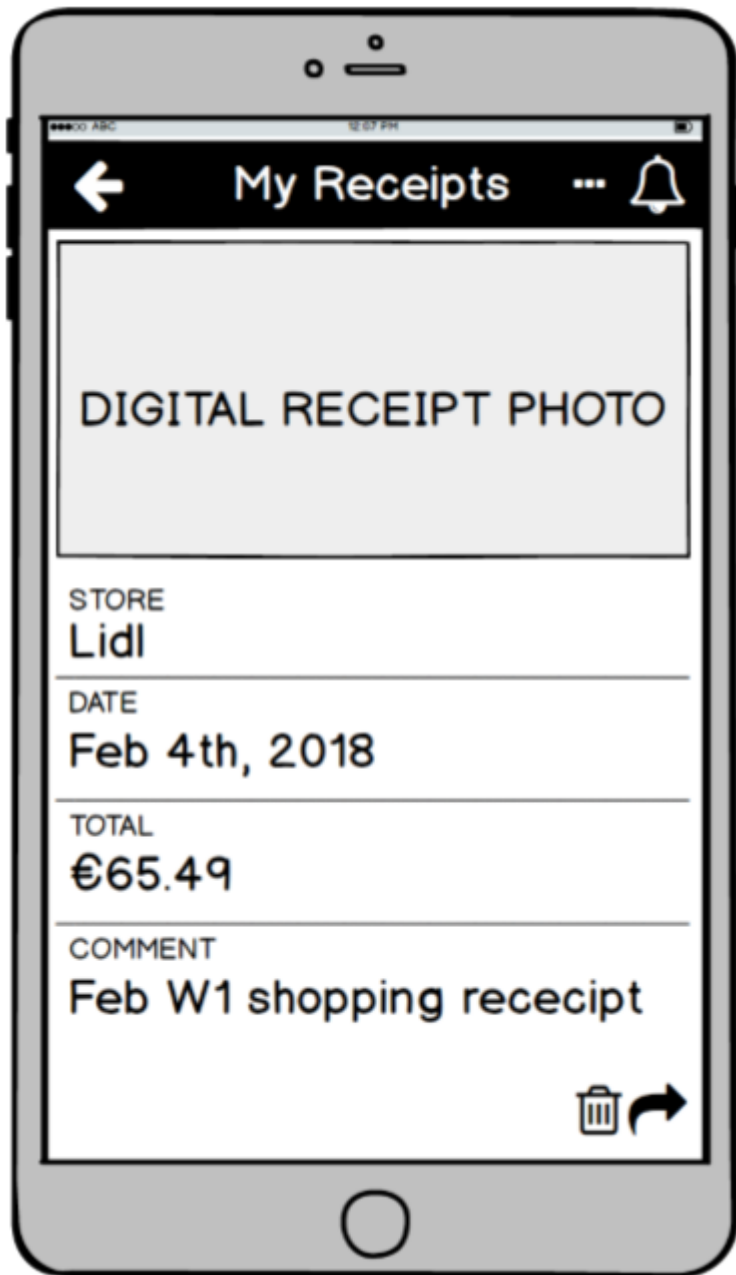
Register Page



My Receipts Page



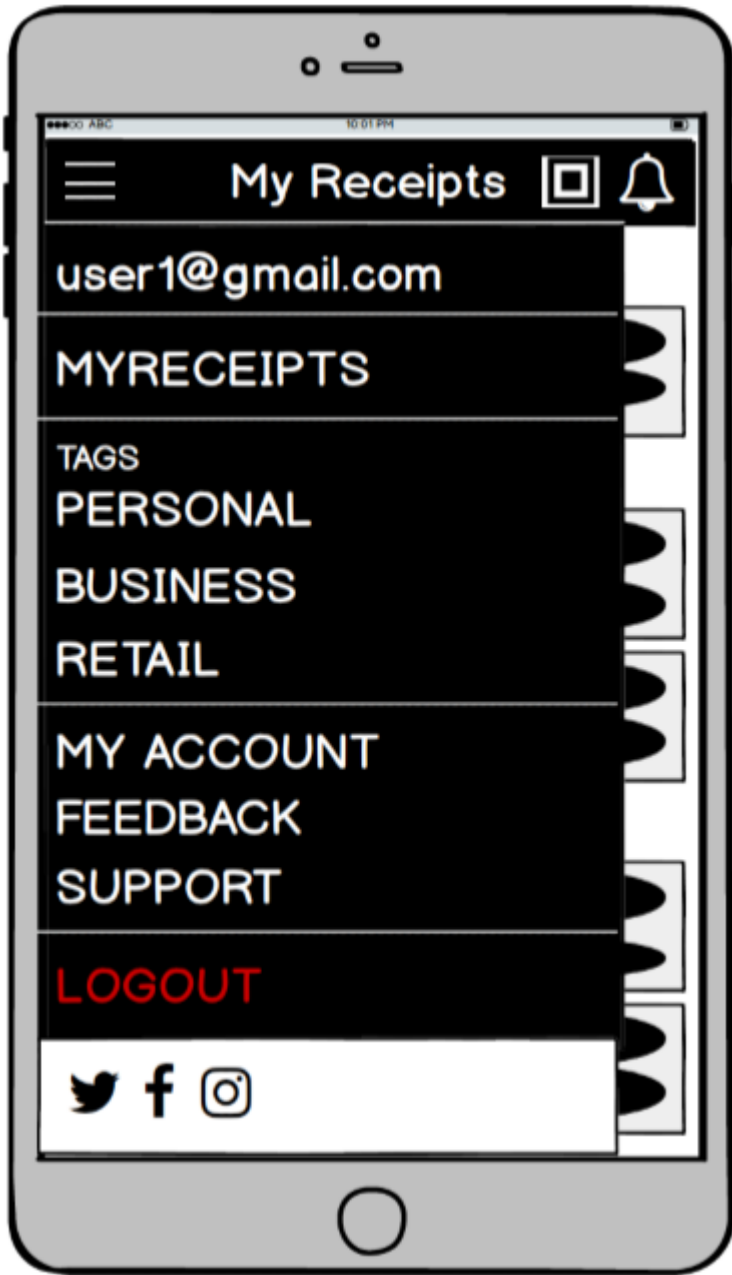
Receipt View



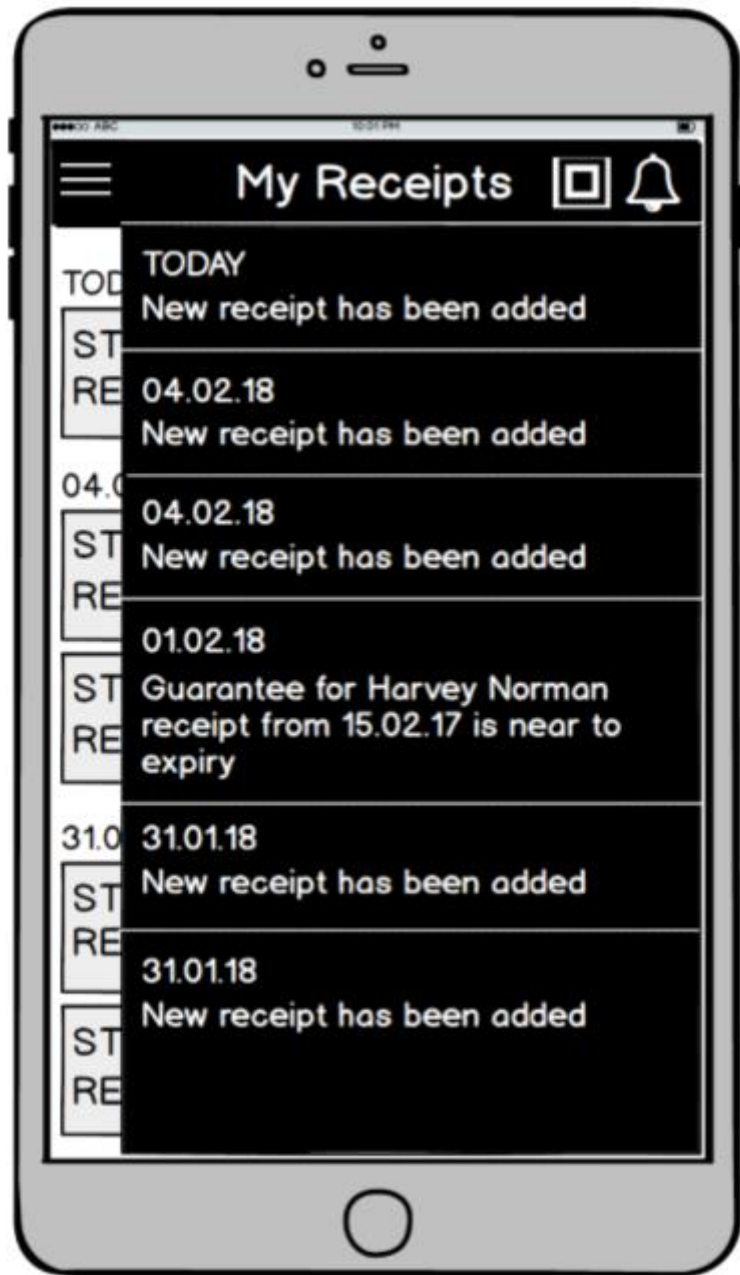
QR Code



Sidebar

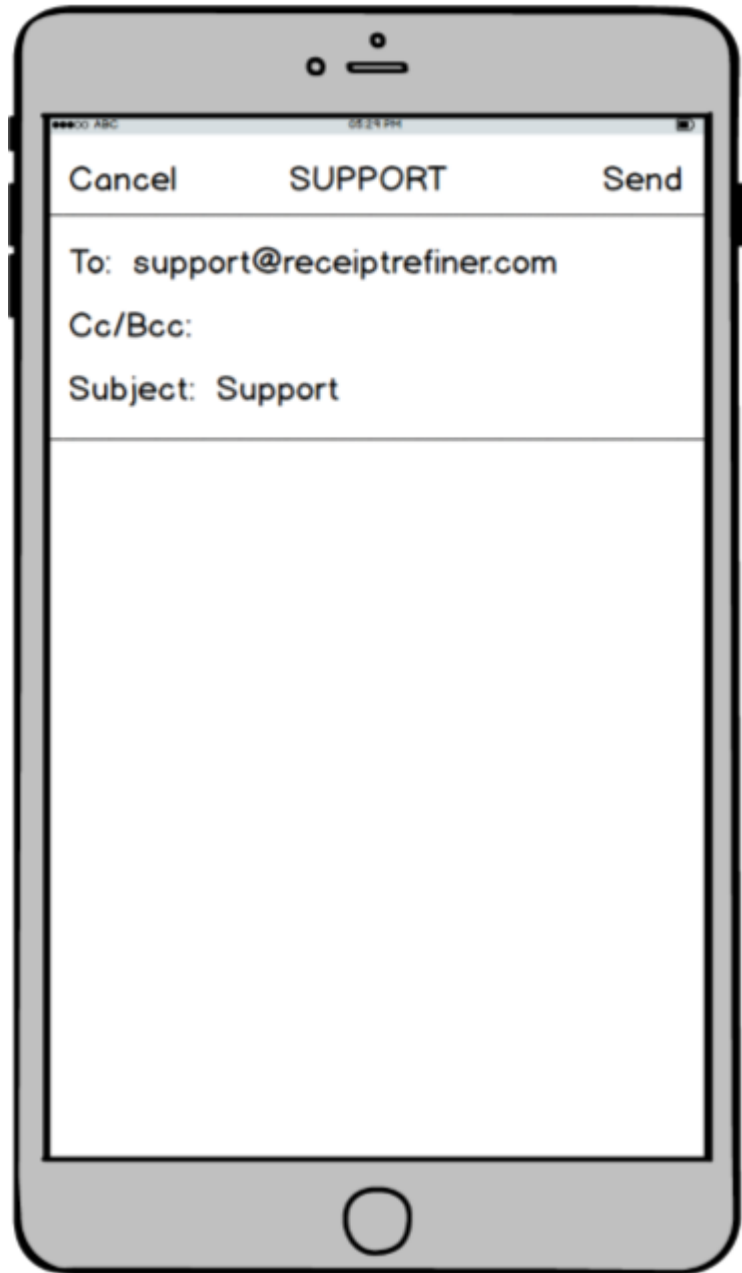
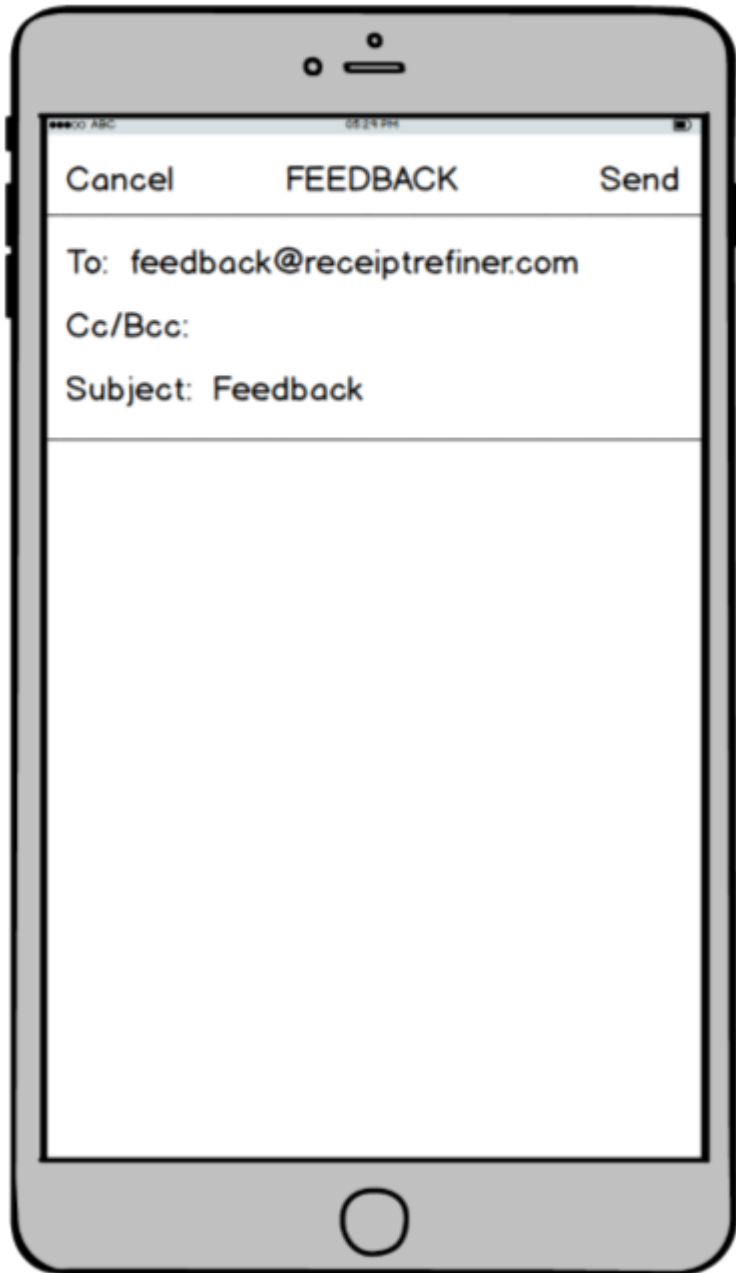


Notification View

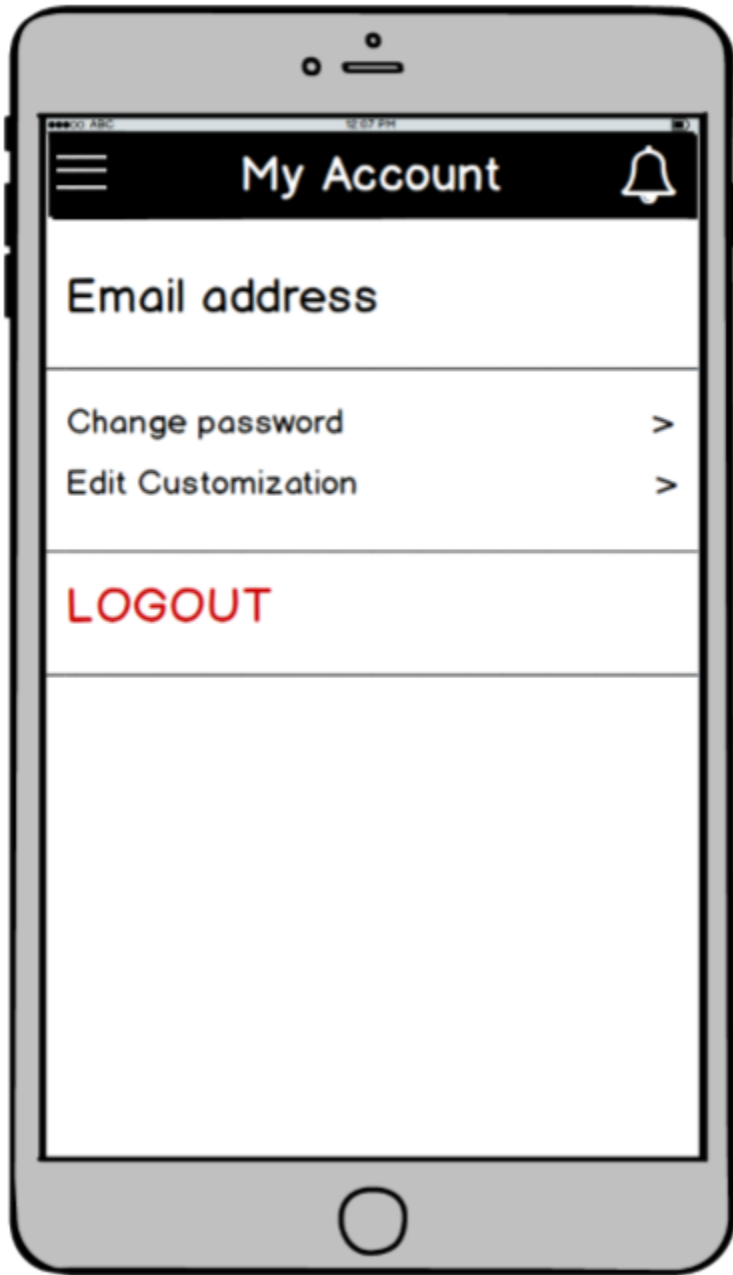


Feedback

Support



My Account



Prototype Version Two Conclusion:

This prototype was developed after the requirements workshop took place on Tuesday March 6th 2018. A number of modifications have been done to the first prototype of the ReceiptRetriever app based on stakeholder's opinions and critiques. Most modifications are design changes.

The start page now includes a small image to make it more attractive for the user and the buttons and font are now bigger to ensure the user clicks on the correct button. The buttons and font size on the login and register pages are now also bigger. The changes in button size address the concern of a user clicking on the wrong button for example a user clicking on the register button when they mean to click login and then start filling out their details and try to login in the register page when they already have an account. The delete buttons that appeared on the receipts on the My Receipts are now removed. It was noted that they make the page look over crowded. The delete button is now on the bottom right corner of the receipt view page, which appears much neater. Beside the delete button is a forward button to allow the user to forward their receipt in an email. This button originally appeared in the top right corner but was moved to sit beside the delete button which looks better. The logout button which appears in the side bar and also the My account page has been changed to red font. This change is to make the logout button stand out and be more obvious to the user. Lastly, the option to filter by creating labels originally appeared in the MyAccount page has been removed. It now appears in the header of the receipt view page beside the notification button. The label button is represented by three dots and when clicked it will appear as a drop down which allows the user to either create a new label for example business, personal, retail, supermarkets or to send that receipt to a particular folder with a specific label.

All other pages will remain unchanged due to positive feedback received from various stakeholders. Despite the few modifications, stakeholders were very pleased with the app and complemented the simple and easy to navigate look.

3.5. Requirements Workshop

The requirements workshop took place on Tuesday March 6th 2018 after the first prototype of the ReceiptRetriever application was created. The stakeholders that participated in the workshop included a number of potential users of the application. The goal of the requirements workshop was to understand the layout of the app and also app features and to promote trust and understanding among stakeholders. The wireframe was created based on the requirements elicited during the various elicitation techniques that were then prioritised using the MoSCoW analysis technique. The prototype depicted that the majority of the requirements that fell in to the 'must and 'should' have sections of the MoSCoW analysis were located on the main few pages of the app. The wireframe also illustrated how the notification system and sidebar would graphically look.

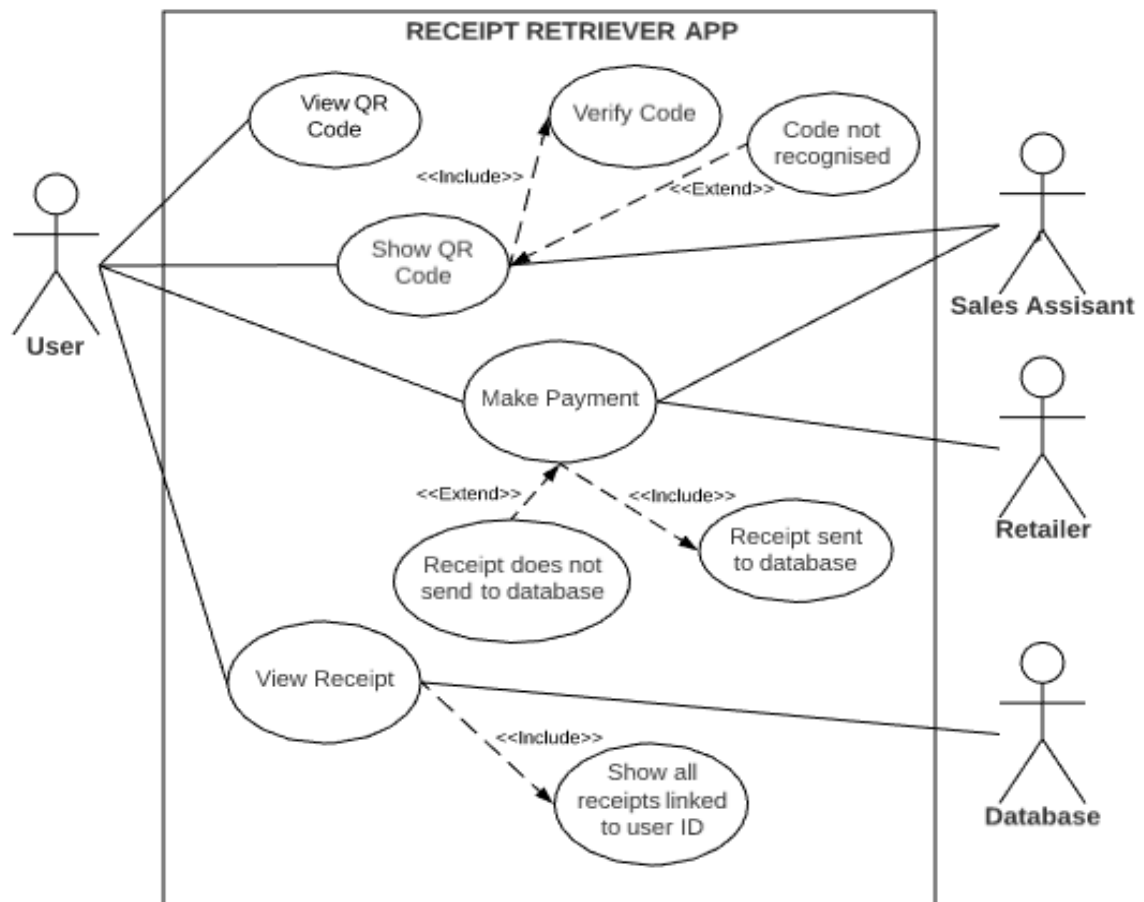
The stakeholders were very pleased with the look of the app and they complemented the simple and easy to navigate look of the app. Great feedback was received from various stakeholders. The straight forward login and registration process was seen as very beneficial to keep users engaged. The MyAccount page was seen as a positive as it allows users to change their password. The sidebar was seen as very beneficial to give users quick access to every page in the app and the notification page was also seen as very beneficial to inform users when receipts have been added and when items are near to their expiry. The feedback and support pages are seen as vital in the app to offer support to users and to prompt users to write reviews to provide suggestions for new features and also changes. The layout of the My Receipts page and the receipt view page extremely satisfied all stakeholders. Both pages simple design were complemented and some minor suggestions for change were mentioned.

The criticism and suggestions regarding the first prototype that the stakeholders would like to see addressed in the second prototype are:

1. The start page should include a small image to make it more attractive for the user.
2. The buttons and font size on the login and register pages should be made bigger to ensure the user clicks on the correct button.
3. The delete buttons that appear on the receipts on the My Receipts page should be removed to make the page less crowded. They should be moved to the bottom right corner of the receipt view page.
4. The forward icon should be moved to appear beside the delete button on the receipt view page.
5. The logout button which appears in the side bar and also the MyAccount page should be changed to red font.
6. The option to filter should be moved to the header of the receipt view page beside the notification button. The filter button is three dots and when clicked it will appear as a drop down which allows the user to either create a new filter for example business, personal, retail, supermarkets or to send the that receipt to a particular filter.

All other pages will remain unchanged due to positive feedback received from various stakeholders. Despite the few modifications stakeholders were very pleased with the app and complemented the simple and easy to navigate look.

3.6. Interface Analysis



Name: Validate the purchase

Goal: This Use Case Diagram represents the interactions that will exist during the process of paying for a product. The primary actor in this use case is the user. The successful outcome of this use case from the perspective of the user is that their QR code is verified when scanned, their receipt is sent to the database when the payment is made and lastly they can see the receipt when they are logged into the app.

Actors:

Primary Actor: The user.

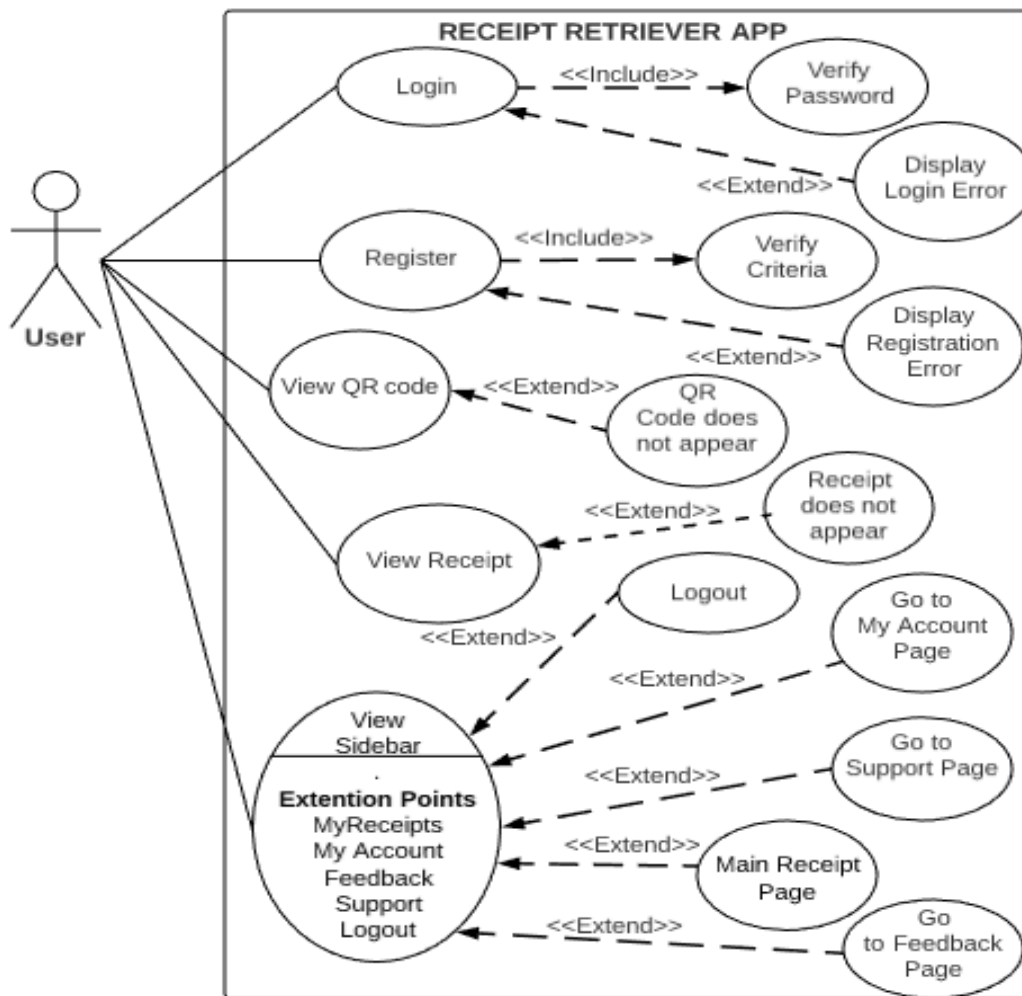
Secondary Actors: Retailer, sales assistant and database.

Precondition: The user has a registered account on the ReceiptRetriever app and they are logged into the app.

Trigger:

User is making a purchase.

Postcondition: The action is completed and the user receives their digital receipt, or if something has failed, the action is not performed and the user does not receive their digital receipt.



Name: Navigate application

Goal: This Use Case Diagram represents the interactions that will exist between the app users and the ReceiptRetriever application. The primary actor in this use case is the user. The successful outcome of this use case from the perspective of the user is that they can efficiently navigate and access all areas of the application.

Actors:

Primary Actor: The user.

Precondition: The user has downloaded the ReceiptRetriever application to their device.

Trigger: Customer downloaded the ReceiptRetriever application.

Postcondition: The user successfully completes all necessary actions, or if something has failed, the user will be unable to perform certain actions.

3.7 Moscow Analysis

The MoSCoW analysis was used to prioritise the requirements that were gathered from the elicitation processes that included:

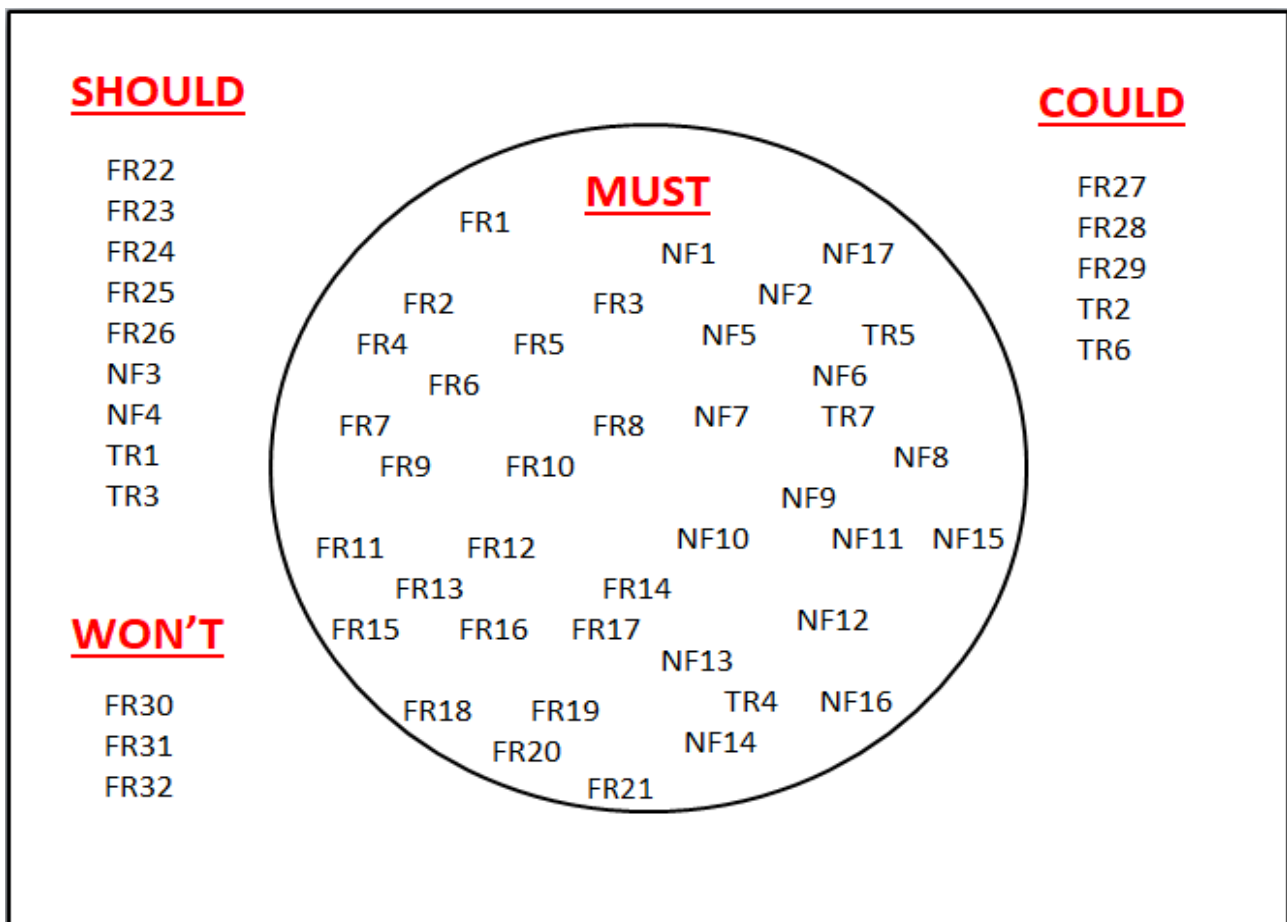
- A brainstorming session
- A survey
- Interview one which was conducted with the project sponsor
- Interview two which was conducted with a developer
- Interview three which was conducted with a sales assistant
- Interview four which was conducted with the head of IT for a major retailer

All requirements have been prioritised and they will be clearly visible in the prototype.

Requirements have been prioritised according to the importance stated by the stakeholders along with determining if implementing the feature/functionality is achievable in terms of time and cost.

All requirements along with their prioritisation are detailed in the Requirements specification section and they are all also mapped below in a scope chart.

Scope chart



4. [IEEE Requirements Specification](#)

4.1. Introduction

4.1.1. Purpose

This IEEE requirements specification document is being developed for the ReceiptRetriever application. The purpose of the IEEE requirements specification document is to clearly identify the key functional and non-functional requirements to ensure that the ReceiptRetriever app meets the stakeholder's needs and expectations. Therefore this document must be analysed by all stakeholders before being passed on to the developer. The stakeholders will ensure expectations are met prior to development and if they request any changes they must be implemented prior to the ReceiptRetriever app being developed.

4.1.2. Scope

The app is being developed for CBE, one of the leading innovators in retail technology in Europe. The conception around the ReceiptRetriever is to provide an application which benefits both users and retailers by managing digital receipts and creating a more efficient process than e-receipts. No similar apps exist. The demand for the app has emerged due to paper receipts heading towards extinction, there is a need for a more efficient process than e-receipts. ReceiptRetriever would provide a solution to this issue. Users of the ReceiptRetriever application will have the capabilities to manage and store their digital receipts within the app.

4.1.3. Definitions, Acronyms and Abbreviations

User: A stakeholder that interacts with the ReceiptRetriever app. The user can register, login and access all features on the app. The user of the app is generally the shopper.

Stakeholder: A person that may interact with the ReceiptRetriever application.

Customer: The retailer/merchant.

Shopper: A person that purchasing products and uses the app.

4.1.4. References

IEEE Software Engineering Standards Committee, "IEEE Std 830-1998, IEEE Recommended Practice for Software Requirements Specifications", October 20, 1998.

4.2. Functional Requirements

4.2.1. User Requirements

Functional Requirement 4.2.1.1	
Requirement Code:	FR1
Requirement Title:	Receipts listed newest to oldest
Source:	Brainstorming session
Priority:	Must Have (High Priority)
Requirement Description:	All receipts will be listed from newest to oldest. If a user logs into the app to view a recently added receipt, that receipt will simply be at the top of the list.
User Story:	As a user I want to login to the App So that I can access my receipts from newest to oldest.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user is logged into the app WHEN the user is on the My Receipts page THEN the user can view their receipts AND the receipts are listed from newest to oldest.</p> <p>Acceptance Criteria 2 GIVEN the user is logged into the app WHEN the user is on the My Receipts page AND there are no receipts stored THEN the user will be displayed a message saying there are no receipts to view.</p>
Justification:	It was clearly stated in the brainstorming session that for ease of use for users, this is a key requirement. This will allow users easy access to the receipt they are looking for.

Functional Requirement 4.2.1.2	
Requirement Code:	FR2
Requirement Title:	MyAccount page link
Source:	Brainstorming session
Priority:	Must Have (High Priority)
Requirement Description:	This link will be displayed in the sidebar that can be accessed by clicking on the three lines that appear in the top left corner of the screen. It will bring the user to their MyAccount page where they can change their password, set up customization and also logout of the app.
User Story:	As a user I want to access the MyAccount page So that I can access my account information.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user is logged into the app WHEN the user clicks on the MyAccount page link in the sidebar THEN the user will be brought to the MyAccount page.</p> <p>Acceptance Criteria 2 GIVEN the user is logged into the app WHEN the user is on the MyAccount page THEN the user can view all of their account information.</p> <p>Acceptance Criteria 3 GIVEN the user is logged into the app WHEN the user is on the MyAccount page AND the user clicks on the change password button THEN the user will be brought to a page to change their password.</p> <p>Acceptance Criteria 4 GIVEN the user is logged into the app WHEN the user is on the MyAccount page AND the user clicks on the customization button THEN the user will be given the option to change the design of the app.</p> <p>Acceptance Criteria 5 GIVEN the user is logged into the app WHEN the user is on the MyAccount page AND the user clicks on the logout button THEN the user will be logged out of their account.</p>
Justification:	It was clearly stated in the brainstorming session that a MyAccount page is a key requirement as it gives users easy access to important features like changing password.

Functional Requirement 4.2.1.3	
Requirement Code:	FR3
Requirement Title:	Support page link
Source:	Brainstorming session and Interview 3
Priority:	Must Have (High Priority)
Requirement Description:	This link will be displayed in the sidebar that can be accessed by clicking on the three lines that appear in the top left corner of the screen. It will bring the user to a support page which will be an email defaulted with the ReceiptRetriever support email address. This will allow the user to write an email explaining an issue they have or asking for help.
User Story:	As a user I want to access the Support page So that I can obtain app support.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user is logged into the app WHEN the user clicks on the Support link in the sidebar THEN the user will be brought to the Support page.</p> <p>Acceptance Criteria 2 GIVEN the user is logged into the app WHEN the user is on the Support page THEN the user will see an email AND the email will be defaulted with the ReceiptRetriever support email address.</p> <p>Acceptance Criteria 3 GIVEN the user is logged into the app WHEN the user is on the Support page AND the user clicks cancel THEN they will be brought back to the My Receipts page.</p> <p>Acceptance Criteria 4 GIVEN the user is logged into the app WHEN the user is on the Support page AND the user fills out the email and clicks send THEN the email will be sent to the ReceiptRetriever support email address.</p>
Justification:	It was clearly stated in the brainstorming session and interview 3 that this page is a key requirement. It was stated by the sales assistant in interview 3 that a sufficient support page would be vital to ensure that customers having issues can access the relevant support to ensure the customers are not asking the sales assistant in the store they are shopping for app support.

Functional Requirement 4.2.1.4	
Requirement Code:	FR4
Requirement Title:	Feedback page link
Source:	Brainstorming session
Priority:	Must Have (High Priority)
Requirement Description:	This link will be displayed in the sidebar that can be accessed by clicking on the three lines that appear in the top left corner of the screen. It will bring the user to a feedback page which will be an email defaulted with the ReceiptRetriever feedback email address. This will allow the user to write an email giving feedback about the app or suggesting improvements or new features.
User Story:	As a user I want to access the Feedback page So that I can provide feedback, suggestions and criticism.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user is logged into the app WHEN the user clicks on the Feedback link in the sidebar THEN the user will be brought to the Feedback page.</p> <p>Acceptance Criteria 2 GIVEN the user is logged into the app WHEN the user is on the Feedback page THEN the user will see an email AND the email will be defaulted with the ReceiptRetriever feedback email address.</p> <p>Acceptance Criteria 3 GIVEN the user is logged into the app WHEN the user is on the Feedback page AND the user clicks cancel THEN the user will be brought back to the My Receipts page.</p> <p>Acceptance Criteria 4 GIVEN the user is logged into the app WHEN the user is on the Feedback page AND the user fills out the email and click send THEN the email will be sent to the ReceiptRetriever feedback email address.</p>
Justification:	It was clearly stated in the brainstorming session that having a feedback page to allow users to provide feedback, suggestions and criticisms is crucial.

Functional Requirement 4.2.1.5	
Requirement Code:	FR5
Requirement Title:	My Receipts Page link
Source:	Brainstorming session
Priority:	Must Have (High Priority)
Requirement Description:	The My Receipts page will be the main page in the app and it will be the first page displayed when the user logs in or registers an account. This page will have all of the users digital receipts listed newest to oldest. The link for this page will also be displayed in the sidebar that can be accessed by clicking on the three lines that appear in the top left corner of the screen.
User Story:	As a user I want to access the My Receipts page In order to view the list of my receipts.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user has not previously registered an account WHEN the user enters a valid email address and password on the register page and then hits register THEN the user has created an account on the app AND the user will be brought directly to the My Receipts page.</p> <p>Acceptance Criteria 2 GIVEN the user has previously registered an account WHEN the user enters a valid email address and password on the login page and then hits login THEN the user is logged into the app AND the user will be brought directly to the My Receipts page.</p> <p>Acceptance Criteria 3 GIVEN the user is logged into the app WHEN the user clicks on the My Receipts link in the sidebar THEN the user will be brought to the My Receipts page.</p> <p>Acceptance Criteria 4 GIVEN the user is logged into the app WHEN the user is on the My Receipts page THEN the user will see the list of their receipts AND they will be listed newest to oldest.</p>
Justification:	It was clearly stated in the brainstorming session that the main page in the app will be the My Receipts Page which will allow users access to all of their receipts.

Functional Requirement 4.2.1.6	
Requirement Code:	FR6
Requirement Title:	Receipt View link
Source:	Brainstorming session
Priority:	Must Have (High Priority)
Requirement Description:	On the My Receipts page, the open button on each receipt is the link to the receipt view for that receipt. The receipt view page will show the digital receipt along with the store, date, receipt total and also the ability to add a comment.
User Story:	As a user I want to access the Receipt View page In order to view my receipt and receipt details.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user is logged into the app AND the user is on the My Receipts page WHEN the user clicks on the open button of any receipt THEN the user will be brought to the Receipt View of that receipt.</p> <p>Acceptance Criteria 2 GIVEN the user is logged into the app WHEN the user is on the Receipt View page of a receipt THEN the user will see the digital receipt along with the store, date and receipt total.</p> <p>Acceptance Criteria 3 GIVEN the user is logged into the app WHEN the user is on the Receipt View of a receipt THEN the user can add a comment at the bottom of the page.</p>
Justification:	It was clearly stated in the brainstorming session that a separate page was needed to show the receipt along with the receipt details.

Functional Requirement 4.2.1.7	
Requirement Code:	FR7
Requirement Title:	QR code link
Source:	Interview 1
Priority:	Must Have (High Priority)
Requirement Description:	On the top right corner of the My Receipts page there is an icon which is a mini QR code. When this icon is clicked it brings the user to a page where their unique QR code is shown.
User Story:	As a user I want to access my QR code So that I can hand it to the cashier to scan.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user is logged into the app AND the user is on the My Receipts page WHEN the user clicks on the QR code icon at the top right corner THEN the user will be brought to the My code page.</p> <p>Acceptance Criteria 2 GIVEN the user is logged into the app WHEN the user is on the My code page THEN the user can view their QR code AND the user can hand the code to the cashier to be scanned.</p>
Justification:	The QR code page is a key requirement as the QR is the key to how the whole process works.

Functional Requirement 4.2.1.8	
Requirement Code:	FR8
Requirement Title:	Offers and ads advertised throughout the app
Source:	Interview 3
Priority:	Must Have (High Priority)
Requirement Description:	Discounts and deals for various stores will be shown throughout the app. Also, adverts will be shown on the app.
User Story:	As a user I want to see deals and adverts So that I receive discounts and I am aware of certain things advertised.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user is logged into the app WHEN the user is on any page THEN they may see deals, discounts and adverts.</p>
Justification:	In interview 3 it was stated that offers and deals would attract users to the app.

Functional Requirement 4.2.1.9	
Requirement Code:	FR9
Requirement Title:	Sidebar
Source:	Interview 1
Priority:	Must Have (High Priority)
Requirement Description:	The sidebar will have links to all pages within the ReceiptRetriever application and it will also have a logout button and links to social media pages. The sidebar will allow users quick access to all areas of the app.
User Story:	As a user I want to access the sidebar So that I have easy access to all app pages.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user is logged into the app WHEN the user clicks on the My Receipts link in the sidebar THEN the user will be brought to the My Receipts page.</p> <p>Acceptance Criteria 2 GIVEN the user is logged into the app WHEN the user clicks on the My Account link in the sidebar THEN the user will be brought to the My Account page.</p> <p>Acceptance Criteria 3 GIVEN the user is logged into the app WHEN the user clicks on the Support link in the sidebar THEN the user will be brought to the Support page.</p> <p>Acceptance Criteria 4 GIVEN the user is logged into the app WHEN the user clicks on the Feedback link in the sidebar THEN the user will be brought to the Feedback page.</p> <p>Acceptance Criteria 5 GIVEN the user is logged into the app WHEN the user clicks on the logout button in the sidebar THEN the user will be logged out of the ReceiptRetriever application.</p> <p>Acceptance Criteria 6 GIVEN the user is logged into the app WHEN the user clicks on the Facebook, Twitter or Instagram icon in the sidebar THEN the user will be brought to the corresponding social media page.</p>
Justification:	The project sponsor stated that a sidebar giving users quick access to all pages in the app is high priority. The sidebar creates simple navigation of the application.

Functional Requirement 4.2.1.10	
Requirement Code:	FR10
Requirement Title:	Receipt sent directly to app
Source:	Survey, Interview 1
Priority:	Must Have (High Priority)
Requirement Description:	The user produces their unique QR code to the cashier when they are purchasing an item and the cashier scans the QR code. When the payment is processed the receipt will automatically appear in the users account.
User Story:	As a user I want my receipt sent directly to the app when I purchase an item So that I can easily access my receipt.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user is logged into the app AND the user is on the My Code page WHEN the user hands their phone to the cashier AND the cashier scans the code AND the code is recognised AND the payment then processes THEN the receipt will appear in the app AND a notification will appear that the new receipt has been added.</p> <p>Acceptance Criteria 2 GIVEN the user is logged into the app AND the user is on the My Code page WHEN the user hands their phone to the cashier AND the cashier scans the code AND the code is not recognised AND the payment then processes THEN the user will receive a paper receipt.</p> <p>Acceptance Criteria 3 GIVEN the user is logged into the app AND the user is on the My Code page WHEN the user hands their phone to the cashier AND the cashier scans the code AND the code is recognised AND the payment then processes AND an error appears on the till that the digital receipt was unsuccessful THEN the user will receive a paper receipt.</p>
Justification:	This requirement is of high priority as it was stated that this is the best process for the app to work. This process is simple for both the user and the cashier.

Functional Requirement 4.2.1.11	
Requirement Code:	FR11
Requirement Title:	User registration
Source:	Brainstorming session and Interview 1
Priority:	Must Have (High Priority)
Requirement Description:	Given the user has downloaded the ReceiptRetriever application; they should be able to create an account. The user must provide an email address and password in order to create an account. Once the user has registered an account they will have access to all pages in the app.
User Story:	As a user I want to register an account on the Registration page So that I can access all features of the app.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user has not previously registered an account WHEN the user enters a valid email address and password on the register page and then hits register THEN the user has created an account on the App.</p> <p>Acceptance Criteria 2 GIVEN the user has not previously registered an account WHEN the user does not enter an email address and password on the register page and then hits register THEN the user is displayed an error that information is invalid AND the registration fails.</p> <p>Acceptance Criteria 3 GIVEN the user has not previously registered an account WHEN the user enters an invalid email address and password on the register page and then hits register THEN the user is displayed an error that information is invalid AND the registration fails.</p>
Justification:	It was stated that a registration page is a high priority requirement because if a user cannot register, they can't use the app.

Functional Requirement 4.2.1.12	
Requirement Code:	FR12
Requirement Title:	Short login
Source:	Brainstorming session, Interview 1 and Interview 3
Priority:	Must Have (High Priority)
Requirement Description:	Given the user has successfully registered an account; they should be able to login to the application. The login process should be short and the user should only have to enter their email address and password.
User Story:	As a user I want to login to the App So that I can access all the features of the App.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user has previously registered an account WHEN the user enters a valid email address and password on the login page and then hits login THEN the user is logged into the app and has access to all app features.</p> <p>Acceptance Criteria 2 GIVEN the user has previously registered an account WHEN the user enters an invalid email address and password on the login page and then hits login THEN the user is displayed an error that information is invalid AND the user is not logged into the app AND has no access to app features.</p> <p>Acceptance Criteria 3 GIVEN the user has previously registered an account WHEN the user enters an invalid email address and password on the login page and then hits login THEN the user is displayed an error that their account is locked AND the user is not logged in AND the user has to click a verification link sent to them through their email account in order to unlock the account.</p>
Justification:	It was clearly stated in the brainstorming session and both interview 1 and 3, that a short login process is a key requirement. The app is focused on creating a simpler process for the user therefore the login process should reflect that.

Functional Requirement 4.2.1.13	
Requirement Code:	FR13
Requirement Title:	Discounts and deals attached to receipts
Source:	Brainstorming session and Interview 1 and 3
Priority:	Must Have (High Priority)
Requirement Description:	Discounts and deals will be attached to the bottom of digital receipts just how they are attached to the back of paper receipts.
User Story:	As a user I want to receive discounts and deals attached to my receipts So that I can receive discounts in stores.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user is logged into the app WHEN the user is on the Receipt view page AND the user opens a receipt with discounts and deals attached THEN the user will see discounts and deals attached to the receipt.</p> <p>Acceptance Criteria 2 GIVEN the user is logged into the app WHEN the user is on the Receipt view page AND the user opens a receipt with no discounts and deals attached THEN the user will see a receipt with no discounts and deals.</p>
Justification:	Both interview 1 and 3 stated this to be a key requirement as it could be seen as a new marketing channel because paper receipts typically end up in the bin. This works as a better approach to advertising.

Functional Requirement 4.2.1.14	
Requirement Code:	FR14
Requirement Title:	Banner appears when new receipt is added
Source:	Interview 1
Priority:	Must Have (High Priority)
Requirement Description:	When a new receipt has been added to the app, the user will be prompted with a banner that appears at the top of the main receipt page. This banner will prompt the user to write a review. If the user clicks on the banner they will be brought to the review page. The user should have the option to not write a review if they do not want to, therefore they should have the option to close the banner. The close icon on the banner will be represented as an X icon.
User Story:	As a user I want to click on the banner So that I can provide feedback, suggestions and criticism.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user is logged into the app AND a new receipt has been added WHEN the user is on the My Receipts page THEN the user will see a banner asking them to write a review.</p> <p>Acceptance Criteria 2 GIVEN the user is logged into the app AND a new receipt has not been added WHEN the user is on the My Receipts page THEN the user will see no banner.</p> <p>Acceptance Criteria 3 GIVEN the user is logged into the app WHEN the user is on the My Receipts page AND the user clicks the banner THEN the user will be brought to the Feedback page.</p> <p>Acceptance Criteria 4 GIVEN the user is logged into the app WHEN the user is on the My Receipts page AND the user clicks the close icon on the banner THEN the banner will close and the user does not write a review.</p>
Justification:	The importance of this requirement was stated in interview 1. Having a way for users to provide feedback, suggestions and criticisms is critical. This banner will try prompt the user to write a review.

Functional Requirement 4.2.1.15	
Requirement Code:	FR15
Requirement Title:	Filtering receipts
Source:	Brainstorming session
Priority:	Must Have (High Priority)
Requirement Description:	When viewing a receipt a user will be able to send that receipt to a particular folder with labels such as business or personal. They should be also able to create a custom label for example retail, supermarkets and send the receipt to that folder.
User Story:	As a user I want to create labels So that I can divide my receipts into different folders.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user is logged into the app WHEN the user is on a Receipt View page AND the user clicks on the three dots icon THEN a dropdown menu appears AND the user can create a label.</p> <p>Acceptance Criteria 2 GIVEN the user is logged into the app WHEN the user is on a Receipt View page AND the user clicks on the three dots icon THEN a dropdown menu appears AND the user can choose any label AND the user can send a receipt to that folder.</p>
Justification:	It was stated in the brainstorming session that having the option to filter receipts by creating labels allows the user to customize the app to their own liking by storing their receipts how they like. Therefore this requirement is of high priority.

Functional Requirement 4.2.1.16	
Requirement Code:	FR16
Requirement Title:	Permanently logged in
Source:	Interview 3
Priority:	Must Have (High Priority)
Requirement Description:	The user will stay permanently logged in to the ReceiptRetriever application unless they click a logout button.
User Story:	As a user I want to permanently stay logged in So that I have quick access to the app.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user is logged into the app WHEN the user is on the MyAccount page AND the user does not click the logout button THEN the user will stay permanently logged in.</p> <p>Acceptance Criteria 2 GIVEN the user is logged into the app WHEN the user is on the sidebar AND the user does not click the logout button THEN the user will stay permanently logged in.</p>
Justification:	The sales assistant in interview 3 stated this to be a key requirement because if the user is exchanging an item, they can obtain their receipt quickly to avoid delaying the que.

Functional Requirement 4.2.1.17	
Requirement Code:	FR17
Requirement Title:	Social media account links
Source:	Interview 3
Priority:	Must Have (High Priority)
Requirement Description:	These links will bring the user to the Facebook, Twitter and Instagram accounts of the ReceiptRetriever application. They will appear as clickable logos and appear at the bottom of the sidebar.
User Story:	As a user I want to click on social media logos So that I have easy access to social media pages.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user is logged into the app WHEN the user opens the sidebar THEN the user sees the Facebook, Twitter and Instagram logos.</p> <p>Acceptance Criteria 2 GIVEN the user is logged into the app WHEN the user opens the sidebar AND the users clicks on the Facebook, Twitter or Instagram logo THEN the user will be brought to the corresponding social media page.</p>
Justification:	It was stated in interview 3 that having links to social media pages would act as great advertising therefore this is requirement is of high priority.

Functional Requirement 4.2.1.18	
Requirement Code:	FR18
Requirement Title:	Logout button
Source:	Interview 1 and Brainstorming session
Priority:	Must Have (High Priority)
Requirement Description:	The logout button will allow the user to logout off the ReceiptRetriever application. If they do not logout using the logout button they will stay permanently logged in. A logout will appear in both the sidebar and also on the MyAccount page.
User Story:	As a user I want to logout of the app So that I can ensure all of my information is secure.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user is logged into the app WHEN the user is on the MyAccount page AND the user clicks the logout button THEN the user will be logged out of the ReceiptRetriever application.</p> <p>Acceptance Criteria 2 GIVEN the user is logged into the app WHEN the user is on the sidebar AND the user clicks the logout button THEN the user will be logged out of the ReceiptRetriever application.</p>
Justification:	The logout button is a key requirement. It was stated in interview 1 the importance of the logout button to appear in the sidebar along with links to all app pages and in the brainstorming session it was stated it was high priority for a logout button to appear on the MyAccount page as most users would generally go to a MyAccount page to look for a logout button.

Functional Requirement 4.2.1.19	
Requirement Code:	FR19
Requirement Title:	Notification system
Source:	Interview 3 and 4 and Brainstorming session
Priority:	Must Have (High Priority)
Requirement Description:	A user will be notified when a new receipt has been added or when a current receipt is heading near to expiry of guarantee or credit note. The notification button should be represented as a bell and will appear in the top right corner of the screen. When the bell is pressed a dropdown of all notifications will appear.
User Story:	As a user I want to receive notifications about my receipts So that I know when new receipts have been added or when receipts are heading towards expiry.
Acceptance Criteria:	<p>Acceptance criteria 1 GIVEN the user is logged into the app WHEN the user is on the My Receipts page AND a new receipt has been added THEN the bell will be appear as red AND a notification stating “A new receipt has been added” will appear in the notification bar.</p> <p>Acceptance Criteria 2 GIVEN the user is logged into the app WHEN the user is on the My Receipts page AND a receipt is heading towards guarantee expiry THEN the bell will be red AND a notification stating “Guarantee from <store> receipt from <date> is near to expiry” will appear in the notification bar.</p> <p>Acceptance Criteria 3 GIVEN the user is logged into the app WHEN the user is on the My Receipts page AND no new receipt has been added THEN the bell will appear as white as normal AND there will be no new notification in the notification bar.</p> <p>Acceptance Criteria 4 GIVEN the user is logged into the app WHEN the user is on the My Receipts page AND no receipt is heading towards guarantee expiry THEN the bell will be appear as white as normal AND there will be no new notification in the notification bar.</p>
Justification:	The brainstorming session and interview 3 and 4 stated that this is to be a key requirement as it keeps users informed when new receipts have appeared in the app and also it is of high priority to inform users of expiry

	of guarantee as losing a paper receipt within guarantee is a major disadvantage of paper receipts.
Functional Requirement 4.2.1.20	
Requirement Code:	FR20
Requirement Title:	Popup box
Source:	Brainstorming session
Priority:	Must Have (High Priority)
Requirement Description:	A user should be notified when logging in or registering that their email or password they have entered is incorrect.
User Story:	As a user I want to receive an error pop up message So that I know my login/registration has been unsuccessful.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user has previously registered an account WHEN the user enters an invalid email address and password on the login page and then hits login THEN the user is displayed an error that information is invalid AND the user is not logged into the app and has no access to app features.</p> <p>Acceptance Criteria 2 GIVEN the user has previously registered an account WHEN the user enters an invalid email address and password on the login page three times and then hits login THEN the user is displayed an error that account is locked AND the user is not logged into the app and has no access to app features.</p> <p>Acceptance Criteria 3 GIVEN the user has not previously registered an account WHEN the user does not enter an email address and password on the register page and then hits register THEN the user is displayed an error that information is invalid AND the registration fails.</p> <p>Acceptance Criteria 4 GIVEN the user has not previously registered an account WHEN the user enters an invalid email address or password on the register page and then hits register THEN the user is displayed an error that information is invalid AND the registration fails.</p>
Justification:	A popup box explaining the reason for the error is essential to create an easy login and register process.

Functional Requirement 4.2.1.21	
Requirement Code:	FR21
Requirement Title:	Start page
Source:	Brainstorming session
Priority:	Must Have (High Priority)
Requirement Description:	When the user downloads and opens the app they should land on the start page. The start will give a brief description of the app and have a link to the login and register pages.
User Story:	As a user I want to land on the start page So that I can either login or register an account.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user has downloaded the app WHEN the user opens the app THEN the user will land on the start page.</p> <p>Acceptance Criteria 2 GIVEN the user is on the start page WHEN the clicks on the login button THEN the user will land on login page.</p> <p>Acceptance Criteria 3 GIVEN the user is on the start page WHEN the clicks on the register button THEN the user will land on registration page.</p>
Justification:	It was stated in the brainstorming session that a simple and attractive start page is important because it is the first page the user will see.

Functional Requirement 4.2.1.22	
Requirement Code:	FR22
Requirement Title:	Forward receipt
Source:	Brainstorming session and Interview 4
Priority:	Should Have (Medium Priority)
Requirement Description:	A user should be able to forward a receipt from the app in an email to any recipient.
User Story:	As a user I want to forward a receipt in an email So that I can send the receipt to any recipient.
Acceptance Criteria:	<p>Acceptance Criteria 1: GIVEN the user is logged into the app WHEN the user is on a Receipt View page AND the user clicks on the arrow icon THEN the user is brought to an email with the receipt attached AND the user can forward that receipt to any recipient.</p> <p>Acceptance Criteria 2 GIVEN the user is logged into the app WHEN the user is on a Receipt View page AND the user does not click on the arrow icon THEN the user cannot forward the receipt in an email.</p>
Justification:	It was stated in the brainstorming session that the ability to forward a receipt in an email would be useful for business users that must provide the company they work for with a receipts of their expenses. This would allow those users to simply email the receipt to an appropriate recipient which in turn creates less hassle for the user.

Functional Requirement 4.2.1.23	
Requirement Code:	FR23
Requirement Title:	Add comment to receipt
Source:	Brainstorming session
Priority:	Should Have (Medium Priority)
Requirement Description:	A user should have the option to add a comment to the bottom of the Receipt View page.
User Story:	As a user I want to add a comment to a receipt So that I can better manage my receipts.
Acceptance Criteria:	<p>Acceptance Criteria 1: GIVEN the user is logged into the app WHEN the user is on a Receipt View page THEN the user can add a comment at the bottom of the page.</p>

Justification:	It was stated in the brainstorming session that this requirement is important as it would help users with managing their receipts.
Functional Requirement 4.2.1.24	
Requirement Code:	FR24
Requirement Title:	Delete receipt
Source:	Brainstorming session
Priority:	Should Have (Medium Priority)
Requirement Description:	A user should be able to delete any receipt they wish.
User Story:	As a user I want to delete a receipt So that I only have all the receipts that I need.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user is logged into the app WHEN the user is on a Receipt View page AND the user clicks on the delete icon THEN the receipt is deleted.</p> <p>Acceptance Criteria 2 GIVEN the user is logged into the app WHEN the user is on a Receipt View page AND the user does not click on the delete icon THEN the receipt is not deleted.</p>
Justification:	It was stated in the brainstorming session that users should have the ability to delete receipts. This allows users to delete receipts that they no longer need.

Functional Requirement 4.2.1.25	
Requirement Code:	FR25
Requirement Title:	Customization
Source:	Interview 3
Priority:	Could Have (Low Priority)
Requirement Description:	The user should have the option to customize the app to their own personal preference. Customisation could be done to different settings, layouts and features.
User Story:	As a user I want to customize the app So that the app feels like my own.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user is logged into the app WHEN the user is on the MyAccount page AND the user clicks on the customization button THEN the user will be given the option to change the design of the app.</p>

Justification:	Customization helps create customer satisfaction by empowering customers to make the app feel like their own.
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Functional Requirement 4.2.1.26	
Requirement Code:	FR26
Requirement Title:	Receipt highlighted if it has not been open
Source:	Brainstorming session
Priority:	Should Have (Medium Priority)
Requirement Description:	When a user is on the My Receipts page looking at the list of receipts, any receipt that has not been opened by the user should be highlighted.
User Story:	As a user I want to see my unopened receipt highlighted So that I know what receipts I have not opened.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user is logged into the app WHEN the user is on the My Receipts page AND the user has previously opened a receipt THEN the user can see that receipt listed and it is not highlighted.</p> <p>Acceptance Criteria 2 GIVEN the user is logged into the app WHEN the user is on a My Receipts page AND the user has previously not opened a receipt THEN the user can see that receipt listed and it is highlighted.</p>
Justification:	This requirement stated in the brainstorming session would allow the user to clearly see what receipt they have not opened and looked at.

Functional Requirement 4.2.1.27	
Requirement Code:	FR27
Requirement Title:	Take picture of receipt
Source:	Interview 1
Priority:	Could Have (Low Priority)
Requirement Description:	This feature would allow users to take a picture of a paper receipt and upload it to the app. The paper receipt would be stored together with the digital receipts. Store, date and total fields are automatically filled when a digital receipt is added but those fields would have to be manually filled when a paper receipt is added.
User Story:	As a user I want to take a picture of a receipt and upload it to the app So that I can store all of my receipts in one place.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user clicks on the camera icon AND the user takes a picture of the receipt and clicks upload WHEN the user is on the My Receipts page THEN the user will see the receipt has been added.</p> <p>Acceptance Criteria 2 GIVEN the user is logged into the app AND the user is on the My Receipts page WHEN the user clicks on the open button of the paper receipt THEN the user will be brought to the Receipt View of that receipt.</p> <p>Acceptance Criteria 3 GIVEN the user is logged into the app WHEN the user is on the Receipt View of a receipt THEN the user will see the paper receipt AND the user must manually enter the store, date and receipt total.</p> <p>Acceptance Criteria 4 GIVEN the user is logged into the app WHEN the user is on the Receipt View of a receipt THEN the user can add a comment at the bottom of the page.</p>
Justification:	The project sponsor stated that although the aim of the app is to push the use of digital receipts and eliminate the use of paper receipts, a feature allowing users to upload a picture of a paper receipt in the case they were unable to receive a digital receipt would be useful as it would allow the user to store all their receipts together.

Functional Requirement 4.2.1.28	
Requirement Code:	FR28
Requirement Title:	Social media logins
Source:	Interview 3
Priority:	Could Have (Low Priority)
Requirement Description:	Social media logins would allow users to use existing login information from social media sites like Facebook, Twitter or Instagram to sign in. The user would not be required to create an account within the app. They simply login through existing login information from social media sites. The social media logins would appear on the login and register page underneath normal login/registration.
User Story:	As a user I want to login through my social media account So that I am logged in quicker and I do not have to create an account.
Acceptance Criteria:	<p>Acceptance Criteria 1 GIVEN the user is on the login page WHEN the user clicks on the social media sign in AND the user enters their login credentials for that site THEN the user will be logged into the ReceiptRetriever app.</p> <p>Acceptance Criteria 2 GIVEN the user is on the register page WHEN the user clicks on the social media sign in AND the user enters their login credentials for that site THEN the user will be logged into the ReceiptRetriever app.</p> <p>Acceptance Criteria 3 GIVEN the user is on the login page WHEN the user enters their social media credentials in the regular login THEN the user is displayed an error that information is invalid AND the user is not logged into the app and has no access to app features.</p>
Justification:	It was stated in interview 3 that social media logins are an attractive feature for users as they are fast and convenient. Signing in with social logins generally takes just seconds and the user is spared from making a login account and remembering a new password for the site.

Functional Requirement 4.2.1.29	
Requirement Code:	FR29
Requirement Title:	Email sent to user to notify of new receipt being added
Source:	Interview 4
Priority:	Could Have (Low Priority)
Requirement Description:	When a new receipt has been added, the user should receive an email to inform them.
User Story:	As a user I want to receive an email to inform me of a new receipt So that I know when a new receipt has been added.
Acceptance Criteria:	<p>Acceptance criteria 1 GIVEN the user has used the app when purchasing an item AND the process successfully completed WHEN the new receipt has been added to the app THEN the user will receive an email to inform them.</p> <p>Acceptance Criteria 2 GIVEN the user has used the app when purchasing an item AND the process did not successfully complete THEN a receipt will not be added to the app AND the user will receive no email.</p>
Justification:	It was stated in interview 4 that it would be a useful for the user to receive an email when a new receipt has been added.

Functional Requirement 4.2.1.30	
Requirement Code:	FR30
Requirement Title:	Budget feature
Source:	Interview 1 and 4
Priority:	Won't have
Requirement Description:	A budget feature would allow the user to create budgets within the application to manage their expense.
Justification:	It was stated in interview 1 that this requirement would be useful to allow the user to easily manage their expenses however for the current timeline of the project this requirement is of low priority. Additional time and money would be required to implement this requirement.

Functional Requirement 4.2.1.31	
Requirement Code:	FR31
Requirement Title:	Payment incorporated within app
Source:	Interview 1
Priority:	Won't have
Requirement Description:	This would allow the user to store their bank details within the app so both the payment process and receipt process are both completed within the app rather than the payment process separate.
Justification:	It was stated in interview 1 that this requirement is the long term goal as it makes the process even simpler and quicker than having payment as a separate process. Additional time and money would be required to implement this requirement.

Functional Requirement 4.2.1.32	
Requirement Code:	FR32
Requirement Title:	Exporting costs of various receipts to spreadsheet to manage expenses
Source:	Interview 4
Priority:	Won't have
Requirement Description:	This would allow the user to export the costs of their receipts to a spreadsheet as opposed to managing expenses within the app.
Justification:	This requirement was stated in interview 4. This feature would be a great addition to the app to allow users to better manage their expense. However, with the timeline for the project this requirement is of low priority and it won't be implemented in the first release of the app but it could be definitely added in an updated version.

4.3. Non-Functional Requirements

4.3.1 Security Requirements

Non-Functional Requirement 4.3.1.1	
Requirement Code:	NF1
Requirement Title:	Encryption of passwords
Source:	Interview 2
Requirement Description:	<p>Passwords should be stored hashed with a hashing algorithm such as MD5</p> <p>To ensure that user's passwords are safe, passwords should never be stored in plain text.</p>

Non-Functional Requirement 4.3.1.2	
Requirement Code:	NF2
Requirement Title:	Password requirements
Source:	Interview 2
Requirement Description:	<p>Password requirements should be a minimum of 8 to 12 characters long with minimum of one capital letter and one number/symbol.</p>

Non-Functional Requirement 4.3.1.3	
Requirement Code:	NF3
Requirement Title:	Security contract
Source:	Interview 2
Requirement Description:	<p>Contract with a security company may be required. Outsourcing security function allows limited resources to be concentrated on core functions.</p>

Non-Functional Requirement 4.3.1.4	
Requirement Code:	NF4
Requirement Title:	Google RECAPTCHA
Source:	Interview 2
Requirement Description:	<p>Google RECAPTCHA could be implemented to ensure the login has been processed by a user and not a bot.</p>

Non-Functional Requirement 4.3.1.5	
Requirement Code:	NF5
Requirement Title:	Failed login
Source:	Interview 2

Non-Functional Requirement 4.3.1.6	
Requirement Code:	NF6
Requirement Title:	No user specific information stored in cookies
Source:	Interview 2
Requirement Description:	To protect user's information, there should be no user specific information stored in cookies.
Requirement Description:	A user should be only able to fail at logging in three times. Each time the user should receive an error informing them of failed login credentials. On the third failed attempt the users account should be locked and they must verify their account via email to unlock their account.

Non-Functional Requirement 4.3.1.7	
Requirement Code:	NF7
Requirement Title:	Data in database must be encrypted
Source:	Interview 2
Requirement Description:	To ensure all data is secure, all data in the database must be encrypted and this should be decrypted on the server side when needed.

Non-Functional Requirement 4.3.1.8	
Requirement Code:	NF8
Requirement Title:	QR code generation
Source:	Interview 1 and 2
Requirement Description:	When a user registers an account, a unique QR code will be generated and all receipts received through that QR code will be linked the user's ID in the database.

4.3.2. Performance Requirements

Non-Functional Requirement 4.3.2.1	
Requirement Code:	NF9
Requirement Title:	Page loading times
Source:	Interview 2
Requirement Description:	Every page on the ReceiptRetriever app should load between 10-15 seconds after the user has selected the page.

Non-Functional Requirement 4.3.2.2	
Requirement Code:	NF10
Requirement Title:	Set time in which receipt appears in app

Source:	Interview 2 and 4
Requirement Description:	When using the app at the till, after the cashier scans the QR code and processes the payment the receipt should appear in the app between 20-60 seconds.

Non-Functional Requirement 4.3.2.3	
Requirement Code:	NF11
Requirement Title:	App should be designed to look and perform the same on all device sizes
Source:	Interview 4
Requirement Description:	App should be designed to fit all devices sizes example mobile phones but also tablets. The app should also perform the same on each different device and device size.

4.3.3 Availability Requirements

Non-Functional Requirement 4.3.3.1	
Requirement Code:	NF12
Requirement Title:	Free to download
Source:	Interview 2
Requirement Description:	The app must be available free to download on both ios and android.

Non-Functional Requirement 4.3.3.2	
Requirement Code:	NF13
Requirement Title:	Provisioned by the app store
Source:	Interview 4
Requirement Description:	The app should be provisioned by the app store.

4.3.4. Usability Requirements

Non-Functional Requirement 4.3.4.1	
Requirement Code:	NF14
Requirement Title:	User friendly navigation focusing on usability
Source:	Brainstorm and Interview 1
Requirement Description:	The ReceiptRetriever app must be easy to navigate for the user. The idea behind the app is a more efficient process than e-receipts therefore simplicity in navigation and usability is important. Also, the age of users that will be using the app will range so it must be easy to use for all ages.

Non-Functional Requirement 4.3.4.2	
Requirement Code:	NF15
Requirement Title:	Minimalistic
Source:	Brainstorm and Interview 1
Requirement Description:	Desired features for stakeholders should only be implemented in the app to ensure the app is not overcrowded with unnecessary features and functionalities.
Non-Functional Requirement 4.3.4.3	
Requirement Code:	NF16
Requirement Title:	Receipt format
Source:	Interview 1
Requirement Description:	The format of the receipt should be one of the following: screen print, file or other. The format should be decided based on easiest implementation.

4.3.4. Maintainability Requirements

Non-Functional Requirement 4.3.4.1	
Requirement Code:	NF17
Requirement Title:	Updates
Source:	Interview 2
Requirement Description:	Updates would have to be done to each platform to improve performance, UI and so on. The server side would also require rare updates to perform database backups and optimise the code base.

4.4. Technical Requirements

Interview 2 which took place with a developer created a better understanding of the complexity of the app and resulted in a large number of technical requirements been elicited. The below technical requirements are vital as they contain details of databases that the system must be integrated with and servers and APIs needed. Requirements of how the QR code process will technically work are also included.

Technical Requirement 1	
Requirement Code:	TR1
Requirement Title:	Technologies
Source:	Interview 2
Requirement Description:	Technologies compatible with both ios and android should be used example JQuery

Technical Requirement 2	
Requirement Code:	TR2
Requirement Title:	Common App
Source:	Interview 2
Requirement Description:	A separate app for both ios and android should be made which is common.

Technical Requirement 3	
Requirement Code:	TR3
Requirement Title:	QR Code scanned
Source:	Interview 2
Requirement Description:	When a QR code is scanned by the cashier while the customer is in the process of purchasing an item, the receipt is sent to the database linked to the user's ID.

Technical Requirement 4	
Requirement Code:	TR4
Requirement Title:	MONGO DB
Source:	Interview 2
Requirement Description:	MONGO DB should be used for storing user data.

Technical Requirement 5	
Requirement Code:	TR5
Requirement Title:	Web host provider
Source:	Interview 2
Requirement Description:	A webhost provider is required.

Technical Requirement 6	
Requirement Code:	TR6
Requirement Title:	CORS
Source:	Interview 2
Requirement Description:	CORS could be implemented.

Technical Requirement 7	
Requirement Code:	TR7
Requirement Title:	Analytics
Source:	Interview 1
Requirement Description:	Analytics must be used to track and identify user's experiences and actions and also to help retrieve user data.

Technical Requirement 8	
Requirement Code:	NF8
Requirement Title:	QR Code generation
Source:	Interview 2
Requirement Description:	When a user registers an account a unique QR for that user will be generated. This QR code is shown on the My Code page accessed through the My Receipts page. The users QR code is linked to their user ID.

Technical Requirement 9	
Requirement Code:	FR5
Requirement Title:	Viewing receipts
Source:	Interview 2
Requirement Description:	When a user wants to see their receipts on the My Receipts and Receipt View page, all receipts linked to their user ID should be shown.

Technical Requirement 10	
Requirement Code:	FR22
Requirement Title:	Forwarding receipt
Source:	Interview 2
Requirement Description:	A simple POST call should be used to send an email to anybody the user may wish provided the server supports SMTP. The client should post the data to an API endpoint; the server side will do the actual mail sending. The user must have an account in order to this.

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6. [Appendix](#)

6.1 Project Proposal

6.1.1 Project Objective

The overall objective of my final year project is to generate a high quality detailed requirements specification document. This will be formulated gathering requirements from a variety of stakeholders. I will address many aspects such as the content, design, navigation and layout of the app.

Once I have identified the main stakeholders in this project, I will use various elicitation techniques to elicit requirements. Some of the techniques I will use include brainstorming, surveys, interviews and prototyping.

After carrying out all of my techniques, I will document all the gathered requirements within my requirements specification document. The information gathered will not only help me in gaining different viewpoints about the application but I will also gain insight to design and navigation which will be helpful while making the prototype. Along with developing my requirement specification document and a prototype of the app I will also be developing a project proposal, requirement specification, performing a midpoint presentation and final presentation and lastly a website which will be used for the final presentation and the project showcase.

The objective of my project is to provide an app that allows users to manage and store all of their e-receipts. The app will be easy and straight forward to use in order to suit all users.

My schedule for the course of the year is outlined in my project plan. I will try to work on my project regularly over the course of the year but I will also have many other assignments and exams throughout the year so I must divide my time accordingly. My project plan will ensure I keep on track and meet all deliverable dates which will ensure I satisfy the needs of all my stakeholders and I wish to exceed their expectations.

Time management will be an important objective during the course of the project. I will delegate my time for my project around my other modules. Time management techniques will ensure I keep on top of the project and all other modules. I also plan to set personal deadlines for different tasks within my project to ensure all deadlines are met and the project steadily progresses. Also, I will try

stick to the project marking scheme closely to ensure I have all of the relevant information which is expected.

6.1.2 Background

The task for my final year project is to create an innovative, creative IT based project. Coming up with an idea for a project was initially easy. I always had a project in mind which I seen a need for and it was a topic I was passionate about. I did initial research and I then completed my project pitch. My idea was accepted and my comments were very positive from all lecturers. After the project pitch I did not work too much on my project due to having many assignments due. Closer to the proposal due date I began to work on my project proposal and I met with my supervisor Ron for the first time. After discussion with Ron he explained that although the idea was good but due to a lack of potential stakeholders I should consider changing my idea.

I liked my original idea and had started working on it but I did agree with Ron and decided to change my idea. With only a few days before the proposal due date I began brainstorming new ideas and I came up with my new idea which is an e-receipts manager app.

Coming up with a new idea in short amount of time was difficult because it was important to me to focus on an area which interested me.

The thought for the application originates from personal experience. I have always witnessed my mother trying to manage piles of paper receipts and losing the important ones. After thinking about this and also thinking about inefficient e-receipts which are now replacing paper receipts as they are heading towards extinction, I came up with the idea for this application.

After doing extensive research online I discovered that no application existed on the market like this idea. Similar apps exist which allow the user to scan or take a picture of their paper receipt and then upload it to the app. However, no app exists where a digital receipt is sent directly to the app. I began talking to friends and family about my idea and they were extremely receptive to the idea. They thought that there was a major need for an application like this. I was really happy with the initial response to the idea.

6.1.3 Technical Approach

There are similar apps that exist on the market but nothing like this. The apps that exist are simply apps to help users manage their paper receipts by scanning their paper receipts and storing them on the app. My research for my project will be directed towards these types of apps as they are the closest competitors.

Steps to building my project include:

1) Requirements Elicitation

Requirement elicitation will involve meeting with a variety of stakeholders with the aim of gathering requirements from them in relation to how the end result should be. I will discuss the apps design and features with the various stakeholders.

2) Prototyping

Using the requirements gathered I will make a wireframe of the proposed app. My prototype will help me get feedback from my client and stakeholders and will allow me to make any necessary changes. A requirements workshop will take place to get the required feedback from stakeholders and a second prototype will be made after the workshop with the amended changes and suggestions.

3) App development

A website will be developed using the final document and also all requirements gathered from various stakeholders during the project. The purpose of the website is to display all content and results of the various techniques. The website will be used at the final presentation and also the project showcase. The website must reflect the amount of work that I completed throughout the life cycle of the project.

4) Project feedback

When I am completely happy with the finished project and so is my supervisor, my client will rate and evaluate my performance throughout the course of the project.

6.1.4 Special Resources Required

I currently lack the knowledge required to construct a prototype using Balsamiq, a website using WordPress, a use case diagram using Lucidchart, a Gantt chart using Microsoft Excel and a video using Video scribe, so I will use the following resources to enhance my skills:

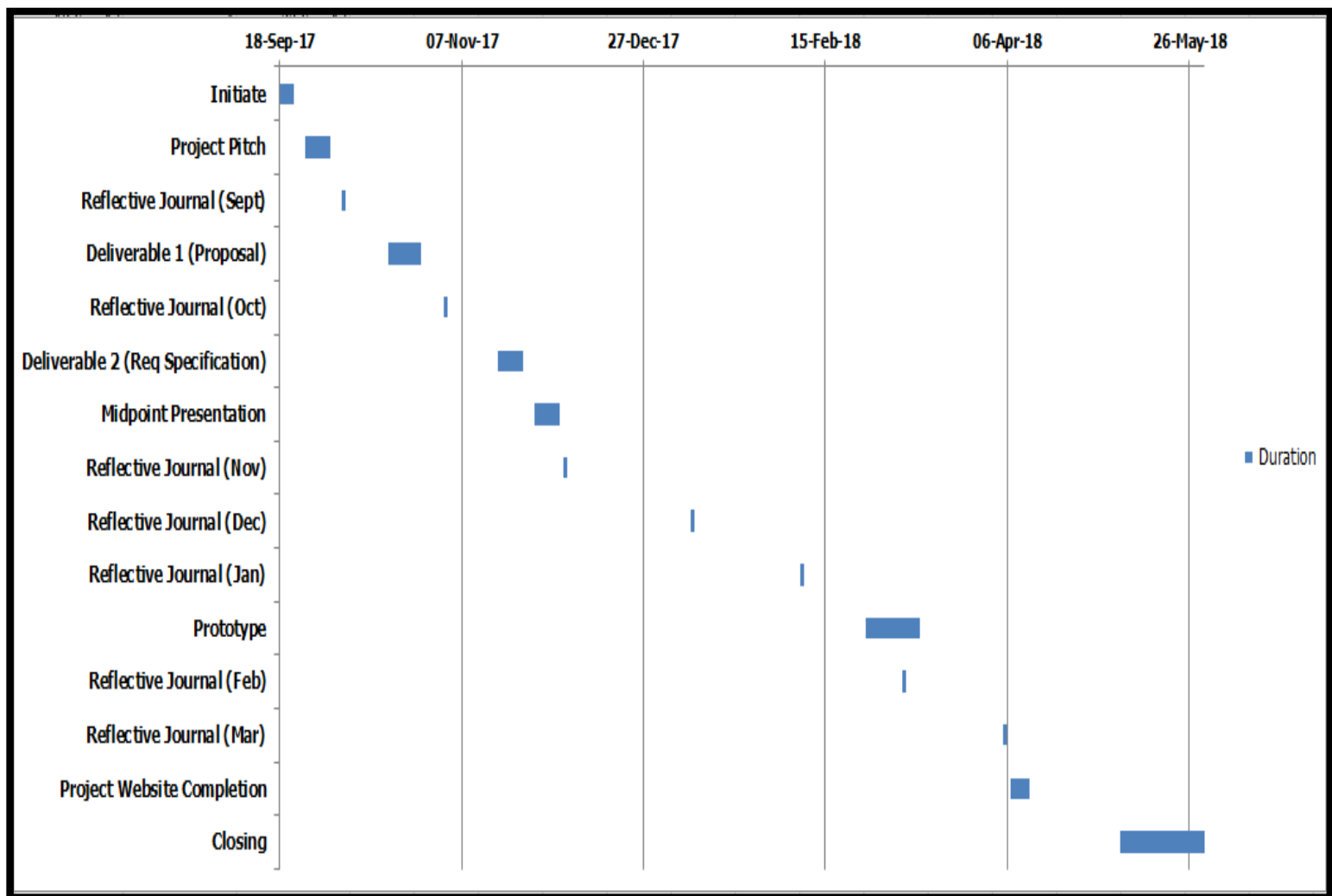
- Seminar with Sam on WordPress
- YouTube tutorials on how to incorporate features on WordPress
- YouTube tutorials on how to create a prototype using Balsamiq
- YouTube tutorials on what are use case diagrams and how to construct one
- YouTube tutorials on how to construct a use case diagram using Lucidchart
- YouTube tutorials on how to construct a Gantt chart using Microsoft Excel
- YouTube tutorials on how to create a video scribe video

Below are the essential resources I will require for this project:

- 1) Apps like Evernote and Receiptmate for research
- 2) A laptop
- 3) USB device
- 4) Dropbox in order to backup and save all files for my project
- 5) “A guide to the business analysis body of knowledge (BABOK guide)” will be vital in helping me create my requirements specification document
- 6) Access to the IEEE guide for effective requirements gathering
- 7) IEEE requirements documentation templates
- 8) Google Forms to create the survey
- 9) Microsoft Excel to further analyse the survey results and make charts
- 10) Balsamiq to create the prototype
- 11) Microsoft office to create the document
- 12) Microsoft PowerPoint to make the midpoint and final presentation
- 13) Microsoft Project to make the project plan
- 14) Microsoft Excel to make the Gantt chart
- 15) Lucidchart to create the use case diagram
- 16) Video scribe to make a video to use for my final presentation and showcase
- 17) WordPress to make the website for the project showcase

6.1.5 Project Plan

Basic Gantt Chart



Note

Project Plan created using Microsoft Project is contained within the next few pages of the project proposal document.

TASK NAME	DURATION	START	FINISH
PROJECT	184 days	Mon 18/09/17	Fri 30/05/18
Initiate			
Read project Brief	1 day	Mon 18/09/17	Mon 18/09/17
Brainstorm ideas	4 days	Mon 18/09/17	Thu 21/09/17
Finalize idea	1 day	Fri 22/09/17	Fri 22/09/17
Project Pitch			
Conduct initial research	3 days	Mon 25/09/17	Wed 27/09/17
Prepare pitch	2 days	Wed 27/09/17	Thu 28/09/17
Pitch	1 day	Mon 02/10/17	Mon 02/10/17
Reflective Journal (September)			
Create reflective journal	1 day	Thu 05/10/17	Thu 05/10/17
Upload reflective journal	1 day	Fri 06/10/17	Fri 06/10/17
Deliverable 1 (Proposal)			
Develop project proposal	6 days	Wed 18/10/17	Wed 25/10/17
Create project plan	3 days	Wed 25/10/17	Fri 27/10/17
Upload deliverable 1	1 day	Fri 27/10/17	Fri 27/10/17
Reflective Journal (October)			
Create reflective journal	1 day	Thu 02/11/17	Thu 02/11/17
Upload reflective journal	1 day	Fri 03/11/17	Fri 03/11/17
Deliverable 2 (Requirements Specification)			
Develop requirements specification	6 days	Fri 17/11/17	Fri 24/11/17
Upload deliverable 1	1 day	Fri 24/11/17	Fri 24/11/17
Reflective Journal (November)			
Create reflective journal	1 day	Tue 05/12/17	Tue 05/12/17
Upload reflective journal	1 day	Wed 06/12/17	Wed 06/12/17
Midpoint Presentation			
List relevant topics	1 day	Mon 27/11/17	Mon 27/11/17
Create first draft	1 day	Mon 27/11/17	Mon 27/11/17
Perform timed practise	1 day	Mon 27/11/17	Mon 27/11/17
Show to supervisor	1 day	Tue 28/11/17	Tue 28/11/17
Make adjustments	1 day	Thu 30/11/17	Thu 30/11/17

Practise presentation	1 day	Fri 01/12/17	Fri 01/12/17
Midpoint presentation	1 day	Mon 04/12/17	Mon 04/12/17
Reflective Journal (December)			
Create reflective journal	1 day	Tue 09/01/18	Tue 09/01/18
Upload reflective journal	1 day	Wed 10/01/18	Wed 10/01/18
Reflective Journal (January)			
Create reflective journal	1 day	Thu 08/02/18	Thu 08/02/18
Upload reflective journal	1 day	Fri 09/02/18	Fri 09/02/18
Prototype			
Develop Wireframe	5 days	Mon 26/02/18	Fri 02/03/18
Discuss with stakeholders in Requirements Workshop	1 day	Tue 06/03/18	Tue 06/03/18
Make requested changes	3 days	Wed 07/03/18	Fri 09/03/18
Finalize Wireframe	2 days	Mon 12/03/18	Tue 13/03/18
Reflective Journal (February)			
Create reflective journal	1 day	Thu 08/03/18	Thu 08/03/18
Upload reflective journal	1 day	Fri 09/03/18	Fri 09/03/18
Reflective Journal (March)			
Create reflective journal	1 day	Thu 05/04/18	Thu 05/04/18
Upload reflective journal	1 day	Fri 06/04/18	Fri 06/04/18
Project Website Completion			
Develop Final Project Website for showcase	3 days	Mon 09/04/18	Wed 11/04/18
Review with Supervisor	1 day	Thu 12/04/18	Thu 12/04/18
Closing			
Create project showcase poster	1 day	Mon 07/05/18	Mon 07/05/18
Upload Project, poster and website	1 day	Sun 13/05/18	Sun 13/05/18
Create final presentation	1 day	Mon 14/05/18	Mon 14/05/18
Practise presentation	1 day	Mon 14/05/18	Mon 14/05/18
Make adjustments	1 day	Mon 14/05/18	Mon 14/05/18
Practise timed presentation	1 day	Mon 14/05/18	Mon 14/05/18
Complete final presentation	1 day	Wed 23/05/18	Wed 23/05/18
Project showcase preparation	2 days	Mon 28/05/18	Tue 29/05/18
Complete project showcase	1 day	Wed 30/05/18	Wed 30/05/18

6.1.6 Technical Details

I have decided to use WordPress to construct the final project website and Balsamiq to develop the app prototype. Both programs are free to use and have multiple features to allow me flexibility towards the way I want to create my wireframes and website. Various YouTube tutorials on both applications also exist which will allow me to enhance my skills. WordPress produces code that is W3C compliant and is flexible. Balsamiq is a quick low fidelity wire framing tool. Both applications save work automatically as I develop, which reduces the risk of losing work. Using Balsamiq is a vital element in my project because using the prototype to gain suggestions from stakeholders is very important. Using Wordpress is also a vital element in my project. The project website will be created when all requirements have been gathered and the project documentation is completed. The website will illustrate all work and tasks I completed throughout the project. At the project showcase the website will be a visual representation of the requirements specification document.

6.1.7 Benefits

The main benefits of my app are:

1. **Improving customer experience:** My app will help improve the overall process of a shoppers purchase from start to finish. The process of entering a customer's email address is eliminated which shortens a customer's time spent at the till and they then have easy access to their digital receipt which saves them time looking for the receipt etc.
2. **Cost savings:** Retailers steer off the idea of digital receipts thinking they will actually produce more costs rather than actually saving money. However, they are completely wrong, the costs associated with paper and other costs throughout the year are much more expensive. The cost of both receipt paper waste added with cost of disposal results in a high cost which my app will save the company.
3. **Enhanced customer service:** Returns can be a strenuous process for both the shopper and the retailer. Digital receipts can create easier access to receipts for retailers which minimize the returns process which saves the cashier time and keeps the customer happy.
4. **Creates marketing opportunity:** Paper receipts typically end up in the bin but this app can be seen as a new marketing channel. Offers can be attached to the digital receipt and advertising can be done on the app. This works better than when email addresses gathered for e-receipts are being used to issue marketing material which is thoroughly annoying for customers.

6.1.8. Problem Statement

There is no application on the market that stores digital receipts which are sent directly to the app at purchase.

There is a big risk with undertaking this project as there is nothing that exists on the market like this. This creates the problem of high expectations from stakeholders and trying to manage the expectations may seem difficult. The scope of the project is also very difficult to measure and there is a high chance that it will change throughout the course of the project. Excellent communication with all stakeholders is paramount in this project and it will help reduce the major risks.

6.1.9. How will the app make money?

- **Creates marketing opportunity:**

Paper receipts typically end up in the bin but this app can be seen as a new marketing channel. Participating retailers will have the opportunity to attach offers and promotions to their digital receipts. This is a better approach to advertising rather than receiving an excessive amount of emails regarding offers. The Data Protection Commissioner has recently looked into the issue of email addresses gathered for the purpose of issuing e-receipts have been used to issue marketing material. Retailers who are prosecuted by the DPC by breaching the rules on electronic marketing risk a fine of up to 5,000. Instead of risking this fine they can attach offers to their digital receipts. This also works better for shoppers by reducing the excessive amount of emails they receive. Shoppers can also feel like they are being preyed on by stores because they hand over their email address as they are told their receipt will be emailed to them for customer convenience but they are then bombarded with spam emails.

As well as retailers attaching specific offers and promotions to their digital receipts, ads can be shown on the app. Ads are a driving force of the global market and ads within apps are vastly becoming popular.

- **Selling data**

Another way we plan to make money is like many free apps that take user data and sell it to advertisers. Data is essential for companies. Taking customer data to improve the customer experience is key to creating competitive advantage. Comprehensive data and analytics drive better experiences for a customer. More and more companies are now taking a data driven strategy.

Retailers can purchase data from us to learn the following about their customers:

- To create better targeting to ensure only people potentially interested in what you have to offer are targeted to ensure you maximize your advertising budget.
- To better understand and know your target market

6.1.10. Evaluation

Now that I have a better understanding of my project objectives, I will begin using a variety of elicitation techniques to gain requirements from stakeholders. By implementing and analysing the various techniques, I will be able to produce a detailed requirements document. These techniques may include surveys, brainstorming sessions, interviews and requirements workshops, interface analysis and prototyping. These are the main techniques I am considering. Implementing these techniques will provide a great foundation toward a highly detailed requirements specification document. I will execute the majority of techniques after the midpoint presentation. Regular meetings with my stakeholders will ensure I do not overlook any requirements.

Monthly journals will help me to keep track of work completed each month and work needed to be completed the following month. I also have arranged to meet with my project supervisor Ron once a fortnight. These meetings will help me with my overall project and ensure the project is progressing and is heading in the correct path. On top of my app and document I will create a website using WordPress. This website will be vital for the project showcase. This website will demonstrate the techniques used in the project and the results.

6.2.Reflective Journals

6.2.1 September Reflective Journal

In September I began brainstorming project ideas. I always had an idea in my head for my project as I had always seen the need for the idea but I brainstormed anyway to see could I come up with anything other ideas. Coming up with more ideas was difficult and I ended up sticking with my original idea.

There was major confusion in September to what was expected from our BSHTM class because all of the information about the project that was given to us was aimed towards the BSHC class. We were unsure how technical our project had to be and we initially thought we were expected to code a website or web application. After a chat with Eugene, our course director we were concrete on what was expected of us. We then knew that our final year project is a requirement specification document and there is no technical expectation.

Once I knew what was expected I began initial research and competitor analysis for my project and I also spoke to people and secured them to be interviewed by me as one of my techniques. I also started brainstorming for my project pitch which is on the 2nd of October.

MY REFLECTION

I am happy with how I performed this month, I did a lot of brainstorming and research and I am happy with my idea.

NEXT MONTH

During October on top of having my project pitch when hopefully my idea will be accepted, I will also create my project proposal which is due on the 27th of October. Also we have our first seminar which is with Keith Brittle about referencing.

SUPERVISOR

I am currently waiting to be assigned a project supervisor, when I get assigned a supervisor they will help guide me on what to do next and discuss the progress of my project.

6.2.2 October Reflective Journal

October was a difficult month. I successfully completed my project pitch on the 2nd of October and I gained excellent feedback. The project pitch went very well and I was very happy. I was very busy with other assignments throughout October as I currently have five other modules so I did not initially work on my project after my idea was approved at the project pitch. The proposal was due October 27th so I began working on my project closer to that time.

During the middle of the month we got assigned our project supervisor. I was assigned Ron Elliott which I was very happy because I have had Ron as a lecture for many modules throughout my years in college. After discussing my project with Ron he explained that my idea was good but I should try to think about a new idea due to the lack of stakeholders in the project. It was difficult at first because I liked my original idea and I had already done a lot of research into the idea but I agreed with Ron and I decided to change my idea.

Trying to think of a new idea that I had an interest in and that also had as many stakeholders as possible was difficult. Eventually I came up with an idea that I really liked. It was difficult restarting the project and completing my proposal in one day but I completed it.

We also had our first seminar with Keith Brittle which was helpful.

MY REFLECTION

It was a difficult month juggling the project with many assignments but I am happy with how fast I came up with a new idea and I worked promptly to complete the project proposal.

NEXT MONTH

During November I plan to get a good start on my project since I am now behind after changing my idea. I want to decide and elaborate on exactly what road I want to go down with my idea and I also plan to get some contacts for stakeholders. Also, the requirements specification is due November 24th and I also plan to prepare for my mid-point presentation which is at the start of December.

We also have another seminar which is with Eugene about requirements gathering.

SUPERVISOR MEETINGS

Date of Meeting: 20/10/17 and 26/10/17

Items discussed: Changing project idea

Ron proposed the idea of changing the project idea which I agreed to. After a lot of thought I came up with a new idea and we met again. I pitched my idea to Ron and he liked the idea and gave me some further advice.

6.2.3 November Reflective Journal

During the month of November I worked hard on my project since I was slightly behind after changing my idea last minute. November was a very productive month. I thought about my idea much more in depth. I successfully uploaded my preliminary requirements elicitation document on the 24th of November and my midpoint document on the 30th of November. There was again confusion about what was expected from our BSHTM class for the two documents which was very annoying.

Both documents included everything I had done so far. I also made my survey this month. Ron checked my draft questions and gave me some feedback. After Ron approved my questions, I made the survey and began distributing it. The survey was distributed through email to relevant participants and also through sharing the survey link on Facebook

I also made my presentation for my midpoint and practised the presentation with Ron and got some feedback. I made the changes to the presentation that Ron suggested. I have practised the presentation a lot and I feel prepared for the presentation on December 11th.

This month I also began watching YouTube videos on how to use WordPress.

We also had a seminar this month with Eugene O'Loughlin which outlined what was expected of us in the midpoint presentation. This seminar really helped as there seems to always be confusion to what is expected from our BSHTM class versus the BSHC class.

MY REFLECTION

I am really happy with my progress this month. I think my project is progressing really well and I am happy with the quality of it so far.

NEXT MONTH

During December other than my midpoint presentation on December 11th I do not expect to do much work on my project because I will have to begin studying for my exams.

SUPERVISOR MEETINGS

Date of Meeting: 16/11/17

Items discussed: Checking survey questions

Ron checked my survey questions before I made the survey and gave me some feedback.

Date of Meeting: 30/11/17

Items discussed: Midpoint document and presentation

Ron approved my updated survey questions and also went through my midpoint document and presentation and suggested minor changes.

6.2.4 December Reflective Journal

During the month of December, I did not work much on my project as expected due to assignments and exam study. I have five exams in January which restricted the amount of time I could delegate to this project during December and also during January.

During December I completed my midpoint presentation. I practised my presentation a lot and presented my presentation on December 11th in front of my supervisor Ron Elliott and also Dermot Killen. I was extremely happy with how my presentation went as I was able to successfully answer all questions asked and I got good positive feedback on my idea and work done so far. The questions asked gave me a lot to think about.

I also had an interview with my project sponsor Gerry on December 12th. This interview allowed me to understand the client's expectations for the app and what they expect of me throughout the process of the project. This interview was extremely beneficial as it provided me with more information to help me create the interview questions for the other stakeholders.

MY REFLECTION

Very little work was done on my project this month but that was expected. Juggling this project along with five other modules is very difficult.

NEXT MONTH

During January I do not expect to get any project work done at the start of the month due to exams but once my exams are finished I hope to start working on my project again and continue on from where I stopped in December.

6.2.5 January Reflective Journal

Again, the majority of January was unproductive due to exams. This was expected and it was in my project plan.

At the end of the month I picked up my project where I stopped in December. I reviewed where I was at and I referred to my project plan to see what I was to do next.

A brainstorming session also took place on January 17th. The brainstorming session produced a number of ideas from a variety of stakeholders in relation to the features and functions of the application. From listening to all stakeholders present I gained a clearer understanding of the features the app should include and also the functions.

MY REFLECTION

I did not do much work on my project again this month but that was anticipated and it was in my project plan. The brainstorming session was a success as many requirements were elicited.

NEXT MONTH

During February I plan to get a significant amount of work done on my project. I plan on starting my other techniques, so far only my survey, brainstorming session and one interview is complete.

Also, Sam is holding two seminars on WordPress on February 7th and 11th which I will attend. These seminars will be very valuable to me as I need to make a website for the project showcase and I intend on making the website using WordPress. I will need to make the website in April therefore I will have the sufficient time after the seminars to watch some YouTube videos on WordPress to further enhance my skills.

6.2.6 February Reflective Journal

February was a very productive month and I made great progress with my project. I completed two more interviews. The interview with a developer gave me better understanding of what developing the ReceiptRetriever app may require from the point of view of a developer and what the app will be able to provide from a functional point of view. The interview with a sales assistant helped me gain a deeper understanding of the disadvantages of e-receipts from the point of view of a sales assistant who deals with them every day. Both interviews were successful.

I attended two seminars on WordPress with Sam this month and two seminars with Eugene. One of Eugene's seminars discussed in detail the outputs from analysis and the second seminar discussed the marking scheme.

MY REFLECTION

I made great progress this month and I am happy with my progress. Both seminars I attended were very useful.

NEXT MONTH

Next month I plan to complete all of my remaining techniques and start to prioritize all of the requirements I elicited from all of my techniques.

SUPERVISOR MEETINGS

Date of Meeting: 01/02/18

Items discussed: Interview question feedback – draft 1

We discussed my first draft of interview questions and Ron suggested some changes.

Date of Meeting: 14/02/18

Items discussed: Interview question feedback – draft 2

Ron checked my second draft on interview questions and approved the questions.

6.2.7. March Reflective Journal

March was another productive month. I created the first prototype using the requirements elicited from the survey, interviews and brainstorming session. Prototyping is important as it helps to give clients a clear visual representation of the potential end goal of the project and they can also provide feedback for any design changes. The prototype was evaluated in the Requirements workshop that took place on March 6th. The requirements workshop was very successful as all stakeholders had the opportunity to critique the prototype and suggest new features or request altering the prototypes design. This was the first time stakeholders seen the prototype. I then created a second prototype after the requirements workshop. A number of modifications have been done to the first prototype of the ReceiptRetriever app based on stakeholder's opinions and critiques. Most modifications are design changes.

Also, this month I created and submitted my project profile that will be included in the booklet for the showcase.

MY REFLECTION

I am extremely happy with the progress of the project and that the project is on track with the project plan.

NEXT MONTH

Next month I have my final exams but I also plan to complete the interface analysis and begin the detailed IEEE requirements section of the project.

SUPERVISOR MEETINGS

Date of Meeting: 16/03/18

Items discussed: Creating a use case diagram

Ron explained what a use case diagram is and the importance of the diagram and he provided me with some resources to research use case diagrams.

6.2.8. April Reflective Journal

At the beginning of April I completed the interface analysis. The use case diagrams help illustrate the many interactions that will take place between the stakeholders and the ReceiptRetriever. I also created the website for the project showcase using WordPress. I am extremely happy how the website turned out.

I then completed my final exams therefore I did no work on my project in the middle of the month.

After my final exams, I started working on the final component of my project which is the highly detailed IEEE requirements specification document. This section contains both a detailed functional and non-functional requirements for the ReceiptRetriever application. I followed clear guidelines for this section as it is imperative that both function and non-functional requirements are covered in the IEEE requirements specification section of the project.

MY REFLECTION

I am happy that the requirements specification section is started and I am extremely happy with the detail and quality of my project so far.

NEXT MONTH

Next month I will finish the requirements specification section and begin the closing section of the project which involves creating the final presentation and project poster, uploading the project, poster and website, practise and complete the final presentation and lastly complete the project showcase on May 30th.

SUPERVISOR MEETINGS

Date of Meeting: 05/04/18 and 19/04/18

Items discussed: IEEE requirements specification section of the project

Ron explained how to prioritize using weighted scoring and Moscow and provided me with some resources. This helped me to begin formulating the IEEE requirements specification section of the project.

6.2.9. May Reflective Journal

With exams over, May was spent solely working on finishing my project work and preparing my document. At the beginning of May I finished my highly detailed IEEE requirements specification document. I also worked on formatting the document and ensuring everything was included in the document along with reading the document to ensure there were no mistakes and I updated sections were relevant.

I then made my project poster for the project showcase. I will upload the project showcase, website and also the document itself on May 13th.

After the upload I will create my final presentation and I intend on practising it emulously. I also plan on creating a video using video scribe to use in my presentation and also at the showcase. This video will be an animation explaining my idea. I hope that this video will be useful in the presentation to maintain interaction to ensure the presentation does not get boring. Once my presentation is complete I will begin to prepare for the project showcase on May 30th. I will finalise my project website to ensure that it is appealing and up to date with the relevant project content.

MY REFLECTION

My final year project is almost complete and the year went by extremely fast. I am extremely happy with the work I did on my project throughout the year. Although it was difficult juggling the project with many other modules and exams, I kept up my project work and the project steadily progressed over the year. My supervisor Ron Elliott was great help throughout the year ensuring I was taking the project in the correct path and offering many suggestions. I am very happy with the quality of my project. The final components of my final year project will be finished over the next few weeks.

SUPERVISOR MEETINGS

Date of Meeting: 01/05/18 and 09/05/18

Items discussed: IEEE requirements specification section of the project

Ron looked over my IEEE requirements specification section of the project and offered further guidance and suggestions.

6.3. Requirements Verification

6.3.1. Brainstorming Session

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Hi,

I would like to thank you again for your participation in the brainstorming session. The brainstorm was a success and it resulted in many requirements being elicited. My understanding of the requirements elicited from the brainstorming session are listed below.

Requirements elicited:

The app will contain the following pages:

- Start page
- Login page
- Register page
- My receipts page - main page
- Receipt view page
- Support page
- My account page

The app will have the following functionality and layout:

- **Forward Receipt** - The ability to forward a receipt in email
- **Notification system** - Notification when a new receipt is added or near to expiry of a guarantee/ credit note
- **Filtering receipts** - Option to create labels and separate receipts into folders
- **Delete receipt** - Option to delete a receipt
- **Popup box** - Displayed if login/registration has been unsuccessful
- **Add comment to receipt** - Option to add a comment to a receipt
- Receipt to be highlighted if it has not been open
- User friendly navigation focusing on usability
- Receipts to be listed newest to oldest
- Deals to be attached to the bottom of receipts

If you feel any requirements have been misinterpreted or missed, please don't hesitate to get in contact.

Kind Regards,
Lauren Lane.

6.3.2. Interview 1

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Hi Gerry,

Thank you again for your time on Tuesday. The interview was very useful and it has given me more information to create interview questions to conduct various stakeholder interviews.

My understanding of the requirements elicited from our interview are listed below.

Requirements elicited:

- User friendly navigation focusing on usability
- Analytics feature
- Sidebar
- Logout button
- Banner appears when new receipt is added
- Email defaulted with the ReceiptRetriever email for reviews
- Minimalistic app
- User registration
- Short login process
- Security contract possibly needed
- QR code generation when a user registers
- Receipt sent directly to app
- All receipts associated with a user will be shown when they login
- Ads to be shown on the app
- Offers to be attached to digital receipts
- Budget feature
- Ability to take a picture of receipt
- Payment incorporated within app

Could you please confirm these requirements and let me know if you feel any requirement has been missed or misinterpreted.

Kind Regards,
Lauren Lane.

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Hi Lauren,

I am delighted the interview offered you assistance. I am happy with the significant amount of requirements elicited from our interview and I do not feel that any requirements have been missed or misinterpreted.

Best of luck with the remainder of the project and we will talk again soon.

Kind Regards,
Gerry Concannon.



...

6.3.3. Interview 2

Hi,

Again, thank you for your time on Monday. This interview was extremely valuable as many technical requirements were elicited.

The requirements elicited are listed below.

Requirements elicited:

- Technologies compatible with all devices to be used
- Common app
- QR code produced when user registers
- QR scanned for process to work
- Viewing receipts
- Forward receipt
- Webhost provider needed
- CORS could be implemented
- Updates required
- Encryption of passwords
- Password requirements
- No user specific information stored in cookies
- Data in database must be encrypted
- Google's RECAPTCHA
- Failed login - user informed if login/register is unsuccessful
- MONGO dB to store data

Could you please confirm these requirements and let me know if you feel that any requirements have been missed or misinterpreted.

Kind Regards,
Lauren Lane.

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Hi Lauren,

From the point of view of technical requirements, I can confirm all listed requirements and I do not feel any requirements have been misinterpreted.

If you have any more questions you would like to ask me don't hesitate to get in contact.

Kind Regards.

[REDACTED]

...

6.3.4. Interview 3



Lauren Lane

Today, 14:14

Lauren Lane

👤 ⌘ Reply all | ▾

Hi [REDACTED]

I would like to thank you again for participating in our interview. My understanding of requirements elicited are listed below.

- Short login
- Option to stay permanently logged in
- Support page link
- Set time in which receipt appears in app
- Social media account links
- Discounts and deals attached to receipts
- Offers and ads advertised throughout the app
- Social media logins
- Notification system
- Customisation

If you feel any requirements have been missed or misinterpreted please contact me.

Kind Regards,
Lauren Lane.

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Requirements elicited from interview



[REDACTED]

👤 ⌘ | ▾

Hi Lauren,

I am glad you found the interview of use. I can confirm all requirements listed. If you need any further assistance, let me know.

Kind Regards,
[REDACTED]

...

6.3.5. Interview 4



Lauren Lane

Today, 14:33

Lauren Lane



Reply all

Hi [REDACTED]

I would like to again thank you for taking the time out of your busy schedule to facilitate my interview yesterday. The interview resulted in many business and technical requirements been elicited.

Requirements elicited:

- Exporting costs of various receipts to spreadsheet to manage expenses.
- Receipt format
- Set time in which receipt appears in app
- Budget feature
- Notification system
- App provisioned in app store
- App should be designed to look and perform the same on all device sizes
- Email sent to user to notify of new receipt being added
- Forward receipt option

Could you please confirm the requirements listed above and let me know if you feel that any requirements have been missed or misinterpreted. Again, I would like to remind you that this interview will be anonymised.

Kind Regards,
Lauren Lane.

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Requirements elicited from interview



Hi Lauren,

I am delighted that the interview offered you assistance and I am happy with all requirements you have listed.

Kind Regards,

[REDACTED]

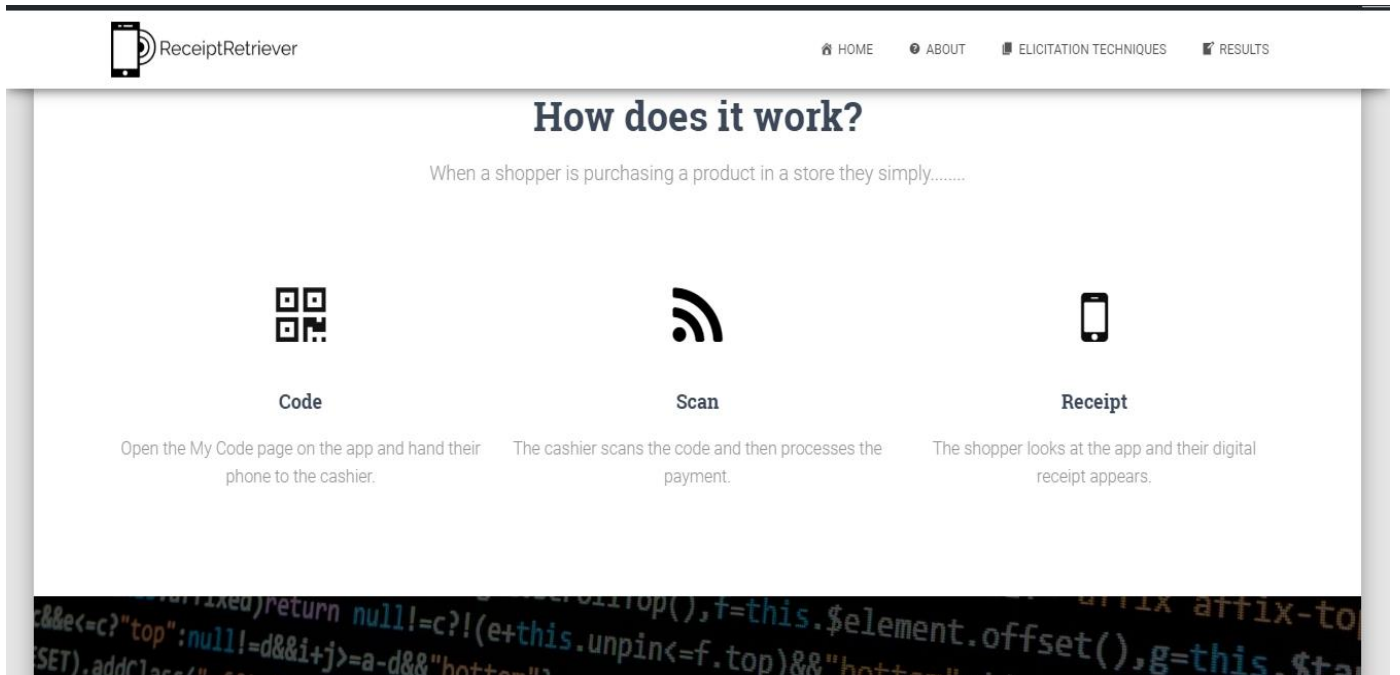
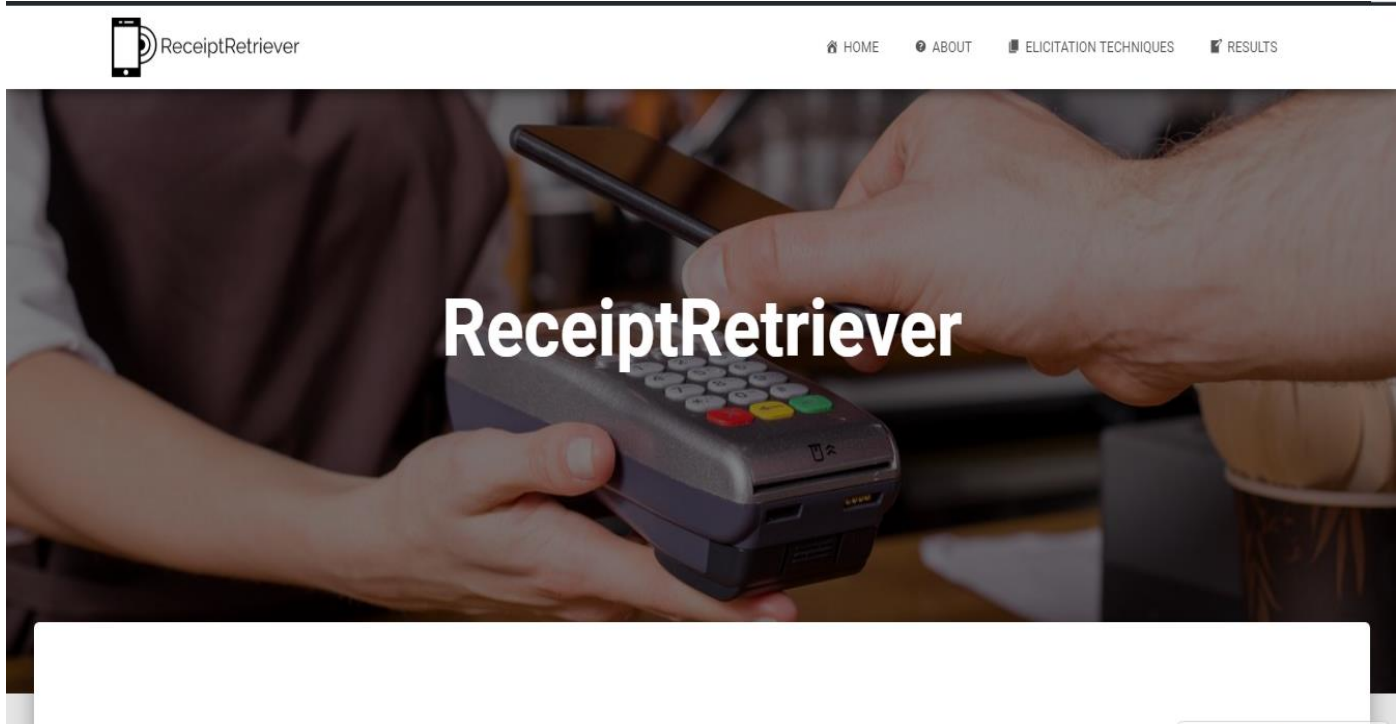
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6.4. Website Screenshots

Website link

www.receiptretriever.com

This website was built using WordPress for the purpose of the project showcase and presentation.



What Stakeholders are involved?

A range of stakeholders who vary in influence and impact are involved

Business Analyst

The business analyst is vital to the project in order for it to be successful.

Project Sponsor

The application is being built for the project sponsor and they have the final say on the requirements list.

Retailer

Retailers are the target audience of the ReceiptRetriever application.

Users

Users will be the shoppers who purchase products and use the app.

Sales Assistants

Sales assistants scan the users QR code before they process payment.

Developer

The application will be built by a developer.

About

The concept around the ReceiptRetriever application is to provide an EPOS application which benefits both shoppers and retailers by managing digital receipts and creating a more efficient process than e-receipts.

This project required me to take on the role of a business analyst for a leading innovator in the EPOS sector. I carried out a range of elicitation techniques with stakeholders and I elicited a significant amount of requirements. The requirements were prioritised using the MoSCoW analysis method and I then created the requirements specification section.

Elicitation Techniques

This project involved a significant amount of stakeholder input through a range of the following elicitation techniques:

- Survey

- Brainstorming session

A brainstorming session was held with 4 participants with the aim of producing a number of ideas in relation to the features and functions of the application.

- Interviews

Four interviews were held with stakeholders considered vital to the project

- Prototype

A prototype was developed using the requirements elicited from the brainstorming session, survey and four interviews that took place with various stakeholders that were prioritised using the MoSCoW analysis technique.

- Requirements Workshop

The first prototype was critiqued by stakeholders in the requirements workshops. A second prototype was created after the requirements workshop based on stakeholder's opinions and critiques.

Results

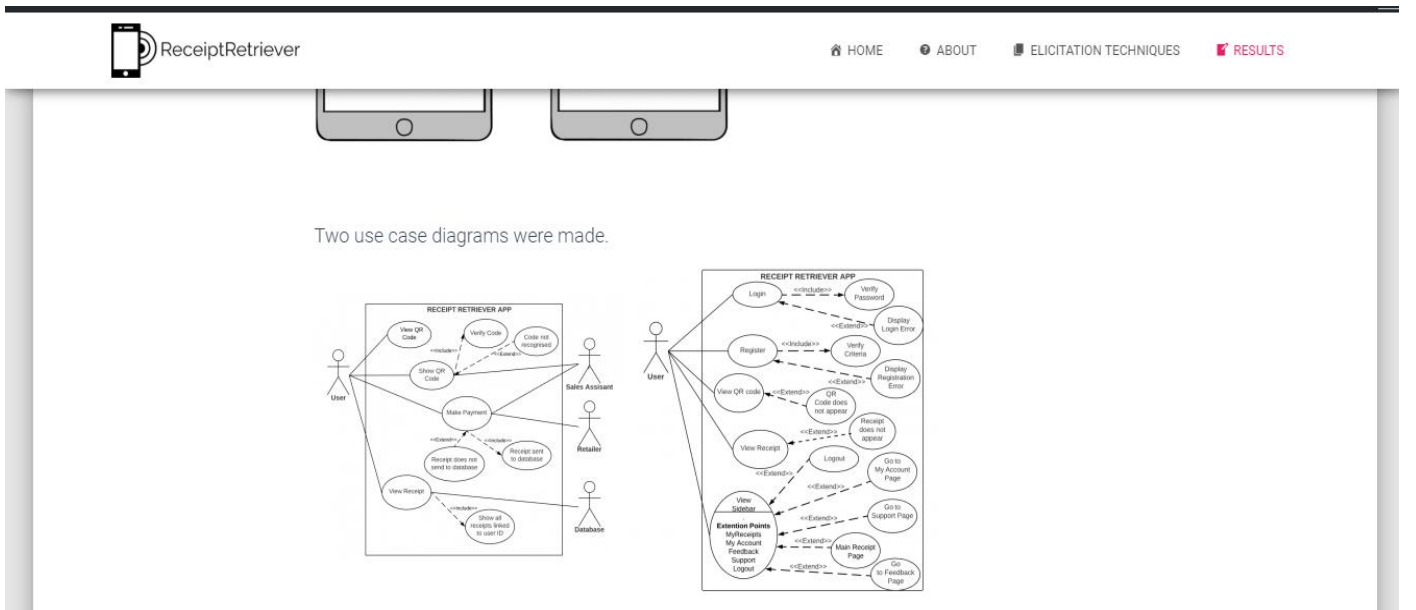
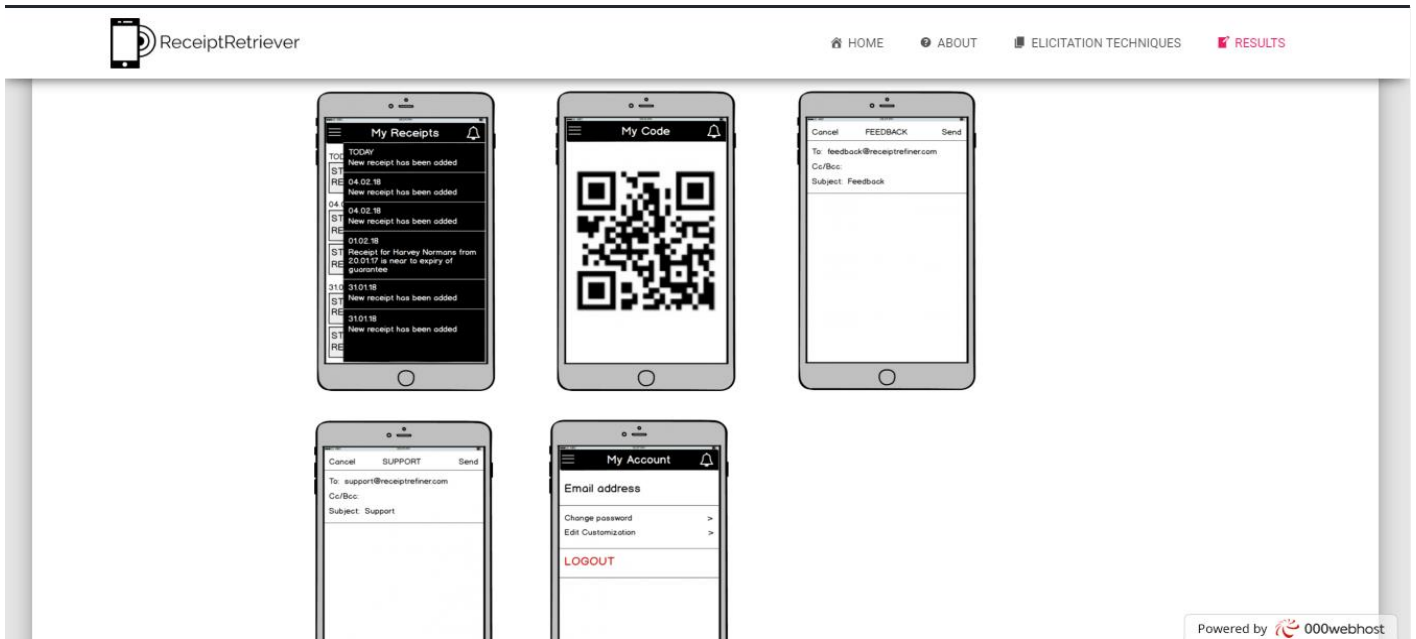
The survey, brainstorming session and four interviews resulted in many requirements. These requirements were prioritised and they are clearly visible in the prototype below.



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6.5. Project Evaluation

Reflection

Completing this project throughout the year has been a challenge as it was difficult juggling the project with many other modules and exams. I am happy how I continually worked on the project throughout the year and the project steadily progressed. The project plan ensured that I kept working on the project and that I did not get side tracked by other modules. I am extremely happy with the detail and quality of my project. I believe that this app could be easily built by a developer using my highly detailed IEEE requirements specification document and it would reduce development effort as the developers would be forced to consider requirement early which reduces later redesign, recoding and retesting.

What are the most important things I have learnt?

I have learnt a lot throughout the lifecycle of this project through research and learning to use new applications. I had never used WordPress before this project. Through seminars with Sam and watching many YouTube videos I successfully built my project website for the purpose of the showcase. I had also never using Lucidchart before and I successfully created two use case diagrams. Other applications used in this project that were new to me included Balsamiq and VideoScribe. Learning how to use the various applications was interesting and they will definitely come to use in the future. Through research on various topics I gained knowledge on a lot of different interesting areas. I found my research on Near Field Communication (NFC) and on QR codes very interesting. I had not got much knowledge on either before this project and my research helped me to understand the best process for the app to work. I also found my research on how free apps make money extremely eye opening and interesting. I had a basic understanding of the various ways in which free apps do make money but I had no idea how much money some free apps make from only selling user data and ads. I enjoyed my research as it was on topics that I knew little about. The most important thing I have learnt throughout this project is the role and duties of a business analyst. I now have a better understanding of what is involved in the role.

What I found most difficult?

I found it difficult to come up with a new idea in a very short period of time as I wanted to the project on an area that interested me. I am extremely happy that I changed my idea as I would have not been able to produce the level of detail that is contained in this project using my original idea.

What do I wish I had done differently?

I am extremely proud of the detail and quality of my project and I would change very little. The only thing I would have done differently is I would have used a different set of interview questions. The interview was the first technique I used and I did not have the knowledge at the time that I do now. I created the interview questions not thinking about the requirements that would be potentially elicited from the different answers therefore minimal requirements were elicited from the survey. I learnt from this and while creating my interview questions I thought about the questions from the point of view of potential requirements that could be elicited as opposed to creating pointless questions.