Project Title: MyReceiptsApp

Student Name: Emer Hennebry

Student ID: 14310781

Stream: CASE4

Project Supervisor Name: Jane Kernan

Contents

1. Introduction

1.1 Overview

My final year is called MyReceiptsApp. It will be an app that will gather in-store receipts from Near Field Communication(NFC). Receipts will be stored on the app, safe in one place, eliminating paper receipts and providing a simple way to organise and budget purchases.

The app will include a section with a shop algorithm to calculate what shops you possibly will like. If receipts include special offers or voucher expire dates the app will alert you when the date is coming up. It will also give you a notification if you want to set a limit on how much you want to spend within a certain time frame. All the information needed for these features will be gathered from your receipts that you have collected on the app.

This application will create the digital connection that is needed for the large number of customers that still shop in-store or spend while travelling. Users will be able to use these receipts to return items, claim expenses, to have proof of warranty, even just to check you haven't been overcharged and to control your spending. On the side, it will allow shops a way to reach targeted customers with targeted information.

Buyers will purchase goods instore and whether they pay with cards, cash or through apps, such as, Android Pay, MyReceiptsApp will be an add on personal financial organiser. Customers will be able to categorise their receipts into preference headings, such as, a particular shop, a trip or business expenses.

MyReceiptsApp will be an Android app that will be created using Android Studio. To use the app user's phones must have NFC. The application will need permission for NFC and permission to use give notifications.

1.2 Business Context

For this app to be implemented into customers everyday lives
there is business context for in-store shops to deploy receipts being sent through NFC. For my project I will be creating a prototype which will send receipts, however, in shops a signal would be sent through NFC hardware, similar to Android pay. The shops could potentially apply sending receipts through their NFC hardware saving the amount they spend on paper and also having the feature of advertising in MyReceiptsApp to their targeted customers.

1.3 Glossary

Near Field Communication

NFC can send and receive data over radio waves. It is a short range communication between compatible devices, normally within 4cm.

2. General Description

2.1 Product / System Functions

The MyReceiptsApp will provide several key features to give customers an improved experience in collecting and budgeting receipts, while also enabling retailers to reach targeted customers with targeted information.
MyReceiptsApp will include the following features:

- **Receipts:**
  When customers use the NFC to collect the receipt, it will be added to the receipts section of the app, which is all the receipts listed according to date. If a user couldn't use the app to gather the receipt through NFC, they will be able to add the receipt for (e.g. for financial concerns or for the shop algorithm), they can add the receipt manually. However, they will not be able to use this receipt as a proof of purchase in these circumstances.

- **Categories:**
  Users will be able categorise their receipts into different folders. For example, if a customer would like to have all their receipts from Rome from within a certain time frame all in one section, customers can simply just set a folder for it and every time they get a receipt from Rome within that period it will save them into the folder. Customers will also be able to freely select receipts to put into a folder or even merely everything they bought in a particular shop. At the end of the folder it shows a calculation of how much was spent.

- **Shop Algorithm**:
  There will be a retail part of the app. Information from the receipts will be tracked and used to calculate what shops you could possibly like. The app will gather information on what and where you shopped and collect information such as student discount and when you shopped to make the app as personalised as possible. This part will be personal to every user. It allows customers to get update information on shops they could like without a third party having access to their person information.

- **Overall calculation:**
  A section of the app will have an overall calculation on how much you have spent. If users want to set a limit on much they want to spend they can set a notification to notify them when they have reached it.

- **Special Offer/Vouchers/Warranty:**
  If receipts include special offers or voucher expire dates the app will give you a notification when the date is coming up. For example, In Dunnes Stores they have vouchers at the end of their receipts but it must be used within a certain time. Also, when a warranty is expiring.

2.2 User Characteristics and Objectives

MyReceiptsApp target audience will be males and females at any age who have an Android smart phone with the NFC feature on their phone. To use the app users must accept permissions for the app to use the NFC on their phone and permission to give notifications. The NFC feature on smart phones can be turned on and off, therefore, users will have to make sure when they are using the app that the feature is turned on. On most phones this is easy to do in the settings.

The app will have simple user functions with simple navigation. People with different levels of technical competency should be capable of using.

2.3 Operational Scenarios

This section describes with a set of scenarios the users will experience with the functions available. For some of the scenarios, I have provided simple prototype pictures of the app to gain a clear picture.

Scenario 1: Registration

For unregistered users.

Steps:

- First thing users should do is check that their device meets the requirements of the app, which is that their device must have NFC. In majority of phones this can be checked in the settings or in the manual.
- If the user's phone has NFC they can then download the app from the play store.
- Once they go into the app they must accept the app's permission to use NFC and to use notifications.
- Select "Register" on the launch page.
- Users will register with:
    - Full Name
    - Username
    - Password
    - Email
    - Age
- Then after clicking the "Register" and agree to the conditions and terms the user is now able to use the app's features.

Scenario 2: Sign In

If a registered user of MyReceiptsApp is signed out and they want to sign in.

Steps:

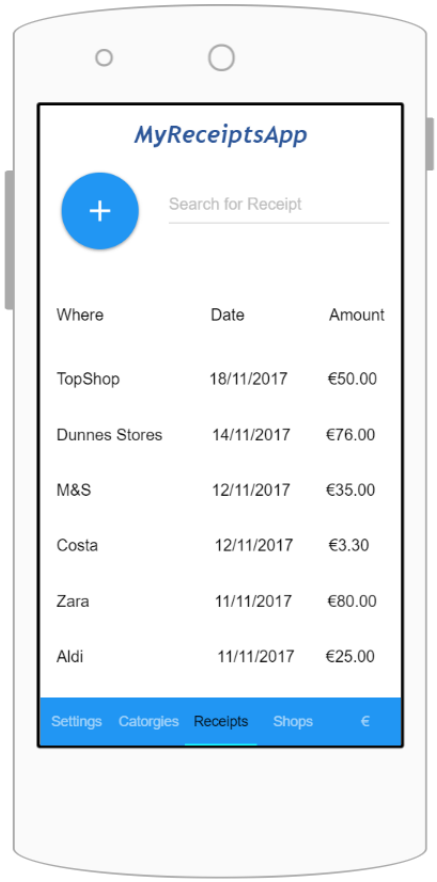
- On the launch page select "Sign In".
- Sign in with their Username and password.
- If they have forgotten their username or password, they will have to reset a new password through the email they provided during registration.
- They have three tries to submit their password, then the user will have to reset their password through email.

Scenario 3: Gathering receipts from NFC

This scenario is for when a customer buys something in shop and want to collect their receipt. For this project the receipt will be gathered from a NFC prototype.

Steps:

- When a customer wants to add a receipt to their account through NFC
    - It is essential to check first that their NFC feature is turned on in the phone settings,
    - Open the MyReceiptsApp application,
    - Then place their phone on the NFC hardware,
    - The receipt will then be added to the list of receipts in the receipts section.
- If a user wanted to add a receipt manually they can press the plus button and they can put in the purchase details themselves. However, this receipt cannot be used as proof of purchase as it will be clearly marked that it didn't come from the shop.
- Users can select the receipt and the app will bring you into a more detailed receipt of the purchase and this is what you will show the retailer if you would like to exchange or return goods.
- If a user can't find a receipt they can search by the shop name or date by clicking the "Search for Receipt" text box.

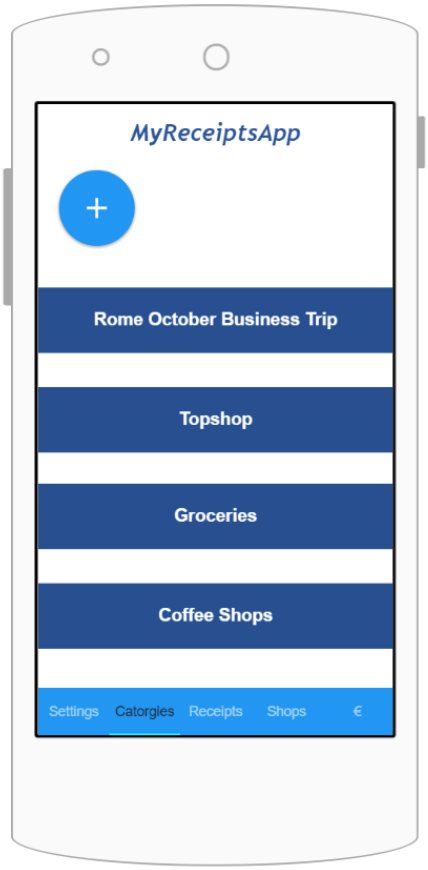


Scenario 4: Categorising receipts

This scenario is for customers who want to organise and group receipts together for budgeting or to have all expenses from a trip in one section.

Steps:

- First the user will go into the categories section of the app.
- Press the plus button
- Create a folder
    - They can name the folder what they like, and this is what will appear in categories section.
    - They can select existing receipts to add to the folder
    - Users can choose an option to have receipts automatically added to their created folder by shops or places from within a time frame or from then on wards.
- In the folders there will be the list of the picked receipts along with the total amount spent in all the receipts.
- Users can add or remove receipts to the folders as they wish.

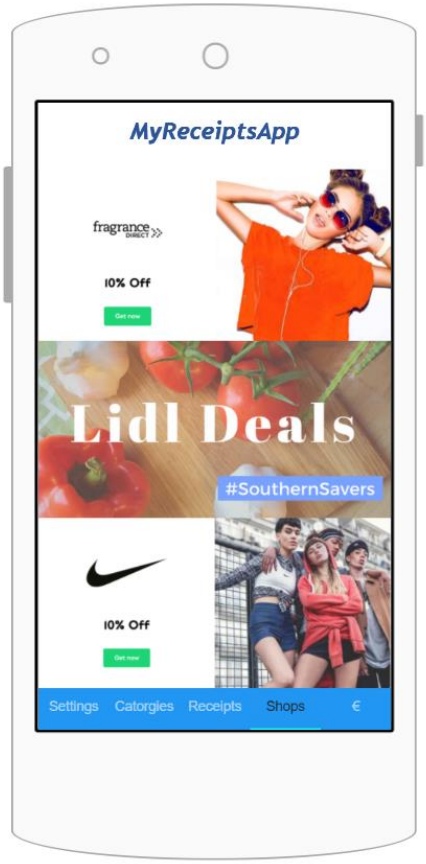


Scenario 5: Shop Algorithm

This scenario is the section of the app with the shops targeted information for users to browse through.

Steps:

- User clicks on the shops section of the app.
- Shoppers browse through information about shops they shopped at or different shops they could like which is calculated from their receipts. In this section it will either show the shop's name or the deals these shops have so that users can see the current deals.
- Users can examine the shops in more detail by selecting the picture that is displayed.

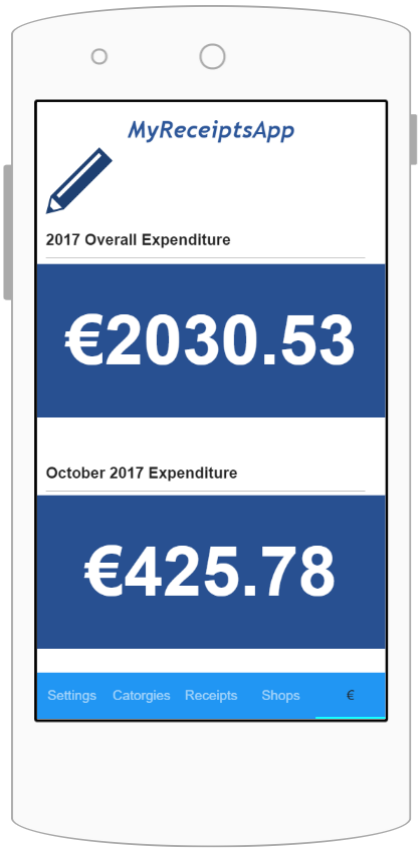


Scenario 6: Overall Calculation

A section of the app will show how much a user is spending.

Steps:

- User goes into the money section of the app.
- Users can edit the page by clicking the edit button at the top of the page.
- They can edit what total amounts they want to see, and which total amounts appear at the top of the page. They can choose total amounts for certain months of the year or an overall expenditure for the year. If they don't want to see any total expenditure they can do that to.
- Users can also set up a limit notification in the edit section of this page. So that the user will receive a notification if they spend a certain amount.



Scenario 7: Notification

Some receipts will include special offers or vouchers at the end of their receipts. This app will give you a pop up notification when these dates are coming up.

Steps:

- In the setting of the app the user can edit the notification settings.
- They can select how many days before they would like to get the notification.
- The notification will appear in a pop up similar to a text message or a Facebook notification on the phone.

Scenario 8: Editing Settings

If users would like to edit their settings or log out.

- Users select the settings part of the app.
- They can edit personal information or features of the app.
- This is also where users can log out of the app.

2.4 Constraints

Time Constraints

The final delivery of all project materials is on the 21st of May 2018. I have to take into consideration for the project to be fully tested the project will have to be done before the project date to give the required time for testing. I will also have to balance my time with project work, assignments, study and exams.

NFC requirements

A constraint in developing this project is that for this app to work I need to have NFC hardware. I do not have access to shops tills, so I will be creating a prototype, therefore, testing the app with users will be more difficult. Another constraint involving NFC is that the app is not suitable for all devices, it will only available to devices that have NFC.

Storage

The application server will have to require a large amount of storage space for the app. As the project grows it will have to hold more shops information and images, as well as holding user's details.

3. Functional Requirements

Functional Requirement 1: Registration/Log In

Description:

On the launch page of MyReceiptApp users will have the option to sign in or register. If the user doesn't have an account setup already they will need to register and accept the terms and conditions. If users are registered they can sign in by selecting the "Sign In" option. This will direct the user to another page to sign in with their username and password. If they forget their password or username they will have to reset their password through email. If they fail to enter a password in 3 times the will also have to reset their password using their email.

Criticality:

The registration and log in are mandatory for users to use the app features. Once the app is downloaded from the play store it is critical that users accept the apps permissions to use their phones NFC and notifications or else they won't be able to use features of the app.

Technical Issues:

Technical issues will be the storing and editing of users details for when they register and for if they need to reset their password. This will also be important for making sure that their information is safe from third parties.

Dependencies with other requirements:

This feature will depend on the Play Store to allow the app to be downloaded on phones. This will also depend on users accepting the terms and conditions, and to give permission to use the phone features. It is critical that users check that they have an android phone with the NFC feature.

Functional Requirement 2: Generating Receipts

Description:

Users will collect their receipts through NFC. It will be added to the receipts section of the app and will be listed according to date. Users will be able to search their receipts it this section by shop name or by date. Shoppers will then have digital copies of their receipts, which they can easily skim through. Users can also add receipts manually but cannot use these receipts as proof of purchase.

Criticality:

That the NFC feature on the phone is turned on in the settings, so that receipts can be used in the app.

Technical Issues:

If the user doesn't give enough time for the data to send the receipt will not be sent to the app. There is also the security issue, I will have to make sure that when the receipt is being sent that there is no one interrupting the connection through possibly through encryption.

Dependencies with other requirements:

This will depend heavily on the NFC hardware to send the data for the receipts.

Functional Requirement 3: Categories

Description:

As well as having digital copies of receipts, users will be able to categories their receipts into headings, such as, a particular shop, a trip or business expenses. This will make it easier for customers to group their receipts together and to budget their spending. If users want receipts can be sent automatically to their folders of receipts as they purchase. In each folder there will be a calculation at the end of all the receipts included in the folder.

Criticality:

The categories section is for the customers benefit so that they can assess the receipts they want quickly and to manage their expenditure for different aspects of their lives. People on business trips can collect their receipts on the app and group them rather than paper receipts to make it easier to claim money back. People paying expenses of their business can organise their receipts to make accounting easier and to redeem VAT.

Technical Issues:

There is the technical issue if the receipt data is being sent correctly because receipts that are been sent automatically to the different folders mightn't be directed to the correct folder.

Dependencies with other requirements:

This feature of the app depends on the receipts being generated so that they can be categorised.

Functional Requirement 4: Shop algorithm

Description:

This app will use the information from the receipts to receive targeted offers and targeted shops based on what in-store customers buy/where they buy. Users of the app will be able to see things such as when shops are on sale or shops they could like are on sale. As well as taking the information on what and where you shopped the app will also take information such as student discount and when they shopped to make the app as personalised as possible.

Criticality:

This part of the project is essential as it will personalise customers relationships with retailers without giving them private information. Companies will be able to market to their customers or possible customers.

Technical Issues:

The algorithm will consider all receipts even once off buys which would change customers shop page with a few shops they mightn't like, however, after a while these types of shops will phase out. There is also the technical issue of storing all the shops information and making sure it's up to date. Collecting the information from all the different receipts will be difficult in some cases, the receipts will have to be formatted correctly. There's the technical issue is with how retailers information will be updated, the information will be physically placed into the database when retailers send their information about products, however, when this app expands a separate part will have to be put in place to make it easier for retailers to update their information about their shops and products.

Dependencies with other requirements:

This feature will depend on the receipt information being correct.

Functional Requirement 5: Overall calculation

Description:

A section of the app will have an overall calculation on much you have spent. They can pick which total amounts they want to have in the section and the order of them. They can choose total amounts for certain months of the year, for a whole year or none. If users want to set a limit on how much they want to spend they can set a notification to notify them when they have reached it.

Criticality:

This section of the app will give a better indication on how much customers are spending in different parts of the year. It will be a real-time account of what they have spent.

Technical Issues:

When items are returned or exchanged the correct amount will have to be subtracted.

Dependencies with other requirements:

Depend that the receipts are calculated correctly including discounts being deducted right.

Functional Requirement 6: Notifications

Description:

Customers will be alerted if receipts include special offers or voucher expire dates. The notification will appear in a pop up on the phone like a text message or other app notifications. Users can edit the notifications to how many days before they would like to get the notification, or they can edit to turn the notification off.

Criticality:

This reminder will benefit the consumers in saving money and not missing special offers or voucher expire dates.

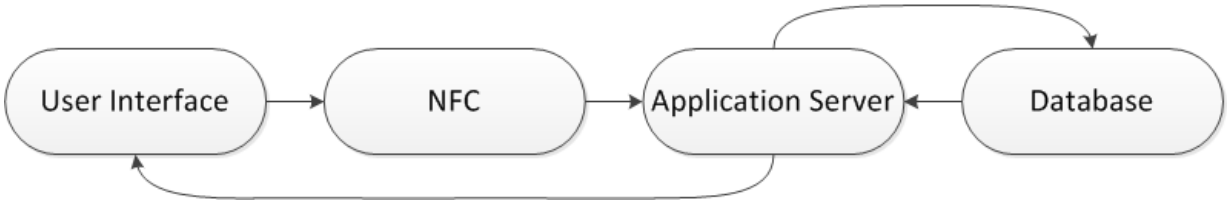
Technical Issues:

Technical issues associated with this feature will be the sending of the notifications and how they will appear on different phones. Permissions must be set for the app to use notifications.

Dependencies with other requirements:

The expiring dates from the receipts will have to be clearly marked to set up the notification.

4. System Architecture



The diagram above illustrates the system architecture. This diagram is after the user was signed in and they're using the application. In the diagram there are four aspects user interface, NFC, application server and database.

User Interface:
This is the front end of the application. This is where the receipts and the features of the application are presented. The user must be logged in to use and see the features.

NFC:
The receipts will be sent by Near Field Communication.

Application Server:
This is the backend of this application and is responsible for the functionality of the system. The server will gather the receipt and will send it to the database. It will give the receipts to the users.

Database:
This is where all the receipts, user information and the shop information will be stored and kept safe.

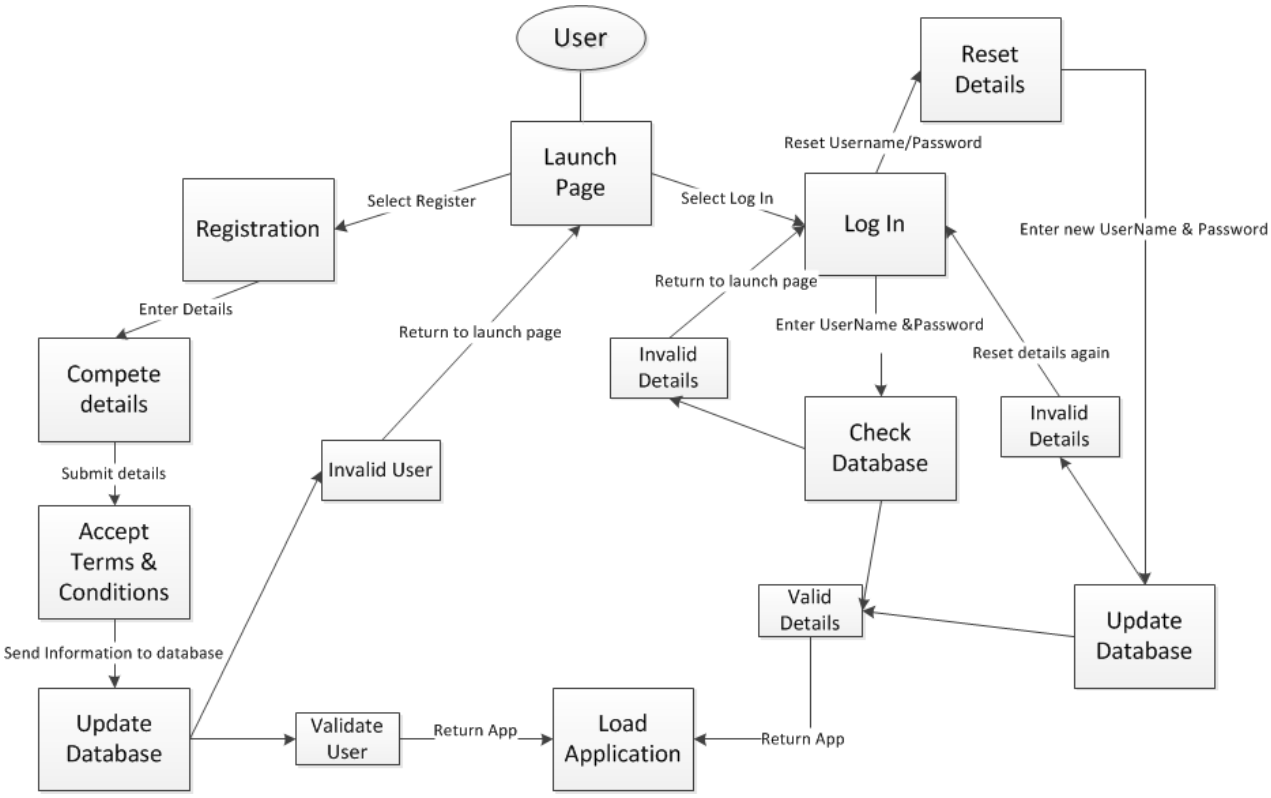
5. High-Level Design

Data Flow Diagram 1

Below is the data flow diagram for the user registration/login. On the launch page there are two options. One for unregistered users and the other for registered users.

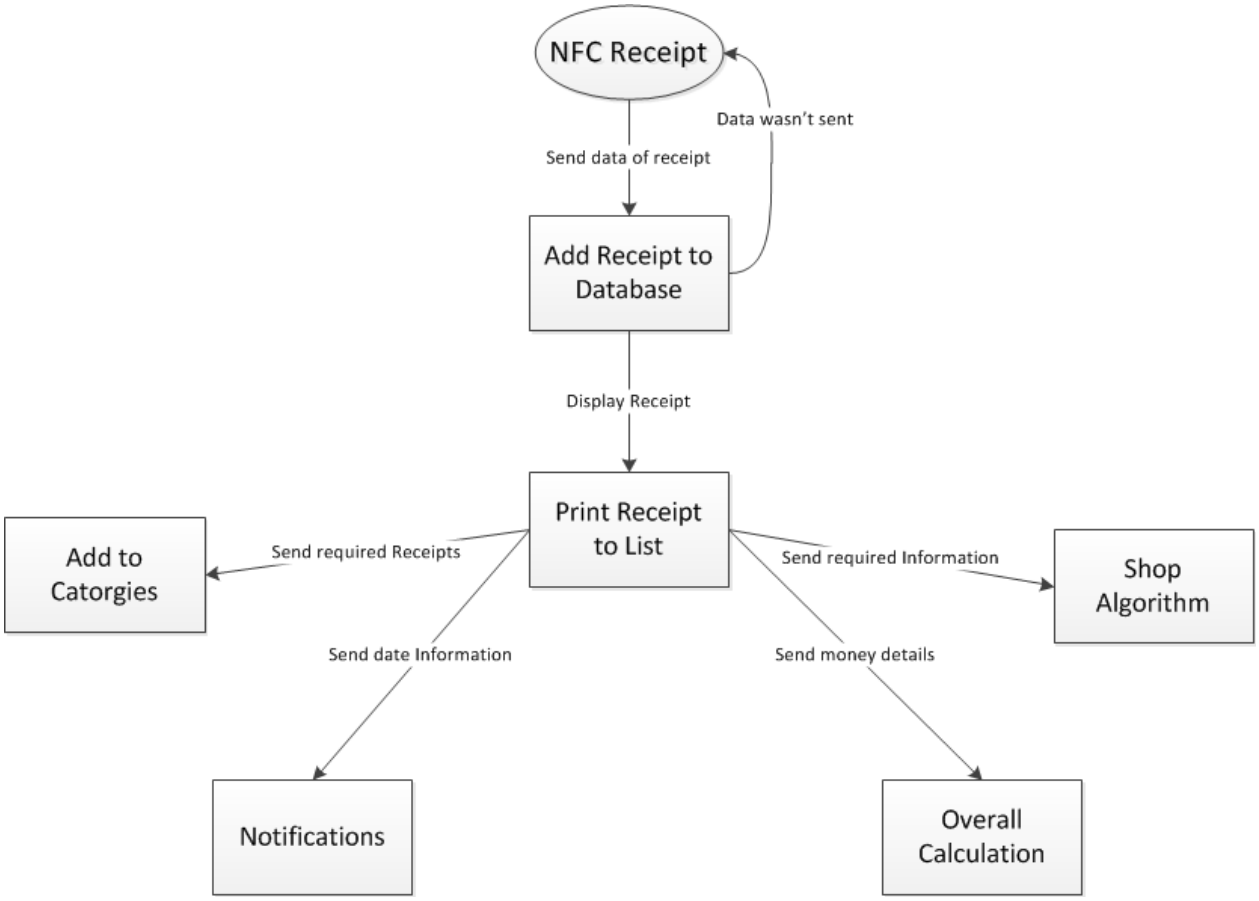
If a user is unregistered they choose to register they enter their details and accept the terms and conditions. If they successfully complete this process they will be able to use the application, if not they will be returned to the launch page.

If the user is registered they select to log in. If they enter their username and password successfully they can use the application. If they enter their password or username wrong they be sent back to the log in page. They can enter their details wrong three times before they have to reset their details to enter the application.



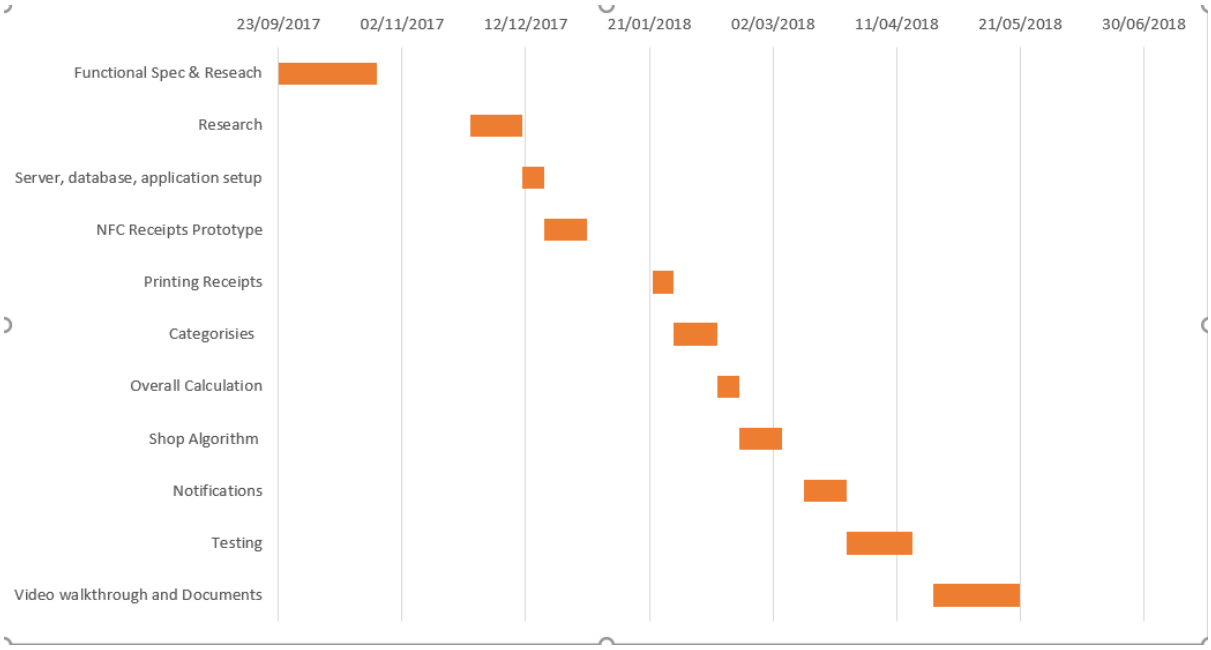
Data Flow Diagram 2

Below is the data flow diagram for the functions of the application. The receipt will be read through NFC, stored in the database, then the receipt will be printed for the user to see and use. The information on the receipt will be used in the other features of the application.



6. Preliminary Schedule

	Task	Start Date	End Date	Duration
2	Functional Spec & Reseach	23/09/2017	24/10/2017	32
3	Research	24/11/2017	11/12/2017	17
4	Server, database, application setup	11/12/2017	18/12/2017	7
5	NFC Receipts Prototype	18/12/2017	01/01/2018	14
6	Printing Receipts	22/01/2018	29/01/2018	7
7	Categorisies	29/01/2018	12/02/2018	14
8	Overall Calculation	12/02/2018	19/02/2018	7
9	Shop Algorithm	19/02/2018	12/03/2018	14
10	Notifications	12/03/2018	26/03/2018	14
11	Testing	26/03/2018	23/04/2018	21
12	Video walkthrough and Documents	23/04/2018	21/05/2018	28



https://www.androidpit.com/what-is-nfc

https://www.androidauthority.com/what-is-nfc-270730/

https://proto.io/