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FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTER ENGINEERING

LEVEL 500

REPORT ON INTERNSHIP CARRIED OUT AT DIGITAL RENTER.

Internship Report Submitted to the Department of Computer Engineering, Faculty of Engineering and Technology, University of Buea, in Partial Fulfillment of the Requirements for the Award of the Bachelor of Engineering (B.Eng.) Degree in Computer Engineering.

By

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University of Buea

February, 2021

UNIVERSITY OF BUEA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTER ENGINEERING

Design and implementation of a Restaurant Mobile Application (Chopbox) and a Facebook Messenger Bot and some modules for Digital Renter App, ZitoCard reload App.

By

USMAILA ABDOUL MOUMINI

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Performed at

Digital Renter, Buea

South West Region, Cameroon

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February, 2021

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DEDICATION

To both my Mum ADAMA ADAMU and Dad ABDOUL MOUMINI IBRAHIM.

ACKNOWLEDGEMENTS

Firstly, i would like to thank the Almighty Allah for the strength, knowledge and wisdom he gave me during the course of my Internship period, secondly i want thank the Faculty of Engineering and Technology, University of Buea for having the internship program included in their curriculum. This really gave me the opportunity to get industry level experience in my field of study.

I would like to thank my supervisor Dr. Elie Fute for his mentorship, guidance, willingly guiding me not being exigent but dedicated to the proper writing and presentation of my report in spite of his tight schedule.

I wish to thank Digital Renter as a whole especially the Founder and CEO Mr. FONGOH MARTIN, for the opportunity to perform my internship in his company. To my technical supervisor and mentor Mr. Orock Bessongayim Lawrence, for his continues encouragement, criticisms, support and for making sure that all my work and task assigned were well done.

I would like to thank my Dad, Mr. Abdoul Moumini Ibrahim and my Mum, Mrs. Adama Adamu, for their spiritual and financial contributions.

My gratitude also goes to my friends who have accompanied me during these five months Jume Brice, Ebai Jeneline.

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LIST OF ABBREVATION

API	Application Programming Interface
CEO	Chief Executive Officer
CTO	Chief Technical Officer
HTTP	Hypertext Transfer Protocol
iOS	Apple Operating System
macOS	Macintosh Operating System X
OTP	One Time Password
REST API	Representative State Transfer
tvOS	Apple TV Software
UI	User Interface

CHAPTER 1. INTRODUCTION

1.1. What is internship, its Goals and Objectives.

1.1.1. What is internship?

An internship is a period of work experience offered by an organization for a limited period of time. It is a professional learning experience that offers meaningful, practical work related to a student's field of study or career interest. An internship gives a student the opportunity for career exploration and development, and to learn new skills. It offers the employer the opportunity to bring new ideas and energy into the workplace, develop talent and potentially build a pipeline for future full-time employees.

1.1.2. Goals and Objectives of Internship

Some of the objectives and goals of internships are:

- It serves as an opportunity for the student to apply classroom knowledge and theories related to Engineering and Technology to real-life experience in the industry.
- Assists the students development of employer-valued skills such as teamwork, communication and attention to detail.
- Exposes students to the environment and expectations of their companies and organizations practices.
- Gives an opportunity to learn by doing and asking constructive feedback questions which will help the student hone the skills and become more professional.
- Exposes students to professional role models or mentors who will provide the students with support in the early stages of the internship and provide an example of the behaviors expected in the intern's workplace.
- It helps build the students resume and provide opportunity for full-time employment after

graduation.

1.2. About DIGITAL RENTER

Digital Renter is an all-in-one real estate site that gives you the local views about homes for rent, homes for sale, plots of land for sale, markets and trends to help you figure out exactly what, where, and when to buy, sell or rent. You can also find a real estate agents/agencies, view prices of vacant houses/lands, and see home values in your community. Get advice and opinions from local real estate agents, brokers, and other local experts.

We work with different landlords, real estate agents/agencies, caretakers, brokers to give them more visibility and enable them showcase their services. Our goal is to REDUCE THE STRESS involved in the process of searching for a vacant home.

1.3. Location

Powered by tech giant, ActivSpaces. Digital Renter is located in same building as its tech hubs address: First trust building, Soppo, Buea, Cameroon

1.4. Company structure

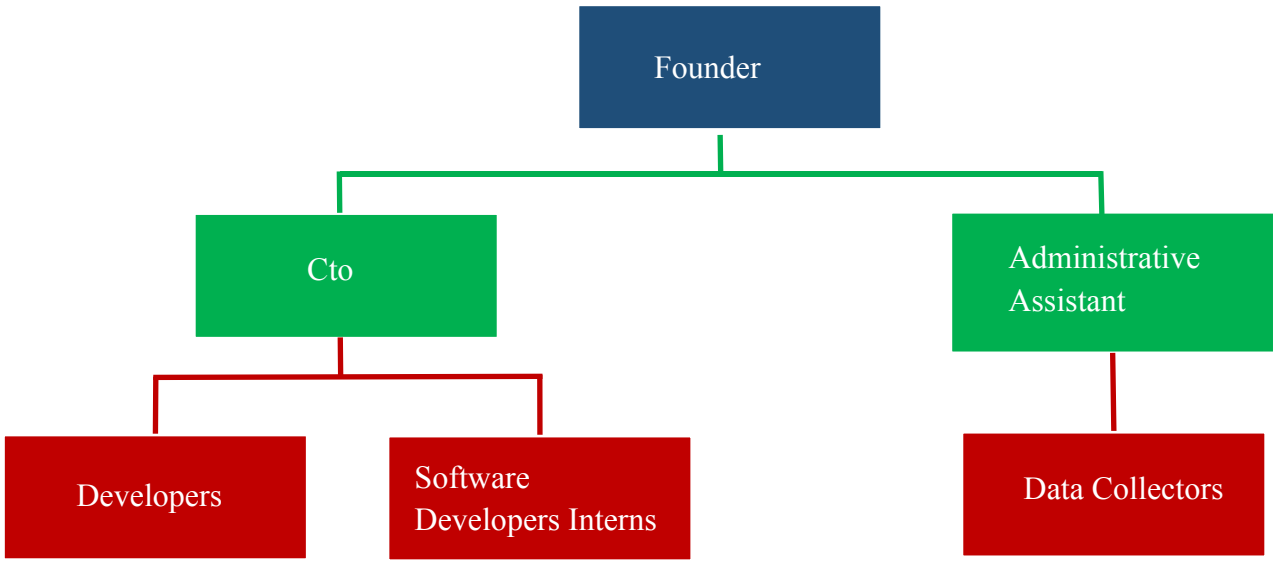

Figure 1: Structure of DIGITAL RENTER

CHAPTER 2. INTERNSHIP ACTIVITIES

2.1. Introduction

My first day at DIGITAL RENTER was really exciting. I got to meet the staff members at the office, we had a general meeting in which i introduced myself alongside the other interns and we were introduced formally to all the staff members of the company by the CEO. We were presented with the rules and regulations of the company, how we are to work and the procedures of how things are carried out in the office. We later spoke of the work we were going to be doing at the office, the different projects we where to work on, both in-house project and clients projects. I was assigned to the front-end team of the company.

My technical supervisor is Mr Orock Bessongayim Lawrence who is the CTO and also in charge of the front-end development department at DIGITAL RENTER, he gave us a brief introduction and how we are going to work, the major technologies the company uses, why they chose them and what we needed to get up and running with the current on going projects.

2.2. Tasks Assigned and How They Were Performed

2.2.1. Learning projects: Design tasks

A series of designs were given to me to design using React-Native a JavaScript framework, in order to help me master and acquire the necessary designs skills required to deliver top quality mobiles apps using React-Native and to hone the required skills to work on client and in-house projects.

The aim of the designs task was for me to familiarize my self with the company code standards and structure, good practices and things to avoid when building a mobile app.

Different designs had different expectations and techniques i had to master like using images, importing and setting up icons, adding navigation, adding logic and functionality to a design, using different packages to accomplish specific designs etc.

This task gave me a good understanding of the React Native framework, its good practices and a better understanding of design.

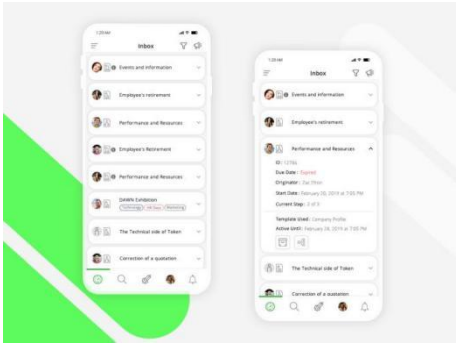

Figure 2: Design of a list view

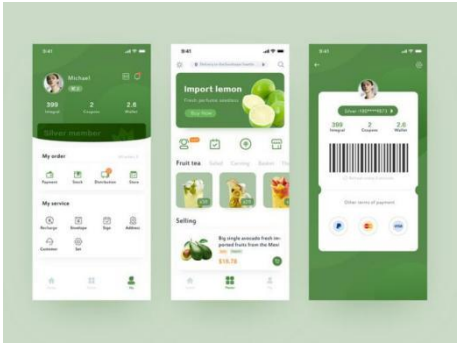

Figure 3: Designing shapes

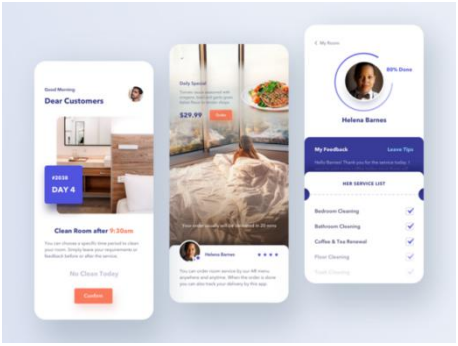

Figure 4: Using images

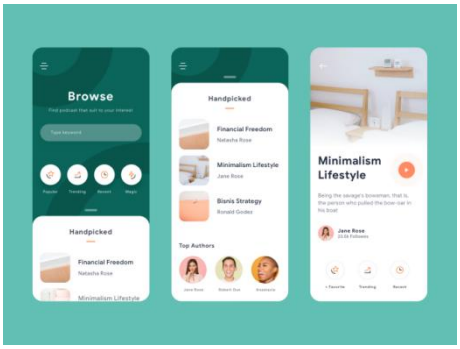

Figure 5: Using scroll views

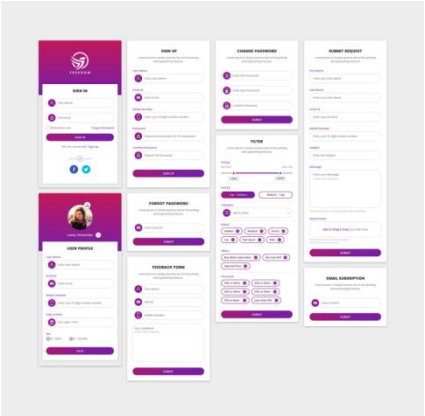

Figure 6: Building a complete App

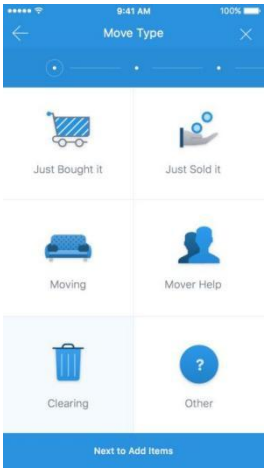

Figure 7: Side by side

2.2.2. Implementation

This section will summarize the technologies and programming languages used in the development of the projects in the company. The company uses JavaScript programming language and in particular React-Native framework to build Mobile Applications.

2.2.2.1. JavaScript Programming language.

JavaScript (often shortened to **JS**) is a lightweight, interpreted, object-oriented language with first-class functions, and is best known as the scripting language for Web pages, but it's used in many non-browser environments as well. It is a prototype-based, multi-paradigm scripting language that is dynamic, and supports object-oriented, imperative, and functional programming styles.

2.2.2.2. React and React-Native.

A. React

React is an open-source, front end, JavaScript library for building user interfaces or UI components. It is maintained by Facebook and a community of individual developers and companies. React can be used as a base in the development of single-page or mobile applications. React is declarative component-based library. React makes it painless to create interactive UIs.

B. React Native

React Native is an open-source mobile application framework created by Facebook, Inc. It is used to develop applications for Android, Android TV, iOS, macOS, tvOS, Web, and Windows by enabling developers to use React's library along with native platform capabilities. React Native combines the best parts of native development with React, a

best-in-class JavaScript library for building user interfaces.

React primitives render to the native platform UI, meaning your app uses the same native platform APIs as other apps do. With React native one team can maintain two cross platforms and share a common technology.

C. Node.js

Node.js is an open-source, cross-platform, back-end, JavaScript run-time environment that executes JavaScript code outside a web browser. Node.js is a JavaScript run-time built on Chrome's V8 JavaScript engine, it is an asynchronous event-driven JavaScript run-time, Node.js is designed to build scalable network applications.

2.2.3. Internship projects

This section will cover all the internship tasks and projects i participated in and implemented.

2.2.3.1. Zitocard Reload App

Zitocard is a prepaid visa card which can be reloaded via Mobile money and used worldwide. During this project of building a mobile application for Zitocard, i was assigned a task of coming up with a great design for the authentication pages, Card reload page of the mobile and to build a pixel perfect design with all its functionality and consume the API made available to me by the team. This app is used by a company called Zito, based in Molyko, Buea, to recharge their prepaid visa card, the app makes use of an API created by our back-end team to perform transactions.

A. Analysis and Concept

In this section i will give a step by step analysis and description of each task and looking at various conditions and security measure to be taken to ensure all users information is kept secured and all Card transactions are protected and secured.

For this project i had two primary task building the **Authentications pages** and the **Card reload page.**

i. Authentication pages.

For any modern and secured application today an authentication process is required for the user to access their application, this is done by registering the user to the system and requiring the user to log in on any device before performing any sort of transactions. For the Zitocard application the user is required to register using their name, phone number, email, and password and log in using email or phone number and password.

- **Register page:** Basic information of the user is collected and verified after verification of this information, it is submitted to the server using a REST API made available by the back-end team, a token and user data is returned from the request this information is saved locally for future API request validation. See Figure 8.

- **Log in page:** The log in page is displayed when there is no token available in storage this is used to avoid the user logging-in multiple times when their token is available in the device. If the token is not available and the user has an account they are required to enter either their email or phone number and the password to authenticate themselves. Upon successfully logging-in the users token and user information is saved locally for future use. See figure 9.
- **Password forgot page:** The forgot password the users recover their password using the

email or phone number. After entering a valid email or phone number an email is sent to the user requesting them to enter a new password which can be used to log-in into the Application at any time. See Figure 10

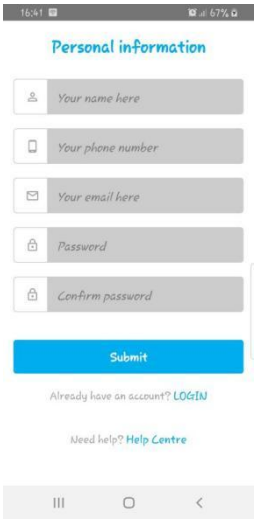

Figure 8: Register page

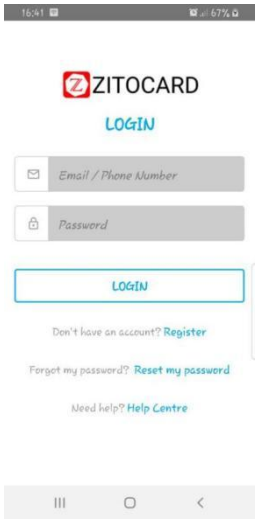

Figure 9: Login page

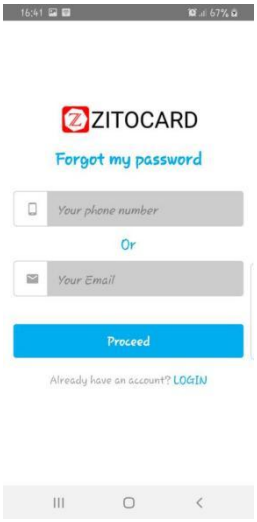

Figure 10: Forgot password page

ii. Card reload page.

The Card reload pages is the page that the user uses to enter the amount they wish to load into their prepaid visa card and hence there was a lot of pressure for me to deliver a very well functioning and design page. Here the only information given by the user in the amount which i use to calculate the total amount the user will receive and the fee taken by the system for the transaction.

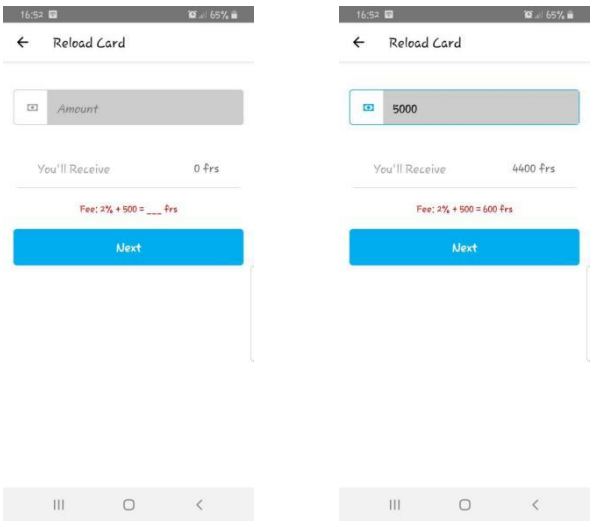

Figure 11: Reload account pages

B. Project Management

For the management of this projects we used GitHub, and WhatsApp.

i. **GitHub**: this is a code hosting platform for version control and collaboration. We used this platform to share the code we worked on and get the complete code of the all the other members working on the project.

ii. **WhatsApp:** A social media messaging platform was used for communicate between members.

2.2.3.2. Digital Renter App

Digital renter already had a web based platform, creating the mobile was the next step in the growth of the company to reach more users and to expand. During the deliberation meeting for building of the mobile app we had to think of design features users would want to see and use, how this will be connected with the already existing web platform, how the data will be structured the database connections and relationships between different data being used in the app from the users and platform. The Digital Renter app shows its users listings of properties available, users can contact the agents who posted this houses and users can also post search request telling agents around the area, users can also chat with agents using the app.

A. Analysis and Concept

In this section i am going to look at a step by step analysis and description of the different pages i was assigned to focus on for the app, the security measures to be taken to make sure the app and users information is completely secured.

For this project i was assigned quite a few key pages for the app, this included **Authentication pages** i.e (**Log in, Register, Forgot-password**), **Profile page** this included

quite a few other pages in it namely: (**Edit Account page, Posts page, Personal Information page, About page, Upgrade Account page, Terms and Condition page**), **Notification page.**

i. Profile page.

Building the profile page i had to take into consideration a lot of things, the Profile page had to give the user access to all of his information, information about the app, his subscription plan, and all his other settings so coming up with a design was quite demanding. See figure 12

- **Personal information**: The profile information page of the app displays all the available information of the user and their status like if their phone number is verified or not and how to verify them if its not verified. See Figure 14.

- **Edit account:** Edit account page allows the user to update their information, if there was maybe an error or a typo. The user is able to change their profile picture, name, email, phone number, bio, their location and role. See Figure 15.

- **Upgrade account:** The upgrade account page is one of the key sales point of the app, this is used by the user to upgrade their subscription plan for their account. There are basically 3 types of subscription plans; landlord, Agents/Agency and Premium all subscriptions have different use cases. See Figure 16.

- **Post page:** The post page has all the post the user has made, it give them a quick view of how the post looks like and also possibilities to edit the post and mark it as available or not. See Figure 17.

- **Terms and condition:** This page contains the terms and conditions of use for the app, its privacy policy, the page also serves as a tool to inform the user how the platform manages their personal information. See Figure 18.
- **About page:** The about page simply displays information of the the app and the

company Digital Renter, it tells the user what Digital renter is and what they do. See Figure 19.

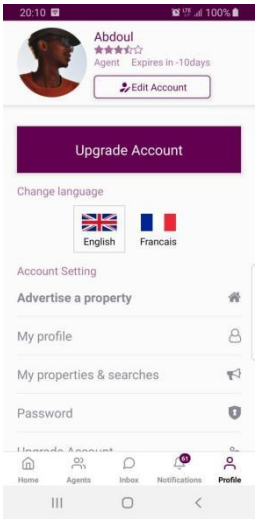

Figure 12: Profile page (a)

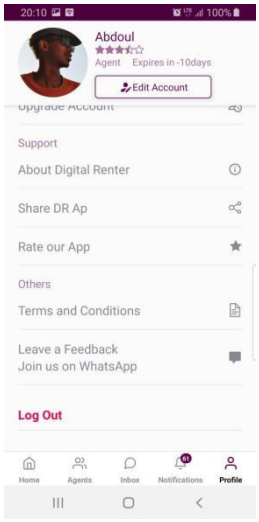

Figure 13: Profile page (b)

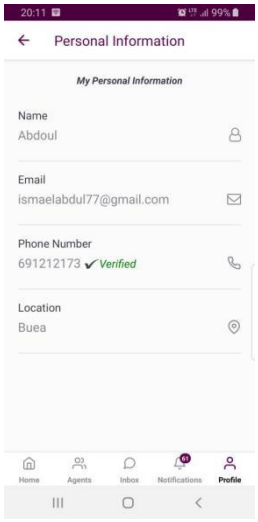

Figure 14: Personal details page

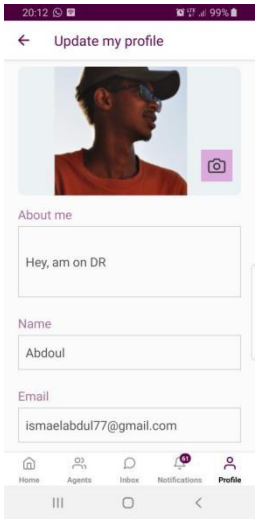

Figure 15: Update profile page

Figure 16: Upgrade account page

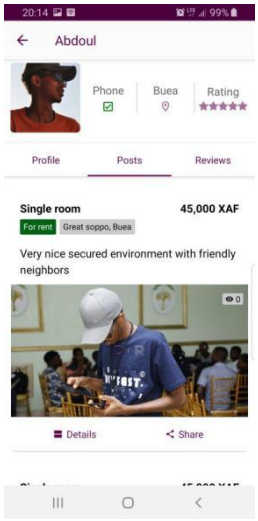

Figure 17: Posts page

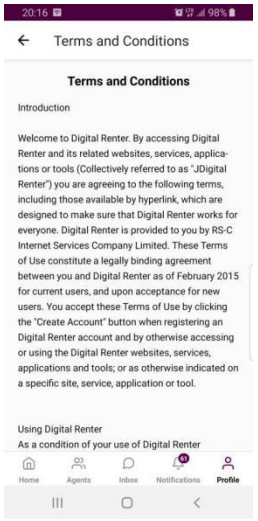

Figure 18: Terms and conditions page

Figure 19: About page

ii. Authentication pages.

Similar to the Zitocard app for the Authentication i had to prioritize the users security and easy design for the user. Apart from this if the user doesn't wish to sign up they can decide to try the app without signing up or log in, of course certain functionality will be limited to unregistered users.

- **Sign up:** For the user sign up, their basic information is required i.e Name, email, number, role and password, this information is collected, verified and sent to the server using a POST request with all the collected information. See Figure 20 and 21.

- **Log in:** Initially when the apps opens if there is a user token saved locally the log in page is not displayed, otherwise the log in page is display and here the user can enter either their email or phone number and their password if they have an account to log in. See Figure 22.

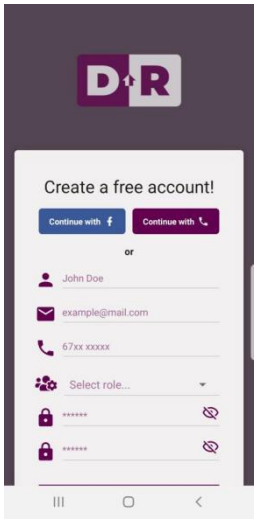

Figure 20: Register page(a)

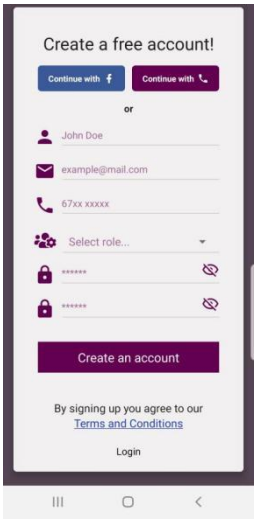

Figure 21: Register page (b)

Figure 22: Login page

iii. Notification page.

The notification pages has 2 types of notification it displays notification when another user sends you a message in your in-box this can be identified by a message icon below the profile image or a request notification this is when a user makes a request for a property and agent around that location receive a notification and this can be identified by a house icon below the profile image of the person who left the request. See Figure 23.

When a notification is clicked it is opened in its respective location, the list of notification of a particular user are gotten my making a GET request to the server which returns the users notifications.

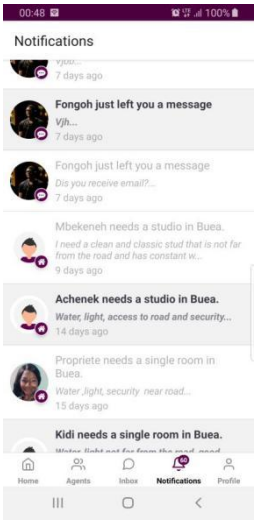

Figure 23: Notification page

B. Project Management

For the management of this projects, we used GitHub, Trello, WhatsApp, and Slack.

i. **GitHub:** GitHub is a code hosting platform for version control and collaboration. We used this platform to share the code we worked on and get the complete code of the all the other members working on the project.

ii. **Trello:** Trello is an organization tool used to organize a project into boards, at a glance

trello tells you whats being worked on, who is working on what and the progress of every task. We used trello to track the progress of the application, to see what everyone is working on and what modules of the application has been completed, what modules are still to be completed.

iii. **WhatsApp:** WhatsApp a social media messaging platform was used to communicate between members.

iv. **Slack:** Slack is a channel-based messaging platform. With Slack, people can work together more effectively, connect all their software tools and services, and find the information they need to do their best work. We used slack to separate our selves into different channels, we had a daily-update channel where we would give updates on what we where working on for that day, our difficulties and what progress what made.

2.2.3.3. Chopbox App

Chopbox is an in house project, it is a restaurant app that helps restaurants get their business online, it gives their users the possibility of making orders others online, paying for the products directly or on delivery. It also gives the owners of the restaurant control, like adding new products, product categories, new users, admins and also the possibility to approve orders made by users or to cancel an order.

A. Analysis and Concept

For this restaurant mobile app we had to build two(2) sections for the app, the admin section of the app, and the user section of the app. The admin section needs to give the owners of the restaurant the possibility of the managing everything, that is managing products, categories, admins and users, while the user section of the app shows all the products available in a

restaurant, various categories of products, making orders and payments, adding products to favorites. A few pages of this app where also design by another college this include the categories, profile and favorite pages and this will not be covered in this report.

i. Admin section

The admin section of the app contains different pages to allows the admin to be able view general statistics i.e Dashboard, view all products and manage them, see new orders that have just been made, pending orders and delivered orders, is also allows the admins to see all newly registered users and admins and the ability to delete or add a new admin.

All the data displayed in the app like the products, categories and users are gotten from a REST API made available by the back-end team, all the above mentioned section are manipulated through the HTTP request methods these are GET, POST, DELETE and PUT methods.

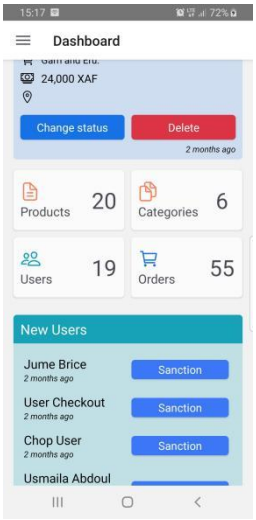

Figure 24: Dashboard(a)

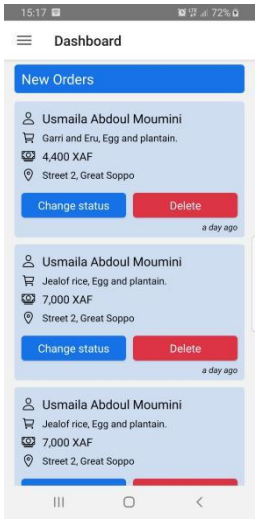

Figure 25: Dashboard(b)

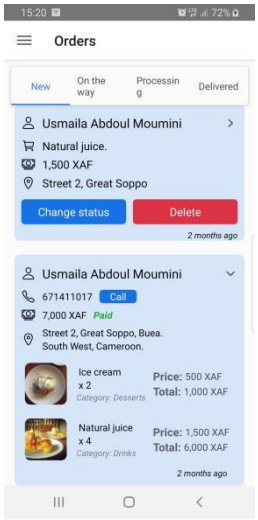

Figure 26: Orders page

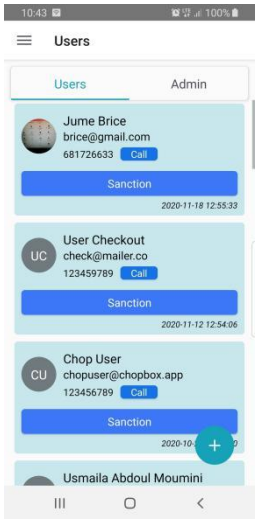

Figure 27: User page

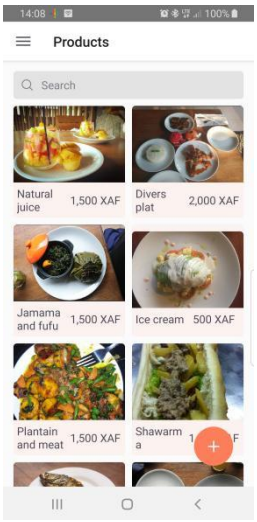

Figure 28: Products page

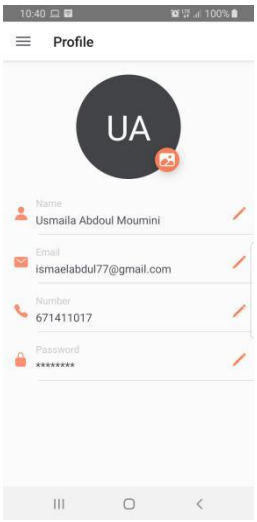

Figure 29: Profile page

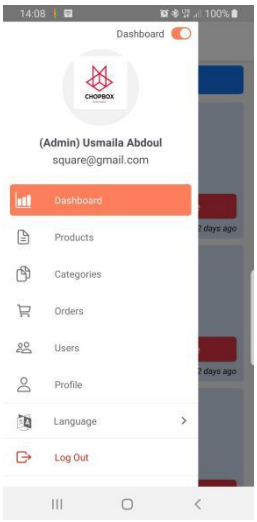

Figure 30: Admin app drawer

The above images show the different parts of the admin section. The drawer also has a switch which allows the admin to view all the products as they would be presented to the user.

ii. User section

The user section displays all the available products, the different categories featured products, the orders they have made, their profile page when logged in.

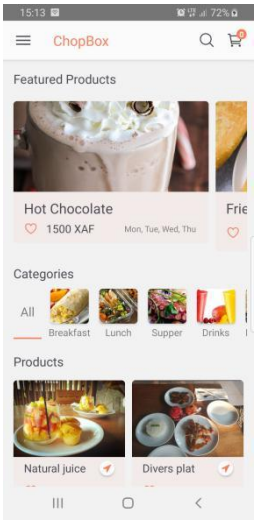

Figure 31: Home page

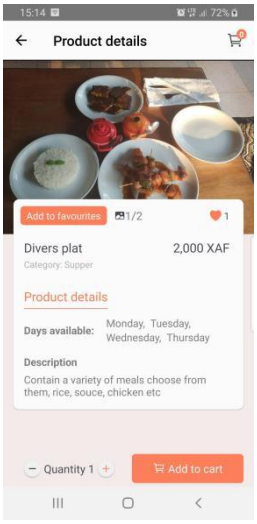

Figure 32: Product details page

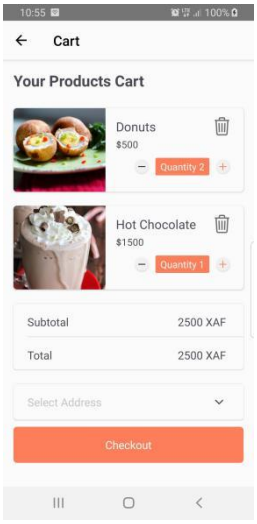

Figure 33: Cart page

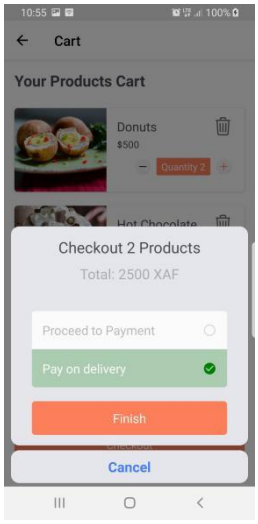

Figure 34: Making payment in the cart page

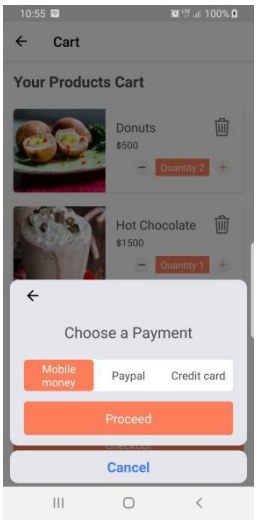

Figure 35: Choosing a payment method in the app

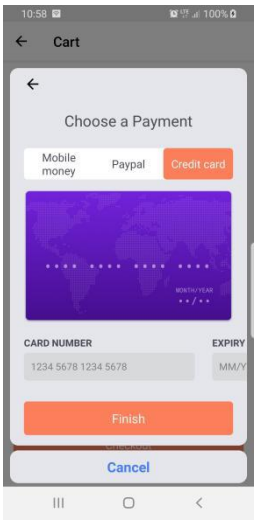

Figure 36: Making a card payment

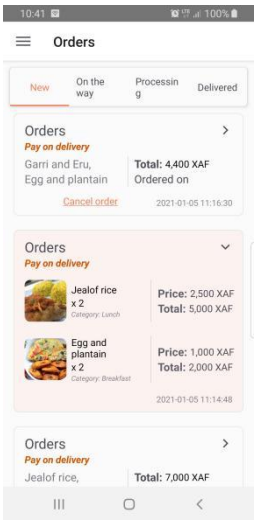

Figure 37: User orders page

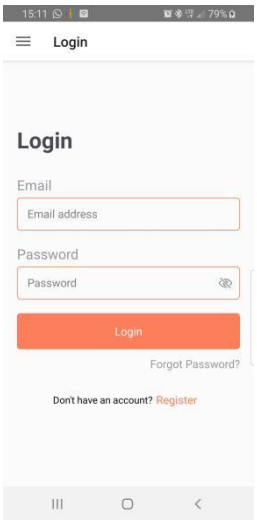

Figure 38: Login page

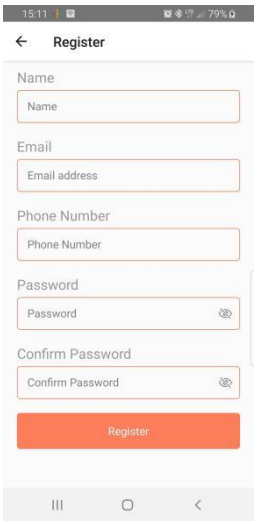

Figure 39: Register page

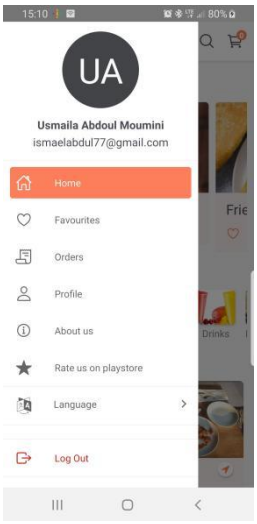

Figure 40: User app drawer

Above are the different pages of the user section in the app, this also shows the cart screen here a user is required to enter an address before checking out a product, after this they can select to pay for the product on delivery or they can pay using any one of the available payment methods, these are Mobile money, Paypal and through a Credit card. To access the app the user is not required to log-in or register but before a user checks out a product in their cart they are required to register or log-in this is to track the user who made the order

B. Project Management

For the management of this projects, we used GitHub, Trello, WhatsApp, and Slack.

i. **GitHub:** GitHub is a code hosting platform for version control and collaboration. We used this platform to share the code we worked on and get the complete code of the other members working on the project.

ii. **Trello:** Trello is an organization tool used to organize a project into boards, at a glance trello tells you whats being worked on, who is working working on what and the progress of every task. We used trello to track the progress of the application, to see what everyone is working on and what modules of the application has been completed, what modules are still to be completed.

iii. **WhatsApp:** WhatsApp a social media messaging platform was used to communicate between members.

iv. **Slack:** Slack is a channel-based messaging platform. With Slack, people can work together more effectively, connect all their software tools and services, and find the information they need to do their best work. We used slack to separate our selves into different channels, we had a daily-update channel where we would give updates on what we where working on for that day, our difficulties and what progress what made.

2.2.3.4. Digital Renter Messenger Bot

The digital renter bot or as we call it the DR bot is a chat bot that lives in Facebook messenger, this bot is used to interact with Facebook users on the Digital Renter Facebook page.

A chat bot is a software application used to conduct an on-line chat conversation via text or text-to-speech. For the DR bot its main aim is to receive user request for properties, i.e the type of property they are looking for and the locations, this is then taken by the bot and submitted to a Node.js back-end i built to analyze the request, get this properties from the Digital renter server through API request and send the responses back to the user with the use of webhooks which communicate with the messenger bot, i also tell the messenger bot how to display the information properly to the user with the use of predefined methods the bot already recognizes made available to us by the Facebook messenger documentation whiles following the guidelines offered by Facebook on using and displaying information on messenger or Facebook.

A. Analysis and Concept

In the development of this app, Node.js was used along side the Facebook messenger API for connecting the webhooks and for communicating between the Node.js server and the Facebook messenger bot.

When a user opens the Digital Renter Facebook page chat box they are greeted with a button to get started when a user clicks this the bot can now interact with the user, the user is greeted by the bot and then ask what type of request they want to perform (see Figure 41). There are primary two types of request a user can make, this are, **Posting a property** or **Searching for properties**, the user is given this two options to choose from. See Figure 42

i. Posting a property

After the user is greeted they have the option to post a property this is mainly focused at agents who have available properties and want to advertise them on the Digital Renter platform. After they select this option they are given a step by step guide on how to download the Digital Renter app and upload their properties and a button link is made available for the agents to download the app of playstore. See Figure 42 and 43.

ii. Search for properties

When a user click on the Search for a property button, the bot replies to them with options demanding the user the type of property they are looking for, this could be (Apartments, Studios, Single rooms, Store, Duplex or Guest house), after the user selects any one of this property types, the bot then ask for the location to which they want this property, the location include cities where Digital Renter has properties listed in its platform this include but limited to (Buea, Douala, Limbe, Kumba, Yaounde and Kribi).

With the above the information which the bot has collected (property type and location) a request to the server can be made, the server then makes an API request to the Digital Renter API with the available information. The response gotten from the request contains all the information of all the available properties available in that location, the server then sends this information back to the user, displaying the image of the properties, a brief description and a more details button which when clicked opens the particular property on the Digital Renter website in a webview on the messenger app (see Figure 45). Only the first 10 properties found can be displayed at a time, this is due to the Facebook design policy which says only a maximum of 10 cards can be displayed at a time to a user,

Below are images of how a user is interacting with the messenger bot and how the bot responses to them.

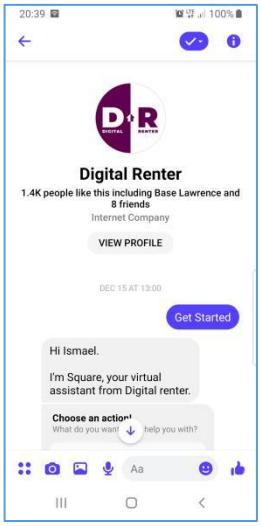

Figure 41: Bot welcomes user.

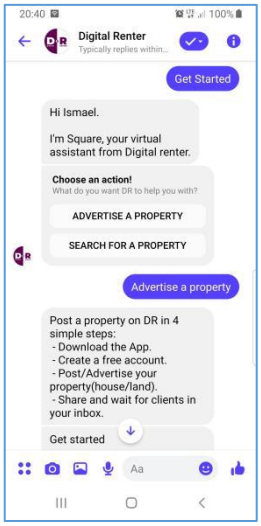

Figure 42: Bot gives user list of actions they can perform with responses.

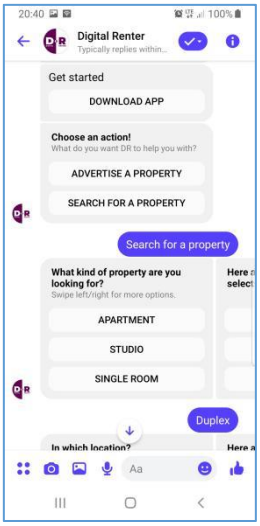

Figure 43: A response from the server giving the user a list of properties to pick from.

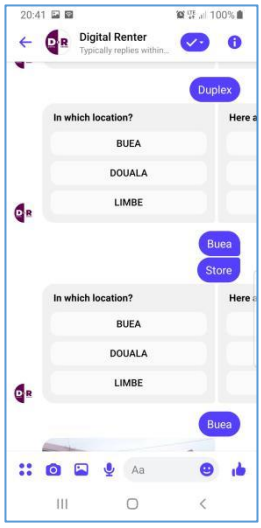

Figure 44: A response from the server after the user has entered the property type, a list of locations to pick from is given.

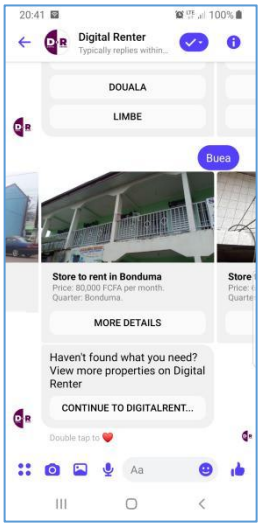

Figure 45: After entering the type of property and location to the server through the bot, a list of properties matching the user request are shown to them.

CHAPTER 3. EXTRA-CURRICULAR ACTIVITIES

3.1. Introduction

An extracurricular activity or extra academic activity is an activity, performed by students, that falls outside the realm of the normal curriculum of university education. Such activities are generally voluntary and social.

3.2. Trade fair

Our company was invited to participate in a trade fair organized by Afrik jobs, the company was invited to come and showcase its products to the attendees and also to offer the possibility of internships.

3.3. Events participation

The company is privilege to participate in multiple events one of which stands out to me is when we had the ambassador of Canada to Cameroon visit our office, our Boss pitch what our company does to him, i got to learn a lot from the discussions at the event, took note of a lot points given by the ambassador concerning technology and its impact and his general experience and advice.

CHAPTER 4. DIFFICULTIES AND CHALLENGES

4.1. Introduction

This section talks about the difficulties and challenges i faced from the first day to completion of the internship and how i managed to overcome them.

4.2. Difficulties

- **Internet connection issues.**

At the start of work at the office there wasn't any stable internet connection and this as challenging for me since our work required internet when installing packages, doing Google searches and following tutorials etc. This was solve by me getting a modem which i used to subscribe to a monthly renewable internet subscription and this solved my issues.

- **External noise and disturbance from the neighbors.**

At Digital renter, there was quite a bit of noise and disturbance since the company is situated beside a market and main road, this was solved at times by shutting the doors and windows completely and also pleading with our neighbors to keep it down during working hours.

4.3. Challenges

- My major challenge at the start of work was having a low spec machine this limited me to the amount of work i could do, since i was doing mobile development most of the time i had to constantly run emulators from android studio, this was really challenging, but i was able to get pass this briefly by installing a lighter virtual simulator called **Genymotion.** before getting a better laptop capable of running this projects.
- I also had challenges setting up my environment, since this was a complication process, the only way i solved this challenge was by continues practicing how to properly setup.

CHAPTER 5. CONCLUSION AND RECOMMENDATION

5.1. Introduction

This section will elaborate my recommendations to the organization and the university, and conclusion of the internship report.

5.2. Conclusion

The time i spent at Digital Renter was packed with a lot of interesting and learning experiences, Digital Renter has given me the opportunity to grow as a software engineer and developer, the exposure needed in the field, the opportunity to interact with consumers of our products first hand and above all meeting new people and making new relationships and growing my network and skills like analyzing a project, coming up with designs and requirements for different project. Above all the possibility of working as a team member contributing to projects, and learning to communicate in a team. This internship has given me the fundamental skills needed to work at any other company and has given me the skills of a professional software engineer. I believe that the time spent at Digital Renter has made me a better engineer.

5.3. Recommendations

5.3.1. To Digital Renter

- Digital renter should continuously open its doors to students who wish to do internships at the company provided they have the required treats required.
- Extracurricular activities, Digital renter should have more extracurricular activities to expose it interns to more experiences while in their internship.

5.3.2. To the Faculty of Engineering and Technology

- They Should continue with the internship program this helps students have real world experience, and a taste of what their future career requires from them.

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