



Independent University, Bangladesh

Mobile Application Development of “Administrator App” at Factorydox ltd

An undergraduate internship report submitted by
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In consideration of the partial fulfilment of the requirement for the degree of

BACHELOR OF SCIENCE in Computer Science & Engineering

Department of Computer Science and Engineering

SPRING 2021

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ATTESTATION

I understand the nature of plagiarism, and I am aware of the University's policy on this. I certify that this is an original work by me during. However, following internationally accepted academic guidelines of using others' written work and / or software (in the form of code) in my University project is properly cited if used in any part of this work.

Signature:

Signature:

Name: -----

Name: -----

ACKNOWLEDGEMENT

I would like to start by thanking **Almighty Allah (SWT)** for giving me the ability to come this far in life.

I would like to express my gratitude towards the **School of Engineering & Computer Science** and **Faculty of Computer Science & Engineering** for giving me an opportunity to study CSE in this wonderful university. This internship has provided me with an entryway to the industry and experience it on a day to day basis and learn a lot of new things and experience how the industry is totally different from what was my perception of it. I would like to extend my heartfelt gratitude to my supervisor **Mrs. Sabrina Alam** who has provided invaluable guidance & helped me with this report and presentation.

I would also like to thank my organization's supervisor **Emdadul Haque** Senior Software Developer of Factorydox Ltd, for guiding me during my internship. It was a privilege to be mentored by him. He has taught me to work in a professional environment and develop my skills in Mobile Application Development. I also gathered knowledge about the integration of web/mobile application with the server, guided by my supervisor.

I am also thankful to all the employees of FactoryDox Ltd. who helped me in completing my internship program smoothly and bringing out the better version of myself. My teammate Raiyan Khalil Shuvo has helped me expand my knowledge and perception towards solving and handling tasks.

I would also like to thank **Emrul Kayes, CEO** of Factorydox Ltd for giving me an opportunity to work as an intern in this company and giving his precious time in teaching me how the business side also works.

LETTER OF TRANSMITTAL

21st May, 2021

Mrs. Sabrina Alam

Lecturer,

Department of Computer Science & Engineering,

School of Engineering & Computer Science,

Independent University, Bangladesh

Subject: Submission of Internship Report for the completion of Graduation.

Dear Madam,

I am hereby submitting my Internship Report, which is a part of the BSc. Program in Computer Science and Engineering curriculum. It is a great achievement to work under your active supervision. This report is based on, “Internship at FactoryDox Ltd”. I have got the opportunity to work at FactoryDox Ltd. for three months, under the supervision of Mr. Emdadul Haque, Senior Software Developer, FactoryDox Ltd.

This internship has given me both academic and practical exposures. The internship has given me the opportunity to develop a network with the corporate environment. I tried to make this report as much informative as possible with the experience I have gained during my internship period. To prepare a well-organized internship report, I have followed the guidelines and described the required fields with sufficient details. I sincerely believe that this report will serve the purpose of my internship program.

I shall be highly obliged if you are kind enough to receive this report and provide your valuable judgment. It would be my immense pleasure if you find this report useful and informative to have an apparent perspective on the issue.

Sincerely Yours,

Mohammad Tansen Siraji

ID#1510505

Department of Computer Science & Engineering,

School of Engineering & Computer Science,

Independent University, Bangladesh

EVALUATION COMMITTEE

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Supervisor

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Internal Examiner

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External Examiner

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Convener

ABSTRACT

This report highlights the activity of the IT department of Factorydox Ltd and my contribution to one of their projects. This report gives a broad description of the mobile application project developed for FactoryDox Ltd. This internship program provided me with the opportunity to work on a real-life professional environment. Thus, helping me in gaining more experience that will support the future of my career. This mobile application is aimed to bring the administrative operations, performed on desktop computers, to handheld devices. Admin operations such as viewing, creating, modifying and deleting certain information onto database are possible to perform on the go, after the development of this mobile application. Developing a mobile application has increased the mobility and productivity of the operations performed. The project has mainly tackled the mobility and flexibility factor of the existing system, hence enhancing the productivity of the workflow. This report mainly has been documented based on my work experience as an intern in this company.

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INTRODUCTION

One of the most important sectors of a student's learning process includes the Internship Program. This helps students enhance their focus on learning, observing and determining their career interests and goals. The Internship program allows students to gain experience in working and dealing with real world environments and variables. I started my Internship at FactoryDox Limited on **1st February, 2021**. Applying theoretical knowledge into real life situations was one of the main challenges for me as an intern. The internship experience was not only about applying and verifying my problem solving skills, it was also about learning new techniques, working on different platforms, solving new problems and most importantly working in a team. This journey helped me discover and improve my communication skills and experience the real life version of the methodologies that we have studied theoretically. Completing challenges and tackling daily obstacles has helped me in changing myself into a better and confident person. The skills that I have attained from this Internship experience, both technical and non-technical, are beneficial for my career growth.

I have portrayed the overall feature and usage of the project in this chapter. Under the supervision of Emdadul Haque, Senior Software Developer, FactoryDox Limited, I have worked with a software developer team in developing a Mobile Application. FactoryDox Limited is an e-commerce company, which requires admin to manage and view product orders. The mobile responsive version of this admin website was not user-friendly and effective. Hence, the company decided to shift to mobile applications for admin-controlled operations, providing users to perform their required operations anywhere and anytime. This application will allow Company Admins to perform certain admin-controlled activities on the go, diminishing the use of computers and allow more mobility. Specified admins will be able create, read, update and delete product order list using this application. Users will be able to input Custom Order information, view order lists and also modify and delete them via this mobile application. This application will make the system more efficient by reducing the time consumption and allowing mobility.

Background

The existing system for admin control is functional but not efficient considering the urge for the company to perform admin operations on the go. Admin users need to have access to a computer every time they want to view or make any changes on the order list. Pre-made products are available for order from the company website but users can also get customized products according to their preference. Usually, customized products need to be ordered in large amounts and customers have to confirm their order by contacting our online sales department. An admin from this department has access to the admin site, who enters the customer, product, quantity and customization information on behalf of the customer to confirm the order. These orders can only be viewed and updated or deleted if required, using a computer.

In critical situations admin users may require access to the application using their mobile phone. The user may need to update an already entered order information when there is no computer nearby, for example, if an order payment is complete, the user has to update the information for the corresponding order. The user will then have to access a browser from the mobile phone and use the admin web application. The existing web application's user interface for mobile phones is not user friendly and users often find some features not functioning properly due to different aspect ratios for different mobile phones.

The Mobile application will allow the admin users to get relieved of all the hassle they have to face while performing these operations via mobile phone. This application will remove the usage of third-party applications (browsers). It will also provide a clean user interface for admins to operate without any difficulties. This allows real-time information updates in the database. This Mobile application will make life easier for the admins to perform CRUD operations more conveniently.

Objective

The Project objectives are the main requirements that we plan to attain from the Project, by the end of the development process. The main objectives of this application are briefly described below:

- Admin will be able to input information for large quantities of customized product order using the Mobile Application.
- Read or View order list and information on the go via mobile application. This will provide the viewer/admin an idea about the status of the order.
- This application will allow the admin to Update and Modify any order status or information anytime and anywhere they want, without any use of the computer.
- A Delete feature, enabling the admin to delete any garbage value or faulty order information using this application.
- Creating a clean User Interface to make operations easier to handle by the admins.
- Using REST API to create connections between the server and mobile application.

Scope of the Project

The Mobile Application will allow the admin to view all the updated information instantaneously, on the go. It has different features and user interfaces to utilize them. Admins can create or input custom order information to the live database, using the application. This application will allow them to perform various other tasks regarding the order information. It will provide a tabular view of all the orders in the database. Along with creating new orders, admins will also be able to View, Update and Delete the data, depending on the requirement. The main and only user for this Mobile Application will be the Admins, responsible to keep the database up-to-date and modify when required. The system will provide information regarding the customized, large quantity order of products the customer wants to buy from the Company. Admins will be provided with the information of products, which consists of customization attributes, quantities, delivery date and many others. The admin will input this information using the Create order feature in this Application to confirm their order and provide the bill generated to the customer. This application will help keep record of orders easily at any moment and provide a better experience by providing such important functionalities on a hand-held device.

COMPANY PROFILE OF FACTORYDOX LTD.

Factorydox Ltd is the parent company of multiple ecommerce platforms. Its software division is an ecommerce solution platform which provides e-commerce solutions to multiple companies such as Wristband House, USCrafts and others. Factorydox develops and maintains the software stack of these companies. The business wing of the company provides B2B solutions from a plethora of factories across china. FactoryDox offers mass integration where businesses can find reliable sources who are able to provide your desired products at a lowest price possible through automations.

Vision

To provide B2B e-commerce solutions to various companies.

Mission

Their mission is to introduce new technologies such as Big Data, AI and make the ecommerce experience one of the best in the country.

Values

- Provide effective B2B solution
- Customer Oriented
- Fairness & Transparency
- Continuous Improvement
- Health & Safety
-

Main Expertise of FactoryDox Ltd

- IT services, solutions & consultancy
- Mobile App development
- Market & Business Intelligence
- Cloud Migration & hosting

Key Projects of FactoryDox Ltd

- <https://www.uscraft.com/>
- <https://www.ozcraftsman.com.au/>
- <https://www.craftguru.co.uk/>
- <https://wristbands-house.com/>
- <https://www.wristbandshouse.sg/>

INTERNSHIP EXPERIENCE AND OBSERVATION DETAILS

This Internship program is one of the most essential programs which plays a huge role in a student's career. Being a student of Computer Science and Engineering (CSE), it was very challenging and exciting for me, to be able to apply, evaluate and develop my skills in a real-life work environment. This 12-week Internship program provided me the practical knowledge which is key for the application of my theoretical knowledge. This curriculum allows students to observe and deal with the real-life scenarios and how to deal with it. Apart from the tasks an intern performs, from their designated field of work, they also get exposure to meeting new people and learn how to deal with each individual. This help enrich the personality of a student and develop other life changing skills along with the scope of applying their theoretical concepts into reality.

I have started working at FactoryDox Ltd. as an intern on 1st February 2021. I was designated to work as a Software Engineer. Under the supervision of the Company's Senior Software Developer, Mr. Emdadul Haque, I was assigned to work with a teammate, Mr. Raiyan Khalil Shuvo to learn and complete the development task. My teammate and I were both interns and new to a work environment, so we had to face few challenges in conducting and understanding the procedures of working in a professional environment, initially. Working with a teammate, with an entirely different mindset and approach in solving daily challenges has helped me in developing a different perception towards everything. I have learned a lot from this 12-week internship program. Being able to work in the software developing section of the company which is relevant to my academic background, has developed my skills and confidence in utilizing those skills. Observation was key to my success in understanding the environment that I have committed myself to work in. Our supervisor, Mr. Emdadul Haque was very helpful and provided us with the proper guidance and support to sustain in this fast-paced workplace. My teammate and I used to observe our supervisor and his perception towards problem solving. His experienced approach was totally different and new to our techniques in completing a task. Apart from guiding us in our developing process, our supervisor has also played an important role in enhancing my communication skills to deal with different stakeholders of the company. I have learnt the importance of time management and efficiency in completing a task. Apart from developing my programming skills, I also learned to

cooperate and work with my fellow partner. Sharing ideas and problem-solving techniques, relevant to our work, with my teammate has helped me become a better team player. With all the support and guidance, provided by our seniors, we worked in a good and productive environment. This enabled us to know and give our best in the tasks we were assigned to complete.

Job Responsibilities

At FactoryDox Ltd, this internship journey has provided me the chance to obtain a new experience. On the first day of my Internship journey, I was introduced to all the employees in the office, my Supervisor and my teammate. My supervisor gave us a tour of the office and showed us the functionalities of every section in the office.

After this small orientation period, my teammate and I had to sit for a meeting with the CEO of the company and our supervisor. In this meeting we were introduced to the Company's existing system and running projects. We also discussed the technical limitations in the existing system and a requirement for Mobile Application to remove those limitations. We were assigned to work in a small part of a huge project of transforming the Company Admin control from Desktop to Mobile Phone devices. Our supervisor provided the necessary documents which contained the description of the Mobile Application that we were about to work on. We were asked to learn and develop skills in React Native Framework to develop the Mobile Application. We were also asked to learn and gather proper knowledge in understanding the Django Framework to develop the Back-end of the Application. We were provided with the necessary tutorials and online courses to learn these frameworks properly.

The first month was the learning phase in which we were expected to learn and understand the concepts of React Native and Django Framework. My teammate and I used this whole month in developing our knowledge on these concepts. From the second month, we started applying our newly gained knowledge into practice. Guided by our supervisor, my teammate and I adapted a pair programming concept, along with individual participation, in developing this Mobile Application.

Our deliverable was to develop a Mobile Application for certain operations of Admin Site for the Company's e-commerce transactions. I had to attend daily scrums with my teammate and supervisor to set objectives for longer sprints and fragment the objectives into small daily tasks. As I have mentioned earlier, we have adapted a Pair Programming concept in developing both

Front-End and Back-End of the Application. We divided the Application Development into two sections, Front-End and Back-end. I started focusing more on the Front-End. In a team of two members, along with working on our specified sections, we provided full support in each other's work. Apart from developing the Front-End, I have worked on the regular testing procedures of the Back-End program.

LITERATURE REVIEW

In this new era of technological advancements in every aspect of our lifestyle has introduced a scope for everyone do their tasks with flexibility. People no longer have to sit and work in a specified workstation or desk. Nowadays, the computing capabilities of any handheld device is extremely high. Mobile phones or any other handheld device can easily get your work done. In some scenarios, people are more comfortable using mobile phones to manage their business, rather than sitting on a desktop computer. Smart phones have opened the scope and demanded the development of mobile applications. People use mobile applications to complete their desired task on the go. This allows user to gain flexibility and mobility in their job.

Undergraduate Courses related to the Project

The courses organized by department of Computer Science and Engineering was very helpful for me to accomplish my goals in completing the project. Web Application and Mobile Application courses helped me in understanding the basic usage of JavaScript and in learning the React native framework with much ease. The courses, Database Management System and System Analysis and Design, helped me in analyzing and managing the project in a disciplined manner and go for a professional approach with proper documentation. Data structure and other courses related to programming gave me the initial boost in working on my coding skills and pursue a career based on it. All these courses combined helped me in developing the application that I have developed on my internship program.

Related Works

Understanding the Existing System – The existing system is a web application. So the knowledge gathered from the Web Application course helped me in understanding the functionalities and the coding structure of the existing system.

Implementation of new system – The Mobile Application and Development course played a huge role in providing me with the capability to develop a mobile application in this Internship program for the company.

Data manipulation, handling and organizing – Database management system course helped me in setting up the data in a proper structure. Table creation and writing queries to manipulate data were some of the main concepts that I have learned from this course and implemented.

A systematic approach to work on my project – I learned about the software development methodologies from Software Engineering course. I was properly exposed to the methodologies and its real-life usages in this course. Following the concepts and knowledge I have gathered from this course; I was able to select and follow a specific and suitable methodology in developing the project.

Analyzing the system properly to deliver the application according to the requirements – System Analysis and Design helped me in conducting a proper analysis and assuring that the requirements are met.

METHODOLOGY

The techniques and procedures adopted to conduct a project development is known as Methodology. Based on the framework of Scrum, we designed the approach in developing the application.

Scrum

Scrum is an agile development methodology used in the development of Software based on an iterative and incremental processes. Scrum is adaptable, fast, flexible and effective agile framework that is designed to deliver value to the customer throughout the development of the project. The primary objective of Scrum is to satisfy the customer's need through an environment of transparency in communication, collective responsibility and continuous progress. The development starts from a general idea of what needs to be built, elaborating a list of characteristics ordered by priority (product backlog) that the owner of the product wants to obtain.

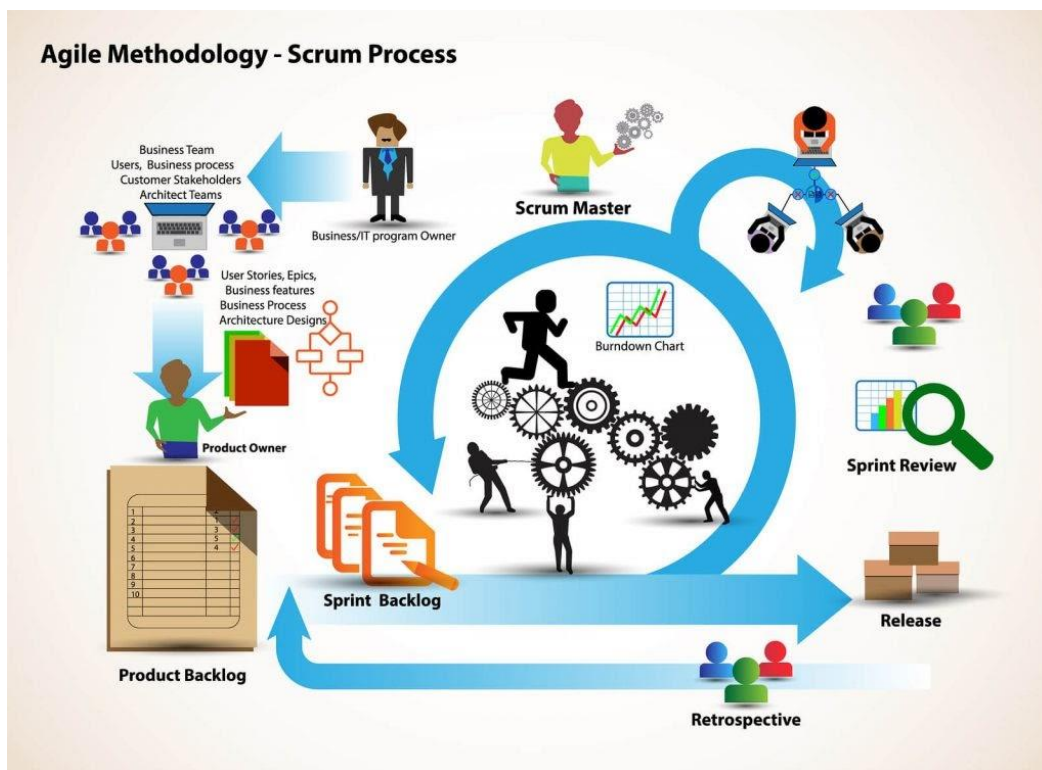


FIG: Scrum Methodology

Roles in Scrum

There are three roles in Scrum.

Product Owner

In our case, the Product owner was the CEO of FactoryDox Ltd. The CEO of the company defined the main characteristics of the application. The core functionalities of the desired Application are mentioned by the CEO.

Scrum Master

The scrum master basically guides the team to maintain the rules and processes of the methodology. Our supervisor, Mr. Emdadul Haque, played the role of a Scrum Master. He mentored and trained us to work according to the Scrum methodology.

Team

This is the development team working on the project. My teammate and I played this role. We, the developing team, were constantly guided by our Scrum Master in following the methodology and fulfilling the Sprint goals.

Scrum Events

Scrum events are essential in maintaining the development procedure. These events affect and enhance the productivity and efficiency of the development process.

The Scrum events used in developing the Mobile Application are mentioned below.

Sprint

In a Scrum team, sprint is basically the unit of work. To create consistency in our development process, we have set monthly sprints. These are monthly events, set to complete the tasks required to achieve the ultimate goal. At the end of each sprint, a new sprint is initiated.

Sprint Planning

The main framework, procedure and planning of the Sprint events are done in this phase. While developing the application, we had meetings with our supervisor in deciding the techniques and approach in completing the tasks required to achieve the goals set for the next sprint.

Daily Scrum

Daily scrums are brief meetings held daily within the sprint period to set small tasks for each day. On our daily scrums, we discussed the works done the day before, the works that we need to do on the present day and the concepts that I need to understand to complete our daily tasks. Our Supervisor and Scrum Master, Mr. Emdadul Haque, helped us in solving any problems that we were not able to resolve.

Sprint Review

As the name of the event suggests, Sprint Reviews are basically the phase in which we review our completed sprint objectives. On our Sprint Reviews at the end of every Sprint period, we made sure that all the goals, set for that certain sprint, is completed and matches the Product Backlog.

Sprint Retrospective

In this phase, we went through all the aspects of completing the previous sprint. We focus on highlighting both the good and bad factors of the development processes on our last sprint. This helped us mitigate the inefficient approaches in completing the Sprint goals. Pointing out these issues, we were able to improvise our methods and implement them in the next Sprint.

Benefits of Scrum Methodology

- Iterative development and the concept of Sprint goals provided us with the ability to scale our modules based on functionality, scope, design and characteristics.
- Sprint reviews and mostly daily Scrums helped us stay up-to-date with the application development progress. Any sudden change in requirements was easier to implement.
- If required, the company could use different features of the Application. Each Sprint provided a small deliverable consisting of small functionalities of the Application.
- Due to regular Sprint after every month, we were able to understand the average speed of the team to complete certain tasks. Analyzing this information, we were able to predict the time required to complete the goals set for the next Sprint.
- The benefits that I have mentioned above, helped us in reducing the risks in conducting the development process.

SYSTEM ANALYSIS

Existing System

The functionalities required by the admins are already present in the existing system. Admins have to use a desktop computer to access the admin website, using a web browser, to perform their tasks.

Problems of Existing System

The need to develop a Mobile Application to replace an already existing system has emerged due to some barriers and constraints in increasing the productivity and efficiency of the workflow. The main issues which led to the development of a Mobile Application are mentioned below.

- To get the most out of the admin-controlled operations, users had to have access to a computer.
- Third party applications such as Web Browsers are required to access the particular website.
- Mobility and performing tasks on the go is not possible in the existing system.
- Accessing websites using a Mobile phone was not enough to provide a good experience in performing tasks on the go.
- Using a Web Browser in a mobile phone limits the workspace for the user to perform their tasks.
- The Delete Order feature is not available in the existing system. Admins are not able to delete faulty entries using the Admin site.
- Admins also had to shift to the Desktop View, available on the Mobile phone Web Browser, to gain access to all the functionalities.
- Mobile responsive styling for User Interfaces on a mobile phone was more difficult to work on compared to developing a Mobile Application, with a much cleaner User Interface and broad workspace.

Requirement Analysis

User Requirements

The flaws and constraints in the existing system have introduced the need for a new Application. A proper meeting was scheduled with the Users, specified to use this Application, and the Company's CEO to gather the User Requirements regarding the Mobile Application. The features that need to be implemented in this Application within our course of Internship are mentioned below.

1. **Dashboard:** To view the Updated Information regarding certain data as the front page of the Application.
2. **View Order List Page:** Admins should be able to view updated information for all the orders being processed currently.
3. **Create Order:** New customer orders can be placed using this feature. Admins will input this customer information using this application and store data into the database.
4. **Update Particular Order Information:** If required, admins should be able to update information of already existing Order Data in the database.

Example: In many cases, the customer does not make full payment until the ordered product is delivered, so the payment status on the database shows "UNPAID". Whenever the customer receives the product and makes the payment, the admin should be able to access that person's order information using the application and update his/her payment status to "PAID".

- **Delete Particular Order Information:** Admins should be able to delete particular order information from the database, if the data is faulty or no longer required.
- **Clean User Interface:** The interface should be easier to understand and interact with.
- **Easy Navigation:** To make Navigation Between different screens simpler.

Functional Requirements

Functional requirements capture the intended behavior of the system. This behavior may be expressed as services, tasks or functions the system is required to perform. Therefore the proposed system is able to:

Name of the Function: Must be compatible with IOS & Android Devices		
Input: 1. N/A	Process: 1. Apps must be developed in a common development environment.	Output: 1. This app will be accessible in both Android & IOS devices.
Precondition: User must have an Android or an IOS phone to run the application.		
Post condition: 1. Admins can use this application.		
Alternate Options: N/A		

Name of the Function: Dashboard		
Input: 1. N/A	Process: 1. Admin will land on the dashboard after login.	Output: 1. Admins will be able to view new, pending and confirmed orders.
Precondition: User has to be logged in		
Post condition: 1. Admin can check their most recent information		
Alternate Options: View order lists		

Name of the Function: View Order Lists		
Input: 1. N/A	Process: 1. Admin will click order list tab	Output: 1. Admin will view the orders in a list.
Precondition: Order datas has to exist		
Post condition: 1. View order list, select and view specific order information.		
Alternate Options: Search for specific order from search bar		

Name of the Function: Enter Customer Order information onto database.		
Input: 1. Order ID 2. Product Name 3. Product Quantity 4. Pro 5. duct Color 6. Customer Information 7. Payment Information 8. Delivery Date.	Process: 1. Users will input customer order information onto the database using the application interface.	Output: 1. Customer order information will be stored on the database.
Precondition: All the input fields should be filled.		
Post condition: 1. This Customer order can be later accessed on the View Order List. 2. Update order information in the database		
Alternate Options: N/A		

Name of the Function: Update Specific Order Information		
Input: 1. Changes in Information	Process: 1. Admin will tap on any Particular order from the Order List page. 2. The admin will be navigated to the Individual Order Information Page. 3. Click on the Update/Edit Order button to navigate to the Update page. 4. Admin will be able to change any pre-stored data in their corresponding fields 5. Press the Save button.	Output: 1. Updated information will be stored on the database.
Precondition: Order datas has to exist.		
Post condition: 1. This Updated Order information can be later accessed on the View Order List.		
Alternate Options: N/A		

Name of the Function: Delete Specific Order Information		
Input: 1. N/A	Process: 1. Admin will tap on any Particular order from the Order List page. 2. The admin will be navigated to the Individual Order Information Page. 3. Click on the Delete Order button.	Output: 1. All information for that specific order will be deleted from the database.
Precondition: Order datas has to exist		
Post condition: 1. This deleted order information will no longer be visible on the View Order List.		
Alternate Options: N/A		

Non-functional Requirements (NFR)

Non-functional requirements are requirements which specify criteria that can be used to judge the operation of a system, rather than specific behaviours. This is contrasted with functional requirements that specify specific behaviour or functions. Systems must exhibit software quality attributes, such as accuracy, performance, cost, security and modifiability plus usability, i.e. easy to use for the intended users. NFRs help to achieve the functional requirement of a system. Thus the proposed system does the following:

- The system has high performance and reliability levels. The mean time between failures, mean time to repair, and accuracy are very high.
- The system has user-friendly interfaces. This ensures the ease with which the system can be learned or used. The system can allow users to install and operate it with little or no training.
- Handles growing amounts of work in a graceful manner as can be readily enlarged i.e. the ease, with which the system can be modified to handle a large increase in users, workload or transactions.

Data Flow Diagram

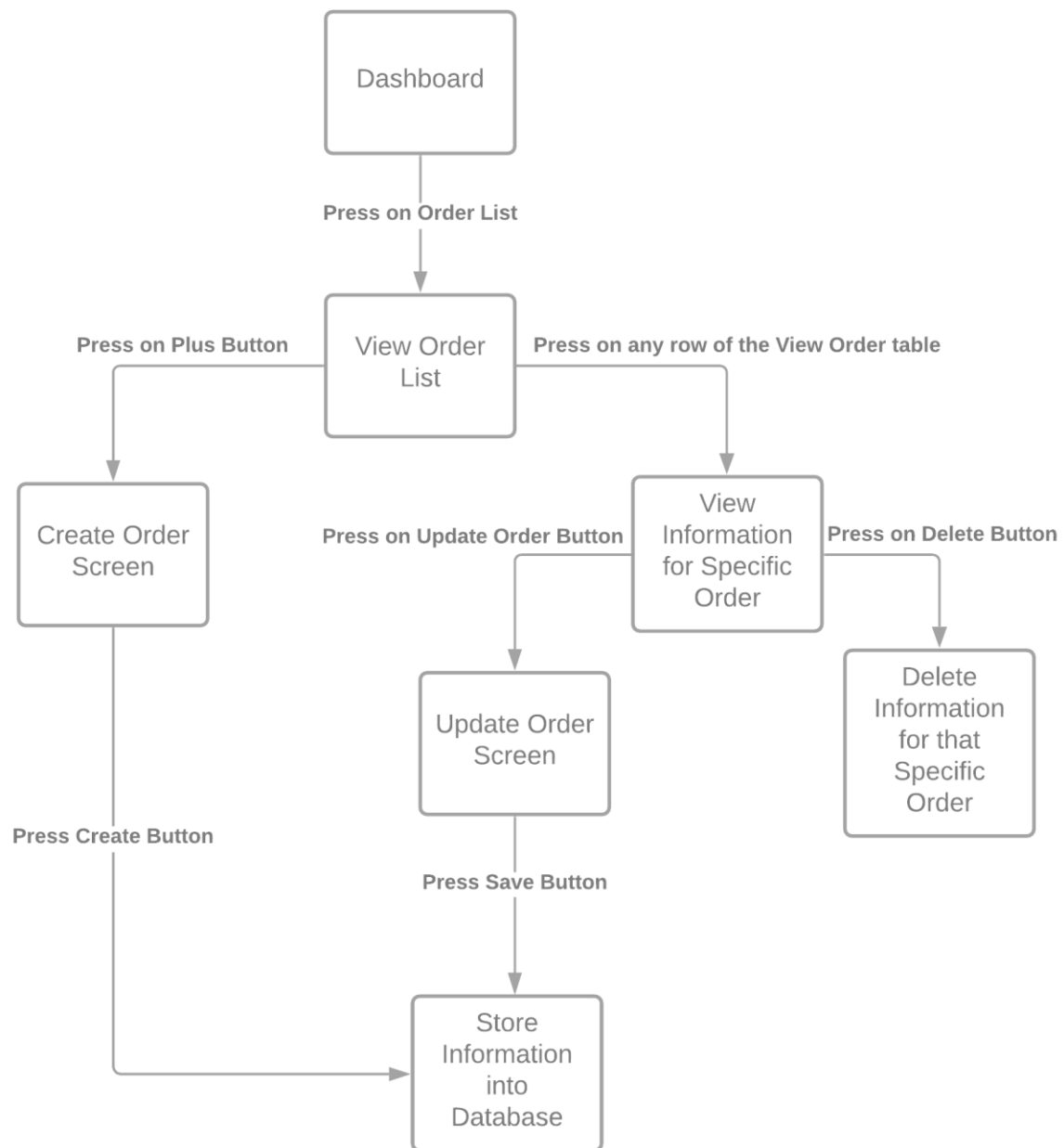


FIG: Data Flow Diagram

Rich Picture Diagram

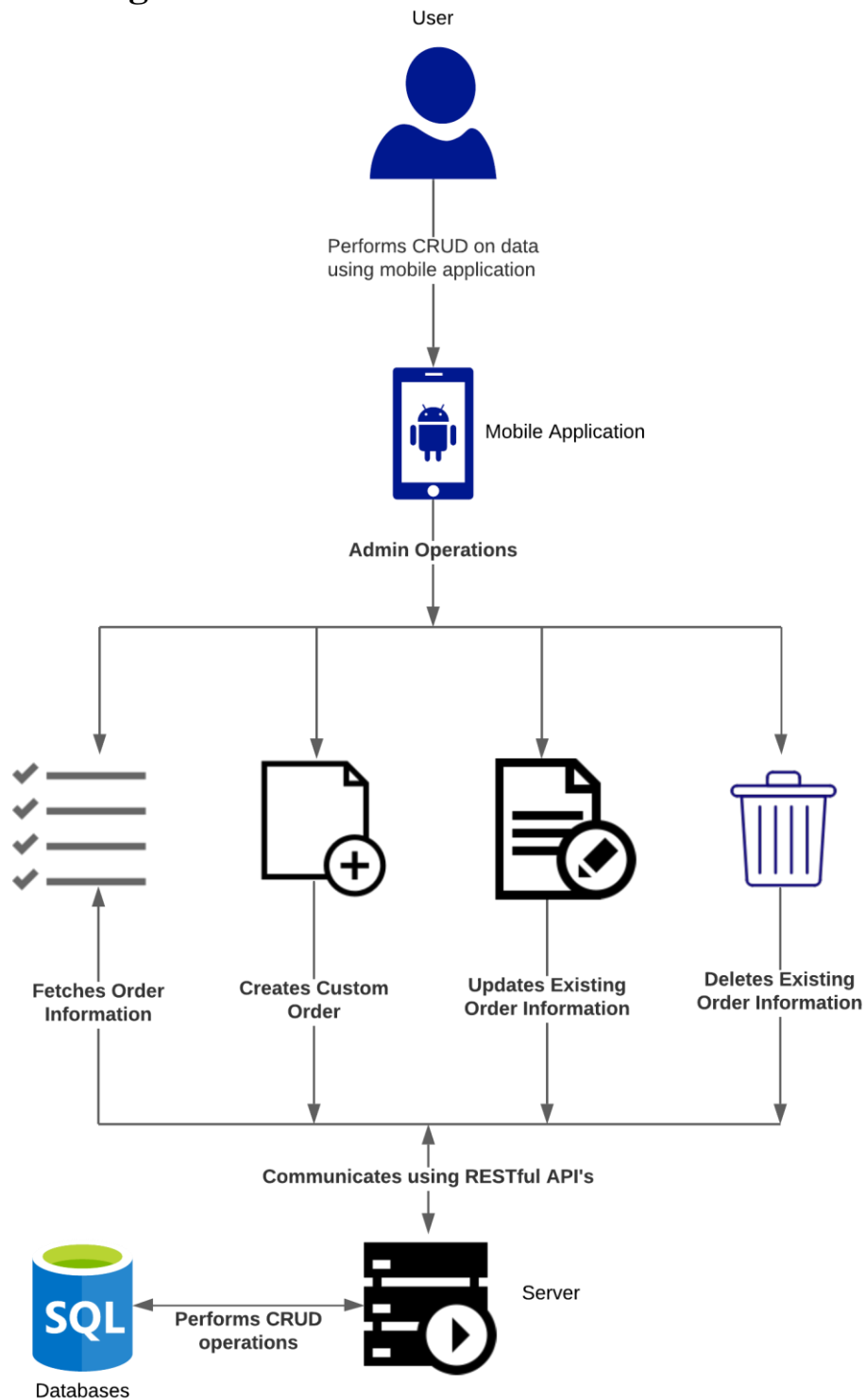


FIG: Rich Picture Diagram

Design

This section will provide the idea regarding the designing approach in this application. This includes the User Interface design in the mobile application that I have worked on to develop this system. I have also participated in the framework design of the backend and use of RESTful API's to communicate with the server and manipulate data.

User Interface of Mobile Application

In User interface designing we used Adobe Xd to design the basic interfaces and functionalities. This design was then later verified by the admins and the CEO, to check if it meets the user requirements. Using this design as a prototype or dummy application interface, we were able to design the main application.

The library we used in creating this application is React Native. Using this library made it easier for us to create and design our application with proper flexibility. There are many packages, such as “Date Picker” and “Switch”, that helped us creating the functionalities and design them with ease. We made interfaces for:

- **Dashboard:** This screen gives user the updated information regarding the order information on the database. Simple boxes are used to show the total number of orders, paid orders and unpaid orders. The box for total number of orders is pressable, which on click will navigate the user to the View Order List Screen.
- **View Order List Screen:** In this screen, we have implemented a table to show all the data in the database. The table rows are made clickable, which on click will navigate user to the detailed Order Information screen for that order.
- **Create Order List Screen:** In this interface, we used various components from “React Native Paper”. React native paper is a collection of customizable and production-ready components for React Native. Various types of input fields such as text input, switch inputs and date inputs were used in this screen, to take input from the user.
- **Update Order Screen:** Using React Native paper, we implemented the input fields similar to the create order screen, to design the update order screen. We also used Floating Action Buttons to implement various functionalities. This helped us reduce the number of buttons on screen and create a clean user interface.

RESULT AND TEST ANALYSIS

Testing

Validating and verifying the system according to the User's requirement is known as Testing. The main objective for this phase is to make sure that the user requirements are fulfilled, all the functionalities are working properly and the main user of the system can interact with the application well.

Functional Testing

Functional testing, as the name suggests, is to ensure that the functionalities specified in the user requirements are properly performed by the application. Each functionality of the application is systematically tested in this phase, to make sure that no feature is missed out accidentally. Testing the functionalities by the admins, led to the discovery of few errors, which were fixed right after the testing phase.

System Testing

In this phase the system is tested to check if the user requirements were met, and the application performs according to the requirements. After the development of the whole system, each section or functionalities is tested with realistic amounts of test data, to ensure no errors have been introduced and the system behaves properly. The system testing phase includes Recovery Testing, System Acceptance Testing and User Acceptance Testing.

Recovery Testing

Recovery testing is the activity of testing how well an application can recover from crashes, hardware failures and other similar problems. To conduct the recovery testing, the system or application is forced to fail in a variety of ways to verify that recovery of data is properly performed. The system failures are performed in a controlled environment. Later, the system is checked to ensure that the information stored on the database is not corrupted.

System Acceptance Testing

In this phase the system is tested by running it on multiple devices to check if the application behaves properly. Different devices with different specifications and display ratio were used for this testing.

User Acceptance Testing

After the system acceptance test is passed, users are asked to go through and perform all the functionalities. In this project the users were the administrators of the company and the CEO. User Acceptance Testing provided us with the ultimate test results, as they are going to use the application after the development is complete.

Test Data

Test data is the input given to a software program during test execution. It gives us the idea of how the data affects or gets affected by the operations performed using the system. We considered using two types of testing in this phase. They are Positive testing and Negative Testing.

- Positive Testing: We entered correct data into data fields while creating new order, in the create order feature, to check if the application produces expected results.
- Negative Testing: Wrong and unexpected data were inserted into data fields, to check if the application can handle unusual or unexpected inputs.

Test Results

After completing all the phases of testing, we were able to come up with a better understanding of the application's status. We passed in almost 95% of the tests that we have performed. Few issues were highlighted while conducting these testing. Initially, data fetching from the database was not working properly. There were also some issues in rendering updated data automatically onto View Order List screen. Fortunately, these issues were resolved right after the testing phase. The API call was fixed to fetch data properly and a Refresh Control package was used to implement "pull down to refresh" feature to render updated data onto View Order List screen. Using a systematic approach in testing the application has helped us troubleshooting the issues conveniently and quickly.

INTERNSHIP OUTCOME & ISSUE ANALYSIS

Problems & Challenges Faced in the Workplace

Working in a Professional Environment was a very new experience for me. During this Internship Program, I had to face many different and entirely new scenarios. Coping up with the new circumstances was challenging for me. These challenges and difficulties have helped me in developing my confidence and improvise my capabilities to sustain and deal with the corporate life. The main problems and challenges faced during this Internship experience are briefly discussed below.

- Learning about the company and how it works in this short period of Internship along with working on the assigned projects was tough for me to manage initially.
- Compared to the other employees, it was becoming difficult for me to present and complete my work on a tight schedule. It took me some time for me to gain the pace in my work process.
- I had to work on my communication skills, to get my work done. Dealing with members from different departments of the company was basic task daily.
- Working in a team, with a completely new person, was hard for me to gain the understanding, initially.
- During the second wave of the Lock Down, we had to shift to working from home. This has become a huge issue, as the communication became less.
- At the initial stage, it was a bit troubling for me to cope up with the workload. This amount of work, with short deadlines, was a completely new experience for me. After some time, I got used to the work pressure and with proper distribution of work and time management I was able to overcome this issue.

Job Analyzing of the Issue(s) Based on Relevant Theory

I have completed many different courses during my academic session in this University. Joining a professional workplace has given me the idea of the applications of the theoretical courses that I have completed. These are the course that was relevant and helped me complete my work at FactoryDox Ltd.

- **Software Engineering:** In this course I have learned approaching a software development in a systematic manner. Following a particular development methodology helps develop a software properly. Applying these theories into real life scenarios has helped me understand the methodology that I should work on, gather proper user requirements, design the project and analyze the workflow and outcomes.
- **Database Management:** The database management course played a huge role in developing my data organizing and managing skills. The knowledges I have gathered from this course has helped me to organize, manage, store and filter my data more efficiently.
- **System Analysis and Design:** System analysis and design deal with planning the development of information systems through understanding and specifying in detail what a system should do and how the components of the system should be implemented and work together. Using knowledge from this course, I have prepared the documentation which included the business plan requirement, data flow diagrams, use case diagrams and many more.
- **Web Development:** This was one of the most important courses that helped me improving my web development skills. I have learned basic javascript and building my codebase setup. I have implemented my knowledge of Javascript into better understanding of the React native library, that I have worked on. This course has also helped me in working with APIs, which I have implemented in this Internship project to fetch and post data to the database.

- **Mobile Application Development:** This course introduced me to the world of Android Application development. I have implemented this basic knowledge of android development into developing the Mobile Application for FactoryDox Ltd.

Recommendation

Here are few recommendations for the company.

- The company should recruit more freshers and youths to generate new and innovative ideas.
- The company should improve and get more comfortable with online communication, due to this pandemic.
- They should work on following a certain development methodology for every project they work on, as it will allow them to be more productive and complete their task within time.
- They should maintain standard quality of products and services.
- The company should gather more feedback from the users regularly, regarding the utilization and flaws in their existing system.

CONCLUSION AND IMPLICATION

In this three-month internship program, I have worked on developing a Mobile Application for the admin operations performed by FactoryDox Ltd. to maintain, view and update Customer Order information on the database. This application allows the admins to perform their operations without the need for Desktop Computers. Thus, promoting the flexibility and mobility in performing these tasks, on the go.

This Internship program provided me with the opportunity to work as a mobile application developer, in a corporate environment. During this session, I have experienced and learned many new things, which includes problem solving skills, dealing with other employees or stakeholders and punctuality in completing my tasks on time. Internship at FactoryDox Ltd. has guided me to handle different situations and overcome unexpected and new challenges. This program allowed me to gather more knowledge in developing my software developing skills in a systematic manner. This experience surely played a huge role in boosting my career and developing my skills in Mobile Application Development and many other sectors. From this internship program, I was able to improve and work on my communication skills, critical thinking capabilities and expand my perception towards every scenario that I faced. Being able to overcome all the challenges and working in a professional environment with experienced developers, I can conclude that I have transformed to a better version of myself. I will always be thankful to my University and FactoryDox Ltd. for giving me an opportunity to gain this real-life work experience through this Internship Program.

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APPENDICES

Appendix A

Weekly Log

Week	Activity
1	Learn basic HTML and CSS
2	Get familiar with Javascript
3	Learn Python for Backend
4	Learn and experiment with React JS
5	Learn and experiment with React Native
6	Learn the basics of Django Framework
7	Preparing User Requirement and making a UI/UX prototype
8	Worked on Back-End and generated the API to fetch and post data to the database
9	Created Screens for View All Order List and Create New Customer Order
10	Created Screens for View Specific Order Information, Update Specific Order Information and Delete Order functionality
11	Worked on Styling of the Front-End Design
12	Conducted the testing procedures

Appendix B (UI Screenshots)

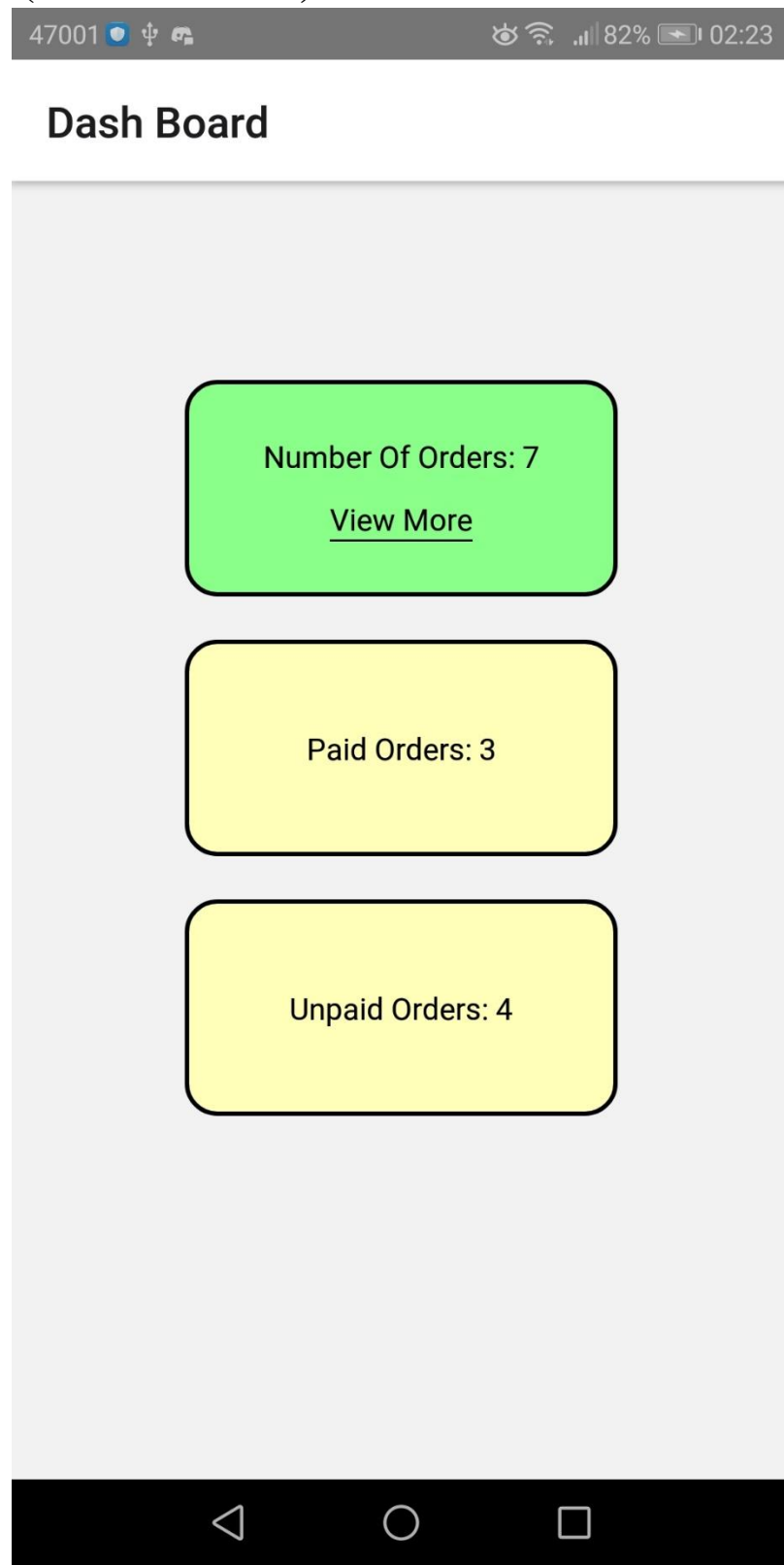


FIG: Dashboard

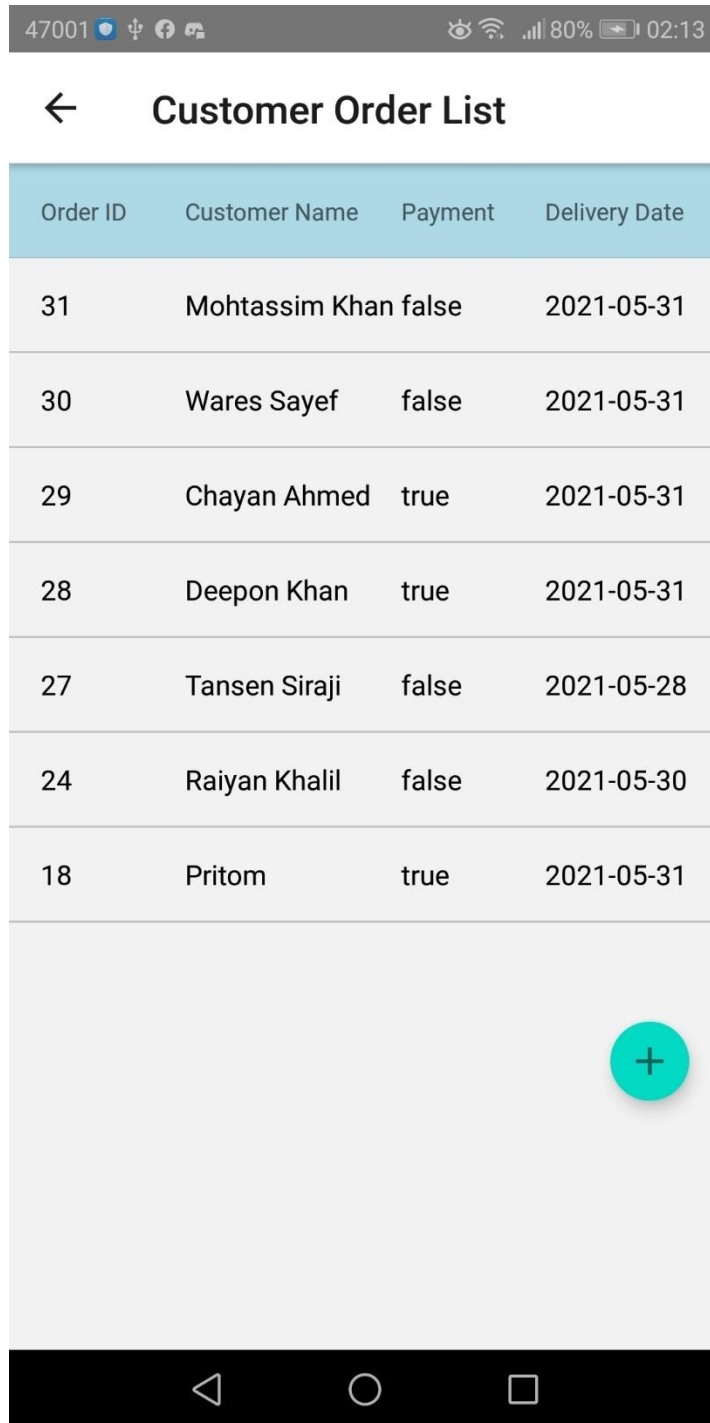


FIG: Customer Order List Screen

47001 82% 02:22

←

Order Information

Order ID 29	
Order Date 2021-05-21	Delivery Date 2021-05-31
Customer Name Chayan Ahmed	
Mobile Number 01789562345	
Email chayan12@gmail.com	
Address Farmgate	
Payment true	
Product Name Neck Gaiter	
Product Quantity 50	
Per Unit Price 30	
Total Price 1500	

+

FIG: Specific Order Information

47001 81% 02:21

← Order Information

Order ID 29	
Order Date 2021-05-21	Delivery Date 2021-05-31
Customer Name Chayan Ahmed	
Mobile Number 01789562345	
Email chayan12@gmail.com	
Address Farmgate	
Payment true	<div>Edit</div> <div></div>
Product Name Neck Gaiter	<div>Delete</div> <div></div>
Product Quantity 50	<div></div>

FIG: Update and Delete Order Function



Create New Customer Order



FIG: Create Customer Order Screen



Update Information

Full Name

Chayan Ahmed

Mobile Number

01789562345

E-mail

chayan12@gmail.com

Address

Farmgate

Delivery Date

2021-05-31



Product Name

Neck Gaiter

Quantity

50

Price per Unit

30



Total Price
1500

Payment



SAVE

FIG: Update Order Information Screen