



ONLINE TRUCK RESERVATION SYSTEM

SCHOOL OF COMPUTING SCIENCES

Final Project

BY

SHALOM CHEMUTAI KOLIGEY

Adm No: 18ZAD103390

SUPERVISOR

PAUL MWANIKI

A Final Project Submitted in Partial fulfillment of the requirements for the Degree of Computer Science, School of Computing Sciences Riara University Nairobi, Kenya.

19th April 2021.

DECLARATION

I declare that this or any other University has not previously submitted this work for the awarding of the course marks. To the best of my knowledge and belief, this work contains no material previously published or written by another person except where due reference is made.

Student Name: ...Chemutai Shalom Koligey...

Signature: ...S.C.K...

Date: ...19th April 2021...

APPROVAL The project proposal of student name was reviewed and approved by the following:

Supervisor Name: ...Paul Mwaniki...

Signature:

DEDICATION

I would like to appreciate my supervisor, Mr Paul Mwaniki, for dedicating his time and effort to make this project a success.

All the members of Riara School of Computing Sciences ensuring the smooth sailing of this degree boat my sincere gratitude to you all.

I would also like to thank my family for the supporting, encouraging and cheering me on. A special thank you goes to my late mother whom I am because she was.

ACKNOWLEDGEMENT

I am entirely grateful to God who made this project possible.

I sincerely appreciate my supervisor, Mr. Paul Mwaniki who tirelessly took me through the project build and proposition.

I would also like to thank my classmates and friends who answered some of the questions I had and encouraged me to keep going.

ABSTRACT

The overall goal of this project is to manage transportation issues that have been faced in the country for the past several years.

Since time immemorial we have had people talk about different problems they are facing. This study sets out to investigate these issues and address them with the help of users and management. We will ensure interactions and experience is top notch for the users.

We explore the aspect of transportation and pursue the question of if, how, and why secure communication impacts the process of online requests of vehicles.

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CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

In the country today, the transport industry is terrible, we see matatu drivers speeding, overcharging customers, dropping them at any part of the road and many more. The train tracks have now been covered by grass since no trains are in use, airplanes become more expensive by day and trucks are owned individually by different people. This therefore means that there is some sort of bias, robbery and any kind of problem caused in this industry.

Today's focus is on trucks which has become expensive, corrupt and unusable by the day. The need for the development of this system stems from all the problems we face as a nation. Lenys brings you an affordable, efficient, reliable and yet a fast way of ordering, transporting and paying for services. This system come with several advantages which will be discussed in a later chapter.

1.2 PROBLEM STATEMENT

We have several ways to get trucks for our transport but are the affordable, efficient and easy? As it is today, trucks do most of the transporting of goods from one point to another within the country. These trucks however are not reliable since there is theft, bias, and all sorts of malicious happening on the road between the picking and dropping point. Lenys' focus is the trucks sector which is used by a high percentage of citizens. Study has shown that goods barely get to their destination especially if the transporter "doesn't know someone". Not only does that happen, but also theft of goods because no one is made accountable for their actions and even lack of security since it is owned by an individual therefore, claiming their vehicle at any point in time.

1.3 OBJECTIVES

- To develop a system that connects truck drivers and orders from any place at any time.
- To develop an application that allows clients to book a truck.
- To develop an application that shows live location of trucks.

1.4 JUSTIFICATION

The computerization of the various delivery channels is geared towards improved service delivery for the citizens, wherein they can make an order for a truck to pick and deliver their goods just like how Uber picks and drops clients.

The app will be able to give the customer a truck and a driver who has had experience in driving for more than four years. It will guarantee arrival of goods even showing the time it took on the road plus the estimated cost for transit.

1.5 SCOPE OF THE STUDY

The focus of this project will be to ensure all citizens have equal access to transportation vehicles without having to “suffer”. The study will focus on trying to improve the transportation industry in the country and bring long-term solutions.

It also ensures that tracking systems are put in order for the goods to arrive at final destination without any hinderances. Although the application has not covered the tracking devices and any payment APIs, it is assured that the whole process has been thought of and documented.

CHAPTER TWO: LITERATURE REVIEW

2.1 INTRODUCTION

In current times, transport systems especially the truck involves a lot of biasness and corruption. An online reservation system will be great for coordination, control, analysis and visualization of information in an organization.

2.2 TRANSPORT SYSTEMS

Transport since long ago has evolved for sure. It all begun with animals such as donkeys, then it went to carts that were driven by animals, then it went to bicycles and then cars and everything else the world has and keeps evolving up to today.

We have seen recently that amazon wants to pilot the idea of sending out their orders and packages using drones to different destinations. Will this work?

2.3 CASE STUDY

US FLEET TRACKING SYSTEM

The case study will revolve around a fleet tracking system that was founded in 2005.

It makes use of a mobile application that offers tracking services in vehicles on the go. This means that it alerts the company of problems including aggressive driving, excessive idling, start and stop, and speeding to say the least. It also makes use of a device called an AT-V3 GPS Tracker.

Below are the system features;

Keep your fleet on time with live integrated traffic. Avoiding costly slow-downs due to backups and stand stills. Time is money, need we say more?

Put the power of data to work for your business. Our reports will save you time and money. Breaking down the important details quickly, while allowing you to schedule and customize reports to meet your fleet needs.

Playback the activity for any tracker up to 90 days back. Helpful in legal disputes, job completion verification and much more. See real time speed, location, stops and integrated street view.

Stay ahead of any weather condition with live weather radar. Giving ample time to secure or reroute your assets.

Virtual fences that alert you when assets enter, exit or are in proximity. We love unlimited, so create as many geofences as needed. Customisable to any size, shape or time of day. Pair with reports for insightful display of your fleet. (Regan, 2019). This system helps save time and money. It also has great reviews from its customers.

2.4 HISTORY OF TRUCKS

Trucks date back to the 1890s. They were first used by the military during the world war 1 with Ford being the original designer. Some studies however show that the first designer was Chevrolet and the truck was in three parts. In 1922 both Ford and Chevrolet improved their trucks and they began to sell as they improved the look and body. Farmers especially bought these trucks to transport their food and use in their farms. (Bellis, 2020)



Figure 1: COCA COLA TRUCK

The illustration above shows an early Coca-Cola truck. As seen, it has a small body and not enough room to be able to carry enough or a lot of what was needed in the market. However, in the image below, we see a truck of the same company today looking evolved big and able to carry what is required and needed in the market. (Spencer, 2015)



Figure 2: COCACOLA TRUCK 2

Animals like horses and donkeys pulled these trucks especially in the farms and the freight on railroads were mostly within centralized urban areas. We have definitely evolved thus far. If trucks weren't in use or working, they were treated as historical monuments and people would go and look at them for leisure.

As decades passed these trucks began to evolve and have more space not only for produce or luggage but also for people. The designers also built heavier engines that could accommodate other

people who were not farmers for example those working in the textile industry and even roads were made for the trucks to use mostly in urban areas.

Truck popularity grew and technology evolved causing the engineers to realize that it would be easier if they used internal combustion engine instead of gasoline powered combustion engine. In line with that improvement, gear drives were also created making the work easier for other people.

Other designers joined in to create their own due to the demand. This allowed users to choose the kind of truck they wanted and for what purpose.

Most of these trucks that were invented then are still in use today.

2.4.1 ADVANTAGES

Convenience - Instead of being involved in a long activity of trying to find the perfect truck for you, the electronic hail system will help you get a truck of your choice, set a date and time for its arrival and even see an estimate of the price from your location.

A client may link their Mpesa or their credit card to their account and payment will be done at the time of arrival and a receipt is sent via email with a link to an option of rating the driver.

Professionalism - Drivers may resort to not caring for the trucks they drive because they don't own or care for them but with this system, because of the ratings and competition, they will be few to none cases of such. This may also include kindness and being polite because of the ratings.

To add on to this, after a client has input their destination, the driver uses the maps to travel reducing the chances of destructing and disturbing clients during their work time.

Safer for drivers - Safety is important for everyone. The clients using this service have registered their identities with the e-hail platform and are not random people on the street therefore the drivers are somewhat assured of security.

2.4.2 DISADVANTAGES

Loss of jobs - The above discussed system may cause a loss to the already available jobs of drivers. Take for example, normal taxis are almost no longer in use because people are leaning more towards an estimate of price and knowing who their driver is plus their rating. Most taxis resorted to joining the already existing Uber, Bolt and Taxify to be on the safer side of this.

Fluctuating fares - This may be due to the environmental factors such as rain. In harsh conditions, the price may increase because of traffic or the fact that the driver may spend more time on the road. The system being automated may have a large range between the prices. This means that the prices may double or triple causing fears in the clients.

Competitive pricing - We may be engaged in a battle to offer the cheapest service compared to others offering a similar service. This may cause customers to choose others to us or even lead to a drop in the earnings of company causing a loss in the company.

2.5 TRACKING SYSTEMS

According to GPS tracking is good for fleet owners.

The following are his reasons;

- Its efficiency saves time and money.
- It is easier to manage the many cars while helping to lower associated risk, and boost productivity.
- Common challenges are easily detectable this is because the user doesn't have to go through each vehicle.
- Similar patterns are detected making it easy to solve an issue.

Most tracking systems in the USA make use of an application and/or a few devices that are intelligent enough to track the vehicles. The systems are considered to be very effective since and efficient to both the users, drivers and the company. Statistics show that in the past decade, more companies are leaning towards this including amazon that ships world-wide.

2.6 GAP IDENTIFIED

It has become difficult to transport goods from one point to another. This is because of the various setbacks that we encounter in our everyday life. For example, trucks have now become expensive because of corruption. We are simply in a cycle of brokers. Most people who own trucks just sit in their homes and wait for money from the broker they employed to get customers. This broker also employed another broker who employed another leading us to the cycle of brokers.

Trucks end up being expensive since every one of the has done their job and expects to receive profits (justly or unjustly) at the end of the day.

Lenys brings you an app where you simply order a truck at the comfort of your home and have your goods transported securely, cheaply and fast having the knowledge of an estimated price and ratings of the driver.

CHAPTER 3: METHODOLOGY

This section discusses the research methodology that is used in the study. It covers the approach intended to be used to develop the project and concept diagram too. This chapter will provide the detail methodological framework about how the data will be collected and analyzed in order to solve the research question.

3.1 SYSTEM DEVELOPMENT METHODOLOGY

For the development of this system, I used waterfall model.

3.1.1 WATERFALL MODEL

This is one of the most traditional and commonly used software development methodologies by software developers. It clarifies the process in a linear sequential flow and ensures one step is complete before moving to the next.

I used this model since I was building this system alone and it required me to follow a certain procedure so I do not miss or skip any part of the building of this system.

3.1.2 ADVANTAGES

- It saves a significant amount of time since all phases are processed and completed at a given time.
- The requirements are simple to understand and works effectively for smaller projects.
- You can easily do testing of the system.
- It is very easy to manage the project because of how the method is rigid.

3.1.3 DISADVANTAGES

- It can only be used if the resources are available and outlined upfront.
- You cannot include customers valuable feedback because of the specification of timings.
- The end is result is unknown in the beginning and one can only undergo the process for them to see it.

3.2 SYSTEM ANALYSIS AND REQUIREMENTS

This is defined as the process of identifying problems and organizing the facts and details of a system.

3.3 STAGES IN SYSTEM ANALYSIS

3.3.1 IMPORTANCE OF SYSTEM ANALYSIS

Systems analysis is a crucial part in the development of a project. A lot of times, projects fail due to the lack of a prior analysis regarding the project.

The following are some of the importance of system analysis;

Cost, efficiency and flexibility – when an analysis is done, it ensures that correct paths are taken and minimizes any errors that may occur. This saves an organization from loss of money and time. It also ensures that a correct path is followed in development accommodating future plans and amendments.

System analysis follows a step by step guide to development this not only turns out to help the software become close to perfect but also ensures changes and enhancements are considered and done in a way that does not require development to start from scratch again.

Risk assessment ought to be done on a system while developing one. Risks are generally likely to happen and if we follow a procedure, then there is a low chance of the system falling apart. Therefore, it increases quality of the system.

3.4 FEASIBILITY STUDY

3.4.1 TECHNICAL FEASIBILITY

This is simply the feasibility that assesses in detail the intention of the product or service. It concerns different areas such as labor, location, and technology used.

In this case, the system needs to be built so there is need for a software developer and tools that will help in the building of this system. Some of these tools include a device, applications such as Android Studio Code.

This study is important because it is the determinant of whether the system is workable and usable considering the necessary versus the available resources.

3.4.2 ECONOMIC FEASIBILITY

This concerns the financial cost of the new venture that will ultimately be profitable to the company.

Table 1: SYSTEM BUDGET

DESCRIPTION	QUANTITY/PERIOD	UNIT COST	TOTAL
ANDROID STUDIO CODE	3 MONTHS	FREE	Ksh. 0
INTERNET CONNECTION	3 MONTHS	Ksh. 5299/month	Ksh. 15,897
PERSONAL COMPUTER	1	Ksh. 40,000	Ksh. 40,000
		TOTAL	Ksh. 55,897

3.4.3 TIME FEASIBILITY

This refers to the estimated time required by the company to develop the product.

Table 2: TIME FEASIBILITY

WEEKS	1	2	3	4	5	6	7	8	9	10	11	12
RESEARCH												
ANALYSIS												

CODING												
FINAL REPORT												

3.4.4 RESOURCE FEASIBILITY

This entails the resources that would be needful for the project development to be a success.

Lenys is a computer-based project mostly relying on software components that include; Windows (7 or above), a web browser (Chrome) and Android Studio Code.

3.5 REQUIREMENT ELICITATION

This is the process of researching and finding out the system’s requirements from the users. It means therefore, a survey must be done through the future users to receive information on the needful.

Below are some of the techniques.

3.5.1 REQUIREMENT GATHERING METHODS

- Secondary data

With technology being improved by the day, it is time that we think about ways to automate and make our lives easier. People will definitely resort to the above system not because they are lazy but because of convenience.

- Questionnaire

Having asked people in the transport industry how many clients they get and how it works, I concluded that this ‘shortcut’ manner is the best since it may also help people with trucks get clients and a profit from its usage.

3.6 SYSTEM DESIGN

This is the process of pointing out the elements of a system; it defines, develops and designs systems to satisfy the specific needs and requirements presented. (The Economic Times)

3.6.1 PHYSICAL DESIGN

This is a breakdown of how the physical system will look like. i.e how the user will sign in and create an account, request for a truck under the account, ensuring they have chosen the date, time, destination and kind of truck they wish to get and finally pay at the end of the trip.

3.6.1.1 USE CASE DIAGRAM

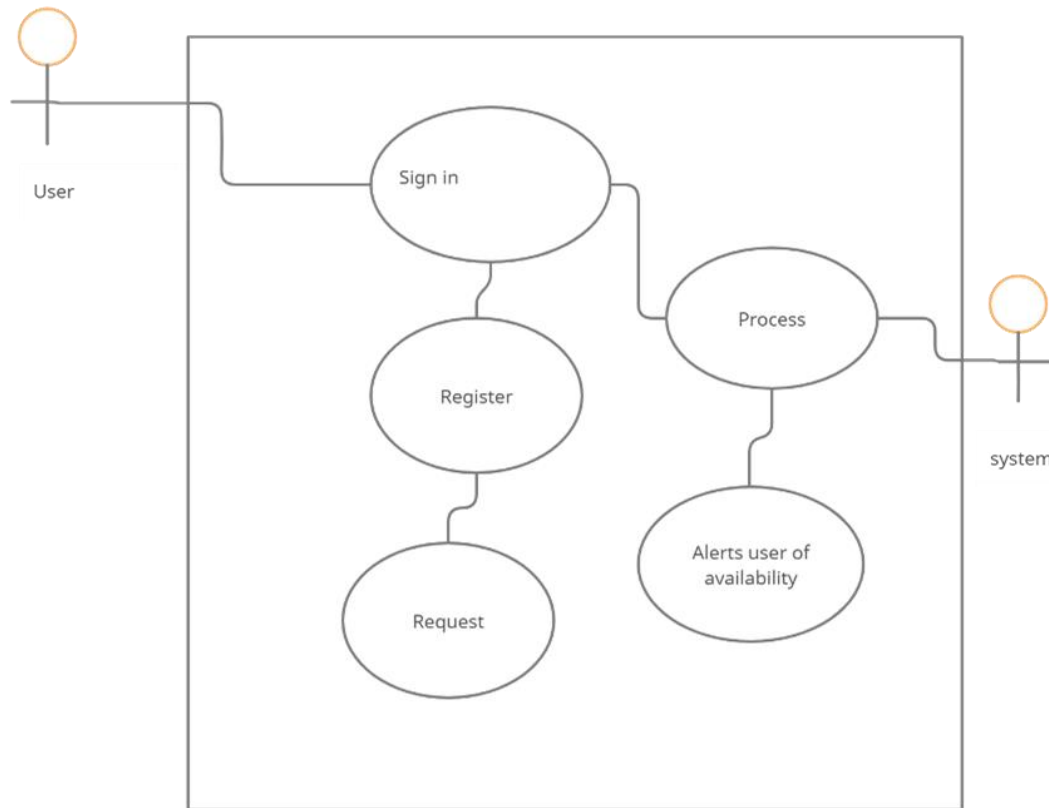


Figure 3: CASE DIAGRAM

3.6.1.2 DATA FLOW DIAGRAM

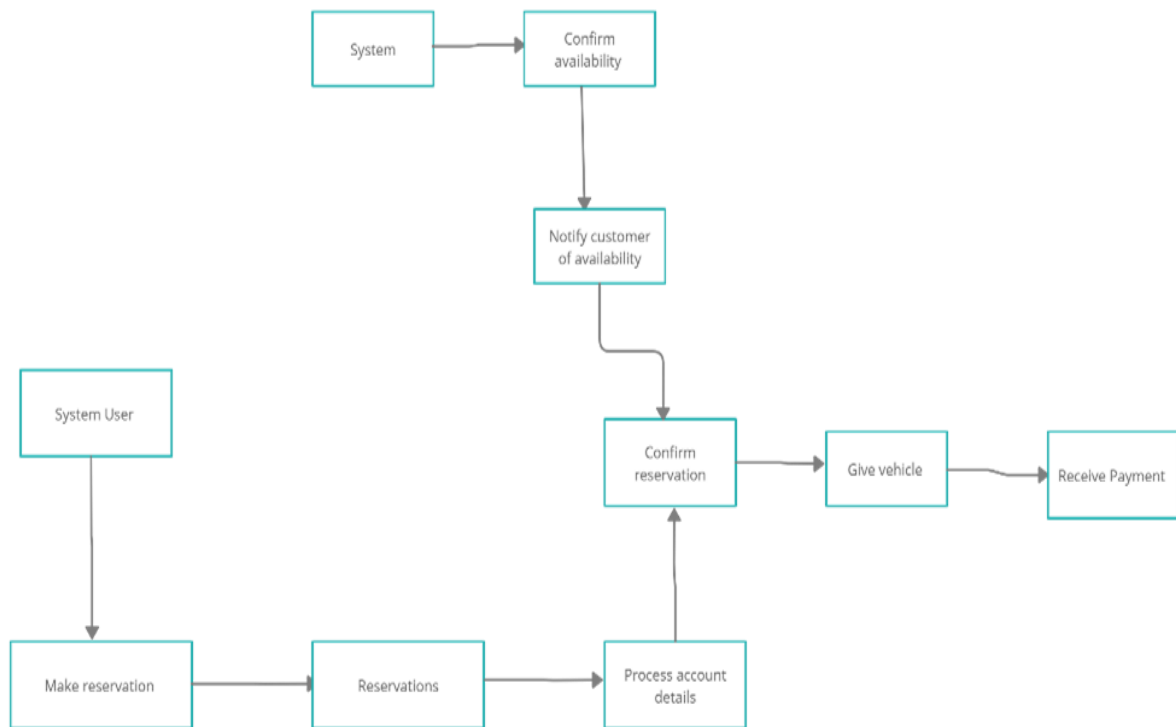


Figure 4: DATA FLOW DIAGRAM

A data flow diagram is a diagram that maps out the flow of information for any process or system. It uses defined symbols such as rectangles, circles and arrows to name but a few.

The data flow diagram above explains the process in the Lenys system. It shows how a customer will order a truck then the system will confirm availability before accepting the order then reserve the vehicle for the customer.

It also explains how after the systems confirms availability and a user gets to use a vehicle, the user will be promoted to make a payment before checking out of the system.

3.6.1.3 ENTITY RELATIONSHIP DIAGRAM

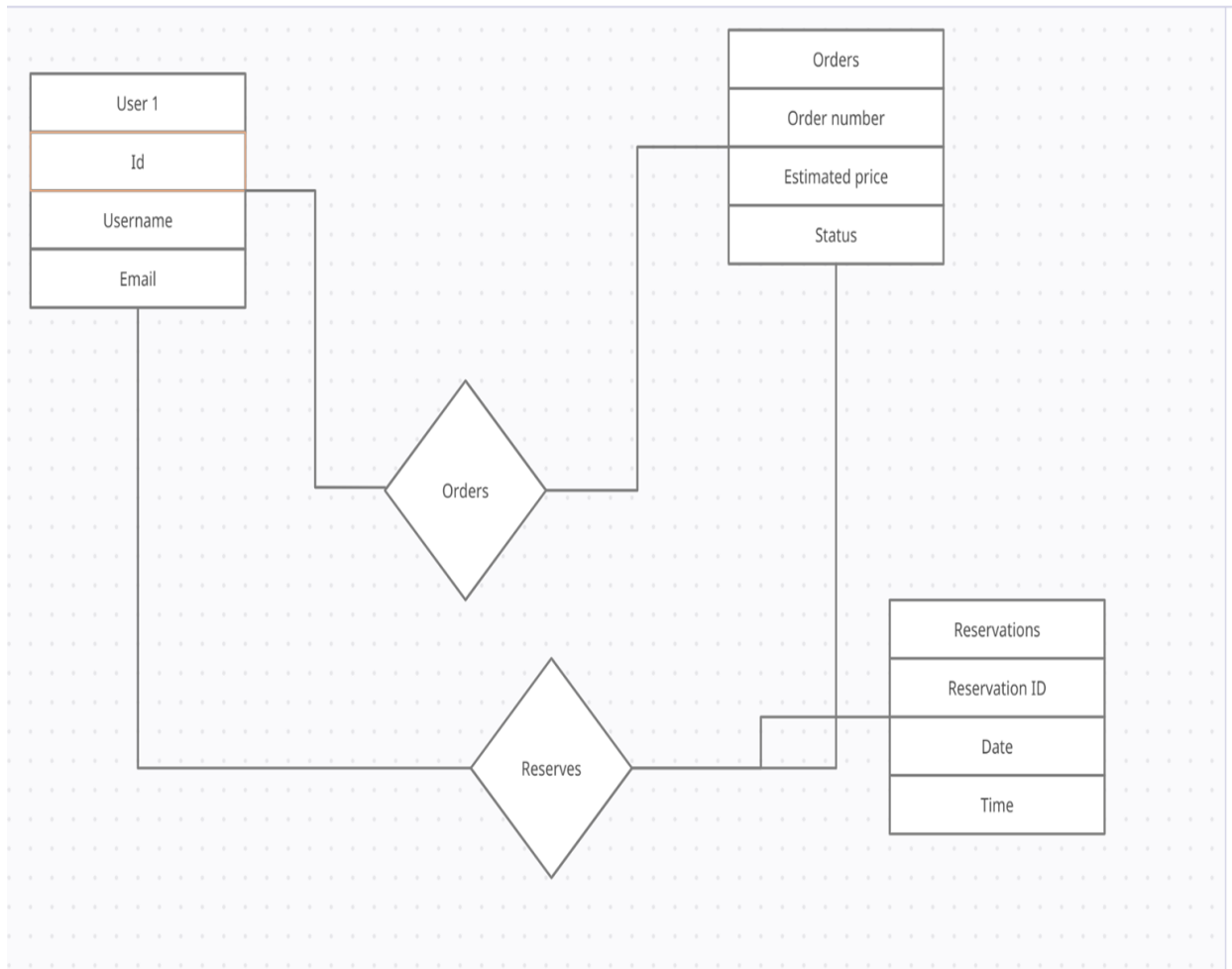


Figure 5: ENTITY RELATIONSHIP DIAGRAM

An entity relationship diagram shows the relationships of entity sets stored in a database. Identifying entities, their attributes and showing the relationships between them, an ER diagram illustrates the logical structure of databases.

In the above diagram for example, orders, reservations and users are entities and the items below them are their attributes being matched and creating a relationship.

CHAPTER 4: IMPLEMENTATION, TESTING AND RESULT

4.1 IMPLEMENTATION:

This system was built using the simple programming language Java and Android SQLite Database for the database. The system has both front-end which is accessed by both the users and administrator (anyone) and back-end which can only be accessed by an administrator.

4.1.1 HARDWARE/SOFTWARE USED

A laptop core i7 was the only hardware I used for this project. I used Android studio and Android SQLite for the software I needed for the success of this project.

I opted for the language Java since it has high-performance applications for the widest range of computing platforms possible. It can also be used in any operating system such as Linux or Windows.

4.1.2 IMPLEMENTATION LANGUAGES

I made use of the language Java exclusively for the whole project.

- Java

This is a programming language commonly used in app development. It is an object-oriented, high-level language that is concurrent and class-based. It was developed by Sun Microsystems in 1995. As of 2019 Java was the most popular programming language according to GitHub.

Java language makes use of Java fundamentals like classes and objects and its other useful features of object oriented programs. It also makes use of a large number of libraries and can run on different hardware platforms.

I used java language to create different classes for my project for example, I used it to create the class “Trucks” which then contained objects which included the different types of trucks available for order.

- Android SQLite

This is the most preferred way to store data for android applications. I therefore used it for my database and to store user’s information.

4.2 HOW THE SYSTEM WORKS

All of the user of the system must have an account for them to access any services being offered.

The below diagram is a model of the home-page before creating an account.

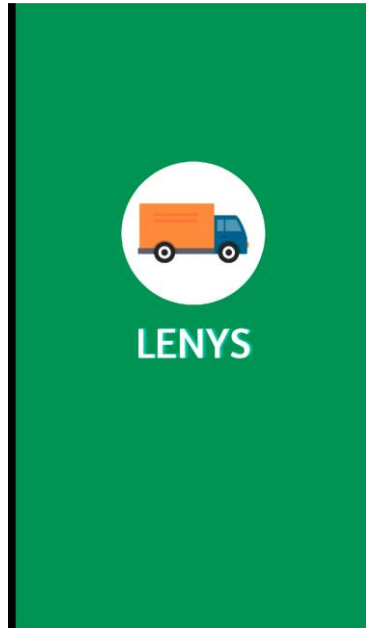


Figure 6: SCREENSHOT OF THE HOME PAGE BEFORE CREATING AN ACCOUNT

4.2.1 SYSTEM MODULE

Customers of the system will interact with the home page after creating an account and logging in. The home screen will include a map of the estimated area of the customer. It will also include a menu tab that allows the user to access their profile. Under the menu bar, their will include; previous trips if any, a wallet where one can store their money to use in their next trips, support which will include a chat bot and a website where any frequently asked questions are answered.

Below is the screenshot of the home page.

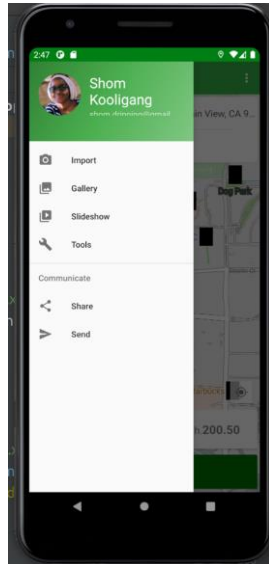


Figure 7: SCREENSHOT OF THE HOME PAGE AFTER CREATING AN ACCOUNT

4.2.2 ADMINISTRATOR INTERFACE MODULE

This includes everything back-end which can be accessed by the administrator and not the users.

4.2.3 HOW THE BACK-END WORKS

The back-end is the part of the system only accessed by the administrators. It pulls every record entered by the users and stores them for future reference. This includes names, numbers, payment cards, trips made and even often input locations. It is here that the administrator may add or remove any elements from the app and make any changes required.

For example, when there is a new truck, the administrator updates from the back-end its existence and users are now able to access them.

4.2.4 KEY DEMONSTRATIONS

Reservation; when a user finds a truck they would like to use and are satisfied, they make a reservation on when they would like to have it and input the trip they would like to make. All of this is displayed on the administrator side and changes are made for example, the number of trucks reduces. A driver is also assigned the trip and the trip is scheduled in the system.

Payment: This is done after the trip is over. Once the trip is over and the driver has finished trip on their application, then using the customers billing method, an amount is paid and the application notifies the system that payment has been done.

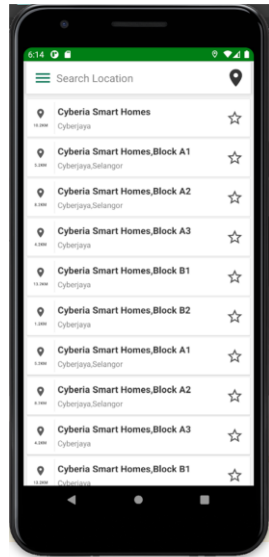


Figure 8: DEMONSTRATION 1

4.3 TESTING

4.3.1 TYPES OF SYSTEM TESTING

For the purpose of this project I conducted the following types of test:

a) Back-end testing

This is testing done to check if the server side of a system is fully functional and up to standard in accordance with the information being fed from the front-end.

I was able to test this by inputting data to the front-end application and studying the patterns on the back-end. I used multi-login to input the data to the database and ensured no error was recorded while at it.

b) End-to-End Testing

This is testing that is done to a system from the beginning to the end to ensure the whole application flow is as expected. It defined the system dependency on each other and integrates every work accordingly. Watching how the data flowed from start to finish of the input gave clarity on the working of the system.

c) Integration Testing

This is a kind of testing where the whole system is treated as one and is tested without breaking into individual units. It's main purpose is to expose faults in the interaction between the two parts of the system ie front-end and back-end. I was able to test all components of the application. This was by registering as both a user and an administrator and checking the reflections on the database.

d) Graphical User Interface (GUI) Testing

GUI testing is a software testing type that checks the Graphical User Interface of the software. The purpose of GUI testing is to ensure the functionalities of software application work as per specifications by checking screens and controls. This ensures the user is not struggling to use the system. I did this test not by myself but by asking for help from a potential user and they confirmed that it was quite easy to navigate the application.

e) Performance testing

This is a testing process used to determine the speed, functionality, and reliability of the system. The functionality includes the response time and it's stability to name just but a few. Although I wasn't able to test this application on an iOS device, I was able to test it in different android devices and the response time and functionality was close to similar due to different android versions.

f) Functional testing

Functional testing is a type of software testing that validates the software system against the functional requirements. I tested whether the app was able to perform it's main function which was to order a truck.

CHAPTER 5: CONCLUSION, EVALUATION AND FURTHER WORK

5.1 OBJECTIVES ATTAINED

5.1.1 To develop a system that connects clients and Truck drivers.

As I started out the research on this project, one of the objectives was to connect clients and drivers anywhere and at any time. This is an objective that has been attained because the users are able to use and access the application at anytime and anywhere.

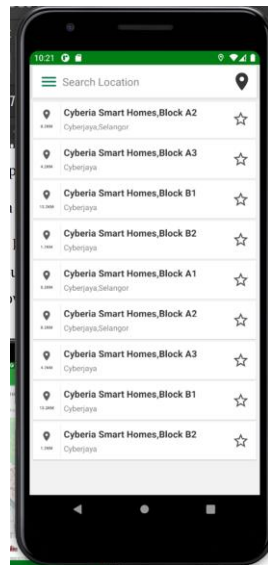


Figure 9: DEMONSTRATION 2

5.1.2 To develop an application that shows live location.

Another objective was to show live location. This feature has proved to work and be available not only for the administrator but also for the user. The application will show our clients where their goods have arrived and how long it will take to arrive at the final destination.

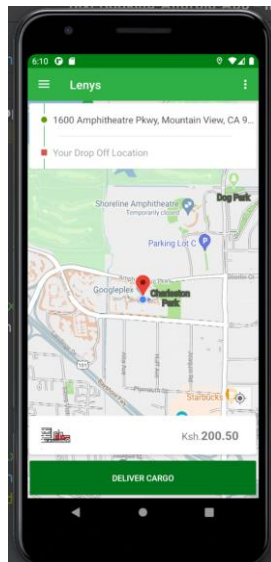


Figure 10: DEMONSTRATION 3

5.1.3 To develop a system that allows users to book a truck

This is another objective that I had in mind while I started this research. It has been obtained because now anyone can sign up and be able to order a truck from wherever they are at any time. As long as one has an account, they are able to interact freely with the application.

5.2 CONCLUSION

In conclusion technology is fast changing and so is our transport systems. Dramatic trends are emerging by the day and soon if we are not aware we shall be left behind. It is therefore time we move with the trends and use technology to ease our lives in every way and everyday.

5.3 FUTURE RECOMMENDATIONS

Future Work;

Expand to other regions in the country since the existing application only works within one county.

Think about the freight back to the station of rest including carrying another set of cargo and how much it will cost.

5.4 CHALLENGES FACED DURING DEVELOPMENT

Incorporating the M-Pesa API to the system. This was difficult task that I unfortunately didn't succeed with.

Android studio errors. I experienced the problem of errors which could almost not be resolved since the code editor didn't give the error reason.

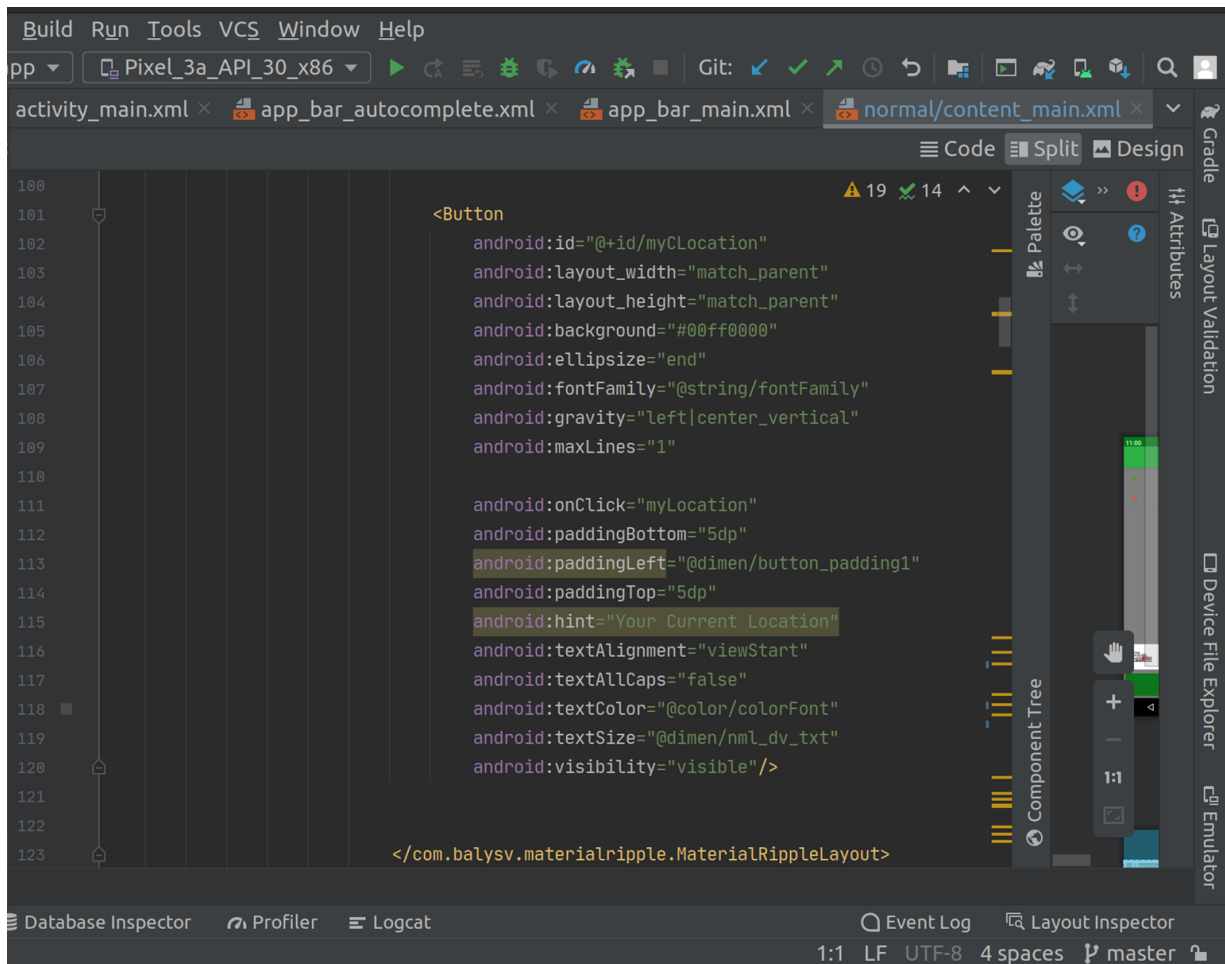
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<Button
    android:id="@+id/myCLocation"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="#00ff0000"
    android:ellipsize="end"
    android:fontFamily="@string/fontFamily"
    android:gravity="left|center_vertical"
    android:maxLines="1"

    android:onClick="myLocation"
    android:paddingBottom="5dp"
    android:paddingLeft="@dimen/button_padding1"
    android:paddingTop="5dp"
    android:hint="Your Current Location"
    android:textAlignment="viewStart"
    android:textAllCaps="false"
    android:textColor="@color/colorFont"
    android:textSize="@dimen/nml_dv_txt"
    android:visibility="visible"/>

</com.balysv.materialripple.MaterialRippleLayout>
```

Figure 11: Code showing the pick-up location

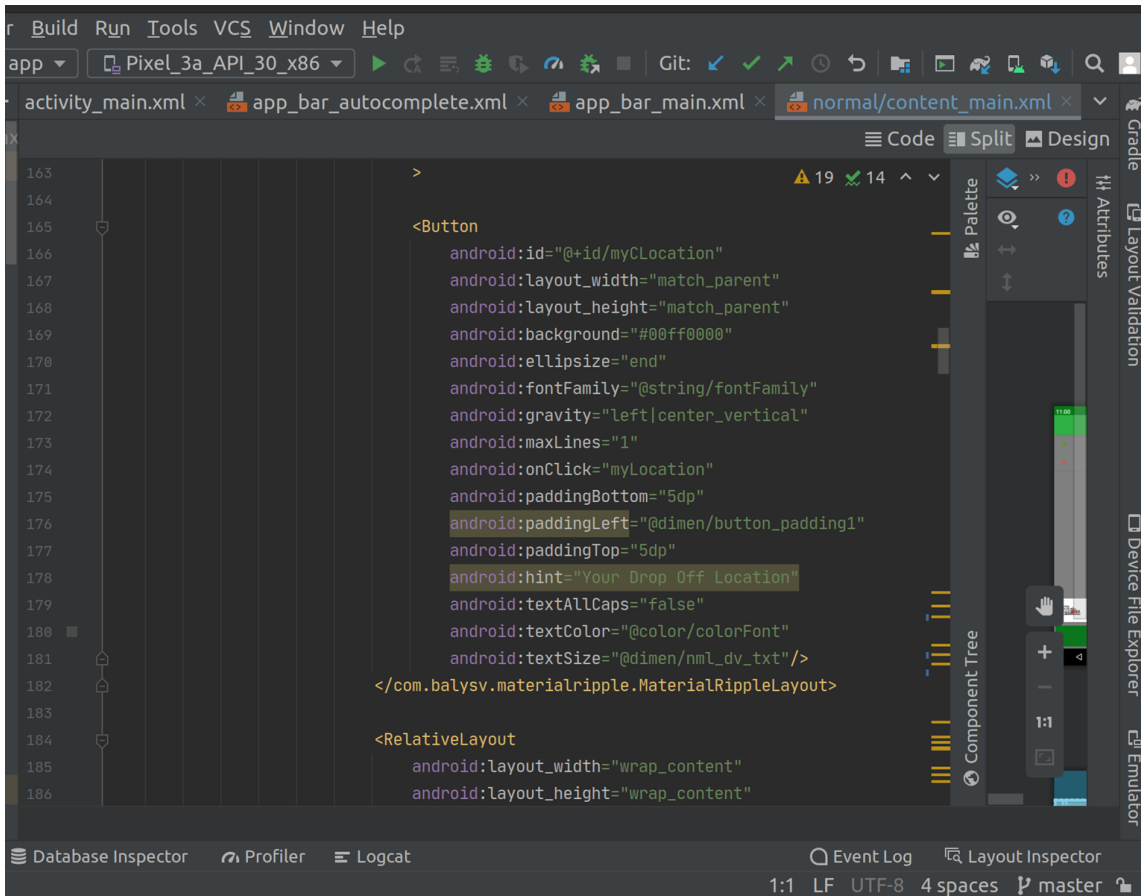


Figure 12: Code showing drop off location

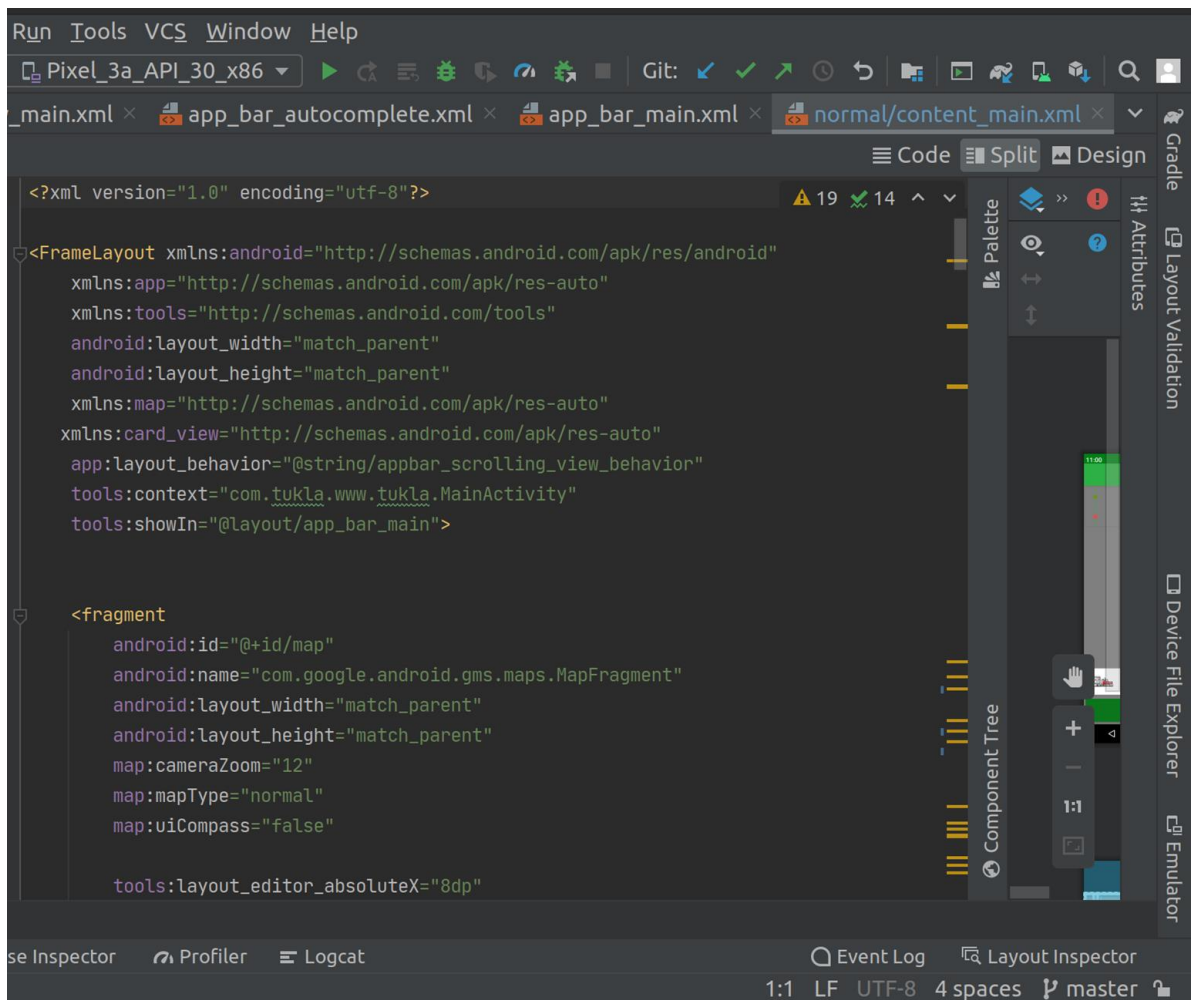


Figure 13: Layout code