A Web Based Application to Provide Online Bidding Platform For Used Government Vehicles:

A Case of Kenya

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Declaration and Approval

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the research proposal contains no material previously published or written by another person except where due reference is made in the research proposal itself.

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Abstract

In Kenya, there is wastage of resources by our government which may be utilized by the public sector if an opportunity to do so arose. Resources such as government vehicles, which are bought brand new on a termly basis and given to government officials, are usually sidelined when a new term begins and kept in yards upon the arrival of a new administration. The vehicles, which still have high resale value, stay in these garages with their fate unknown.

This project proposes at developing a bidding website which will hopefully reduce such instances by providing the public with another option at acquiring the resources other than importing. When the resources are available to be acquired by citizens, it will reduce the need for the government to overspend on services of such unused vehicles and cut on cost. This proposed solution will also make the disposal of such resources efficient and will provide an additional source of income for the government.

The proposed solution will be implemented by creating of a bidding system that can be incorporated into the official government website, where citizens can visit the site and make bids for the cars they wish. The car will be awarded to the highest bidder and revenue collected. The winner might also receive incentives on insurance for a year or so from the government.

Table of Contents

List of Figures

List of Abbreviations

API- Application Programming Interface

CSS - Cascading Style Sheet

DFD - Data Flow Diagram

ERD – Entity Relationship Diagrams

HTML - Hyper Text Markup Language

JS – JavaScript

KRA - Kenya Revenue Authority

PHP - Hypertext Pre-processor

UML - Unified Modeling Language

Chapter 1. Introduction

1.1 Background Information

In the case of Kenya, when a new government takes over a new term, each of the 21 ministries in the government orders a fleet of high end vehicles for public servants countrywide. As of 2013, the Government of Kenya, started leasing, instead of outright purchasing, vehicles from suppliers such as Toyota Kenya. The Kenyan treasury stated that the leasing program was preferred to encourage citizens to buy locally. This was done to discourage import of second hand vehicles from abroad by circulating existing cars within the Kenyan car sector (Olingo, 2017).

In some instances, vehicles are confiscated from senior judges, magistrates or public servants after their withdrawal from office. Such vehicles are usually kept in junk yards under the sun awaiting clearance which might take years to come. In this state some of the vehicles get damaged and are unusable once they are finally cleared off the government books, and they command a high maintenance and repairing costs. This however, can be avoided by selling the cars to the public for use at the earliest available opportunity and cut on repair costs

Eventually the cars get sold but in a poor state compared to when they were decommissioned from their respective ministries. It is then up to the various ministries upon which each vehicle is registered to bid them off to the public. Most ministries contract different bidders or in some cases banks to bid them off. This however causes low sales and low price bidding because there is no centralized bidding place. A report in 2014 occurred when such cars were selling for as low as 18,000 Kenyan Shillings (Karanja, 2016).

In previous years, public communication, mainly newspapers, have been used to advertise the auctions from the government in advance to prepare for the auctioning process at Milimani Law Courts. This means of communication is still being used as of the last public auction. Though effective, this means of communication is not far reaching to the younger car enthusiasts interested in such deals.

The proposed project therefore tries to address this problem by firstly providing an efficient and quick lay off plan compared to existing bidding solutions. The plan is to integrate all solutions and come up with one marketplace where those interested in such vehicles can easily access them. This all of the bidding process into one website that can be embedded into the official government website with sections for all ministries. This will be beneficial as it will pull a larger audience into centralized place and therefore increasing the value of them. This will lead to these cars being offloaded from the yard quicker and cut on cost of maintenance being incurred onto the taxpayers.

1.2 Problem Statement

The current systems imposed by the Kenyan government to drive reuse of government vehicles after a new term is non efficient. Though biding is the most common method used, the government mostly relies on physical bidding techniques to lay off such resources. This solution however does not provide an efficient way of biding for these vehicles, and henceforth it drives away a lot of potential bidders.

The manual bidding process is tiresome and requires a reschedule of one's daily activities as most auctions are done on working days. This causes a low turnout and makes the cars sell below the set reserve value.

1.3 Objectives

The general and specific objectives of the proposed solution are:

1.3.1 General Objectives

Our objective is to develop a web application that brings together interested customers into one efficient marketplace where they can buy used government cars.

1.3.2 Specific Objectives

i.   To investigate how bidding has been in the past.
ii. To analyze how existing systems tried to solve the bidding process of used government cars.
iii. To discuss the problems that current solutions face.
iv. To develop a system that will ease the bidding of used government cars.

1.4 Research Questions

i.   Has bidding been done on such cars and how has it been done.
ii. How have the current solutions tried to solve the problem.
iii. How does the proposed system compare to the existing systems.
iv. How will the proposed system be tested and validated.

1.5 Justification

The purpose of this project is to reevaluate the process involved in acquiring ex used government cars by the public citizens. While other platforms exist for this purpose, (Car Duka Corporation, 2021), there is a lack of direct government to citizen exchange through its official platforms. This causes the ministries to announce these auctions on newspapers and hire auctioneers to handle the bidding process. Each ministry hires their own auctioneer and organizes various dates for the auctioning which can be tiresome for interested individuals.

In Kenya, approximately 85 percent of the population is covered by 3G or higher signal which has directly led to increase in technological advancements (Ngila, 2020). This power has enabled a lot of individuals to connect to work stations in another county online, or even competitive bidding of goods online via apps BidPesa. This system can also be extended into the car bidding or purchasing sector. Therefore, the proposed solution is aimed at creating an efficient online experience of bidding used government vehicles by interested individuals.

1.6 Scope and Limitations

This project focuses on creating a web application that will help in bidding of vehicles delisted from the government roster. The project covers the problem of the delayed lay off of used government vehicles in Kenya from 2013 to 2021 to potential public buyers, and it aims at combining the resources of all ministries into one website and create a bidding system for them with an administration page that will allow for monitoring of the webpage and a user module for placing bids on listed bids.

A limitation of the project is that it might be vulnerable to cyber-attacks as rising technological advancements are made in the country. This is due to the amount and value of transactions projected to be handled on the website on a daily basis. Therefore investment in security architecture might be necessary for efficient running of the system, and gain trust by users.

Chapter 2. Literature Review

2.1 Introduction

This chapter discusses literature review and talks about existing solutions, technologies used in the existing solutions and the challenges faced in the current implementations if any.

2.2 Challenges with the Current Systems

The biggest challenge faced with the current bidding system is reliance on announcements to be made via the various ministries which then contract companies to bid them off. This causes a lack of awareness of such ongoing auctions and therefore low value bids are placed and the cars sell the cheap.

2.3 Related Works

Some of the current technologies solving the current problems are:

2.3.1 Physical Bidding

This is also known as auctioning and is done at a preset date and time by an auctioneer sanctioned by the government to sell cars in their yards. A set reserve value is then set on each car depending on its value, by the two parties, and bidding is done in various warehouses by the attendees. The winner of the bid is then awarded a certificate to confirm their won bid and later paperwork on when to collect their prize. This process however is tiresome and requires prior arrangements in since most auctions are done on weekdays and is therefore inefficient.

2.3.2 Online Bidding

Online bidding is done virtually on a website or a mobile application. An example of an online bidding site is CarDuka (Car Duka Corporation, 2021), which mainly resells savaged or repossessed cars sent to them from banks or confiscated from loan defaulters. Vehicles are displayed on the bidding page with a reserve price and a timer running down to when the auction on each item lasts for. Figure 2.1 below displays the bidding page of car duka bidding website, with some vehicles available for bidding, the reserved amount that they can sell for and contacts of the auctioneer.
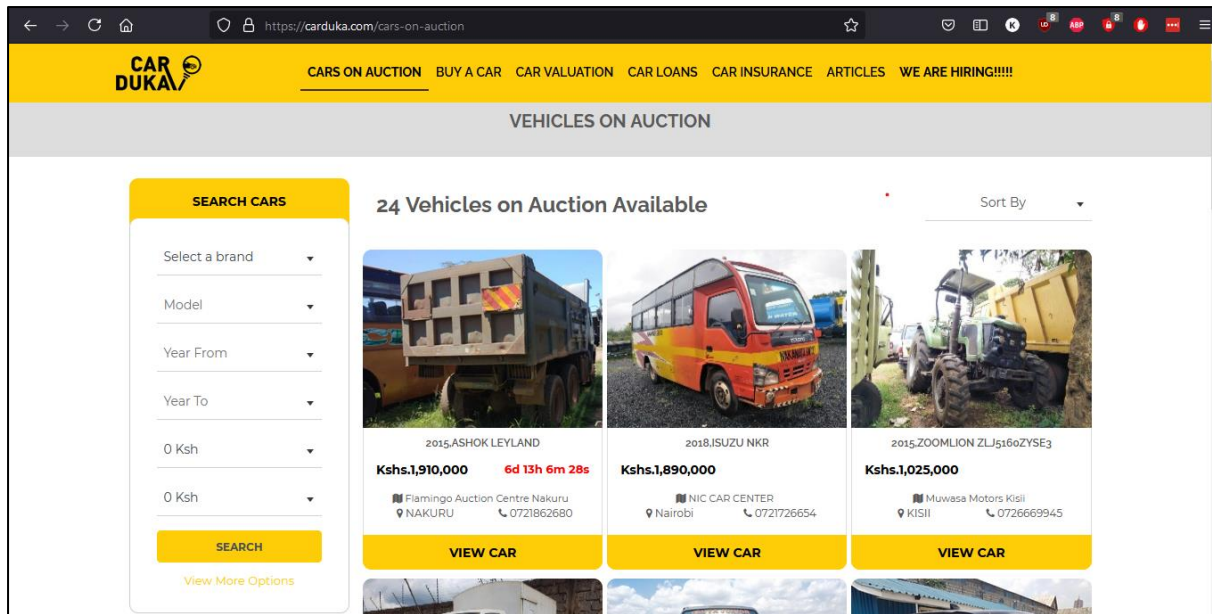
Figure 2.1 Car Duka Bidding Website

Another online bidding platform is Clyde Motors (Inventory, 2021), which sells new or used vehicles of choice available in their inventory. After logging in, listings are displayed on the bidding page with the information of the vehicle and the reserve price set by the company. Figure 2.2 below shows the landing page of Clyde Motors site where you can search for the car model or make to bid for.
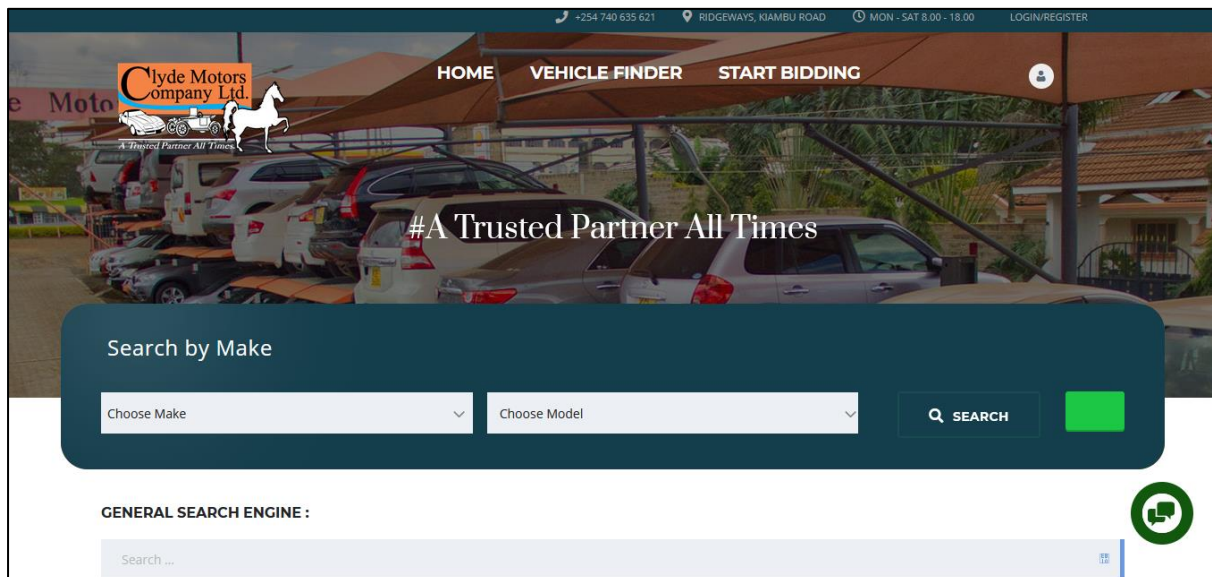

Figure 2.2 Clyde Motors Company Limited Landing Page

Figure 2.3 shows the listings available on the bidding page and the information relevant for each listing. It also has a search bar where you can filter the specific vehicle you are looking for.
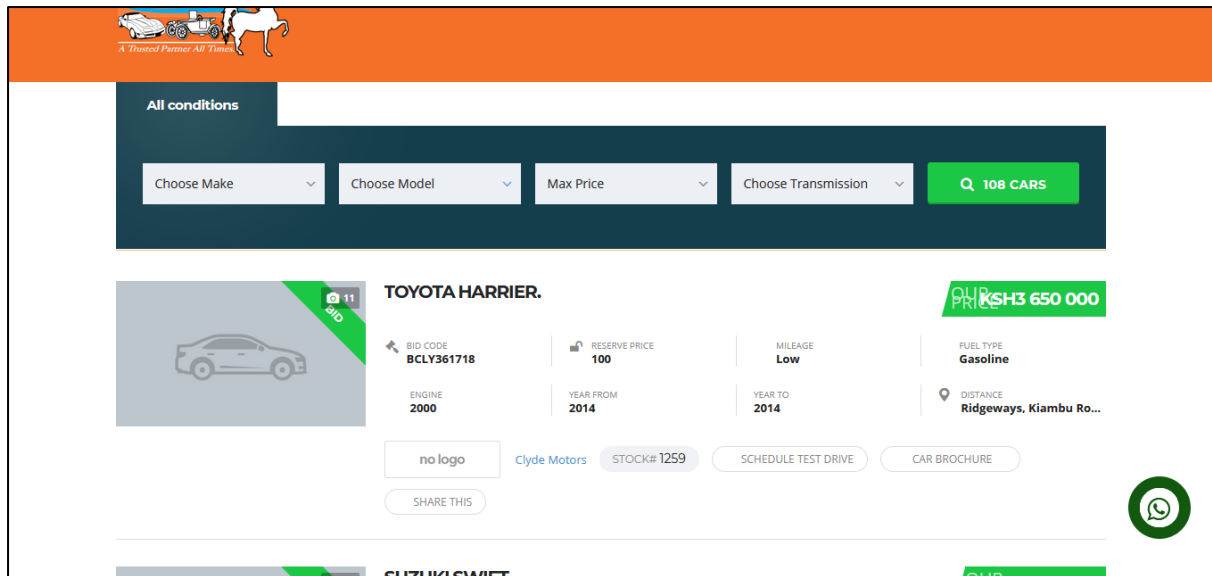
Figure 2.3 Clyde Motors Listings Page

2.4 Gaps in Related Works

One challenge of the existing online solutions is the lack of vehicle registration details. This lack of vehicle information might lead bidders away due to lack of trust in the sites. Some vehicles posted on the sites are repossessed vehicles from loan defaulters. In the case of car duka, as illustrated in Figure 2.1, there is also no way of knowing what stage the bid is in. Information such as current value of the bid is not displayed at a glance. Another issue is the pictures accompanied in the bidding process do not give the bidder a detailed virtual view of the car and thus bidding is done blindly.

Physical bidding on the other hand does not give a user the flexibility that online bidding systems provide, since a bidder has to be aware of the bidding dates and sites via public communication, and reschedule their activities for that situation.

2.5 Conceptual Framework

A conceptual framework illustrates what you expect to find through your research. It defines the relevant variables for your study and maps out how they might relate to each other (Swaen, 2015).

Figure 2.4 shows the conceptual framework used in this project.
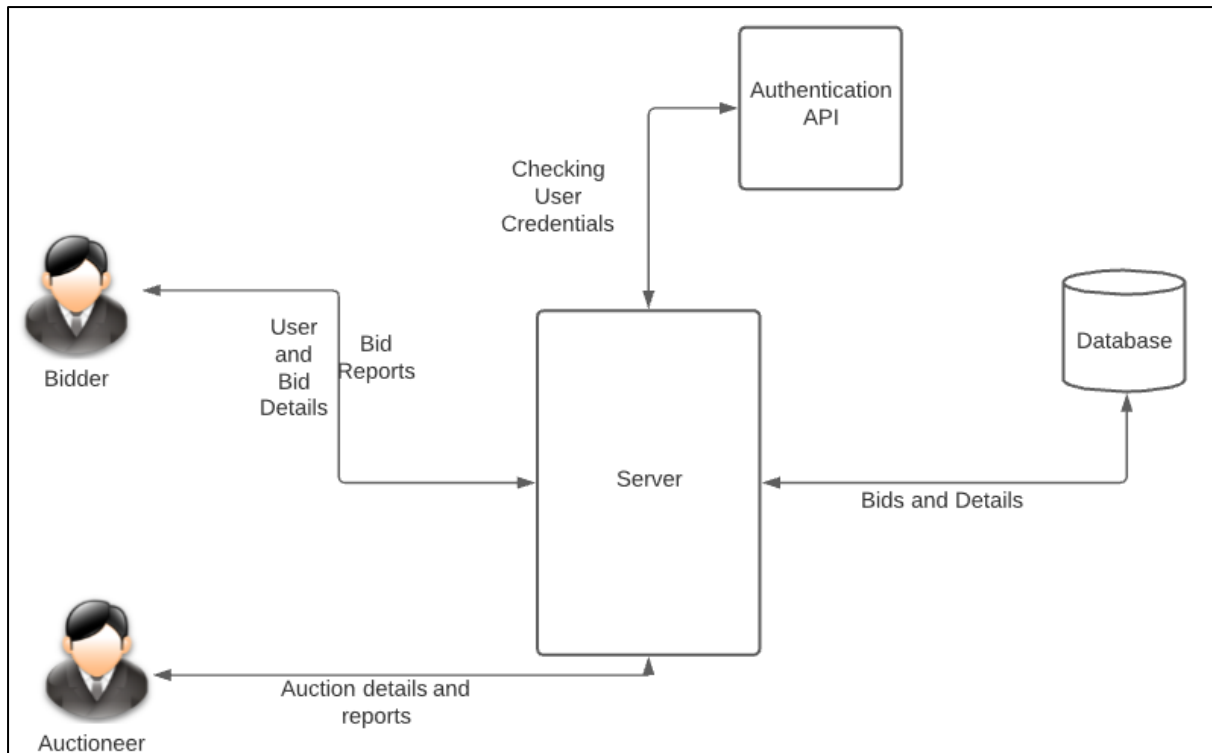
Figure 2.4 Conceptual Framework Diagram

The user or bidder logs into the website and the website authenticates their information using an authentication API for a successful or unsuccessful login attempt. In the case of a successful login attempt, the home page will be accessible and all available cars for bidding will be displayed. Once a bid is placed, the details of the bid and the amount will be stored in a database server and in turn reflect an increase bid amount in real time on the website. The bidding reports and bidder details will also be available to the auctioneer for supervision.

Chapter 3. Methodology

3.1 Introduction

A methodology is a formal approach to implementing the SDLC (Barlow, 2016). This chapter states a basic summary of the methodology that will be used for the proposed system. The aim of the methodology is to ensure that the proposed system will be able to improve the class attendance system. The chapter will cover the following areas: development methodology, justification of the methodology, functional, non-functional requirements and tools and techniques.

3.2 System Development Methodology

System Development Methodology also known as the SLDC is the industry-standard approach to managing phases of an engineering project. Think of it as the equivalent to the scientific method for software development. It includes seven phases that trace a product or project from a planned idea to its final release into operation and maintenance (8 Models of the System Development Life Cylce, 2021).

The project of choice will use the waterfall model which is based on the incremental methodology.

3.2.1 Incremental methodology

Incremental Model is a process of software development where requirements are broken down into multiple standalone modules of software development cycle. Incremental development is done in steps from analysis design, implementation, testing/verification, maintenance.

The incremental methodology is preferred as it is flexible and suitable to use when making web based applications.

Error! Reference source not found. below shows all the steps involved in the incremental method of development.
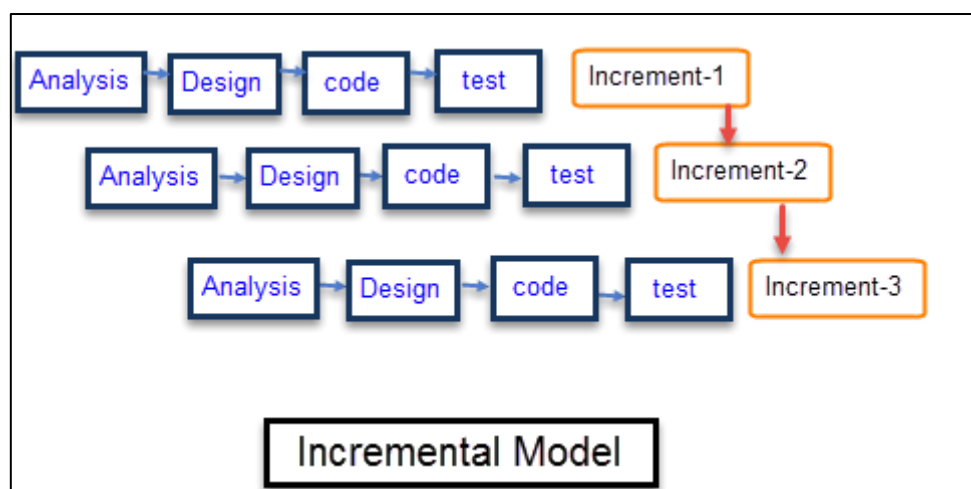

Figure 3.1 Incremental Model of Development

3.2.2 Requirement Analysis

In requirement analysis, the process of defining user expectations for a new project begins. This is the requirements and specification needed for the creation of the software to the user preference, which can be done using the following step:

3.2.3 Design Phase

In this phase the desired features of the system are discussed through UML diagrams such as wireframes, which visually help in laying out the skeleton for the project. User interface models, ERDs and data models can also be designed in this phase for detailed design. This is done to prevent future misunderstanding when coding begins by creating a uniform approach agreed by all parties involved.

3.2.4 Coding Phase

In this phase development of the proposed solution begins to be created using code editors such as Visual Studio and through various languages such as JavaScript, HTML and CSS amongst others. During coding

3.2.5 Testing

The final stage before full deployment is testing, where an assessment of the project is done to the fulfillment of the client's needs. This is done after completion of coding to remove any bugs in the code that can adversely affect the fluid operation of the product.

3.3 System Analysis

The System Structure Analysis Design model incorporates the following diagrams:

3.3.1 Use case Diagram

A use case diagram is graphical example of a UML diagram that shows how users interact with the proposed system. In this project it will be used to roughly demonstrate how various actors interact with each use case within the website.

3.3.2 Data Flow Diagram

A data flow diagram shows the way information flows through a process or system. It includes data inputs and outputs, data stores, and the various subprocesses the data moves through. DFDs are built using standardized symbols and notation to describe various entities and their relationships (Bangerter, 2021).

3.3.3 Logical Database Schema

A database schema is the skeleton structure that represents the logical view of the entire database. It defines how the data is organized and how the relations among them are associated. It formulates all the constraints that are to be applied on the data.

3.3.4 Wireframe

Wireframes provide a clear overview of the page structure, layout, information architecture, user flow, functionality, and intended behaviors. As a wireframe usually represents the initial product concept, styling, color, and graphics are kept to a minimum (JayeHannah, 2021).

3.4 System Design

The diagrams that will be used in illustrating the design of the proposed system are; wireframes, database schema and system architectural diagram.

3.4.1 Database Schema

A database schema is a logical schema that helps in visualization of the database structure for future reference. It represents a logical configuration of a relational database. A database schema helps programmers know how software will interact with the relational database. In this project a database schema would be helpful in providing a clear reference about the tables and fields the project needs.

3.4.2 Wireframes

A website wireframe is a simple black and white layout that outlines the specific size and placement of page elements, site features etc. (Climer, 2021). The design of this project will be based on drawn wireframes for guidance on the website layout throughout development up to deployment.

3.4.3 System Architecture

A system architecture is a plan of the whole system used to understand how different modules communicate with each other. Having a good system architecture also eases the process of removing bugs from the code when testing in the future. The proposed system will use system architectural diagrams to show how various components such as database and browser interact.

3.5 Tools and Techniques

This refers to the tools that were used to ensure that the system will be created in an efficient manner. The IDE used was Visual Studio.

3.5.1 HTML

HTML, which stands for Hyper Text Markup Language, is a standardized system for tagging text files to achieve font, color, graphic, and hyperlink effects on World Wide Web pages. As a scripting language, it is used to render pages on the web (Hayes, 2020). HTML will be used as a basis for the project and will be applied in structuring the website into the desired output based on the wireframes available.

3.5.2 Firebase Server

Firebase is a Google-backed application development software that enables developers to develop iOS, Android or Web apps (Rosencrance, 2019). It provides features such as, authentication, cloud messaging, and real time database, the latter which can be used to store bidding data and display it on screen to the user in real time.

3.5.3 JavaScript

JavaScript, which is known as JS is a lightweight, interpreted, just-in-time compiled programming language. It is a scripting language for web pages is used in creating of fluid user friendly web pages with light code (Docs, 2021). This project will use JS as one of the tools in creating a fluid and interactive web application.

3.6 System Deliverables

The following modules will be covered during the process of development of the proposed project:

3.6.1 Interactive User Module

At the completion of this project, the aim is to create an interactive user module that is interactive and informative for clients. This module will allow bidders to view all listings and be able to bid for any item of their choice with ease.

3.6.2 Admin Module

This is a module is aimed at creating an informative admin side to the website that can be used for data collection if need be. The module will also be able to easily add cars into the system for bidding, and set any relevant information associated with each listing.

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Appendix
Appendix A: Gantt Chart