MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of Higher Education
"South Ural State University (National Research University)"

School of Electronic Engineering and Computer Science
Department of Computer Engineering

THESIS IS CHECKED   ACCEPTED FOR THE DEFENSE
Reviewer,   Head of the department,
_____   Ph.D., Associate Professor
_____ _._._ _____   _____ D.V. Topolsky
"___"_____ 2022 г.   "___"_____ 2022 г.

Development of the electronic vehicle registration system in Iraq

GRADUATE QUALIFICATION WORK
SUSU – 09.04.01.2022.308-643.GQW

Supervisor,
PhD, Associate Professor
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"___"_____2022 г.

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Chelyabinsk-2022

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TASK
of the master graduate qualification work
for the student of the group CE-228
Anas Al-karawi
in master direction 09.04.01
"Fundamental Informatics and Information Technologies"
(master program "Internet of Things")

1.   The topic (approved by the order of the rector from 24.05.2022): Development of the electronic vehicle registration system in iraq .

2.   The deadline for the completion of the work: 01.06.2022.

3.   System requirements:

3.1. wireless-bt4.0 Bar Code Gun 2D Barcode :

- Voltage class 5V .

- Current 135mA .

- Interface USB/COM/PS2.

- Light Source 617 nm LED Aimer, White LED .

- Scanning field 10-500mm .

- Weight 0.354kG.

3.2. C#.net 2019 (c# as a programming language for project implementation and requires .NET framework).

4.   The list of the development issues:

4.1. Develop software that will link by computerization all the procedures of motor
vehicle licensing system in motor license authority (that is, to have a centralized
system).

4.2. To test the site and give examples of how to register on the site and the site is less
expensive and data processing is faster.

4.3. To deploy the vehicle registration site on the Internet.

4.4. Develop a website makes the final information saved in the form of a barcode,
and the QR code device reads the barcode.

5. Issuance date of the task: 25.12.2021.

Supervisor   _____/ *D.V. Topolsky* /

Student   _____/ *A.Q. Al-karawi* /

CALENDAR PLAN

Phase	Deadline	Supervisor's signature
Introduction and literature review	10.03.2022	
Development of the model, design of the system	21.03.2022	
Implementation of a system	04.04.2022	
Testing and debugging of the system, experiments	25.04.2022	
Full text, normative control	16.05.2022	
Proposal defense	24.05.2022	

Supervisor   _____/ *D.V. Topolsky* /

Student   _____/ *A.Q. Al-karawi* /

Annotation

A.Q.Al-karawi. Development of the electronic vehicle registration system in Iraq . –Chelyabinsk: SUSU; 2022, 56 p., 23 pic., bibl. – 23.

This thesis consists of six main chapters: introduction, definition of requirements, design and implementation, publication and testing, conclusion, and references.

In the first chapter, there will be an analysis of the subject area and then we have an overview of analogues and will be presented the main solutions that I will use. All registration websites will be described .

In the second chapter, there is a description of both functional and non-functional requirements as well as a description of how different software components interact with each other.

In the third chapter we describe the design and implementation of the program and how programming languages and databases will interact with each other .

In the fourth chapter we will implement and publish interfaces for both the program and the website .

In the fifth chapter we will have a test, functional and non-functional requirements.

Finally in the sixth chapter we will have a conclusion of the thesis, with recommendations and future improvements .

CONTENTS

Acknowledgements

After praising God and thanked him for the end of this Thesis, I extend my sincere thanks and gratitude to the South Ural State University obtain a master's degree from Of which, and I would like to extend my sincerest thanks and appreciation to my supervisor PhD Dmitry Topolsky for his support guidance, motivations and encouragement throughout the project. many thanks to my friends, who acknowledged me about this opportunity. I also extend my highest words of thanks and appreciation to my father, mother and brothers who instilled in me a love of Science from a young age, and they were credited after God for what I have reached now I have nothing but to pray for them and thank everyone who has extended a helping hand, or his contribution, small or large in the completion of this work, is my sincere thanks and appreciation.

INTRODUCTION

Currently, car registration systems are centralized, and the Department of Motor Vehicles is the only entity with the power to add/alter vehicle data. Individual users have access to their own records, which they may view either online or in paper, but they do not have access to the data of other users. This is a security mechanism that ensures the confidentiality of records and prevents them from being altered by unauthorized parties. However, this diminishes transparency and provides dishonest employers the opportunity to misuse their power by injecting fraudulent data into the system in order to legally register stolen and smuggled automobiles [1].

This is particularly difficult to discover if the car was stolen in one county/country and registered in another. It becomes more difficult as the records age and the car is acquired several times. When a car is reported stolen to the police, an investigation is launched to locate it and identify those responsible.

A motor registration authority in a country issues a vehicle license (also known as a vehicle registration certificate in some jurisdictions) for a specific motor vehicle. For a motor vehicle to be legally authorized to be used or stored on a public road in the jurisdiction, it must have a current license. A license is usually valid for one year and requires payment of an annual license fee before a new one is granted [2].

A vehicle license might be a paper document that needs to be maintained in the car at all times. This might be in the form of an adhesive sticker that is mounted to the vehicle's windshield or shown on the registration plate in some countries [3].

In recent years, there has been an increasing demand to computerize the activities of large institutions, both public and private, in order to improve their overall efficiency. This is accomplished through storing, processing, and retrieving information on a computer, as well as generating reports. These computers use application packages, which are computer programs and manuals that cover all parts of a specific task in order to achieve the goal. It is now universally understood that an

efficient data processing system considerably aids the coordination of all complex tasks of an organization [4].

In today's world, registrations continue online. Online Vehicle License Registration System is a business that aims to develop a computerized system to maintain all the daily business of vehicle registration providing an easy and stress-free way for the vehicle registration, to provide an easy and stress-free method of vehicle registration, to enhance the database of correct information and record keeping. This work is designed Some features such as vehicle information facility, Vehicle registration through which the supervisor can Monitor the entire system and change ownership [5]. This system was developed to assist the car Management to maintain vehicle registration Licensing in the best possible way and thus limiting Stress and manual efforts. programming language used in the development of this C#.Net and MS SQL Server.

As the number of vehicles in Iraq is increasing, there should be a website that registers these vehicles and deals with them electronically instead of manual registration that takes a lot of time and momentum in registration sites. It offers new and innovative ways for humans to cooperate, communicate and interact. Although data has received most of the attention in embedded systems, the integration of vehicle registration with embedded computer applications provides a flexible means to provide human interaction, communication, and control.

Vehicle registration, when implemented correctly and with respect to convenience, price and human factors, may provide a more diverse user interface at a lower cost than traditional methods such as printing information for persons wishing to register the vehicle or transferring ownership of the vehicle from the person of the seller to the buyer.

There are many advantages to the new registration and transfer form for the vehicle system.

• electronic vehicle registration is generally useful for all citizens, especially when epidemic diseases appear when it is difficult for many citizens to register or transfer vehicles. For example, it may be very convenient to use an electronic registration site;

• vehicle registration in the classic non-electronic system is a waste of time and you need to make hard copies of the person and car information, and also when you forget any of the required papers, you need to postpone for another day, while when you are alone at home and fill out the registration form two electronics may save a bug Yourself time and also have at any time that you can listen and respond without using complex commands;

• electronic vehicle registration can reduce the number of employees working in the traffic department, as the employee working in the traffic department must enter the information of the citizen and the car into the computer, while when the registration is electronic, the citizen himself registers his information on the sites and after completing the registration, he takes a special barcode With the information and he has to go to the traffic department, the traffic officer only needs to direct QR code readers to read the barcode of the citizen.

Many countries have also converted the vehicle registration system into a website into databases and a template for their country. This service, we think, can extract car fines and complete information on the vehicle, and the fines fees can be paid and the ownership of the car transferred electronically, through a website specific to a country and a traffic department. But in this project, I will develop this system, for example, in Iraq, there is only now, where Iraq registers cars and transfers ownership in the old complicated ways, which is to go to the traffic department. The calculator takes a long time in this transaction, while in this project only the person enters the private website and enters the information in two electronic forms and after completing the filling of the information and all the required things, a barcode will appear to him, and when he

goes to the traffic circle and gives the barcode of the transaction, he will The traffic officer will decode the transaction barcode using a QR code device and after that he will print his card.

The purpose of the research:

To create a site for the registration and transfer of vehicles is the purpose of the qualifying work. To achieve the purpose, it is necessary to solve a number of tasks:

- develop software that will link by computerization all the procedures of motor vehicle licensing system in motor license authority (that is, to have a centralized system);
- to test the site and give examples of how to register on the site and the site is less expensive and data processing is faster;
- to deploy the vehicle registration site on the Internet;
- developing a website makes the final information saved in the form of a barcode and using the Internet of things the QR code device reads the barcode.

1. SUBJECT AREA ANALYSIS

The Internet is changing the way businesses are conducted and is also changing how traditional government services are delivered. E-Government, or the use of technology by the government to deliver information and services, allows for major gains in customer service while lowering staffing costs and related expenses. E-Government allows citizens to interact with government agencies using a self-service model, allowing access to information and services 24 hours a day, seven days a week, without the need for additional customer service workers or extended hours of operation. The E-Government movement, however, is delivering on its promises. Have online government services actually cut headcounts and increased operational efficiency[6]. This article investigates the influence of e-government projects by looking at the outcomes of putting online services and interactive tools in place .

To benefit from vehicle registration is to reduce consumer time in the old system. Software that connects all of the procedures of the motor vehicle licensing system in the motor license authority in the current online motor vehicle registration system and introduces a better system, which is a computerized system with access control based on roles in the organization and implemented using QR code mechanisms, which will contribute to providing solutions to the current system's problems [7].

Computers play an important part in human growth because they solve some of the most complicated problems that humans confront and analyze large amounts of data in a short amount of time or at breakneck speed. In most of our businesses, the recent emphasis on information and data processing has increased in an undesirable way, as in the case of motor vehicle license and plate registration. While motor vehicle registration has been for a long time, the previous system of registration was in use, which did not have a substantial impact on highway safety until the introduction of a new system of vehicle registration that uses reflective sheeting that is easier to read even in the dark .

This thesis will argue that implementing a web-based solution based on government business using expert systems technology is a viable and promising choice. The simplicity with which this can be done is primarily determined by the development environment's accompanying tools. The prototype system we created enables for the deployment of many platforms, each with its own set of rules. Our contributions to expert system research include a modular rule-base design strategy for future legislative changes, a method for mining rules from legacy codes, and flexible publishing of rules-serving software.

1.1. OVERVIEW OF ANALOGUES

1.1.1. EVREG

The FCT Directorate of Road Traffic Service (DRTS) and the Taraba State Board of Internal Revenue (BIR) developed eVReg for car registration. It is an internet real-time alternative that arose from years of research and development aimed at finding solutions to problems faced by the general public, such as car registration and licensing, and the need to help the government manage its receivables while also emphasizing the importance of providing services to its citizens (eVReg, 2018).It assures comprehensive car registration by requiring the entire process to be completed in a single electronic step. This system does not use biometrics to secure information, nor does it include a way for detecting fraudulent ownership changes [8].

The Web was created to support eVreg's usage of the public internet infrastructure. It's a web-based automated solution built with cutting-edge technology and a top-notch security system.

Advantages of the Solution Using e payment for online transactions to implement a cashless system. By adopting an integrated intelligent system that cannot be broken since each motor vehicle has a unique identifying code, falsification of vehicle documents is eliminated.

As all transactions must be completed within a computerized one-stop shop, full car registration is ensured. A legitimate insurance policy issued by a reputable insurance company. Because the proceeds of the procedure flow directly to the accounts of the various levels of government involved, there is no loss due to fraud. As an online solution, it is enlightening and inquisitive to the common motorist, thereby breaking the illiteracy barrier in the country.

If you haven't received your renewal notification, go to the BMV website and request a Quick Quote. Fees are determined by a number of criteria, including: The

one-time registration cost is: A normal passenger automobile costs $21, whereas trucks cost $30 to $1,692, depending on their weight [9].

1.1.2. UTAH DMV

Division of Motor Vehicles, most vehicles are issued with two license plates to be displayed at the front and rear end of the vehicle. Exceptions to this rule are motorcycles and trailers, which only require one rear license plate. License plates are used for identification purposes and provide law enforcement a means to locate the vehicle owner through DMV records. Just like in other states, most vehicles are issued with two license plates to be displayed at the front and rear end of the vehicle.

This is of course with the exceptions of motorcycles and trailers, which only require one rear license plate. License plates serve as the official and only "name" of the vehicle and shall be indicated in all transaction forms and documents to conveniently identify it. License plates provide law enforcement agencies a means to locate, identify and trail the vehicle owner through DMV records if the need arises [10].

What You Need When Transferring Vehicle Ownership:
- original Title Certificate;
- duplicate Title Application Form TC-123 (alternative to title certificate);
- Utah Title Application Form TC-656 (for new owners);
- Safety and/or Emissions Inspection Certificates (if applicable);
- other Ownership Documents (if applicable);
- lien Release (if applicable);
- payment for applicable fees (varies).

Other requirements may be demanded if the vehicle is leased:
- power of Attorney (from the lessor);
- billing Statement;
- Utah Sales Tax Number.

The Utah DMV is adding more and more services online so that you can get things done without having to visit a physical office for an appointment at all. You can renew your vehicle registration, replace your license, and more online. The main reasons you would need to visit the DMV Office in person are that you just moved to the state, are getting a license for the first time, or registering a new car. Other than that, you should be able to complete your business from home [11].

You can expect to pay the following when renewing the registration for a passenger vehicle: A vehicle that is less than 3 years old has a $150 registration fee. A vehicle that is 3 to 6 years old has a $110 registration fee. A vehicle that is 6 to 9 years old has an $80 registration fee [12].

Do you have to renew your vehicle registration in Utah every year?" Almost always, the answer is yes. For passenger cars and motorbikes, however, a 6-month option is also available. You'll spend even less upfront, but you'll have to remember to do the chore more frequently [13]. You cannot register a car without insurance in Utah [14].

1.1.3. AUTOREG

Courteville's first e-business solution project is the AutoReg Vehicle License. It is the automation of the vehicle license registration and renewal system, which is aimed to make it easy and quick for all vehicle owners in a state to register or renew their licenses.

Vehicle licenses must be renewed every year, and they allow the vehicle owner to operate on Nigerian roads for that time period. It was created to display the car owner's information as well as vehicle information[15].

Over fifty thousand (50,000) examples of number plate duplication have been found and cleared out in Lagos State alone since the start of AutoReg. The AutoReg Vehicle License platform has the following intrinsic advantages [16].

- establishing and maintaining a reliable data base, as well as providing accurate information on the number of automobiles in the state;

- the income of the states where the business solution has been implemented has more than doubled;

- renewal of a valid driver's license may be done quickly and easily.

In the case of stolen automobiles, the business solution approach was able to curb criminality.

Vehicle registration and licensing costs between $60 and $72 at the moment. The cost of renewal ranges from $24 to $31. However, the Lagos State government is about to raise the fees for both new registration and renewal, with new registration costing $250 and renewal costing $72 [17].

By comparing the analogues EVREG, UTAH and AUTOREG a vehicle registration system observed the difference in prices and speed in the completion of registration in these systems and discovered weak points of these systems and this helped me to build a special system that is complementary to these systems .

When comparing analogues EVREG, UTAH and AUTOREG each of these services is quite similar in their offerings ,but different in performance.

Since all the systems are the main goal of helping governments in the management of their dues with the importance of providing services to their citizens . We find in the system of isotopes EVREG, UTAH and AUTOREG where the use of electronic payment for transactions over the internet and this feature is considered a similar Wicker in the systems, but in terms of identification of the vehicle panel did not find it in all systems where we find it in the system UTAH but did not find it in two systems EVREG and AUTOREG.

These systems help governments to establish and maintain a reliable database that provides accurate information on the number of vehicles in the country . Where he helped the state to know the state of the stolen vehicle where these systems solve the

work of the ability to curb crime . Fifty thousand (50,000) examples of dual license plates have been found in Lagos State alone since the start of the electronic registration system. Fifty thousand (50,000) examples of dual license plates have been found in Lagos State alone since the start of the electronic registration system UTAH .

But when looking at these isotopes we find that the registration of new vehicles and transfer of ownership of vehicles differ from the other system in terms of price where we find in the system EVREG ranges from $30-21 we find that the price of registration of the usual Vehicle $21 while the price of trucks 30 .While we find in the system UTAH cost of registration of vehicles ranging from $150- 80 ,the cost price varies according to the model of the car where if the age of the car less than 3 years the cost of registration $150, but the age of a car between 3-6 the cost of registration $110 and so when the age of the car between 6-9 years the cost of registration of the vehicle $80 . The vehicle must be registered every year and this is special for vehicles and motorcycles .

System AUTOREG the cost of registration of vehicles with a license ranges to $72 at the moment . The cost of renewal ranges from $31-24, but this cost is about to raise the registration fee and renewal cost $250 and turn the cost of renewal $72 .

Table 1 – Comparison of analogues

Feature	EVREG	UTAH	AUTOREG
payment for online	Yes	Yes	Yes
Automatic Number Plate Recognition	No	Yes	No
Establishing and maintaining a reliable data base	Yes	Yes	Yes
Cost Rate, $	21-30	80-150	60-72
Country	Taraba territory	Utah State	Nigeria

1.2. ANALYSIS OF THE MAIN TECHNOLOGICAL SOLUTIONS

Our system is designed to maximize user experience,moreover our system differs from existing systems in the following ways:

1.2.1 Wireless-bt4.0 Bar Code Gun 2D Barcode

I will use the barcode reader to be an integrated program as well as to be more sophisticated and easier to use. At first I will explain to him the work of barcode readers in general form and then there will be importance in my project since QR codes place information on an object.

QR code is a two-dimensional (2D) code invented by Japanese Denso Wave Company in 1994.In the international standard ISO/IEC-18004:2015, the QR code is defined accordingly. The QR code is generated by the black and white modules according to certain coding rules. It is mainly composed of functional patterns and an encoding region.

Figure 1 – QR code is a two-dimensional

Quiet zone, position detection patterns, and their separators, timing patterns, and alignment patterns are all part of the functional patterns. Format information version information, data and error correcting code words are all included in the encoding region format.

In every orientation, a QR code contains three position detection patterns with a black and white module ratio of 1:1:3:1:1. There is no comparable characteristic in other areas, allowing it to be readily identified [18]. For firms that need to handle forms, document scanning software is the best option for increasing efficiency.

This program scans, processes, and transmits data from driver's licenses to car registrations without the possibility of human error and in a fraction of the time it takes manual data collectors. When you consider how much time and money it saves on a routine chore, you will realize how valuable it is. No more squandered staff hours, erroneous data from papers, or concerns regarding document processing.

Each project is designed the most important goal is to reduce the cost and lengthen the work when the research in isotopes has been reached the work of the project is linked in the Internet of things so that the vehicle registration information is collected when completing the registration form through a special site and after filling the form fully and making sure of the information is given a special barcode of information to get rid of printing the information on paper and when going the traffic the special employee records the information and this is a waste of time as well as a delay in the completion of the information where only in Iraq per day goes about a thousand people[19], Between the vehicle conversion and the registration of the new vehicle,so this program will help citizens as well as the Department of vehicle registration in the speed of conversion and registration of vehicles only the citizen needs to show his barcode box and the vehicle registration officer deciphers the barcode through the QR code.

Table 2 – Advantages and disadvantages of Barcode

Advantages of Barcode	disadvantages of Barcode
1. With the aid of barcode scanners, it is possible to capture real-time data precisely and quickly. 2. It allows for faster data entering with fewer mistakes. 3. It's a tried-and-true technology. 4. It is more affordable. 5. It is smaller and lighter than RFID tags, and it is simple to use.	1. To decode a barcode, a specific instrument called a barcode scanner is used, which emits light and gathers reflected light. 2. A barcode scanner or reader connects to a computer or a point-of-sale terminal. 3. Barcodes do not have the ability to read or write data. 4. It necessitates scanning along the optical line of sight (LOS). 5. It is time consuming since each item must be scanned separately.

1.2.2 SQL Server

Microsoft launched SQL Server, a data engine. It provides a platform for creating and managing databases. It enables safe and effective storage. It includes additional components and services that assist the business intelligence platform in producing reports and analyzing data[20].

A new Big Data Cluster feature in SQL Server 2019 allows users to connect SQL Server, HDFS, and Spark containers together. Column store index builds, rebuilds, and static data masking are also new features in SQL Server 2019. Another new feature is Accelerated Data Recovery, which executes and undoes a redo phase in the oldest page log sequence number.

This is done, for example, in the instance where a user stops a program that has been operating for a long time so that the user does not have to wait long for the application to close. Always On Availability Groups, which debuted in SQL Server 2012, have been updated to make management of availability groups easier. MSDB and Master system databases are now supported. Other enhancements include the ability to conduct more operations with Always Encrypted data; new Polybasic connections for SQL Server, Oracle, MongoDB, and Teradata; more persistent memory storage choices; and improvements to Query Processing.

The SQL statements may be classified into the following groups:

1) Data Definition Language (DDL): DDL is a programming language that is used to design databases, data types, data structure, and restrictions. The following are examples of DDL statements:

- CREATE: This command is for creating a new database object;
- ALTER: This command is used to change database objects;
- DROP: This command is used to remove objects.

2) Data Manipulation Language (DML): DML is a programming language that is used to alter data in database objects. The following are some DML statements:

- INSERT: This command is used to add a new data record to the table;
- UPDATE: This command is used to change an existing record in a table;
- DELETE: This command is used to remove a record from a database.

1.2.3 C#

C# is a type-safe object-oriented programming language that allows developers to create a wide range of secure and reliable programs that run on the.NET framework. Windows client applications, XML web services, distributed components, client-server applications, and database applications may all be created by the user.

Encapsulation, inheritance, and polymorphism are all supported in C#. For memory access, C# allows pointers and unsafe code. The interoperability capability is

supported by C#. It assists the user in doing all tasks in a manner comparable to that of a C++ program.

The class libraries were initially built using a managed code compiler system called "Simple Managed C" during the development of the.NET Framework (SMC). Anders Hejlsberg assembled a team in January 1999 to work on a new language dubbed Cool, which stood for "C-like Object Oriented Language" at the time. Microsoft contemplated maintaining "Cool" as the language's final name, but decided against it due to trademark concerns [21]. The language had been renamed C#, and the class libraries and ASP.NET runtime had been translated to C# by the time the.NET project was formally revealed at the Professional Developers Conference in July 2000.

1.2.4 CSS

CSS is a standard defining the presentation of documents written in HTML. CSS is a separate language with its own syntax. With its help, the appearance of the site is built. At the same time, the amount of work is significantly reduced, because you can change the appearance of the entire site by changing just one table. The browser uses our style sheet when displaying the page[22]. A style is a set of rules that apply to a hypertext element and determine how it is displayed. The style includes all types of elements design: font, background, text, link colors, margins and the location of objects on the page. A style sheet is a collection of styles applicable to a hypertext document

1.2.5 HTML

Hypertext Markup Language is an acronym for Hypertext Markup Language. It's a markup language that's used to create web pages. HTML is a markup language that combines hypertext with markup. The term "hypertext" refers to the connection between online pages [23]. The text document within the tag that specifies the structure of web pages is defined using a markup language. This language is used to annotate (add notes to) text so that a computer can comprehend it and alter it appropriately. The

majority of markup languages (such as HTML) are understandable by humans. Tags are used in the language to specify what type of text processing is required.

Advantages:

- websites are built using HTML;

- all browsers are compatible with it;

- it may be combined with other languages such as CSS, JavaScript, and others.

Disadvantages:

- only static web pages may be created with HTML. Different languages must be utilized for dynamic web sites;

- develop a simple web page, a significant amount of code must be written.

1.3. CONCLUSION

When looking at systems similar to the vehicle registration system, the solutions of the most important problems are the cost of the systems, although the use of programming languages are less expensive and the same output required.

The system is supplemented by the addition of qr code instead of uploading information to the internet and getting a delay in searching for the information loaded only people enter the site and complete the information and then take the barcode of the transaction and when you reach the place of registration of vehicles and the barcode is deciphered by the qr code device people's information is opened in full .Been using language programming c#, Database SQL Server and device qr code.

2. DEFINITION OF REQUIREMENTS

The following basic components are required to implement the project objectives:

● a database that stores vehicle registration location data, such as MS SQL in order to save Person Information, complete vehicle information and other information;

● the language of the program will be one of the most important requirements because it designs the structure of the site, such as ASP.Net C#;

● an electronic device that benefits from being used in the system that decrypts it, such as a QR code because it offers fast readability and a high storage rate;

● the website allows people to enter to complete the process of registering the vehicle and personal information such as HTML where we only need to deal with HTML Code and Css Styles using bootstrap.

2.1. FUNCTIONAL REQUIREMENTS

The system provides the following list of participants:

Manager who is responsible for approval, data entry operator who is responsible for checking information ,system administrator who is responsible for entering persons information and modification and finally customers who intend to register the vehicle as well as transfer ownership, Scheme showing owners of vehicle registration service See (Figure 2).

It turns out the following list of actors:

● Boss:
  ● read a vehicle registration (new, transfer);
  ● approval to complete a vehicle registration (new, transfer);
  ● reports.
● Data entry operator:
  ● verify the integrity of the registration information (new, transfer);
  ● (create, read, update, and delete) vehicle registration (new, transfer).

- System administrator:
  - (create, read, update, and delete) users;
  - (create, read, update, and delete) settings.
- Customer:
  - Create a new vehicle registration form;
  - Create a vehicle transfer registration form.
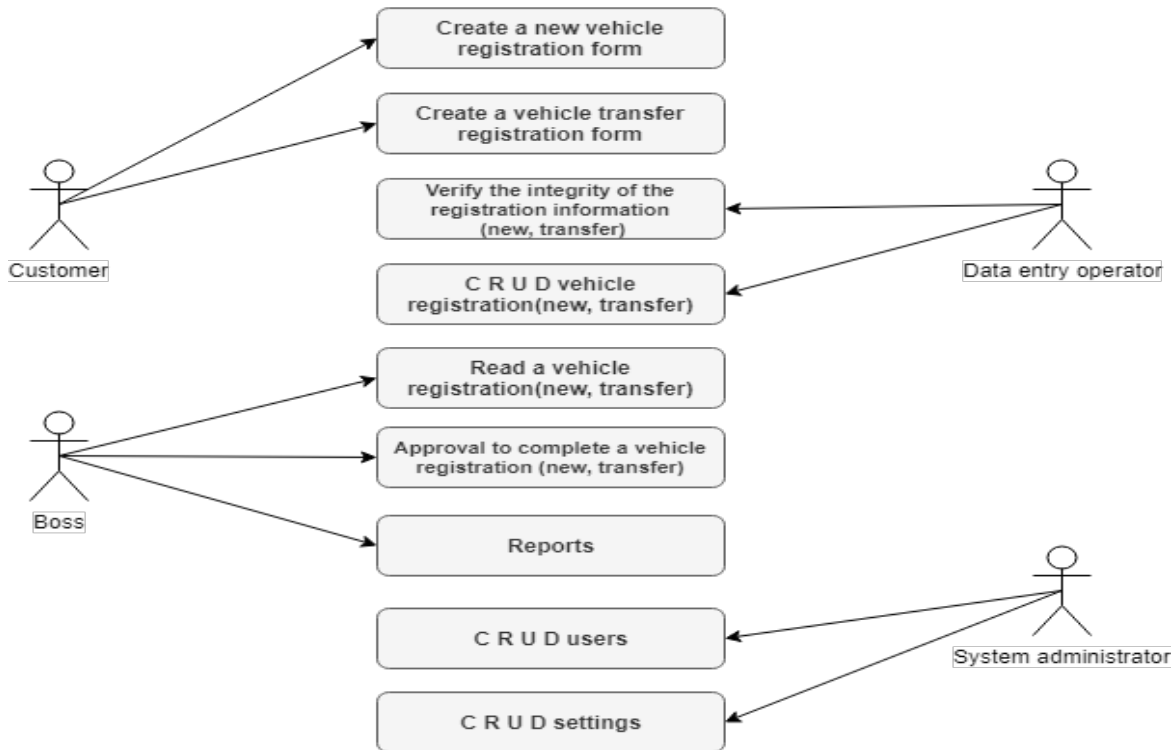
Figure 2 – Usage diagram Vehicle registration system cases

2.2. NON-FUNCTIONAL REQUIREMENTS

2.2.1 User interface

- for the convenience of the user, you need to develop an interface even an inexperienced user will understand. Everything should be easy and understandable for everyone;

- the user interface must be in English and Arabic .

2.2.2 documentation requirements

The database must contain information such as the person's photo, place of residence, type of vehicle, color, type, chassis number, etc.

2.2.3 program part requirements

- data processing for operation in the program should not be Visible to the user;
- change the vehicle information settings in the program by the system administrator;
- there must be a search feature on the vehicles registered in the program by the system administrator;
- a second program must be linked to the central computer of the traffic department to be complementary to the website in order to provide more secure vehicle information;
- the ability to enter new vehicle information and transfer ownership not only through the site, but must have the property of directly entering the place of registration of vehicles by the system administrator;
- the work of the head is very important in verifying the information of vehicles and people and gives the final approval on the registration of vehicles;
- add a barcode reader feature. The system administrator reads the barcode by QR-code device, which is a complete information about the vehicle and people in terms of registering the new vehicle or transfer of ownership,which was declared on the website previously.

2.3 CONCLUSION

In this chapter, we have identified the various requirements of the hardware and software complex used in vehicle registration, as well as the general, functional, non-functional and linguistic documentation requirements. It is on them that further work is built.

3. DESIGN AND IMPLEMENTATION

Vehicle registration used to entail manually recording vehicle information on ledgers, ranging from cars to buses, and later trucks and heavy duty equipment, as well as tracking other related information like registration, road worthiness test certificates, change of ownership, engine and chassis numbers, and road license expiration. This method was exceedingly inefficient, and data recovery was impossible if ledgers were destroyed or lost, which happens all too frequently. The present manual method used by state agencies and parastatals in charge of administering motor vehicle paperwork and registration has failed to meet the goals of the process's stakeholders, namely federal and state authorities, as well as vehicle owners and users in the country over time.

The operation of an organization is always carried out using a certain system or technique, which might be a machine or a manual system of operation. Enugu's motor licensing offices do everything by hand when it comes to vehicle registration. During this manual operation, the applicant who desires registration of his (New Vehicle or Fairly Used Vehicle) is required to fill out three copies of form B by the motor licensing authority. He should also bring the necessary documents, such as a customs duty certificate, a bill of entry, a bill of lading, a customs payment schedule, an import duty certificate a receipt authenticating the total amount paid to the previous owner whether it is the government or a vehicle dealer, and a variety of other documents. These documents are inspected to ensure that they are complete and have the customs stamp and signature. After he has gone over everything, he instructs the inspecting officer in writing on the completed form to proceed with the registration of the applicant's car and to mention the payments that must be paid.

3.1 ARCHITECTURE OF THE PROPOSED SOLUTION

System design stage there is planning in order to build any program , At the stage of registration of vehicles (new, transfer) there must be a website in order for the person to fill the initial information of the vehicle and there must be a database that saves the final information from here came the idea of working a second program in the computer does not save the registered information on the site in order to (Figure 3) it was clarified what is the possible property where the person has the property in the countries of the location and add On the part of the program, there will be a special entry in the name of a special password in order to enter create, read, update, and delete(CRUD) the information of customer and vehicles.
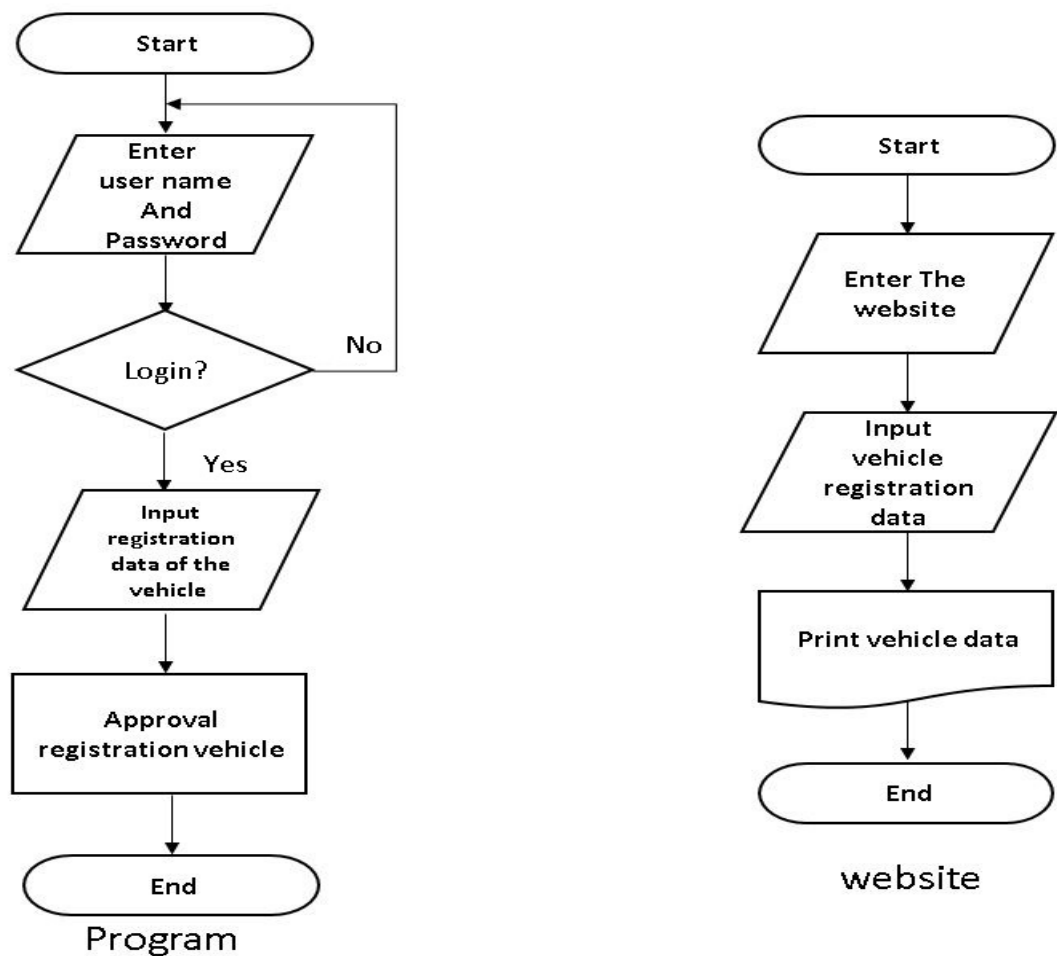
Figure 3 – Data Collection FlowChart (program and website)

3.1.1 Creating An Authorization Form

At the beginning of the design, there will be a user interface in the form (Figure 4)the first design of the login process, there will be three logins (System Administrator, Data entry operator and boss) the logins are determined by the login and password of each of them, and will be in the form of each of these processes and duties that will be the person system administrator responsible for the process of entering information for people and vehicles. The operator of the second login data entry will be responsible for checking the integrity of information for each person, as well as the car. The system has been introduced, the boss will have the duty of the last approval of the registration, after which everything is checked, and this will be the first step in designing the vehicle registration system.
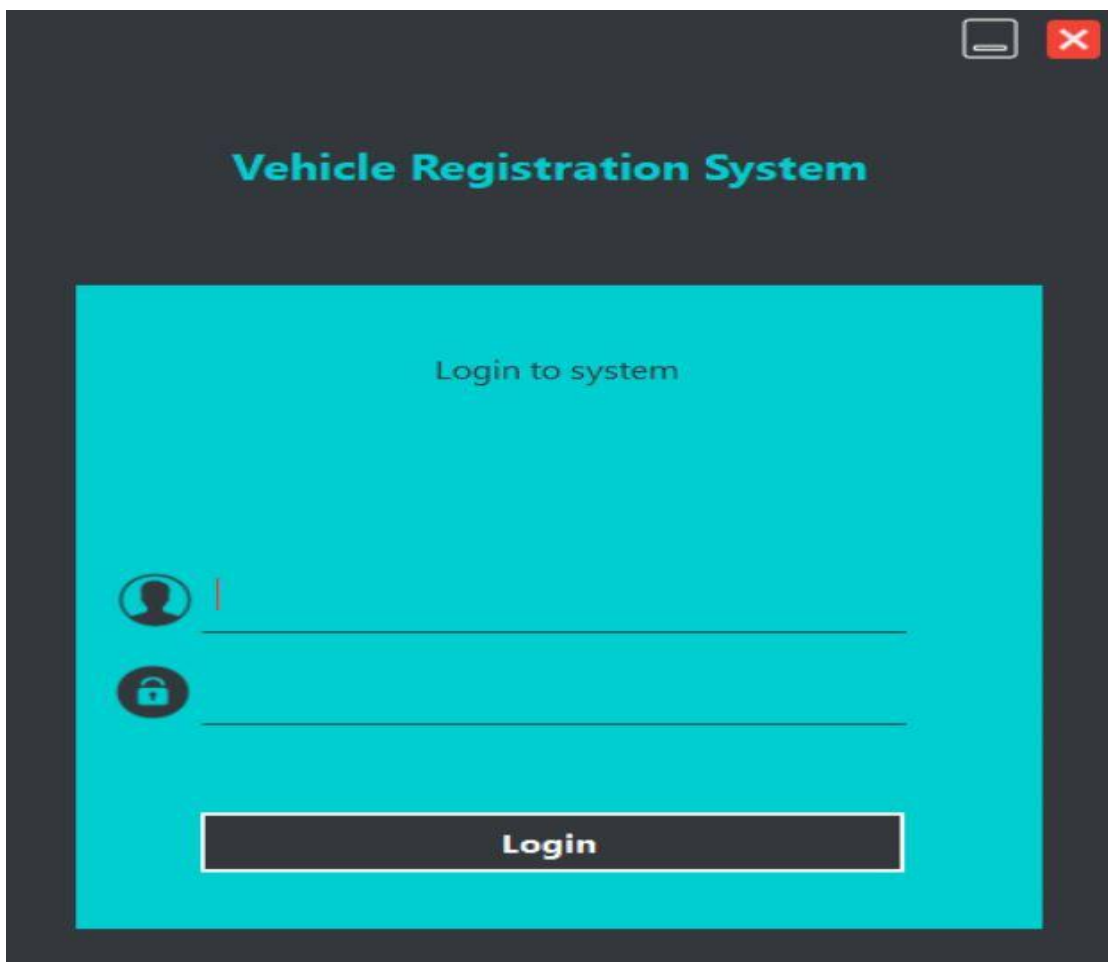
Figure 4 – Design of access interface

3.1.2 Analysis of Proposed System

The new computerized system offers a slew of advantages that will eliminate the problems that plague the existing method. The importance of this new system and what it aims to achieve cannot be overstated.

- computational Accuracy: Accuracy will be attained since the computer system will remain stable in allocating fees based on assessment and correct computation;

- neatness/Lower Paper Consumption: Computerization allows for the development of a highly tidy work. Furthermore, because a large amount of paper is no longer required for keeping/storing information, it will assist in maintaining a very clean office;

- cost Savings: The computerized system will continue to save money in the long run owing to the ongoing manufacturing of forms and registers for keeping records, as fewer forms will be utilized;

- use of Less Space for Record Storage: By developing computer storage medium (disks) that can store large amounts of data in a little amount of space, most of the space utilized for storing records will be eliminated;

- time Savings: This will avoid the difficulties of wasting time registering records, checking from one line to the next, and creating a revenue report, which is faster than doing it manually;

- quick Information Retrieval: Information will be retrieved quickly, which has an advantage over the manual system in that it allows the user to retrieve information faster, especially when it comes to vehicle owners, by using their vehicle registration number to call up their information rather than searching for information record line by line as in the manual system;

- less time-consuming;

- reliability and data consistency.

3.2 DESCRIPTION OF DATA

Entity Relationship Model (ERM) is a high-level conceptual data model diagram, the ER model aids in the methodical analysis of data needs in order to create a well-designed database, the ER Model is a representation of real-world things and their connections. Before you construct your database, it's a good idea to create an ER Model in DBMS.

ER diagrams are visual aids that aid in the representation of the ER model. In 1971, Peter Chen suggested the ER Diagram as a unifying pattern for relational databases and networks. As a conceptual modeling method, he planned to employ an ER model.

The following are some of the most compelling reasons to use the ER Diagram. It will assist you in defining words associated with entity relationship modeling. Provide an example of how all of your tables should relate, as well as the fields that will be on each table.

It aids in the description of entities, properties, and relationships. ER diagrams may be converted to relational tables, allowing you to easily create databases. Database designers can utilize ER diagrams as a roadmap for implementing data in specific software applications. With the aid of an ERP diagram, the database designer acquires a better knowledge of the information that will be stored in the database. The ERD Diagram lets you communicate with users about the database's logical structure.

In (Figure 5) there is a complete diagram of the program's correlation process and the database diagram. When there is information recorded and entered in an electronic system there must be a database where it will save all the information of people such as the name of the owner of the vehicle and the location where he lives as well as complete information of the vehicle such as the color of the vehicle model number of the vehicle type. As well as login to the program there is a name and password for employees
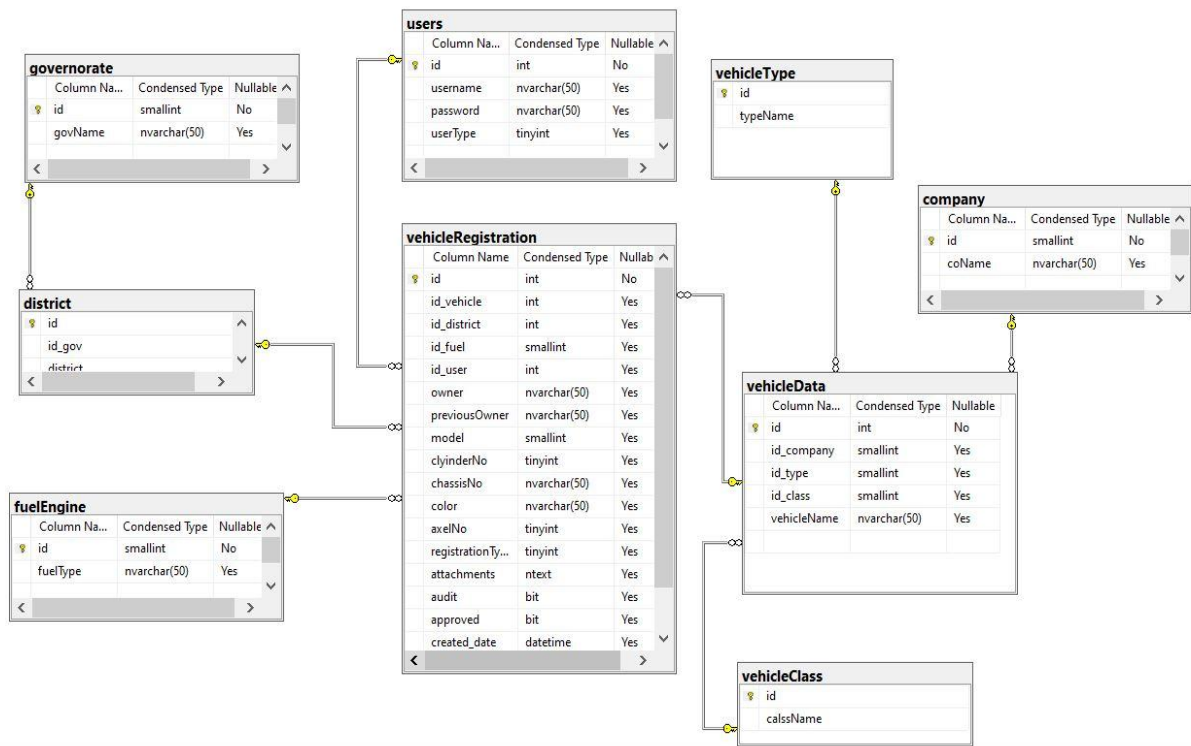
Figure 5 – Tables and relationships (ER) diagram

The database stores all information about people and vehicle information ,The collection of information and files registered in the database allows employees working in the department of vehicle registration to analyze the information and know the number of cars registered and return the information of the car to ensure the authenticity of the information and in the case of theft and can also know who is the owner of the vehicle registered in the name of the car .

as well as can change the information of the car in the case of a change in the color of the vehicle or the place where the person lives and in the case of natural disasters or an accident on the road can know the information of the person this all helps governments to quickly find the information of the vehicle and people .

This system's database is developed using MySQL frontend. Containing two tables with fields in them. The table below shows the fields in the database.

Table 2 – Table showing the fields in admin table of the database

s/n	Field	Data type	Description
1	Id	int	Driver id
2	Username	varchar(60)	admin username
3	Password	varchar(60)	admin password
4	UserType	Tinyint	Drive userType

Table 3 – Table showing the fields in driver table of the database

s/n	Field	Data type	Description
1	Id	int	Driver id
2	Owner	nvarchar(50)	Driver's Owner
3	Previous Owner	nvarchar(50)	Driver's Previous Owner
4	District	int	Driver's District
5	Chassis No	nvarchar(50)	Driver's Chassis No
6	Vehicle Mark	nvarchar(50)	Vehicle Mark
7	Color	nvarchar(50)	Driver's Color
8	Cylinder No	nvarchar(50)	Driver's Cylinder No
9	Axles No	tinyint	Driver's Axles No
10	Fuel type	nvarchar(50)	Driver's Fuel type
11	Model	smallint	Driver's Model
12	Governorate	smallint	Driver's Governorate

3.2.1 Design Information Program

The design of the information entry page is important for the program in terms of form and arrangement and must be integrated in terms of information and there must be important characteristics that must be added in terms of search, addition, modification and deletion and what is the possibility of each login in terms of the system administrator and manager as explained in the previous chapter and the most important figure is that there is a special place for the process of entering the barcode of the person if he fills the information through the site and not go directly to the vehicle registration department . In the (Figure 6) expresses the design of the information interface.

As well as to be saved for some of the details of the vehicle and the person, such as the photo of the person and the vehicle papers in terms of Customs and everything special to the vehicle and must be linked between the program and the computer and save in the computer with the same ID number of the person and the vehicle **.**

Figure 6 – Design Information page

When you open the program there will be several information that must be written by the system administrator and will be explained in more detail :

- registration type : When you open the list there will be two options, the first option is to register a new vehicle and the second option is to transfer ownership of the vehicle;

- owner : Must write the owner of the car in the case of transfer of ownership and will be in the registration of the new vehicle is the name of the person who intends to register his vehicle;

- previous Owner : Here will be the name of the person who wants to buy the car already registered , will be in the case of registration of the new vehicle you cannot write in this place only can write in the transfer of the vehicle;

- district : The person must have a location where he lives and here the place is written such as Baghdad , Erbil and Basra;

- chassis No : A serial number is a number that is used to identify a vehicle that has been built. It's a set of numbers and letters that the manufacturer attaches to or stamps on a vehicle chassis number that is generally seen in the engine compartment or on the chassis itself;

- vehicle Mark : Here is written the type of car where there are many car manufacturers in the world that produce cars in large quantities, Example of a company name (BMW, Mercedes , LADA);

- model : Here the model of the vehicle is selected, i.e. the year in which the vehicle was made;

- color : The color of the vehicle is determined by the external color of the vehicle;

- cylinder No : Here the number of cylinders is selected. A cylinder is an engine's power unit; it's the chamber where fuel is burnt and converted into energy;

- axles No : An axle is a rod or shaft that connects a pair of wheels to push them and hold the position of the wheels to each other;

- fuel type : The majority of automobiles on the road today are fuelled by gasoline or diesel. Ethanol, biodiesel, propane, compressed natural gas electric batteries, and hydrogen are some of the other energy sources (either using fuel cells or combustion);

- show Attachments : Each person has his own information in the form of paper images such as the place of residence and the nationality of the country to which he belongs, as well as vehicle information such as customs clearance of the vehicle and the country of origin and all the information about the vehicle;

- audited : This option is a feature of the Data Entry Operator that reads complete information and gives preliminary approval for the registration of the vehicle;

- approved : This option is a characteristic Boss gives approval to register the vehicle;

- read QR Code : When registering the vehicle through the site and not directly in the registration center will be given a special barcode information and in this option is given an order to paste the bar code and will fill all the information of the vehicle and the person .

3.2.2 Design Website Information

The main tasks that must be solved is the design of the website published on his electronic page has been used programming HTML Code with the help of Css Styles using bootstrap that help him publish the site on the internet with the help of language C# as well as the database that has been explained in the previous chapters where [20].

only needs to verify the information and upload some photos of the person and the vehicle and go the audit and then the manager in order to be more focused work and make the work joint in order to reduce the process of forgery, I will publish the first photos in this chapter so that there are final results in the next chapter . Was used as a div class Of the main tasks so Class. A jumbotron is a large box used to draw more

attention to certain material or information. A jumbotron is represented as a grey box with rounded edges.

The font sizes of the text inside it are likewise increased. Tip You may place practically any valid HTML within a jumbotron, including other Bootstrap elements/classes. A container is a div with the class container attribute.

All components within the div container will be affected by the container. div class container div class container div class container the contents of the container are located here div Containers have a default padding of 15 pixels, which protects them from the page's edge and other containers. This is the XML prologue, which is optional. Version "1.0" indicates that this file complies with the XML standard. The file is encoded using the UTF-8 Unicode encoding when encoding "utf-8" is specified.

3.3 CONCLUSION

It is explained in this chapter how the Website is designed as well as the website at the beginning there was a general view of the process of design and implementation and then it was explained how the process of data flow between the person who intends to register the vehicle on the site as well as between the user of the system that records the information to people, and then the home page, and how to choose the employee the design of the open system was explained, and an information arrangement diagram was drawn Sequentially and was explained and worked out an integrated scheme on the design of the open system, at the end of it was explained what the class used publishing website and what languages and programs used in publishing. In the next chapter there will be a process of development and publication of the website.

4. IMPLEMENTATION

4.1. IMPLEMENTATION OF INTERFACES

Software Implementation in order to verify the requirements for functional viability, this is the ability of the program under certain conditions to solve the tasks that users need. Functional requirements show exactly what the program does, how it behaves and what tasks it performs. Implementation requirements for software development vary and these requirements depend on some predetermined factors, in these points we will not dwell on what these factors are but on what is required of an online car registration system.

The simplicity of the programming language used in the development of this program makes the entire development process less expensive.

Using the functional test method, we will check the operation of the vehicle registration program on the computer.

All we need is to enter the site and we choose the type of registration if the transfer of ownership of the vehicle or registration of a new vehicle if the registration of a new vehicle will be there is a new car owner box only can be written on it and you cannot write in the previous car owner box while he has the choice of transfer of ownership of the vehicle you can write in both boxes .

Fill in the complete information and then pressing on the option print it will appear a barcode box for the information as it exists in the figure (figure 7) saves this barcode box and then can through the software installed in the registration of the site can be given (figure 8) in order to read the information in the barcode through a reader device QR code.

Figure 7 – Screenshot showing vehicle registration Website

Figure 8 – Screenshot showing Form of Vehicle registration

4.2 IMPLEMENTATION VEHICLE REGISTRATION MODEL

To test the vehicle registration program all you need is to open the program by entering the database (MS SQL)program to run it and then enter the program *visual* studio(c#) and click on the start marks the program converts the program code two previous programs and will show you the first page of the program login process as found in the picture below (Figure 9) you will be asked to log in with three properties(Boss, Data entry operator and System administrator) each feature according to its login and password, each of these characteristics will be explained and what is the duty of each of them.
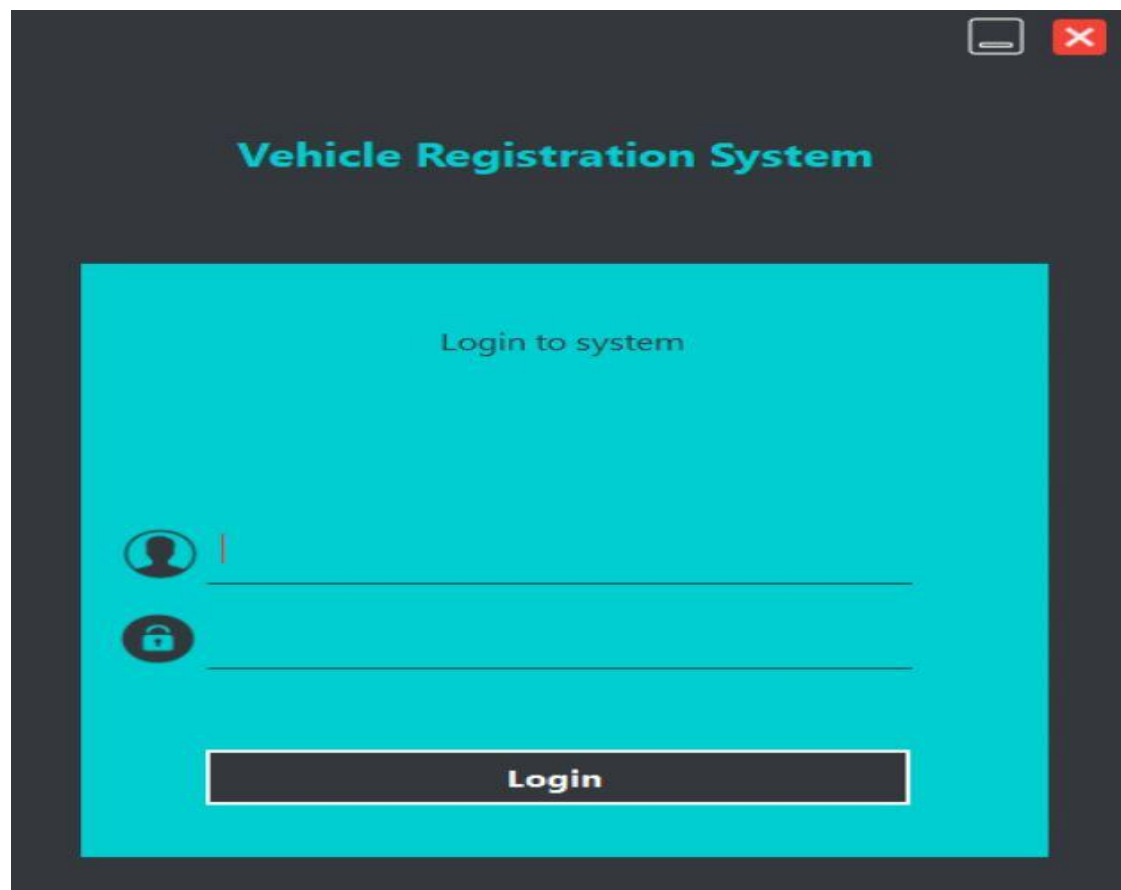
Figure 9 – Screenshot showing login to system

4.2.1 Implementation Login feature Data entry operator

When you are logged in via the Data Entry Operator ,it will be one of the features of how you can register the new vehicle as well as you can transfer ownership of the

39

vehicle as shown in the (Figure 10) where the registration option is pressed and it is the only option open to the Data Entry Operator where it does not open any other option such as add new user or add new features.
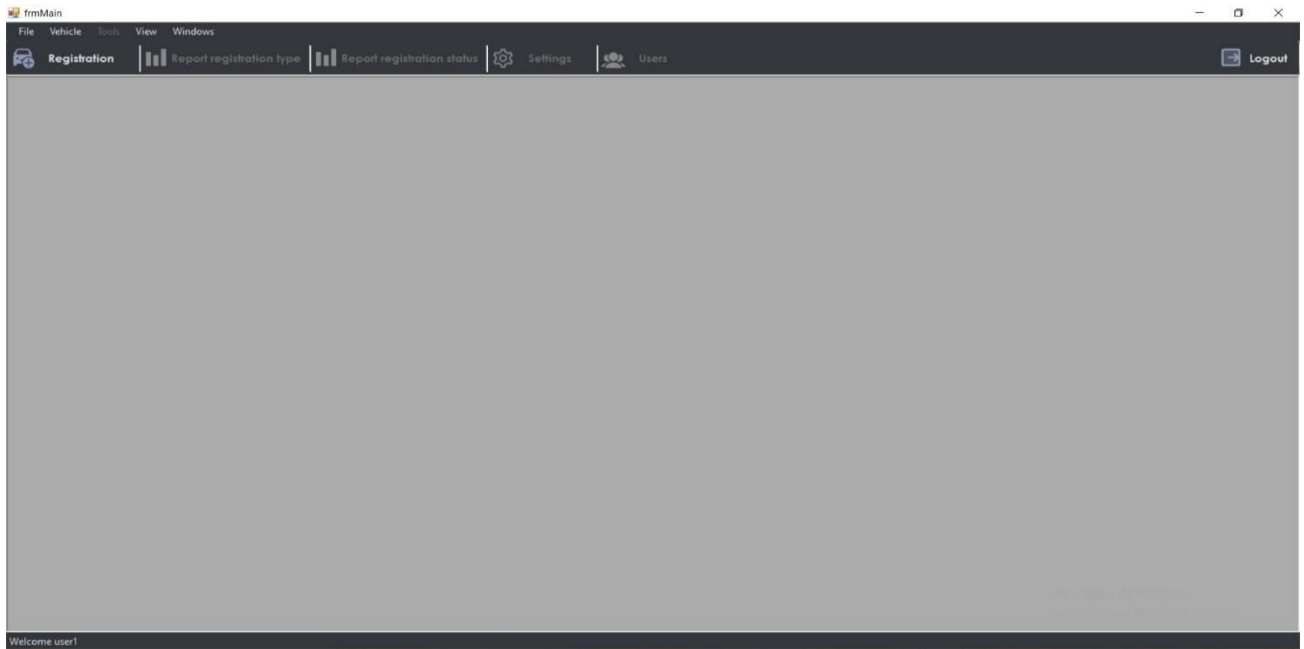

Figure 10 – Screenshot showing Login Data entry operator

Click on the registration option. It will show you a set of options and boxes for the process of registration of vehicles as shown in the (Figure 11) here is to choose the type of registration and enter the name of the seller and the buyer, the type of vehicle, its color and other information of the vehicle.

As well as the duties of Data Entry Operator is add photos belonging to people and their place of residence photos belonging to the information of the vehicle and how it entered the Iraq and the country of manufacture all this can be added as images and saved in a file according to the sequence of the registration number when pressing on it option show attachments.

You can add a new registration and can also modify an old registration that was previously registered and can delete the registration process if there is a mistake in the registration process.
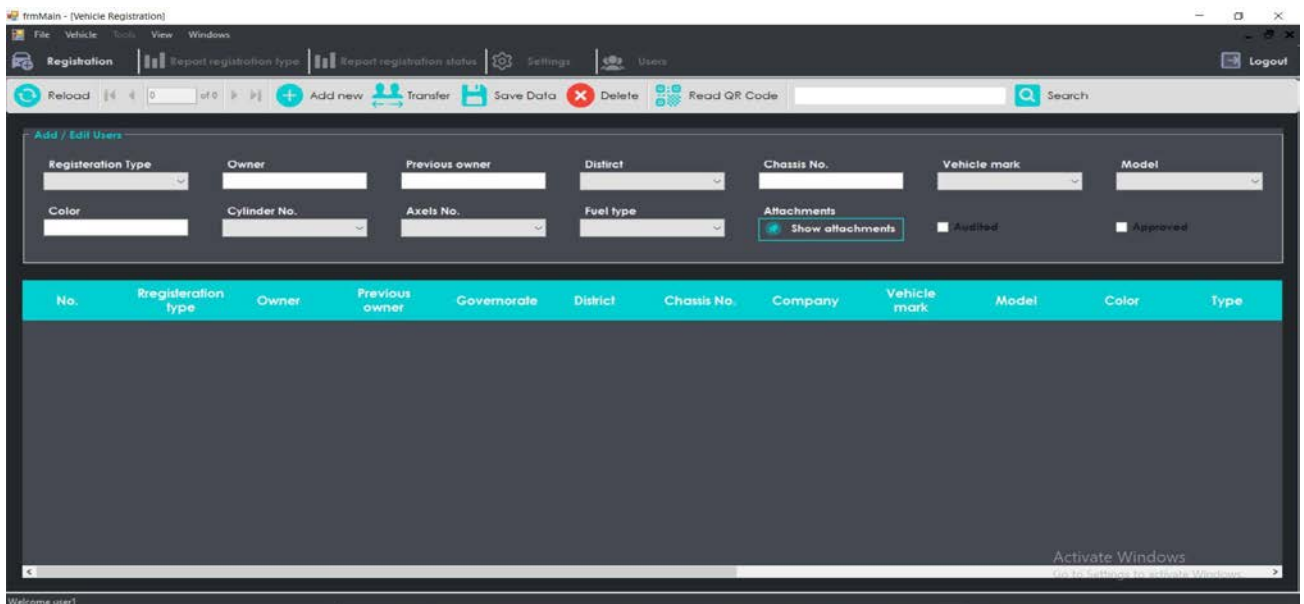
Figure 11 – Screenshot showing Home page Data entry operator

All registered vehicle registrations can only be viewed if you click on the Reload option as shown in the (figure 12).
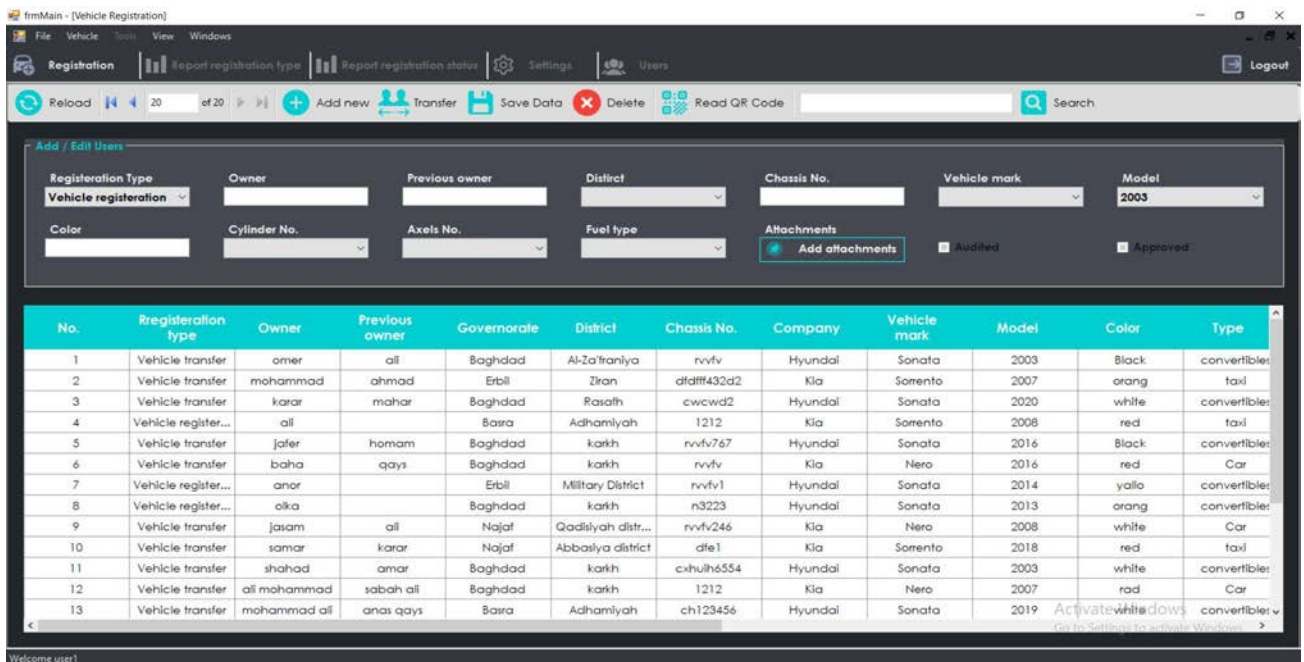

Figure – 12 Screenshot showing List of registered vehicles

Can also search for any vehicle registration that exists in the system by entering Chassis No of the vehicle as shown in the (Figure 13).
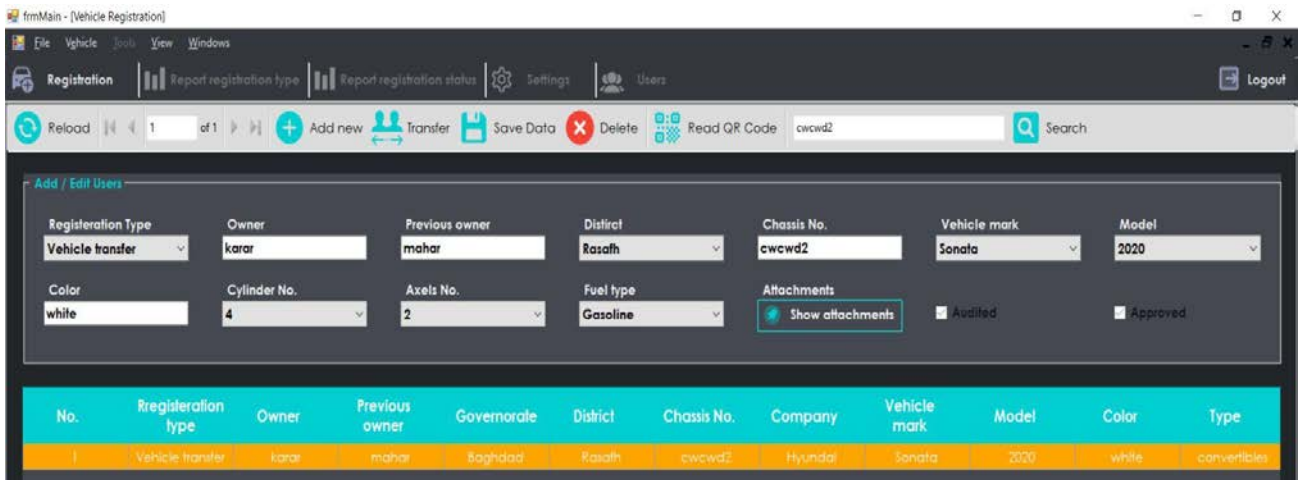
Figure 13 – Screenshot showing Search for a registered vehicle

In the development phase, the process of adding complete information after completing the electronic registration on the vehicle registration site so that it can add the barcode in the (Figure 14) there is a special barcode box with vehicle information and the person once he read the barcode by means of the device qr code by the Data Entry Operator will be shown all the information in the place allocated to IT Data Entry needs to confirm only and click on the option of saving. Figure (Figure 16) shows the process of adding by barcode.
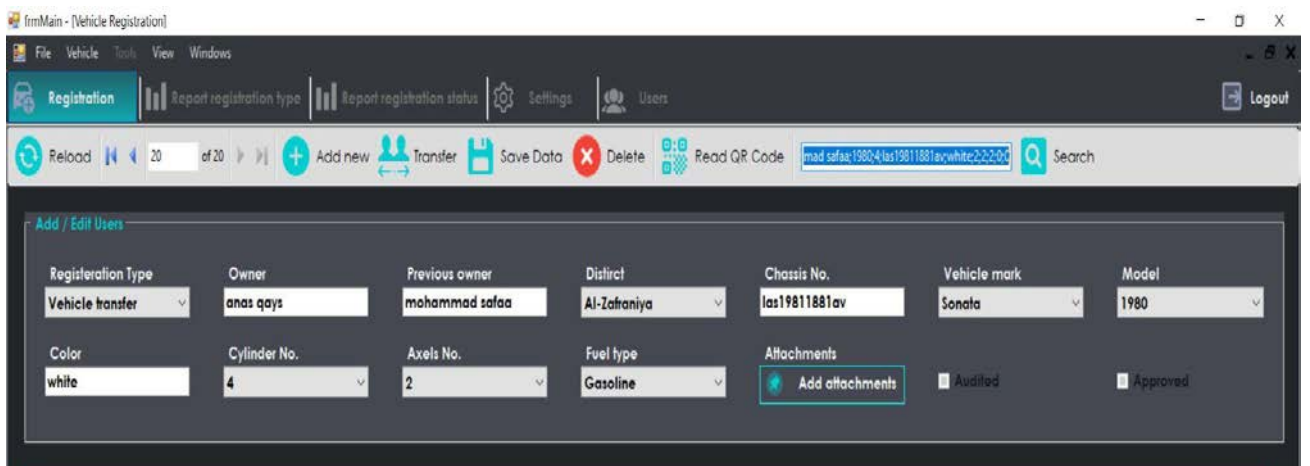

Figure 14 – Screenshot showing Enter information by qr code

4.2.2 Implementation Login feature System administrator

For each system there is a continuous renewal in terms of vehicle registration there is a continuous renewal in the type of vehicles as well as modify, delete and add the user to the system and this is the duty of the system administrator. In the figure (figure 15) shows what are the duties of the system administrator where you can see there is the ability to open the user option as well as the Settings option will explain what these options are guaranteed in the next step.
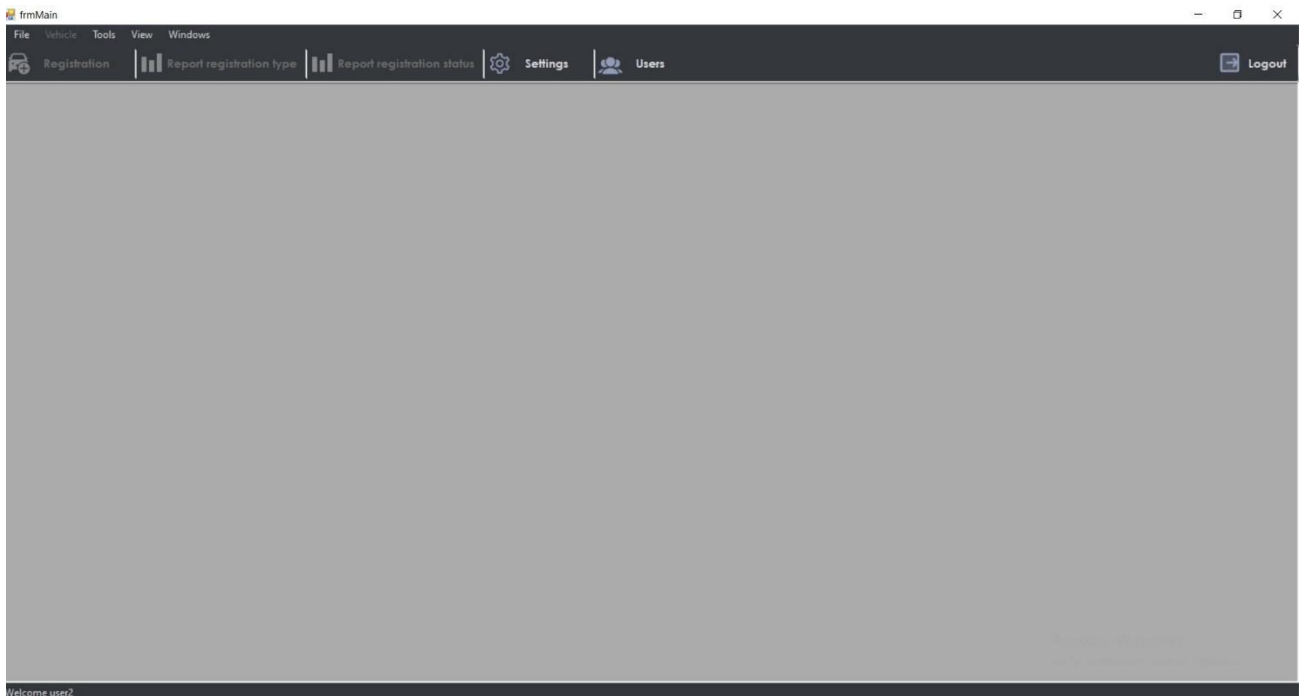

Figure 15 – Screenshot showing Login System administrator

Click on the users option you will see a table in which the number of users and what are the types of users as well as the login name and password for each user of the system shows the (Figure 16) all these options can be modified by users and add a new user.

when you click on the Add User option will be selected login name and password and specify the type of user (Head, Data Entry Operator and System Administrator) .
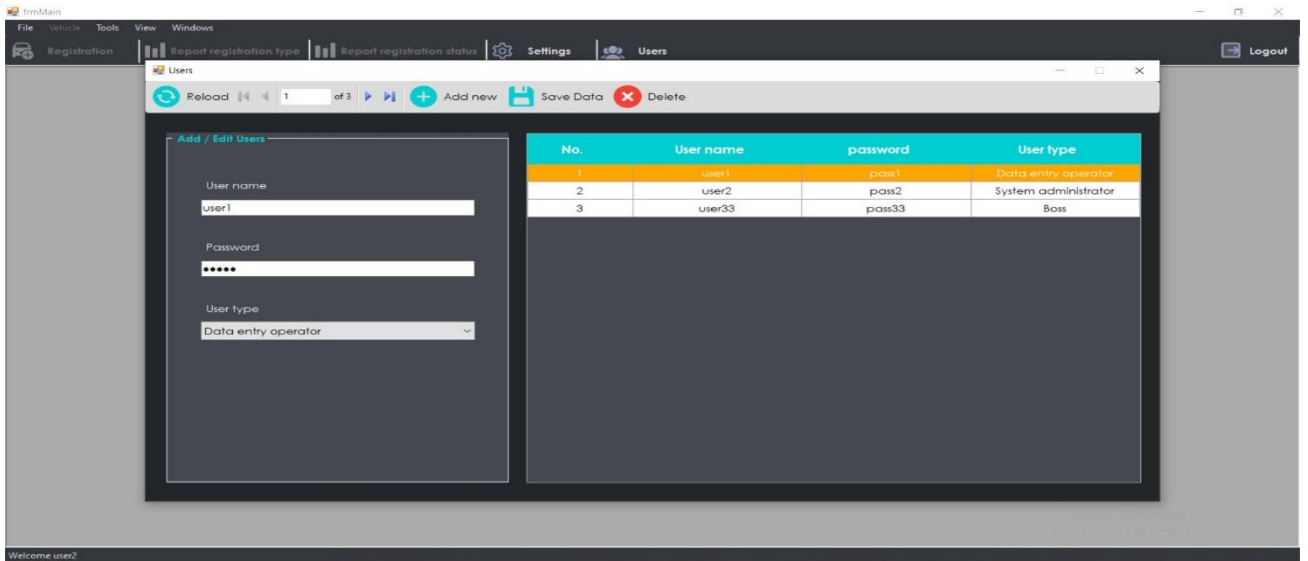
Figure 16 – Screenshot showing modified users and add a new user

One of the duties of the system administrator is also the question of the inclusion of the basis of the system, namely the regions of the country in which it will be dealt with this electronic system, for example in Iraq if it is operated, it will be the duty of the system administrator is to add the Iraqi provinces and also the regions of the provinces affiliated with this province such as the province of Baghdad and also Baghdad areas such as (Karada and Mansour).As shown in figure (Figure 17) these are in terms of provinces .
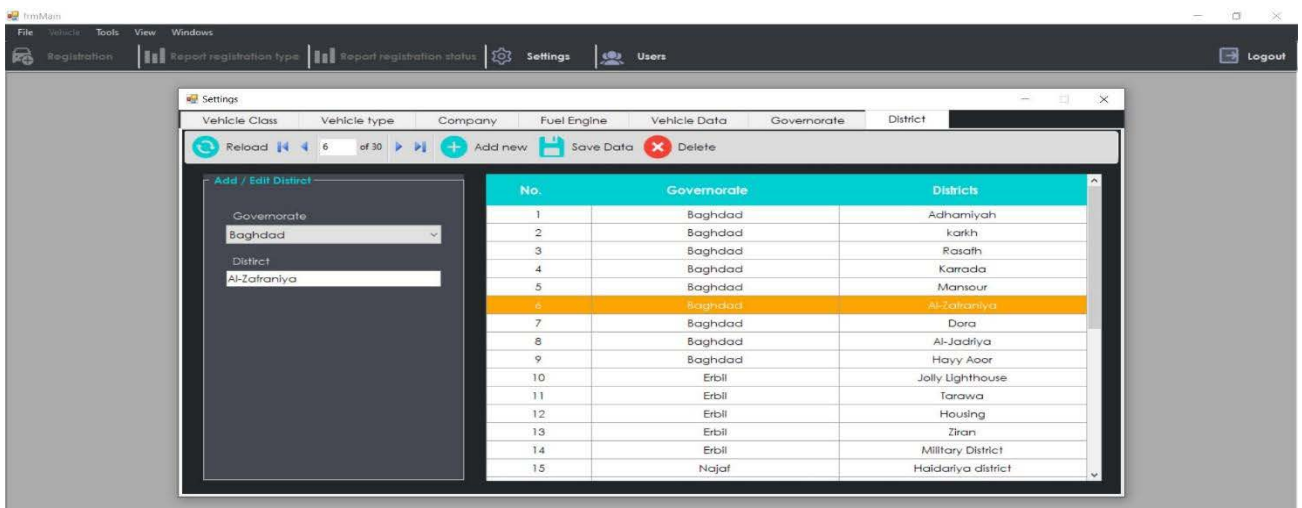

Figure 17 – Screenshot showing Add governorate and district

There is a constant renewal in the name and type of cars and the type of fuel and this is also one of the duties of the system administrator.

as shown in the figure (Figure 18) so that it is the basic base of the database and will show this option when entering by the user of the Data Entry Operator will show him a list of car names and type so that only selects the type and name as well as the location of the person's residence .
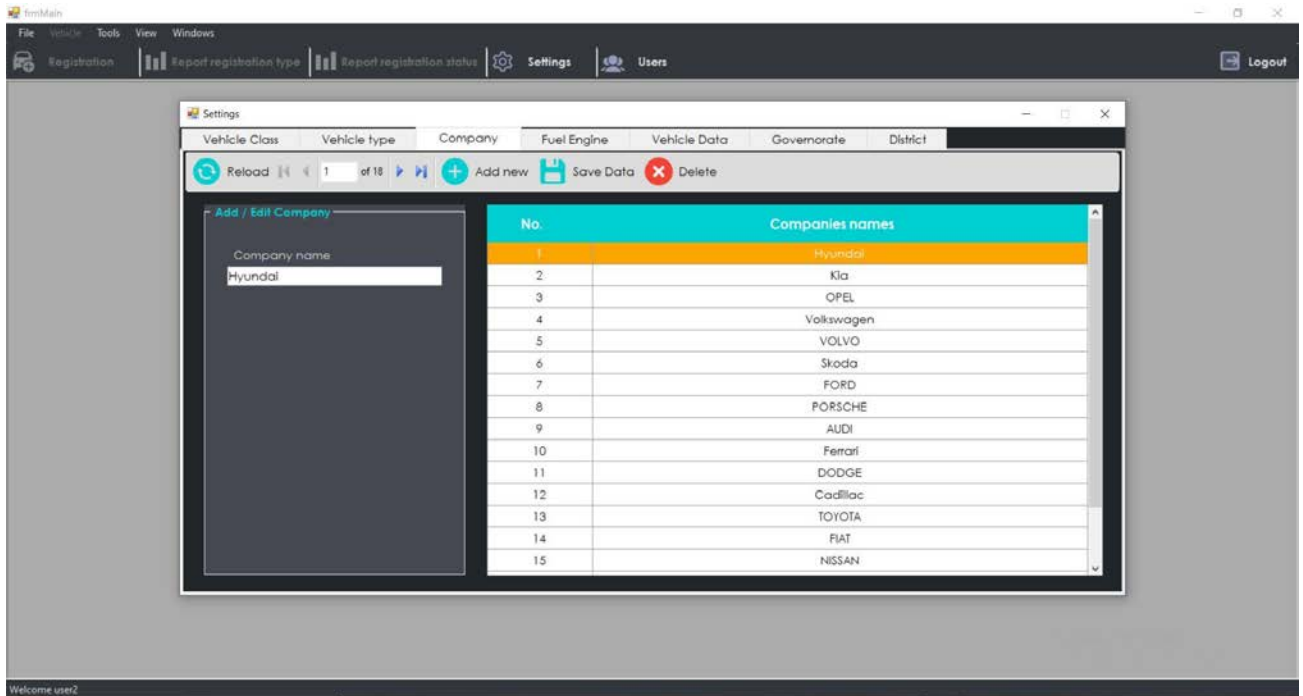

Figure 18 – Screenshot showing Explains the addition of a new vehicle company

4.2.3 Implementation Login feature Boss

It will be the last login in the name of boss and is the system administrator to the administrator of all the system and has the last property in accepting the registration of the vehicle ,in the form (Figure 19) in the toolbar has three properties and read the registration of the vehicle (new, transfer).

Approval to complete the registration of the vehicle (new, transfer) as will be explained in the next steps as well as have the property in the printing of vehicle registration reports.
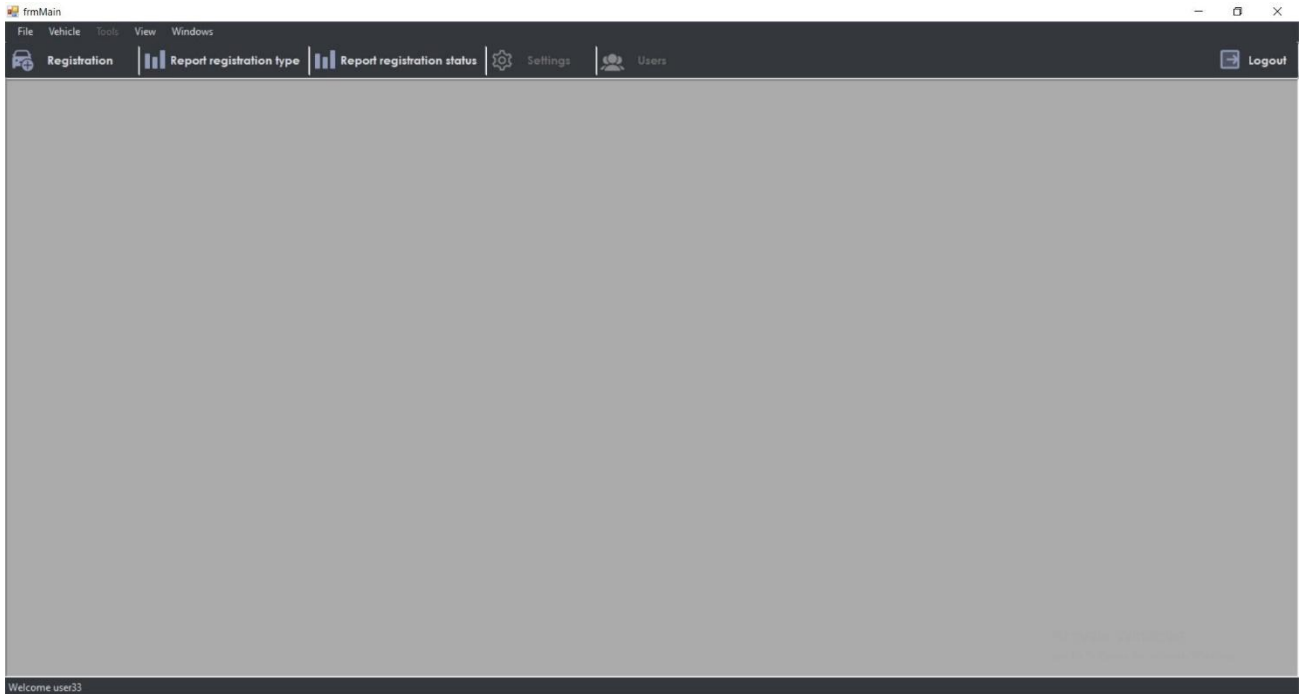
Figure 19 – Screenshot showing Homepage vehicle registration

In this form (Figure 20) shows the first property and this modification of the vehicle registration information.
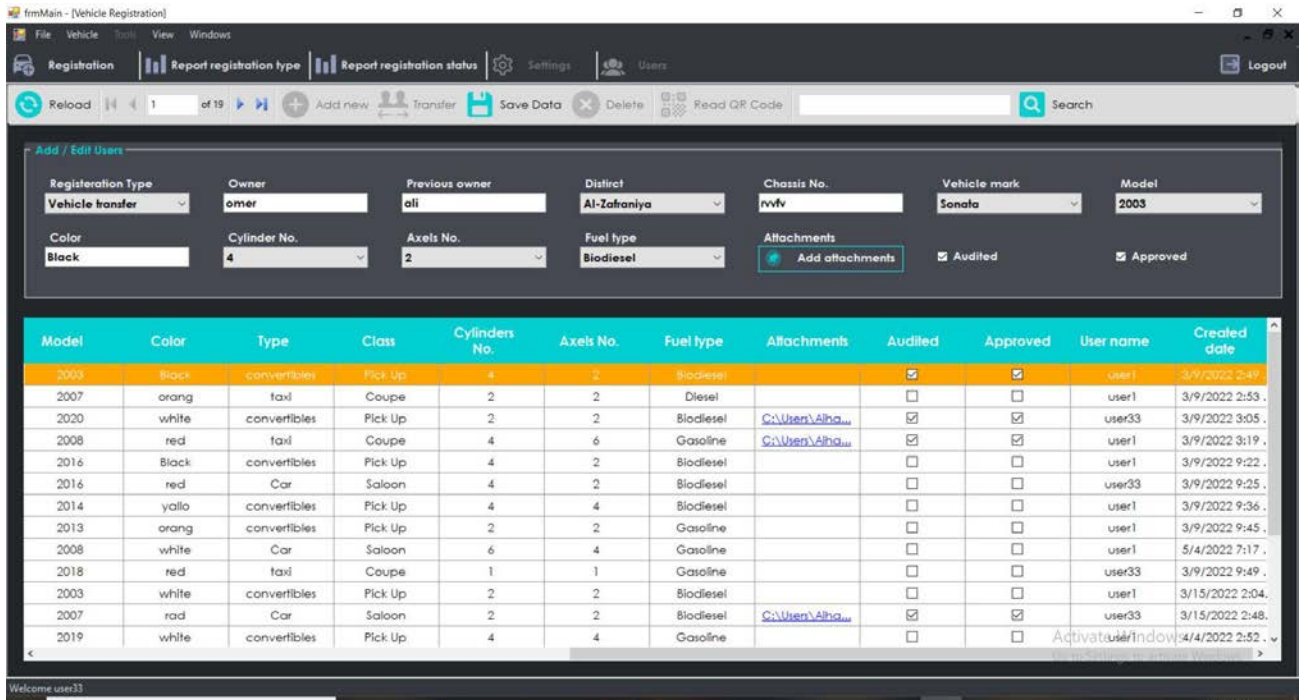

Figure 20 – Screenshot showing Modification of vehicle registration

Here in this form (Figure 21) the approval on the vehicle registration has the pressure on the approval will show the correct knowledge on the full registration of the vehicle.
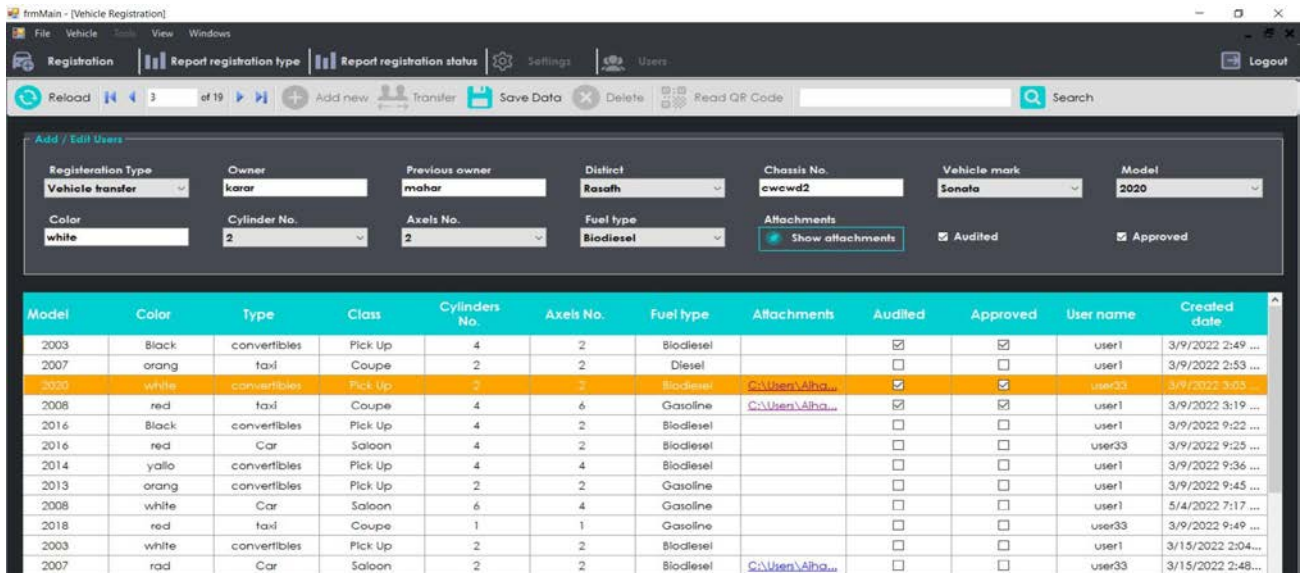

Figure 21 – Screenshot showing Vehicle registration approved

Another feature is to print a report of the number of new registered vehicles and the conversion of vehicles as shown in (Figure 22).
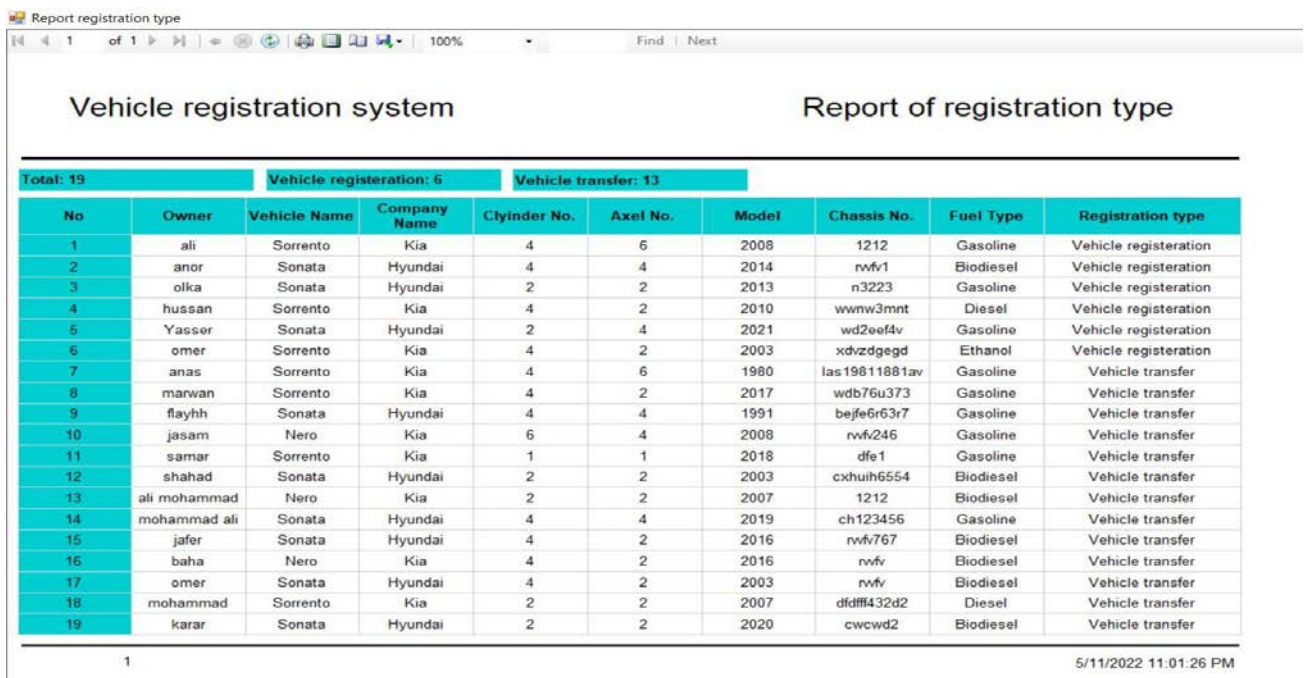

Figure 22 – Screenshot showing Report on vehicle registration and transfer

The last feature of the boss is to print a report showing the number of registrations approved and not approved in the vehicle registration register as shown In the (Figure 23) shows in the tape the total number of registration and what is the number of registered and unregistered vehicles.

No	Owner	Vehicle Name	Company Name	Clyinder No.	Axel No.	Model	Chassis No.	Fuel Type	Audit	Approved
1	mohammad	Sorrento	Kia	2	2	2007	dfdfff432d2	Diesel		
2	baha	Nero	Kia	4	2	2016	rwfv	Biodiesel		
3	anor	Sonata	Hyundai	4	4	2014	rwfv1	Biodiesel		
4	olka	Sonata	Hyundai	2	2	2013	n3223	Gasoline		
5	jasam	Nero	Kia	6	4	2008	rwfv246	Gasoline		
6	samar	Sorrento	Kia	1	1	2018	dfe1	Gasoline		
7	shahad	Sonata	Hyundai	2	2	2003	cxhuih6554	Biodiesel		
8	mohammad ali	Sonata	Hyundai	4	4	2019	ch123456	Gasoline		
9	Yasser	Sonata	Hyundai	2	4	2021	wd2eef4v	Gasoline		
10	anas	Sorrento	Kia	4	6	1980	las19811881av	Gasoline		
11	omer	Sorrento	Kia	4	2	2003	xdvzdgegd	Ethanol		
12	jafer	Sonata	Hyundai	4	2	2016	rwfv767	Biodiesel	False	False
13	omer	Sonata	Hyundai	4	2	2003	rwfv	Biodiesel	True	True
14	karar	Sonata	Hyundai	2	2	2020	cwcwd2	Biodiesel	True	True
15	ali	Sorrento	Kia	4	6	2008	1212	Gasoline	True	True
16	ali mohammad	Nero	Kia	2	2	2007	1212	Biodiesel	True	True
17	hussan	Sorrento	Kia	4	2	2010	wwnw3mnt	Diesel	True	True
18	marwan	Sorrento	Kia	4	2	2017	wdb76u373	Gasoline	True	True
19	flayhh	Sonata	Hyundai	4	4	1991	bejfe6r63r7	Gasoline	True	True

Figure 23 – Screenshot showing Vehicle registration approval report

4.3 CONCLUSION

In this chapter, the full photos of the final implementation process of the site are published and explain how the process of completing the information and how the barcode of the information recorded by the customer appears.

Then the images of the software installed on the computer and the test work were published and explained what logins are authorized to enter the internal system and explained what are the characteristics of both the system administrator, the Data Entry Operator and the boss, at the end of the design of the site dedicated to the registration of vehicles as well as the program.

5. TESTING

5.1. TESTING METHODOLOGY

When testing the application, the functional test method was used. Functional testing is one of the types of testing, aimed at checking compliance with the functional requirements of the program with real characteristics. Its main task is to confirm that the software product being developed has all the required functions.

5.2. TEST PROCEDURE

Test number 1. Registration of the vehicle through the website.

Entry data: it will show a printed word.

Expected result: a special information barcode will appear.

Result obtained: coincides with the expected.

The test was successfully passed.

Test number 2. Registration of vehicles through the program.

Go to the state vehicle registration office. Entry data.

Expected result: vehicle and person information is added to the program.

Result obtained: coincides with the expected.

The test was successfully passed.

Test number 3. The language of entry is English and Arabic.

Data entry: user or system administrator in the main menu.

Expected result: information can be written in English and Arabic

Result obtained: coincides with the expected.

The test was successfully passed.

Test number 4. Exit from the program.

Data entry: the user is in the main menu.

Expected result: the system user clicks the exit button of the program, and

Closes.

Result obtained: coincides with the expected.

The test was successfully passed.

Test number 5. Search for a registered vehicle.

Data entry: the user is in the main menu.

Expected result: the user of the system clicks on the search button, writes a number Chassis No.

Result obtained: coincides with the expected.

The test was successfully passed.

Test number 6. Add information by barcode.

Data entry: the user is in the main menu.

Expected result: the system user clicks the QR code Button, and writes the barcode

Result obtained: coincides with the expected.

The test was successfully passed.

Test number 7. Add a new user.

Data Entry: System Administrator in the main menu.

Expected result: the system administrator clicks the Settings button and can add, modify and delete the user.

Result obtained: coincides with the expected.

The test was successfully passed.

Test number 8. Approved and reviewed to register the vehicle.

Data entry: Boss in the main menu.

Expected result: click Boss on the approved and reviewed button and the approval button will be approved and reviewed.

Result obtained: coincides with the expected.

The test was successfully passed.

5.3 CONCLUSION

A functional test was conducted to ensure that the functions vehicle registrations are working properly, as well the website was working properly.

The expected result and test steps are described for each test. All tests were successfully passed.

6. CONCLUSION

This project undertakes to solve the electronic vehicle registration mechanism and get rid of the complicated manual registration process. The problem of vehicle registration in Iraq was studied and this problem was solved.

 I designed a website as well as a program installed in the computer where it is a common connection in the work, where anyone can access the website and register the vehicle information electronically and then this information is saved in a special barcode.

But this information is not. This system includes the registration of the new vehicle as well as the transfer of ownership of the vehicle from one person to another person.

This system will help speed up the registration process of vehicles as well as have a complete database of people and vehicles and minimize the cost of registration.

The purpose of the work is to develop a vehicle registration system. To achieve this goal, the following tasks were set and solved:

- the problem has been stated;
- an overview of existing analogues was made;
- modern vehicle registration sites and development tools the website testing system has been studied;
- the application is executed;
- the application has been tested, all tasks have been solved.

6.1 Summary

Vehicle registration is used to engage the manual recording of vehicle information, which ranges from cars to buses and later to trucks.

Vehicle registration began in Iraq 100 years ago, and the records were mainly manual, which in turn did not help improve the efficiency of public car services in recent years.

The government in Iraq has identified economic development as a key element to achieve socio-economic development for 2018. A vehicle registration system is a must for any country that wants to be technology Information and communication inclined and ready to reduce the rate of vehicle crime and corruption in its system.

6.2 Recommendation

It is the security of information processing software that must be explored in the computerization of the vehicle registration system with the aim of improving it and making it more useful in the real world.

Since the security of a vehicle registration system is critical in preventing vehicle crimes and other vices, it is worth an additional investigation. As a result, it was recommended that the Iraqi vehicle licensing offices create a computer-based system.

6.3 Future work

In the future, it is planned to implement the following features:

- driving license registration feature as well as driving license renewal;
- link the vehicle registration website with Gmail, after completing the registration information is sent to Gmail to be saved and is referred to if the barcode of the information is lost;
- add registration feature on the new vehicle plate;
- add an accident report and vehicle theft in the Vehicle Register.

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