COMPUTERISATION OF CAR SALE OUTLET

[CASE STUDY OF MUSTAPHA MOTORS MINNA]

BY

ABDU AHMADU
PGD/MCS/2000/1030

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ii

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CERTIFICATION

This is to certify that this research carried out by Abdul Ahmadu (PGD/MCS/2000/2001/1030) of the Department of Mathematics/Computer Science is fully adequate in scope and quality for the award of the Post Graduate Diploma in Computer Science of Federal University of Technology, Minna.

_____   _____
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PROJECT SUPERVISOR

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MR. L. N. EZEAKO   **DATE**
HEAD OF DEPARTMENT

_____   _____
EXTERNAL EXAMINER   **DATE**

DEDICATION

This project is dedicated to my surviving mother,

Malama Rakiya.

ACKNOWLEDGEMENT

ABSTRACT

Improving the techniques of record keeping and computation in a car sell outlet, and the overall performance of the outlet is what this project tends to achieve. Getting vital information at the right time will solve the problems associated with the manual way of storing large volume of record, and the application of scientific methods to complex problems arising in the day to day buying and selling of cars.

TABLE OF CONTENTS

CHAPTER ONE

1.1   WHAT IS A COMPUTER

A computer is any electronic device (machine), which accepts and processes data by following a set of instructions (called program) to produce an accurate and efficient result. The computer system accepts data as input, processes it and subsequently stores it in a storage device as information. This stored information can also be retrieved as result or output. The entire process of computation is carried out at a very high speed, which cannot be equaled to that of humans. A pictorial representation of a computer system is given below:

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                                              ┌─────────────────┐
                                              │     OUTPUT      │
                                              │   INFORMATION   │
                                           →  └─────────────────┘
┌──────────┐      ┌──────────────┐      →
│  INPUT   │  →   │  PROCESSING  │  
│   DATA   │      │     UNIT     │      →     ┌─────────────────┐
└──────────┘      └──────────────┘         → │   STORE DATA    │
                                              │       OR        │
                                              │   INFORMATION   │
                                              └─────────────────┘
```
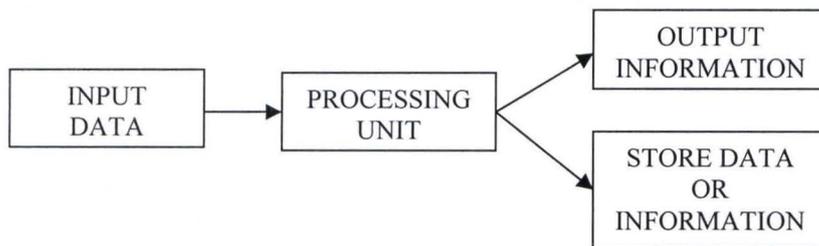
The above diagram illustrates the activities of a computer.

A computer is characterized by the following:

i.   Ability to accept data from the input device

ii.   Ability to store data and information (i.e. there is existence of memory)

iii.   Ability to process data to give information

iv.   Ability to output information.

From the above definition of a computer, data and information can be defined as follows:

1

DATA is a term given to basic concrete (raw) facts or symbols such as numbers, names or values etc, while INFORMATION refers to the processed data, which is more useful as output.

The physical component of a computer machine (that is the mechanical and electronic parts) makes up what is known as the computer hardware. The hardware also includes peripherals such as input and output devices and other accessories.

The computer software consists of the programs that may be used in a computer system together with their associated documentation. There are basically two types of software namely system software and application software.

1.1.1 Types of Computers

Computer types can be classified using different standards of classification. Basically, here, we are going to consider three standards for the classification of computers. They are classification by size, classification by generation and classification my mode of operation.

When classifying computers by size, we have basically four classes, they are briefly outlined below:

i.   Mini Computers: These are computers in the form of microchips in domestic and industrial appliances. They are usually designed to perform specific jobs and serve limited purposes.

ii.   Micro Computers: This class comprises of personal computers that are being used in day to day activities in domestic and industrial settings.

iii.   Mainframe Computers: These are large and very fast computers that are mainly used for specific industrial purposes. They can handle a very large amount of data, compute at a very high speed as well as handle very complex tasks with much ease. Examples of computers under this class are the switchboards that can be found in large organisations such as telecommunication firms.

iv.   Super Computers: These classes of computers are perhaps the largest and fastest and are usually developed for very specific industrial use, mostly in areas where expertise is needed. Examples of computers developed under this class are computers used for space research.

Classifying computers by generation, we have the following classes of computers:

i.   First generation computers (1951 – 1958): These are the first set of computers produced and were built with vacuum tubes as their main components. The basic characteristics of computers of this generation are as follows:

-       Use of vacuum tubes in electronic circuits

-       Limited main memory capacity

-       Slow input and output i.e. card oriented

-       Use of low level symbols language programming

-       Heat and maintenance problems.

An example of a computer in this generation is the Universal Automatic Computer (UNIAC), which was built in 1951.

ii. Second generation computers (1959 – 1964): These sets of computers are an improvement over the first generation computers and so they are much faster than the first generation computers. They are built with transistors. Characteristics of computers in this generation are as follows:

- Use of magnetic core as primary internal storage medium

- Use of transistors for internal operations

- More flexibility of input and output

- Faster input and output – tape oriented

- Use of high level programming languages i.e. FORTRAN and COBOL.

- Reduced heat generation

Computers in this generation were used for batch oriental application e.g. in billing, payroll, updating, inventory etc.

iii. Third generation computers (1965 – 1970): Computers under this class were built with integrated circuits and are far more effective compared to the second generation computers as a single integrated circuit could effectively carry out the job of over ten transistors. Characteristics of computers in this generation are as follows:

- Use of integrated circuits (IC) for internal operations. This IC is made with silicon.

- Use of magnetic core and solid state as main storage

- More flexibility with input and output – disc orientation instead of tapes in the second generation

- Smaller size and better performance with reliability

- Extensive use of high level language (HLL)

- Emergence of the mini computers

- Remote processing and timely communication

- Availability of operating system programs to control input and output and perform many tasks previously handled by human operations.

Applications in this generation include

- Airline Reservations

- Marketing forecasting

- Credit billing

iv. Fourth generation Computers (1971 to date): These sets of computers evolve as an improvement over the third generation computers. They use microprocessors as their building blocks of processing and are very efficient and fast compared to all other classes of computers mentioned above. Characteristics of computers in this generation are as follows:

- Use of microprocessors

- Use of Large Scale Integration (LSI) and Very Large Scale Integration (VLSI)

- Increase in storage capability and speed

- Modular design of programs and compatibility with different computers

- Availability of sophisticated programs for special applications

- Versatility of input and output.

Some applications that characterises this generation are:

- Mathematical modeling and simulation

- Electronic fund transfer (EFT)

- Computer aided instruction (CAI)

- Computer aided manufacturing (CAM)

- Computer aided learning (CAL)

v.   Fifth Generation Computers (yet ahead): These classes of computers are also built on the silicon microprocessor technology and at a much more sophisticated and complex level. These computers are intended to imitate the intelligent behaviour of human beings and should be capable of generating new knowledge from existing knowledge. The field of study towards this realization is called ARTIFICIAL INTELLIGENCE. Today, we have EXPERT SYSTEMS, which are software that allows the computer to act as an expert on some particular discipline and are available for consulting. Such software exists in medicine, geology and several other fields.

Computers in this generation are to be employed in the execution of very complex assignments.

Classifying computers by their mode of operation, we have the following classes of computers:

i.   Digital Computers: This class of computers take their input values in the form of discrete values

ii.   Analogue Computers: These are computers whose input values are in the form of continuous varying quantities.

iii.   Hybrid Computers: A hybrid computer is one that has the capability of the digital computers combined with the ability of the analogue computers.

1.1.2 Application of Computers:

At the moment, there is virtually no field of human endeavour in which the use of computers is not of a great importance. To highlight a few, we'll list some of the areas of application of computers:

Education – Computers are being used in the educational sector for several purposes. Computer aided learning (CAL), Computer aided instruction (CAI), intelligent and analytical tutoring systems for various subjects and courses e.t.c are some uses of computers in this field.

Research – The use of computers in collection, storage and analysis of research data and information has made research much easier and faster. Also the part that computers play in the technology of the Internet can never be

overemphasized, and it is clear that the Internet is a big warehouse for research resources.

Military – The use of computers in the development of weapons is a major landmark in the development of any army. Computers today are being used in global positioning systems (GPS) to track enemy locations, as well as to know what is going on in most parts of the earth. Computers are also being employed in the military as autopilots for unmanned aircraft in wars. Also, use of computers in war projections has aided many armies in attaining victory in wars. There are several other uses of computers in any military.

Communication – Here computers are used to aid communication by enhancing the information technology strengths of computers. Computers can transfer information between its parts and from one place to another at a very high speed, so today we have communication satellite technologies, Very Small Aperture Terminals (VSAT) technologies, Global System for Mobile Communication (GSM) technologies, etc in existence with each technology making a useful use of one or more qualities of computers.

Medicine – Computers are presently being employed in medicine especially in form of expert systems to aid in medical diagnosis and to help increase the productivity of medical practitioners. These expert system help to make the service(s) of a medical expert available to more and more people within the same

period of time as these systems can ask a patient a series of questions concerning his/her ill health and then diagnose the patient based on the complaints given.

Engineering – Computers are being employed in engineering mainly for designs and manufacturing. Software now exists for Computer aided designs (CAD) and Computer Aided Manufacturing (CAM) that helps to solve a great deal of problems in this area.

Architecture – In architecture today, computers are being employed for the development of plans and models. Computer aided design software e.g. AutoCAD helps architects develop with much ease all types of drawings and plans. It also helps them in the projection of the strength of materials and buildings and to visualize structures pictorially before they are being laid on the earth.

Accounting and Statistics – Computers are used to reduce the workload on accountants and statisticians as computers have the ability to perform several calculations in a very short time and with great efficiency and accuracy. The application of computers in the financial and accounting world remains an important factor for the existence of these fields. Examples of software that are useful in these fields are: Microsoft Excel, Standard Package for Scientists and Statisticians (SPSS) etc.

Banking – In the banking sector of today, e banking is the order of the day. Computers have made banking transactions much easier and banks today can attend to more customers within a very short time. This sector of human endeavour takes advantage of the speed and storage capabilities of computers.

Commerce – At the onset of time, for commerce (i.e. buying and selling) to take place, the buyer and the seller has to be together physically. Today the application of computers in commerce has introduced e-commerce that has greatly eased buying and selling. Here the buyer and the seller don't have to see each other, all they do is to buy and sell over a computer network such as the Internet.

Agriculture – Computers are being used in agriculture for projections and also for records keeping, though lately, they are being employed to carry out more complex tasks that require expertise.

Word Processing and Desktop Publishing – This is perhaps the most common area of application of computers. Several software have been developed to perform tasks in this areas, examples include Microsoft Word, Corel WordPerfect and a host of other software.

Power Generation, Space Works (Space Research), Science Development, Finance, Bookkeeping, Economics, Politics, Journalism,

Aeronautics, Automobiles and several other areas of human expertise has been positively affected by the use of computers. One can conclude that any field of human endeavor in today's world that is not successfully aided by the use of computers does not contribute much to human existence as all fields of human endeavor that contribute to human existence makes use of computers in one way or the other.

1.2   AIMS AND OBJECTIVES OF THE STUDY

This project work aim primarily at improving the techniques of record keeping and computation in a car sell outlet and thus improving the overall performance of the outlet. Hence taking effective decision. It intends to encompass the specific methodology and procedure employed in a car sell outlet. It also intends to provide managers a powerful skill or approach for solving problems associated with storage of large volumes of records, as well as the application of scientific methods to complex problems arising in the day to day buying and selling of cars.

Objectives of the Study

The objectives of this project are to provide managers ingenious skills of managing effectively their car sale outlet(s), and to develop and implement a structured and computerized system for computation and record keeping. This system will involve the use of combined utilization of the mathematical techniques and storage facilities of personal computers to assist managers in

taking marketing, purchasing and management decision and producing intended results in shorter time, more accurately and effectively.

In order to achieve this, customized computer system software will be developed to simulate the common processes involved in the management of a car sell outlet and enhance the managers' effectiveness, consistency and decision making process by very high speed and accurate use of the microprocessor of the personal computers.

1.3   SCOPE AND LIMITATION OF THE STUDY

Considering the problems identified above, it is difficult to develop immediately a system, which will cover all the problems facing car sell outlets. For this reason, our study is focussed on the ineffectiveness of the record keeping approach and its computerization. This is because ot its importance for instance that it is taken as the pillar of every sale outlet and even most organisations. Its computerization can even allow the control of the entire system.

Another important reason is that the growth of every organisation can be measured through the effectiveness of its services and this in turn depends largely on the effectiveness and reliability of the methods of storing its growing data records.

1.4   PROGRAMMING LANGUAGE USED

The programming language used in the development work is Microsoft Visual Basic version 6.0. This language is used so that one can take advantage of its

ability to communicate effectively with databases as well as its consistence in computing and output of results. The ease of use of the language is also capitalized on during the development process.

CHAPTER TWO

BRIEF OVERVIEW OF MUSTAPHA CAR SALE OUTLET

2.1 BRIEF HISTORY OF MUSTAPHA MOTORS

Mustapha motors was established in 1992.

Before the inception of the company, the founder of the company, Alhaji Ali Kankara was a dealer in fertilizer products, but with the looks of things then and considering the market formation of Minna, he decided to shift his trading line to car sales. He named the company Mustapha Motors, a name after his first son - Mustapha. He started out with about five (5) cars and the company continued to grow progressively to its present state.

The five cars owned by the company at the onset belonged to one person, but thereafter, the company continued to register more members with each member of the company owning a specific number of cars, some with one car and others with several cars.

At the moment, Mustapha Motors has about one hundred to one hundred and fifty cars at all time for sale. All cars belong to different members of the company.

2.2 ORGANISATIONAL STRUCTURE

On the organisational structure of Mustapha Motors, the owner and founder of the company, in person of Alhaji Ali Kankara is the chairman and chief

executive of the company. Reporting to the chairman is the managing director of the company. Below the managing director are three managers, who are the heads of their respective departments. The managers and the offices under them are highlighted below:

➤ Manager Commerce: This is the office of the head of the commerce department. The offices under this office are the offices of the purchasing officer and the office of the marketing crew respectively.

➤ Manager Maintenance Operations: Heads the maintenance operations department. This department is composed mainly of the offices of the maintenance mechanics - which maintain cars in good shape while in the garage/showroom - and, the office of the repair mechanics. The repair mechanics carry out repair on cars (mostly used cars) that develop one or more minor problem(s) before purchase, during transportation or while under the custody of the company.

➤ Manager Finance and Administration: This is the office of the personnel officer of the company. Reporting to this office are the offices of the accountant of the company, the office of the record keeper, all secretaries of the company, and the office of the drivers, security guards and car wash men.

Below is a pictorial representation of the organogram structure of the hierarchy of the offices in the company.

ORGANOGRAM STRUCTURE FOR MUSTAPHA MOTORS

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                    ┌─────────────────────────────┐
                    │ CHAIRMAN / CHIEF EXECUTIVE   │
                    └─────────────────────────────┘
                                 │
                                 ▼
                    ┌─────────────────────────────┐
                    │    MANAGING DIRECTOR         │
                    └─────────────────────────────┘
                                 │
        ┌────────────────────────┼────────────────────────┐
        ▼                        ▼                         ▼
┌─────────────────┐    ┌─────────────────┐    ┌──────────────────────────┐
│ COMMERCE        │    │  MAINTENANCE    │    │ FINANCE/ADMINISTRATIVE   │
│ MANAGER         │    │  MANAGER        │    │       MANAGER            │
└─────────────────┘    └─────────────────┘    └──────────────────────────┘
   │                        │                      │
┌──┴──────┐                 │              ┌───────┴───────┐
▼         ▼                 │              ▼               ▼
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| PURCHASING OFFICER | MARKETING CREW | | | ACCOUNTANT | RECORD KEEPER |

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                       ┌────────┴────────┐
                       ▼                 ▼
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| REPAIR MECHANICS | MAINTENANCE MECHANICS |

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                              ┌──────────┴──────────┐
                              ▼                     ▼
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| SECRETARY AND CLERKS | DIVERS, SECURITY GUARDS AND CAR WASHMEN |

16
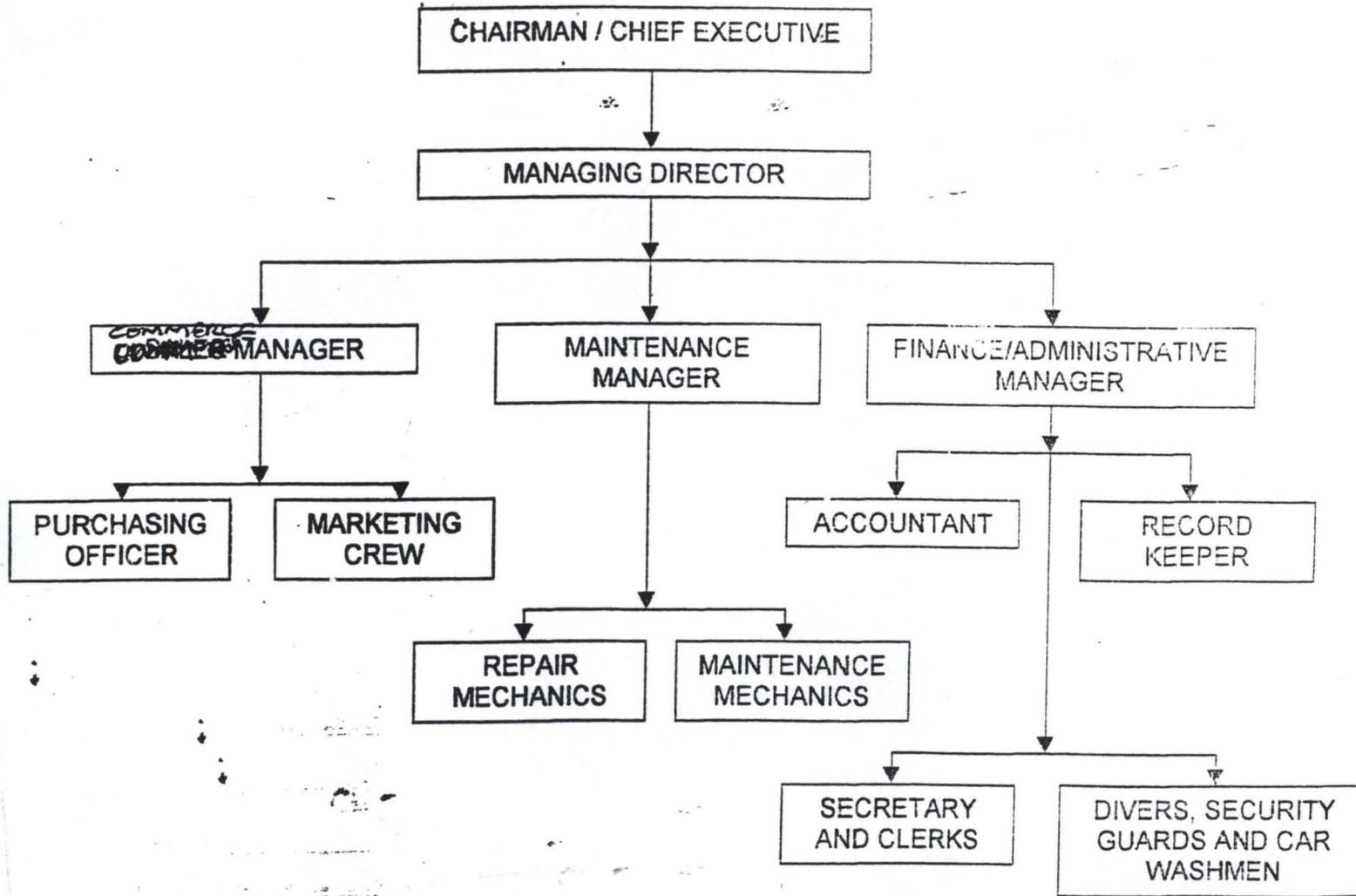
2.3   HIGHLIGHTS OF CAR SALE OUTLETS

Most car sell outlets operate on retail sales of cars. Some car sell outlets engage in the sales of used cars (popularly known as *TOKUNBO CARS*, while some others stock only new cars. We also have a number of car sell outlets that have both new and used cars in their showrooms.   Depending on the management of the car sell outlet and the general objectives of the company, some car sell outlets market different brands of cars from just one manufacturer, while others market different brands of cars from different car manufacturers.

The sources of stock for car sell outlets usually differs, though most car sources in Nigeria today are through imported sources as Nigeria has not started production of cars - the best we have so far are assembly of automobiles. Some car sell outlets purchase their wholesale stock from car manufacturers directly, while others purchase theirs through middlemen.

Whatever brand, make or age (old or new) of cars that a car sell outlet has, one thing is common between all car sell outlets, and that is records of incoming and outgoing cars. These records are kept in different formats, on different platforms and in different ways as methods of record keeping depend on the size and mode of operation of the company.

2.4   REASONS FOR SYSTEM DEVELOPMENT

For any company, as the company grows larger and more complex in operations, especially as the population of data begins to rise, manual systems of operations begins to reveal their loopholes in terms of consistency, accuracy,

effectiveness and in several other areas. With continuous growth, these manual systems of operations fail to the insignificant. At this juncture, every good company management will seek out better ways of operation. Around the helping corner is information technology, which seeks to help these companies automate their operations to make things faster, more effective, more reliable and of course all operations become more portable.

Mustapha motors is not in any way and exception to these operational flaws indicated above, and at the moment the company has well over a hundred cars in stock with regular sales and a non stop supply flow. As the office becomes more busy, the volume of papers is on the increase and presently, the office is having a lot of problems keeping the files containing the photocopies of records of sold vehicles as the quantity is getting out of hand. This problem of volume also makes the searching of a particular record very difficult.

Due to the above setbacks, a system development is required and very important for the company to maintain its integrity of speed of service, accuracy and generally its good reputation.

CHAPTER THREE

SYSTEM ANALYSIS AND DESIGN

3.1   ANALYSIS OF THE CURRENT MANUAL SYSTEM

The current method of record keeping in Mustapha motors is totally based on manual processes. Below is a brief of the processes involved in the acquiring and sale of a vehicle with more emphasis on the manual methods of operations.

The manual method of keeping records is the technology being employed in Mustapha motors today. This comprises of the usual methods of keeping records of cars coming in and cars going out in manual records of files and folder files. Below is a brief explanation of the process.

When a new car arrives, the owner will submit the original particulars of the vehicle to the office of the managing director of the company through the proper channels. This channel includes a legal agreement between the company and the owner of the vehicle. After this has been done, the office of the managing director will issue a sticker of the company to the owner of the vehicle in a situation where the owner of the vehicle does not have a file of dealership with the company. At this juncture, the ownership of the car will be transferred to the company - i.e. Mustapha motors. A new file is at this juncture opened for the car. The file contains the particulars of the car, as well as the maintenance records of the car.

While the car remains under the custody of the company, the company is responsible for the maintenance of the vehicle through the maintenance department specified in the organogram structure above. Any form of depreciation in the vehicle becomes a liability that the company will be responsible for. Also, the security of the car becomes a sole duty of the company, as the company at this point is liable for the loss or theft of the vehicle or any of the parts of the vehicle. From the time of the issuance of a company sticker to the owner of the vehicle, the vehicle continues to be a property of the company, and this is so until the vehicle is being sold.

Once a prospective buyer comes the way of the company and negotiates for the vehicle, he is expected to make full payment for the vehicle at the agreed time. After this has been done, the ownership of the vehicle is being transferred to the buyer and the buyer is being handed over the documents of the car and a receipt of purchase.

When the car has been finally sold, the initial owner of the car i.e. the dealer that brought the car to the company will pay the company an amount of three thousand naira (₦3, 000. 00k) only for the issuance of the purchase receipt and invoice. The initial owner of the vehicle also settles the company as regards any money that was spent on the car while it was in the possession of the company. The expenses are being shared between the initial owner of the car and the company at a ratio that must have been agreed upon and stated in the legal agreement signed when the car was being handed over to the company by the initial owner. Thereafter, a photocopy of the duly certified particulars of the

vehicle will be kept with the company for record purposes and the original documents and the original receipt of purchase is given to the new owner i.e. the buyer of the vehicle.

3.2   PROBLEM IDENTIFICATION

Since the inception of the company, several dealers have joined and quitted the company, and the company remains.   Also, the company has received and sold several vehicles from these numerous dealers.   These said sold vehicles do not in any way include the vehicles bought by the company from its market source(s) and sold to its customers.

As more and more cars are being bought or brought in by dealers and sold by the company, the company keeps photocopies of the records of these vehicles.   These photocopies are usually being kept for record purposes and later references. With the increasing number of total deals already carried out by the company, the volume of these kept photocopies is on the constant increase. Today, the volume of the stored photocopies in the record section has increased so much that it is gradually getting out of hand. Searching of a particular record is also a very big problem as one has to manually search through a whole bulk of folders and files before one can locate the particular car record that is being searched.   This problem has now become a source of concern for the management of the company and has made the administration of the company more tedious. As searching and record keeping becomes a major problem for

the company, it is eminent that this problem will in one way or the other affect the efficiency and management of the company.

Having taken a careful look at the problem facing the company as stated above, the general computerisation of the keeping of records of the company is a possible and feasible solution to the arising problem. This involves a new computerised system that is expected to handle the records of individual vehicles as they come in, their stay under the custody of the company and their outward movement from the company. Once these have been solved, then the major problem of the company would have been removed and the efficiency of the company is bound to improve in the absence of these problems.

3.3   BENEFITS OF THE AUTOMATED SYSTEM

Of the several benefits and advantages associated with the automation of any system, the few that will be of great advantage to the system at hand will be specified below.

- Faster access to information: The new automated system provides a much more fast access to information. This is especially true for records of vehicles that have been sold over a long period of time. When trying to search through all the available records for a particular record, the new automated system makes such operations faster.

- Cost effectiveness: The new automated system provides the management with information for effective planning and it reduces workload significantly. The automated system also helps to store the data in the

physical storage area of the computer, thus increasing the convenience of processing such data. These whole lots of advantages are provided at a cheap and reasonable cost.

- The automated system brings about new innovations and allows the staff of the company more time of their own to come up with other new innovations in other sectors of the company.

- The automated system allows for a free and easier assessment of operations and sales. It makes it easier to check through the list of records of cars sold and make necessary assessment and decisions that can positively affect the activities of the company.

- The automated system makes the correction of mistakes easier and neater.

- The automated system provides an efficient and reliable digital security that prevents unauthorised personnel from accessing restricted data.

- The new automated system helps to store information for a longer time with the quality of storage being kept intact i.e. there is no depreciated quality of the physical data storage formats.

- The new automated system helps reduce the bulk of papers in the record storage section. This advantage is brought about by the storage of most (or all) records of incoming and outgoing vehicles in the computer system. It also helps to put all the stored data in one compact and easy to access physical position. This makes transfer and movement of the records from one location to another easier.

3.4   SYSTEM DESIGN

The software design is broken down below and given as follows:

3.4.1 Input Design: The design of the data input module has provision for several sets of data input, they are briefly outlined below.

-    Incoming Vehicles: There is a provision for the input of records of incoming vehicles. This record includes the chassis number of the vehicle, the engine number of the vehicle, the date the vehicle was purchased (if purchased) and the dealer from whom the vehicle was purchased (if not purchased from the manufacturer). The price the vehicle was purchased (if available) and the proposed minimum sale price of the vehicle will also be included in the input data. Other input data includes the day the vehicle was brought into the company (i.e. the day it came under the custody of the company), the colour of the vehicle, the make of the vehicle and the model of the vehicle. The state of the vehicle and the grade of the vehicle (if the vehicle is not a new one) will also be included in the input data. Also included in the input data are a brief about some deformities and irregularities in the vehicle and a general remark about the vehicle from the maintenance manager and the sales manager respectively.

-    Vehicle maintenance cost: Like all other machines, vehicles if left unused for a while might start to get weaker as some of its parts were designed for constant work. With effect to this problem, vehicles in a sell outlet has to

be checked regularly and some preventive maintenance has to be carried out on them for them to remain in good shape. This module allows the record keeper to input and keep records of all preventive maintenance cost incurred on the vehicle while the vehicle is under the custody of the company. This sub module allows the operator to enter the date the preventive maintenance was carried out on the vehicle, the exact maintenance work that was carried out on the vehicle, the total cost of the maintenance and a remark from the maintenance manager.

- Vehicle repair cost: Like the vehicle maintenance cost sub module, the vehicle repair cost sub module allows the operator to input all the cost incurred on corrective maintenance on the vehicle in situations where some of the vehicle parts damaged while the vehicle is under the custody of the company. This sub module allows the operator to enter the date the corrective maintenance was carried out on the vehicle, the exact maintenance work that was carried out on the vehicle, the total cost of the maintenance work and a remark from the maintenance manager.

- Vehicle sales: This sub module allows the company to document the sales of vehicles. In this sub module, the operator or the user of the software will have to input the engine number of the vehicle and the chassis number of the vehicle. The software automatically searches for other records of the vehicle and makes them available immediately to the user. These records also include the total amount of money spent on preventive and corrective maintenance respectively. The user is allowed to enter the

price at which the car is being sold and a few details about the buyer, if available. At this point, the software tags that particular vehicle as one that is no longer under the auspices of the company. When entering the engine number and chassis number of a vehicle to be sold, if the user enters a combination of engine and chassis numbers that does not exist in its database of available vehicles, it checks its database of sold vehicles. If it does not find a match for that combination in the database of sold vehicles, it signifies the user that the car does not and never existed in the company. If on the other hand the software searches its database of sold vehicles and finds the specified combination of engine and chassis number, it notifies the user that the specific vehicle whose numbers are entered has been sold off.

3.4.2 Output Design: The output design of the system has the following parts incorporated in it:

- Report of Vehicle Sales: This report shows the list of vehicles that has been sold off. It can show the list of sold vehicles on monthly or on annual basis based on the choice of the user. This report also shows the documented price that each vehicle was sold for.

- Report of Vehicle Repair Costs: This report or sub module reveals the amount of money spent on corrective maintenance. It has the ability to display these costs on a particular car or the total sum of money spent on repairs as a whole.

- Report of Vehicle Maintenance Costs: This sub module allows the user see the amount of money spent on preventive maintenance on vehicles in the company. Like the report of repair costs, it can allow the user to see the total amount of money spent on preventive maintenance of a particular vehicle or the total amount of money spent on preventive maintenance.

- Report of the Vehicles in the Possession of the Company: This sub module reveals the list of all the vehicles in the possession of and under the custody of the company at the particular moment. It reveals the date each vehicle came under the custody of the company and the owner of the vehicle.

- Report of the Total Cost of a Particular Vehicle: This sub module allows the user or operator to view the total cost that has been incurred on a particular vehicle. This cost includes the cost price of the vehicle, all money spent on the repair of the vehicle (if any), all money spent on the maintenance of the vehicle (if any) and any other miscellaneous money spent on the vehicle.

- Report of all Vehicles that has passed through the Company: This report or sub module allows the user or operator to view a comprehensive list of all the vehicles that has passed through the company. This list shows all vehicles that have at one time or the other been under the possession of the company. This allows the management to easily make an evaluation of the progress of the company as well as an insight into all the specific

vehicles that the company once had under its possession and the corresponding price that the vehicle was sold.

3.4.3 Miscellaneous Design: This includes all other functional aspects of the software design. These design aspects includes the following:

- Security: The security of the software is designed in such a way that before logging on to the software, an administrator password is required. Without this administrator password, the user is not allowed to log on to the software. This security feature was put in place so as to restrict the users that will have access to the data in the software as this data might be considered as confidential to the company. This feature also limits the number of people who can enter data into the software so as to reduce fraud to the lowest minimum.

- Ease of Use: The design of the software is also made in such a way that users need minimum knowledge of computer operations before they can log on to the software and use the software so long as the user has the correct administrator password. The software was designed to be user friendly.

- Portability: The design of the software was done in such a way that the software is made portable on several operating system platforms (mostly different version of the windows operating system). The software also has the portability to work on different computer architectures, so long the architecture of the computer meets the minimum requirements specified

and the operating system installed is compliant with the minimum specifications of the software designer.

- Efficiency: The design of the software takes efficiency into proper consideration, as the software is extremely efficient for the task it was meant to perform. It performs all the computations required accurately and on time. The method of storage of records within the database also ensures that records are kept safe and accurate such that no record of two different vehicles can get mixed up.

- Reliability: The software is a very reliable one as it produces correct output and the data are being stored in formats that meets international storage standards and specifications. Once there is an absence of hardware failure, then there is little or no expectancy of software failure that may result in loss of data within the software or a mix up of data within the software. Since the storage and computation within the software is very efficient, then any management can confidently rely on the results produced by the software.

3.5 FILE ORGANISATION:

File organisation is a way of specifying the organisation of records within the files and the items of each record.

In this software, all records are organised in a relational database. This database contains tables that hold respective information for the proper functioning of the software and the safe keeping of records. The tables and the

entire database itself are stored on the hard disk drive of the host computer system. This is done to ensure that the records are kept in the safest possible storage location on the host computer system.

Inside these tables, the combination of the engine number and the chassis number of a particular vehicle forms the basis for the uniqueness of records of the specified vehicle in the table. Therefore, no two vehicles can have the same engine and chassis number. This combination of engine and chassis numbers of a particular vehicle thus forms the primary key for tables in the database. Foreign key relations within the database also use this combination as the primary key.

CHAPTER FOUR

SOFTWARE DESIGN

4.1   SYSTEM REQUIREMENTS

The proposed system is a system that makes constant use of its database due to the fact that most of its data is being stored in a database and the software has facilities for processing and reporting data from the database. The system also possesses the ability of handling run time calls to and from the database from the application end user while maintaining the integrity of the system. After a proper study of the developed system, the following was reached as a conclusion for the minimum system requirements for the software to function effectively and maintain its integrity and efficiency.

- A system with a hard disk storage size of at least five (5) gigabytes.

- The computer system's memory capacity should be at least 64 megabytes (MB) for efficiency and speed.

- The computer system should have a processor speed of at least 233 MHz.

- The computer system should have a 3.5 floppy disk drive so diskette backup of the data will be possible.

- An uninterrupted power supply (UPS) unit, which will keep the computer system on and working in the event of power failure from the power source. This is needed so that the software can close normally always and thus ensure that data is kept safe and intact.

4.2   IMPLEMENTATION OF THE SYSTEM

Implementation simply means putting into effect the intention depicted in the design. It has the objective of utilizing the system designed to obtain an operational system, which must have been fully tested.   To achieve this, operations activities like coding, documentation, testing, debugging, user training and changeover are to be carried out.

The coding of the software was done with Microsoft Visual Basic 6.0 and an efficient use of Microsoft Access database was enhanced. This is because of the improved numerous facilities it provides; its ability to handle large programs of this nature and its excellent database handling capabilities.

Before implementation, the program was tested for errors that may be in existence and the errors found were amended accordingly. There are different types of testing methods available and the testing methods employed in the testing and implementation of this software are as follows in the order they were used:

-    Unit Testing: The individual unit functions having their respective and clearly defined specifications were tested.

-    Module Testing: The co-operation of the individual functions when they are put together was tested at this stage. The module testing, like the unit testing yielded successful results.

-    Subsystem Testing: In this stage, efforts were made on module interface with the assumption that the modules themselves are correct.

32

System Testing (Integration Testing): This was the final testing stage that the software passed through. At this testing stage, efforts were made more on finding errors in the design and the coding of the software. This testing stage was also concerned with the validation of the results that were yielded when the system was being used for what it has been designed for. At this stage, the data used to test the software were the same as those used in the old system and their respective results were compared. Also, data already processed by the old procedure was worked upon by the new procedure.

4.3   SOFTWARE RESULTS/OUTPUT

Below are some pictorial highlights of the software usage and output generated from the software:

Fig 4.1 Main Menu
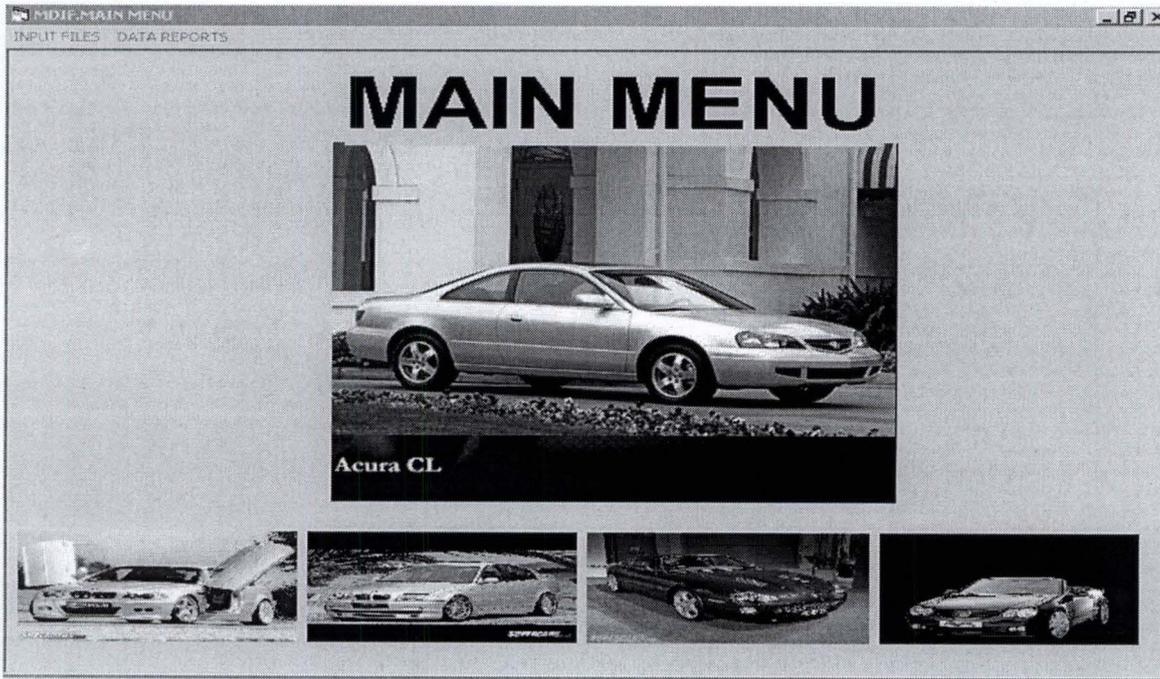
Fig 4.2 Incoming Vehicles

Fig 4.3 Vehicle Sales Form

Fig 4.4 Report of Vehicles that have passed through the company

REPORT ON VEHICLE PASSED THROUGH THE COMPANY

CHASSIS NUMBER	ENGINE	PURCHASE PRICE	CAR MAKE	CARCOLOUR	CARMODEL
TOTAL MAINT COST	SELLING PRICE	BUYER NAME			
GGOO5	52317	500000	peugeot	blue	406
54545454	45345435	dffdgf			
GGOO5	52317	500000	peugeot	blue	406
6546565	6456546	yytyytryty			
GGOO5	52317	500000	peugeot	blue	406
67564	6756767	nghnn			
GGOO5	52317	500000	peugeot	blue	406
53453434534	45353	dfg			
GGOO5	52317	500000	peugeot	blue	406
3423452	33423	dfgedf			
GGOO5	52317	500000	peugeot	blue	406
33434	345345	dfgdf			

Fig 4.5 List of Vehicles in the possession of the company

VEHICLES IN POSSESSION OF THE COMPANY

CHASSIS NUMBER	ENGINE NUMBER	PURCHASE PRICE	PURCHASE DATE	MINIMUM SELLING PRICE
DATE REACHED COMP	CAR COLOUR	CAR MAKE	CAR MODEL	CARA AGE
DEALER NAME	DEALER	STATE	GRADE	
GGOO5	52317	500000	2/1/2003	550000
2/1/2003	blue	peugeot	406	2
folu	abuja	satisfactory	a	

35

Fig 4.1 is a pictorial representation of the main menu of the software. It has two main sub menus, one for Input data files and the other for view of the various reports.

Fig 4.2 shows the form used while registering new vehicles. All the necessary data of the incoming vehicle will be entered into this form, and the computer will save the data in its database.

Fig 4.3 shows the form used to register vehicle sales. Like the incoming vehicle form, all the necessary data will be input in the form, and the software will store all the relevant information about the sold vehicle in its database. Only vehicles that are in the possession of the company will be allowed in this form.

Fig 4.4 reveals the list of all the vehicles that have passed through the company at one time or the other. This report lists vital information about the company, as well as the name of the customer that purchased the vehicle.

Fig 4.5 is a list of the vehicles in the possession of the company. All the vehicles will be listed in this form.

It should be noted that all the various lists of vehicles specified above contain more data than was revealed.

CHAPTER FIVE

GENERAL OBSERVATIONS AND RECOMMENDATIONS

5.1   GENERAL OBSERVATIONS

As a student of Mathematics and Computer Science, I observe that our focus among others should be establishing the fact that all manual operations in any organisation will yield better and timely results if they were automated. The car sale outlet that we looked into in this project is in no way an exception.

The awareness of the fact that automation of activities will undoubtedly improve the activities of a car sale outlet gave birth to the idea of this project work, as software development is a continuously growing area of computer science.

Software development is an area that is so broad that no one software can be developed that it will automate every area of human activities. Nevertheless, it is possible to develop software to meet specific and defined areas of human activities.

This project has thus revealed the fact that automation can go a long way to reduce the stress and improve efficiency of car sale outlet managers while on the job. The software developed can be used for the effective and efficient management of any car sale outlet. The prove of this is in the results got from the software execution.

5.2   RECOMMENDATION

As a result of the above general observations, I believe it is critical to focus on the development of software to automate human activities, so that more work can be done per unit of time. This additional job that can be done per unit of time can also be realised with more efficiency. Since software can greatly improve human efficiency, car sale outlet management is not an exception. Therefore, more tools and software should be developed for automating human activities, especially in the areas of the development of car sale outlet management systems.

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APPENDIX

PROGRAM CODES

Code for frmincomingvehicles

```
Private Sub cmdcheck_Click()
With Data1.Recordset
   .MoveFirst
While Not .EOF

If UCase(Trim(Text1.Text)) = !chassisnumber Then
   Text2.Text = !enginenumber
   Text3.Text = !purchasedate
   Text4.Text = !purchaseprice
   Text5.Text = !minimumsellingprice
   Text6.Text = !datereachedcompany
   Text7.Text = !carcolour
   Text8.Text = !carmake
   Text9.Text = !carmodel
   Text10.Text = !carage
   Text11.Text = !remark
   Text12.Text = !State
   Text13.Text = !grade
   Text14.Text = !dealername
   Text15.Text = !dealeraddress
End If
   .MoveNext
Wend
End With

End Sub

Private Sub cmdclose_Click()
Me.Hide
End Sub

Private Sub cmddelete_Click()
On Error Resume Next
Data1.Recordset.Delete
If Not Data1.Recordset.EOF Then
```

```
Data1.Recordset.MoveNext
ElseIf Not Data1.Recordset.BOF Then
Data1.Recordset.MovePrevious
'Else
'msg "THIS WAS THE LAST RECORD IN THE TABLE IN THE TABLE"
End If
End Sub


Private Sub cmdsave_Click()
With Data1.Recordset
  .MoveFirst
  While Not .EOF
  If !chassisnumber = UCase(Trim(Text1.Text)) Then
  MsgBox "THIS CAR ALREADY EXIST !!!"
  Text1.SetFocus
  Exit Sub
  ElseIf !chassisnumber <> UCase(Trim(Text1.Text)) Then
  .MoveNext
  ElseIf .EOF Then
  .AddNew
  !chassisnumber = UCase(Trim(Text1.Text))
  !enginenumber = UCase(Trim(Text2.Text))
  !purchasedate = Val(Trim(Text3.Text))
  !purchaseprice = Val(Trim(Text4.Text))
  !dealername = UCase(Trim(Text14.Text))
  !dealeraddress = UCase(Trim(Text15.Text))
  !minimumsellingprice = Val(Trim(Text5.Text))
  !datereachedcompany = Val(Trim(Text6.Text))
  !carcolour = UCase(Trim(Text7.Text))
  !carmake = UCase(Trim(Text8.Text))
  !carmodel = UCase(Trim(Text9.Text))
  !carage = Val(Trim(Text10.Text))
  !State = UCase(Trim(Text12.Text))
  !grade = UCase(Trim(Text13.Text))
  !remark = UCase(Trim(Text11.Text))
  .Update
  End If
  Wend
End With
Text1.Text = ""
Text2.Text = ""
Text3.Text = ""
Text4.Text = ""
Text5.Text = ""
Text6.Text = ""
Text7.Text = ""
```

```vb
Text8.Text = ""
Text9.Text = ""
Text10.Text = ""
Text11.Text = ""
Text12.Text = ""
Text13.Text = ""
Text14.Text = ""
Text15.Text = ""
End Sub

Private Sub Form_Load()
Text1.Text = ""
Text2.Text = ""
Text3.Text = ""
Text4.Text = ""
Text5.Text = ""
Text6.Text = ""
Text7.Text = ""
Text8.Text = ""
Text9.Text = ""
Text10.Text = ""
Text11.Text = ""
Text12.Text = ""
Text13.Text = ""
Text14.Text = ""
Text15.Text = ""
Data1.DatabaseName = App.Path & "\vehiclesalesdb"
Data1.RecordSource = "tincomingcars"
End Sub

Private Sub Text1_KeyDown(KeyCode As Integer, Shift As Integer)
'With Data1.Recordset
  '.MoveFirst
'While Not .EOF
'If Text1.Text = !chassisnumber Then
'If KeyCode = 13 Then
'KeyCode = 0
'Else
'SendKeys "{tab}"
'End If
  'Text2.Text = !enginenumber
  'Text3.Text = !purchasedate
  'Text4.Text = !purchaseprice
  'Text5.Text = !minimumsellingprice
  'Text6.Text = !datereachedcompany
  'Text7.Text = !carcolour
```

```
        'Text8.Text = !carmake
        'Text9.Text = !carmodel
        'Text10.Text = !carage
      ' Text11.Text = !remark
        'Text12.Text = !State
        'Text13.Text = !grade
        'Text14.Text = !dealername
        'Text15.Text = !dealeraddress
'End If
    ' .MoveNext
'Wend
'End With

End Sub
```

Code for vehiclesold

```
'Option Explicit

Dim summaintcost1  As Double
Dim summaintcost2  As Double

Private Sub cmdclose_Click()
Me.Hide
End Sub

Private Sub cmdfind_Click()
With Data1.Recordset
   .MoveFirst
   While Not .EOF
   If   UCase(Trim(Text1.Text))   =   !chassisnumber   And   Text2.Text   =
!enginenumber Then

   UCase(Trim(Text4.Text)) = !sellingprice
   UCase(Trim(Text8.Text)) = !sellingdate
   UCase(Trim(Text5.Text)) = !buyername
   UCase(Trim(Text6.Text)) = !buyeraddress
   UCase(Trim(Text7.Text)) = !phonenumber

   End If
   .MoveNext
   Wend
   End With

   summaintcost1 = 0
```

```vb
summaintcost2 = 0
With Data3.Recordset
   .MoveFirst
10  If .EOF Then
      MsgBox "THIS CAR DOES NOT HAVE ANY MAINTENANCE COST"
      Exit Sub
   ElseIf UCase(Trim(Text1.Text)) = !chassisnumber Then
      summaintcost1 = summaintcost1 + !maintenancecost
      .MoveNext
      MsgBox "e1"
      GoTo 10
   Else
      .MoveNext
      MsgBox "2nd record"
      GoTo 10
   End If
End With

With Data4.Recordset
   .MoveFirst
20  If .EOF Then
         Exit Sub
   ElseIf UCase(Trim(Text1.Text)) = !chassisnumber Then
      summaintcost2 = summaintcost2 + !maintenancecost
      .MoveNext
      MsgBox "e2"
      GoTo 20
   Else
      .MoveNext
      GoTo 20
   End If
End With
Text3.Text = summaintcost1 + summaintcost2

End Sub

Private Sub cmdsave_Click()
With Data1.Recordset
   .MoveFirst
   While Not .EOF
   If !chassisnumber = UCase(Trim(Text1.Text)) Then
   MsgBox "THIS CAR ALREADY EXIST !!!"
   Text1.SetFocus
   Exit Sub
   ElseIf !chassisnumber <> UCase(Trim(Text1.Text)) Then
   .MoveNext
```

```
    Elself .EOF Then
    .AddNew
    !chassisnumber = UCase(Trim(Text1.Text))
    !enginenumber = UCase(Trim(Text2.Text))
    !totalmaintcost = Val(Trim(Text3.Text))
    !sellingprice = Val(Trim(Text4.Text))
    !buyername = UCase(Trim(Text5.Text))
    !buyeraddress = UCase(Trim(Text6.Text))
    !phonenumber = UCase(Trim(Text8.Text))
    !sellingdate = Val(Trim(Text8.Text))
    .Update
    End If
    Wend
End With
Text1.Text = ""
Text2.Text = ""
Text3.Text = ""
Text4.Text = ""
Text5.Text = ""
Text6.Text = ""
Text7.Text = ""
Text8.Text = ""
End Sub

Private Sub Command1_Click()

End Sub

Private Sub Form_Activate()
Text1.SetFocus
Text1.Text = ""
Text2.Text = ""
Text3.Text = ""
Text4.Text = ""
Text5.Text = ""
Text6.Text = ""
Text7.Text = ""
Text8.Text = ""

End Sub

Private Sub Form_Load()
    Data2.DatabaseName = App.Path & "\vehiclesalesdb"
Data2.RecordSource = "tincomingcars"
Data1.DatabaseName = App.Path & "\vehiclesalesdb"
Data1.RecordSource = "tsale"
```

```vb
Data3.DatabaseName = App.Path & "\vehiclesalesdb"
Data3.RecordSource = "tmaintenance"
Data4.DatabaseName = App.Path & "\vehiclesalesdb"
Data4.RecordSource = "trepair"

End Sub

Private Sub Text1_LostFocus()
With Data2.Recordset
    .MoveFirst
5   If .EOF Then
      MsgBox "THIS CAR DOES NOT EXIT"
      Exit Sub
    ElseIf UCase(Trim(Text1.Text)) = !chassisnumber Then
      Text2.Text = !enginenumber
      'Text4.SetFocus
    Else
      .MoveNext
      GoTo 5
    End If
    End With


    End Sub
```

Code frmvehicle repaircost

```vb
Private Sub cmdclose_Click()
Me.Hide
End Sub


Private Sub cmdsave_Click()
With Data1.Recordset
    .MoveFirst
    While Not .EOF
    If !chassisnumber = UCase(Trim(Text1.Text)) Then
    MsgBox "THIS CAR ALREADY EXIST !!!"
    Text1.SetFocus
    Exit Sub
    ElseIf !chassisnumber <> UCase(Trim(Text1.Text)) Then
    .MoveNext
    ElseIf .EOF Then
    .AddNew
    !chassisnumber = UCase(Trim(Text1.Text))
```

46

```
        !enginenumber = UCase(Trim(Text2.Text))
        !correctivemaintdate = Val(Trim(Text3.Text))
        !maintenancenature = UCase(Trim(Text4.Text))
        !maintenancecost = Val(Trim(Text5.Text))
        !remark = UCase(Trim(Text6.Text))
        .Update
        End If
        Wend
End With
Text1.Text = ""
Text2.Text = ""
Text3.Text = ""
Text4.Text = ""
Text5.Text = ""
Text6.Text = ""
End Sub

Private Sub Command1_Click()
frmvehiclesold.Show
End Sub

Private Sub Form_Load()
Text1.Text = ""
Text2.Text = ""
Text3.Text = ""
Text4.Text = ""
Text5.Text = ""
Text6.Text = ""
'Text1.Text = frmincomingvehicle.Text1.Text
'Text2.Text = frmincomingvehicle.Text2.Text
Data2.DatabaseName = App.Path & "\vehiclesalesdb"
Data2.RecordSource = "tincomingcars"
Data1.DatabaseName = App.Path & "\vehiclesalesdb"
Data1.RecordSource = "trepair"
End Sub

Private Sub Text1_LostFocus()
With Data2.Recordset
   .MoveFirst
   'While Not .EOF
10   If .EOF Then
       MsgBox "THIS CAR DOES NOT EXIT"
       Exit Sub
     ElseIf UCase(Trim(Text1.Text)) = !chassisnumber Then
       Text2.Text = !enginenumber
       Text4.SetFocus
```

```vb
        Else
          .MoveNext
          GoTo 10
        End If

     '.MoveNext
   '  Wend
     End With
End Sub
```

Code for frmvehiclemaintcost

```vb
Private Sub cmdclose_Click()
Me.Hide
End Sub

Private Sub cmdsave_Click()
With Data1.Recordset
   .MoveFirst
   While Not .EOF
   If !chassisnumber = UCase(Trim(Text1.Text)) Then
   MsgBox "THIS CAR ALREADY EXIST !!!"
   Text1.SetFocus
   Exit Sub
   ElseIf !chassisnumber <> UCase(Trim(Text1.Text)) Then
   .MoveNext
   ElseIf .EOF Then
   .AddNew
   !chassisnumber = UCase(Trim(Text1.Text))
   !enginenumber = UCase(Trim(Text2.Text))
   !preventivemaintdate = Val(Trim(Text3.Text))
   !maintenancenature = UCase(Trim(Text4.Text))
   !maintenancecost = Val(Trim(Text5.Text))
   !remark = UCase(Trim(Text1.Text))
   .Update
   End If
   Wend
End With
Text1.Text = ""
Text2.Text = ""
Text3.Text = ""
Text4.Text = ""
Text5.Text = ""
Text6.Text = ""
End Sub
```

```vb
Private Sub Command1_Click()
frmvehiclerepaircost.Show
End Sub

Private Sub Form_Load()
Text1.Text = ""
Text2.Text = ""
Text3.Text = ""
Text4.Text = ""
Text5.Text = ""
Text6.Text = ""
'Text1.Text = frmincomingvehicle.Text1.Text
'Text2.Text = frmincomingvehicle.Text2.Text
Data2.DatabaseName = App.Path & "\vehiclesalesdb"
Data2.RecordSource = "tincomingcars"
Data1.DatabaseName = App.Path & "\vehiclesalesdb"
Data1.RecordSource = "tmaintenance"
End Sub


Private Sub Text1_LostFocus()
With Data2.Recordset
   .MoveFirst
   'While Not .EOF
10   If .EOF Then
      MsgBox "THIS CAR DOES NOT EXIT"
      Exit Sub
    ElseIf UCase(Trim(Text1.Text)) = !chassisnumber Then
      Text2.Text = !enginenumber
      Text4.SetFocus
    Else
      .MoveNext
      GoTo 10
    End If

   '.MoveNext
 ' Wend
   End With
End Sub
```