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JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

PROPASAL DOCUMENT FOR:

HELTZ CAR HIRE MANAGEMENT SYSTEM

By:

……..

APPROVED BY: _____

Project supervisor

DATE _____**SIGNATURE** _____

UNIT NAME: Computers Systems project UNIT CODE: DIT-0402

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INTRODUCTION

HELTZ CAR HIRE COMPANY is located at Nairobi city centre along Moi Avenue. It has been in operation for the last five years since 2003. It's headed by chief executive officer under the management of Mr. John Njoroge. The environment it's located is very competitive because most of other business in car hire sector are located within the city, this makes it vital for the business to stand out from the rest by offering quality services. The company maintains records of vehicles hired, the individual, company or group hiring a car and payments made. This information is captured and recorded in the company's master file. The Heltz car hire management system will automate all the transactions regarding the company in order to offer quality services to its customers and use the system to compete effectively in the market.

PROBLEM STATEMENT

HELTZ Car Hire Company has been using a manual system to handle the records captured. This manual has a variety of setbacks, which include:

1. Security
   It is very easy for unauthorized persons to access records stored and manipulates them. Files can also be misplaced leading to loss of information.

2. Storage Space
   Records stored in files can be very bulky thus occupying very large office space.

3. Retrieving and updating records
   Retrieving and updating records stored in the manual is a very tiresome task and it is also time consuming

4. Inconsistency
   Information stored in different files in a manual system is not linked therefore there is a lot of data duplication

5. Obsolete data
   It is very difficult to keep track of records in the manual system. This leads to existence of obsolete data.

PROPOSED SOLUTION SYSTEM

It is due to the above problems with the manual system being used at HELTZ car hiring company that I have decided to come up with a computerized system to capture client, car and payment details. The system will accomplish the following:

a) Reduce time spent in retrieving information required for reference or justification.
b) It should be able to implement security aspects and data integrity
c) Reduce time taken by the management in coming up with concrete decisions.
d) To produce reports to the organization for daily, monthly and annually analysis.

SYSTEM JUSTIFICATION

As seen earlier, the manual system has a lot of setbacks; however the Heltz car hire system will reduce these setbacks. Below is a comparison between the existing system and the proposed system:

1. *Manual system*: records are stored in files, which occupy a lot of space. Retrieval of records in these files is time consuming.

Computer system: records will be stored in a database that reduces the amount of office space occupied and also ease retrieval of files.

2. *Manual system:* employees are responsible for recording and handling details captured. These records are prone to human errors.

Computer system: the company's activities will be automated reducing occurrence of errors.

3. *Manual system:* files are prone to unauthorized users who can alter and manipulate records.

Computer system: files are stored in a database, which is protected from unauthorized users using passwords.

4. *Manual system*: has limited storage space.

Computer system: has a database capable of storing large amounts of records.

5. *Manual system:* records are stored in different files, which lead to duplication of data.

Computer system: files are linked making it easy to update them.

SYSTEM OBJECTIVES

1. To keep track of client details
2. To show cars available for hire
3. Speed up access of records stored in the system's database
4. Keep a database of client records
5. Enhance file sharing
6. Provide an easy way to use user interface
7. Improve the efficiency of customer care
8. Reduce the occurrence of errors
9. Capture hiring process
10. Generate required reports

PERSONAL OBJECTIVES

- To help me to gain more knowledge in software development.
- To apply software concepts and developing report writing skills

PROJECT OBJECTIVES

- Collect accurate information which will enable project run sufficiently.
- To carry out research on what information should be available to make the system functional.
- Design a good interaction user interface using Microsoft visual basic 6.0.
- To implement and test the code to check if it meets the user requirements and satisfy its functionality.
- To document all the activities and tasks.

LITERATURE REVIEW

CASE STUDY

I carried out research on this system of car hire management system at JATCO Car Hire Company which is located at Nairobi along acra road and I was able to gather the following facts about their system:

Strength of the system

- The system has reduced the running cost of the organization since most of the middle class workers have been reduced hence causing flattening of the company.

- There is data integrity since unauthorized personnel are denied direct access by the use of password.
- It has drastically reduced the paper work hence saving stationery costs and as a result, there is an increase in revenue for the company.

Weakness of the system

- Maintainability: The system is not able to meet the changing needs of the customer since there is no proper documentation to explain the source code to allow modification.
- Efficiency: The system is making wasteful use of system resources such as memory since the user interface used occupies a large memory space.
- The user interface used is not friendly as expected
- The system database is not reliable since it's not consistent in giving accurate information and as a result it's prone to errors.

CON**CLUSION**

After conducting the study, it was found out that the new system would be counter checking the current limitations. It would be able to capture data effectively and produce quality information for decision making. This will offer the organization a strategic and a competitive advantage over its competitors

RESEARCH METHODOLOGY

I intend to carry out my research through:

Interviews

Arranging for interviews with stakeholders who are using the current manual system and who have been through the process and ask them relevant questions regarding the operations of the current system.

Observation

This involves visiting Heltz car Hire Company to observe the operations of the current manual system. This method will help to observe a number of problems and gives a chance to see how the users perform their tasks.

Internet

The internet will enable the researcher to be able to get more information concerning the system or relative systems through the use of links.

DEVELOPMENT METHODOLOGY

- I intend to use the waterfall model in developing the Heltz Car Hire Management System. Reasons for choosing the waterfall model include:
- It reduces the scope of the project by breaking it down into a set of activities, which are easy to carry out and understand.
- Its easier to note errors and correct them
- The end of one activity means the beginning of another

The outputs from one stage are used as inputs to the next stage. .

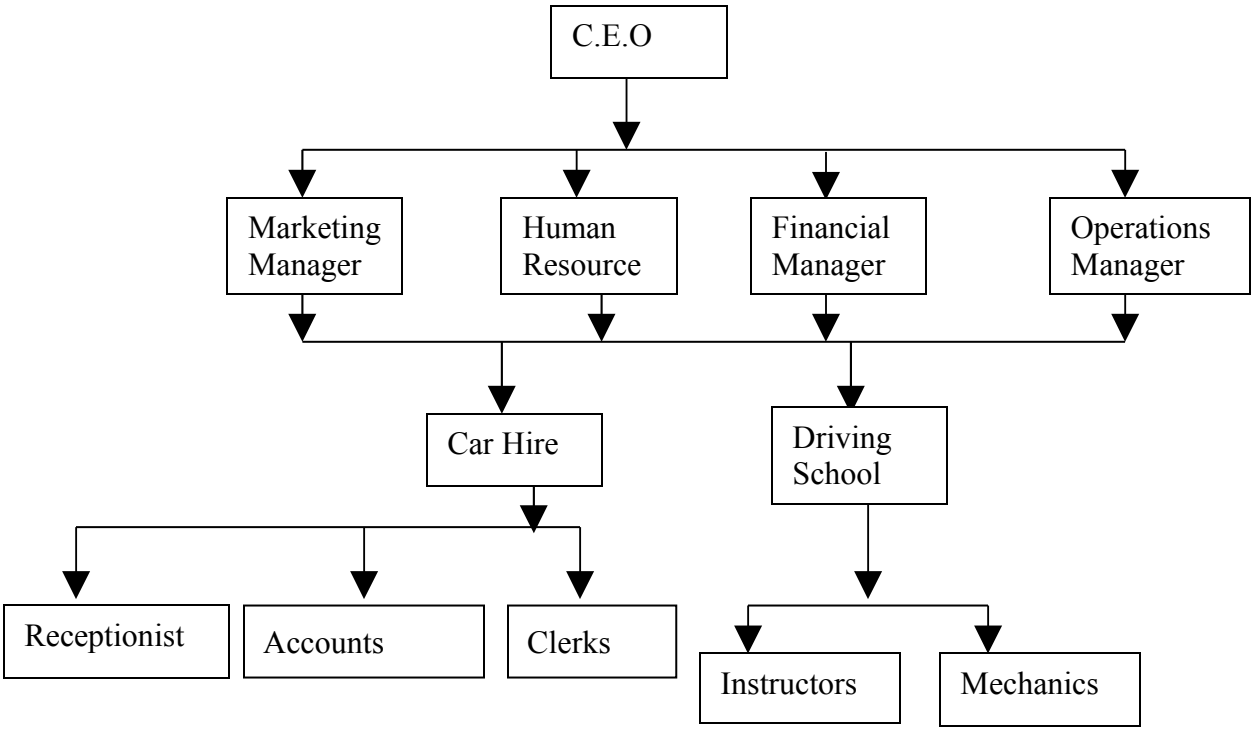
SYSTEM SCOPE

The car hire management system should be able to capture the following:

- client details
- cars available for hire
- payment list of customers
- car hire date
- return date
- penalties/overdue charges
- employees listing
- hire rate

ORGANIZATIONAL STRUCTURE

Below is a diagram showing the organizational structure of Heltz driving school.



SYSTEM DEVELOPMENT BUDGET

According to the data collection methods, some costs will be incurred during traveling to gather fact findings and also cost for producing hard and soft copies .Below is an estimate of the costs to be incurred during system development

ITEMS	ESTIMATED COST	ACTUAL COST
Research costs:		
Traveling costs-traveling to the site to gather actual facts on the ground	Sh.1000	
Browsing costs to search for information over the internet	Sh.500	
Flash disk-for storing information for future reference editing.	Sh.800	
Computer-for transferring manual documents to automated documents.	Available at the college	
Printing and Typing-transferring soft copies to hard copies	Sh.1000	
Stationery-for creating hard copies	Sh.500	
TOTAL	Ksh.3800	

TIME SCHEDULE

Act no	Activity	Duration	Estimated start date (2008)	Actual start date	Estimated end date	Actual end date	Deliverables
1	Project identification	2 weeks	18 Aug		1 Sep		A viable project
2	Writing project proposals	2 weeks	2 Sep		15 Sep		Project proposal
3	Project presentation	2 days	16 Sep		17 Sep		Project presentation
4	System investigation 1.literature review 2.collect data 3.analyse data	2 weeks			1 Oct		Requirements specification document
5	Design specification 1.design the interface 2.database design	3 weeks	2 Oct		23 Oct		Design specification document
6	System development 1.coding	2months	24 Oct		24 Dec		Running program
7	Testing 1.unit testing 2.system testing 3.acceptance testing	1 month	25 Dec		25 Jan		Test plan
8	Implementation 1.systen conversion	2 weeks	26 Jan		9 Jan		Implementation plan
9	Documentation 1.User documentation 2.System documentation	2 weeks	23 Jan		6 Feb		System documentation and user documentation
10	Final project presentation	1 day	2 Feb		2 Feb		Presentation of the developed system

GHANTT CHART

	DURATION IN WEEKS																					
TASK	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1.Project identification	■	■	■																				
2.System investigation				■	■	■	■																
3.Design specification								■	■	■													
4.System development											■	■	■	■	■	■	■	■					
5.Testing																	■	■	■	■			
6.Implementation																					■	■	
7.Documentation	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

RESOURCES

The resources to be used during the system development process include:

1. Hardware tools are:
    a. Computers-for transferring manual documents to automated documents
    b. Printers-for transferring soft copy to hard copy
    c. Flash disk-for storing information for future reference and modification.
2. Software tools are:
    a. Microsoft access - for creating database.
    b. Visual basic 6.0 –Integrated development environment for coding
    c. Microsoft word – for creating and editing documents.
3. Other resources
    a. Lecturers-for consultation, awarding marks and supervising project progress.
    b. System users-to define the limitations of the current system and their expectations of the new system

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REFERENCES

- Software Engineering by Summerville.
- Project supervisor
- Fellow students

IMPLEMENTATION STRATEGY

In order to install the Heltz car hire management system, the following will be required:

Hardware platform

- Pentium processor 1.6 MHZ
- 40 GB hard disk
- 512 MB RAM

Software platform

- Visual basic6.0version for programming
- Microsoft access for creating database
- Windows XP

CHAPTER TWO

SYSTEM ANALYSIS

Introduction
To understand the operations of Heltz car hire company, I decided to carry out research of gathering and interpreting facts, finding problems and use the information to develop and recommend to Heltz car hire management system which will enhance its operations and enable the company to compete effectively in the market

Overview of the current system
The current system of Heltz car Hire Company is manual and captures:

- client details
- payment transaction
- car hired details
- hiring date
- return date
- overdue charges

Study design
The study of the company's operations adopted a survey design. A range of instruments was used to collect information.
Population study
The population of the study comprised of the company's management, employees and customers who hire cars from the company.
Objectives of the investigation

- To understand the nature of the system
- To define constraints of proposed system
- State benefits that are likely to occur if the proposed system is completed
- Specify the time scope and money estimate that are likely to be used

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FEASIBILTY STUDY

Technical feasibility
I carried out research to necessitate whether the organization has the required hardware and software facilities for running the Heltz car hire system management system.
Under my investigation, I found out that the current system was using two computers operating under windows 97 version. Nearly half of the employees in the Heltz car hire company are able to work effectively and successfully with the new system and therefore the new system can be implemented easily using the available skills.

Operational feasibility
I carried out study to determine whether the proposed system will be able to meet the user requirements.
Most of the employees who I interviewed suggested that the Heltz car hire management system could serve better than the current system since it had wide scope of coverage.

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Economic feasibility
After careful study of financial assessment of the new system, I found the company to be financially stable to support the development of the Heltz car hire management system which is aimed at reducing cost and increasing revenue. The company has set a side sh.100 000 for the development of this project.

Legal feasibility
The main aim of legal feasibility is to ensure that there will be no conflicts in future between the system developer and the Heltz car hire company in terms of liability and data protection act and as a result, an agreement was signed among the stakeholders.

Schedule feasibility
After careful study of the activities to be involved in the development of the Heltz car hire management system, it was agreed that the system should be in operation by 9th Jan 2009.

Feasibility report
It attracts my attention that the current system has the following problems:
-Huge physical storage media
-Insecurity of data
-Difficult in generating reports
-Delay in retrieving information

INSTRUMENTS FOR DATA COLLECTION

Questionnaires, interview schedules, observation and document review were developed and validated for the purpose of data collection.
Observation
This technique is most suitable because you get to see first hand of the daily activities of the employees during working hours. The problem is that while observing the employees at work, it was found out that there was laxity at the work place because employees tended to be lazy because of the increasing amount of paper work. Reports needed were not produced on time. This made the workload to be a lot for the employee because the previous day's work is added on.
During observation I concentrated on the following areas:

- storage media
- data entry method
- procedures followed during data entry
- Time taken to produce reports

Advantages of observation technique

- ♦ Helps to acquire information that the user needs to be implemented in the new system.
- ♦ It makes the end users to be involved during the early stages of development and therefore the system has less chances of resistance at implementation stage

Disadvantages

- ♦ Time consuming
- ♦ Employees might tend to pretend they are doing a good job if they know they are being under observation.

Interview

Different respondents were interviewed at different period of time. Those who were interviewed were customers who frequently hire cars from the company. Interviews gave wide information as compared to questionnaires. This is because questions in interviews were giving respondents more space for explanation in details.

While interviewing the employees, it was found out that the employees had a hard time retrieving the needed documents when it is demanded this is because they had large volumes of files to go through.

Sample interview question

- What role do you play in the Heltz car hire company?
- How do you carry out your daily activities?
- Is there any occurrence of data loss? If yes, how do you recover it?
- What are the problems that you encounter while carrying out your daily tasks?
- Do you think a computerized system will curb some of these problems?
- What areas do you think the computerized system will enable you to work effectively?
- What are your expectations of the Heltz car hire management system?

Questionnaire

The questions were prepared and administered to the car hire clients of the company. The employees in the company were also served with the questionnaires.

The following is a sample of the questionnaire that I served the employees;

1. What role do you play in the organization?
2. Does the current system enable you to efficiently serve the clients?
    - Yes
    - No
    - No idea
3. Are you supporting the introduction of the new computerized system?
    - Yes
    - No
    - No idea
4. Please give a reason for your answer above.
5. What do you think the new system will enable you to do?
    - Serve clients more effectively?
    - Get fired?

- Make your work more complicated?

6. Do you have any computer skills
    - Yes
    - No

The following are sample questions served to the company administrators;

What are the major problems that the organization experience with the current system?

- ❖ Inaccuracy.
- ❖ Loss of data and file.
- ❖ Inappropriate data security especially during information access.
- ❖ The system is very slow thus inconveniencing the servicing of customers.

What is the impact of introduction of the computerized system in the organization?

- ❖ Displace most of employee e.g. data entry clerks
- ❖ Introduction of Training lessons to the existing employees.
- ❖ Faster data retrieval and better storage facilities of the file.

If the organization had a computer how would it affect you?

- ❖ Work faster and effectively.
- ❖ Better and secure storage facilities.

What are the major challenges you face in your work?

- ❖ Complains from employees for wrong entry of data leading to wrong information
- ❖ Tiresome and time consuming since almost all transactions are done manually
- ❖ Misplacement of employee's files

Who are the most affected by the technology?

- ❖ Data entry clerks
- ❖ .Administrators
- ❖ Clients
- ❖ All

Document review

I reviewed payment, client, hire and car documents in the firm and discovered that most of them were obsolete, out of date and had a lot of repetition, leading to loss of data integrity.

FACT RECORDING

I recorded facts obtained during data collection for future use and reference.

Reasons for recoding facts

- Information which is not in writing is prone to errors
- It's necessary to confirm the findings with the endusers to avoid rejection and therefore it requires written records.
- The findings need to be analyzed and therefore the process of fact recording makes the work of the analyst easy to carry out.

Principles followed when recording facts

- Recorded information once I got it.
- Arranged records as they are related to one another
- I recorded all facts using simple techniques to ensure consistency, accuracy and to allow others to understand my findings

REQUIREMENT ANALSIS

From the data collected, it was found that three kinds of users interact with the system. The users have different needs, preference, which is a major concern to the development of the new system. The users include:

Novice users
Experts
Professionals

The following facts were obtained:

- The company has a manual system to control its operations.
- The records are stored in files, which are then stored in cabinets
- Updating of these records require some time because it has to start from scratch.
- Recording of cars that has been hired is done manually.
- The current system proves to be tiresome.
- The system is also unreliable and risk due to frequent loss of data.

ANALYSIS OF DATA

Problem of the current system

The following shortcomings were given by the respondents.

- Delay in allocating cars to customers even after payment has been completed due to tedious process in carrying out transactions
- Loss of information due to unreliable data storage in the manual files

- ❖ Inconsistency information is stored in different records that are not linked hence data redundancy.
- ❖ Some clients evading to pay the company because of improper transactions e.g. records not reflecting the actual hiring and returning date and total amount payable, total paid and balance.

Proposed solutions

The best solution is to develop a computerized system that will offer the following benefits:

- ❖ Generate reports of cars hired when required.
- ❖ Capturing details of the car hire customer and the car description at a specific period of time.
- ❖ It will enable the organization to serve its customers quickly and smoothly
- ❖ It will place the organization at competitiveness in order to outmaneuver its competitors
- ❖ The system will store data securely and take less space.
- ❖ Efficient data handling and data integrity.

FILE DESCRIPTION CONTENT

The Heltz car hire management system Would show the following:

1. Client registration-upon receiving customers, the system will:
   - ➢ Add or delete new clients
   - ➢ Edit customer details
   - ➢ Show registration details of either all or a specific customer
   - ➢ Print one or all customer registration report.
   - ➢ Registration date
2. Car description-it will show:
   - ➢ The car registration number
   - ➢ The carrying capacity/type
   - ➢ The car make
   - ➢ The car model
   - ➢ Availability of the car
3. Payment details-it will show :
   - ➢ Client identification number
   - ➢ Amount payable
   - ➢ Total amount
   - ➢ Payment balance
   - ➢ Payment date
   - ➢ Invoice number
   - ➢ Payment number
4. Hiring description-it will reflect
   - ➢ Hire date

- Return date
- Damage cost
- Penalties
- Days hired
- Date hired

5. Employee details-it will show information about the employee serving the client.
    - Identification number
    - First name
    - Middle name
    - Last name
    - Grade
    - Date
6. Hire rates-it will show the rates of hire for a given type of a car
    - Rate
    - Type

REPORTS PRODUCED

Client's detail report
This will help to know the number of customers and their details at any time when needed.
Car report
This will show the availability of the cars and their details.
Payment report
It will be needed to show how much money the company would have collected from the clients who hire cars
Employees report
This will be required to show which employee served the client at a particular date.
Hire report
Expected to show the hire rates, return date, borrowing date, and penalties or overdue

User characteristics

Each of my system user will be required to have the knowledge or skills of the following:

- C.E.O-client details, car model, payment details
- Receptionist-client details, car model and registration numbers
- Accountants-payment details e.g. cash or bank, print the report.
- Car hire department-client details, car model ,total amount payable and cars available for hire

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USER OBJECTIVES

The Heltz car hire company to accept my system would like a system that:

- ❖ Is able to accept and allow registration of new students by taking in their details e.g. registration number, name, address as input and store.
- ❖ Allows client registration information to be deleted, added or updated.
- ❖ Should accept fees charged and show the total amount payable, total paid and balance.
- ❖ Provide the security of data.
- ❖ Shows cars available for hire
- ❖ Shows hiring and returning date.

SYSTEM STAKEHOLDERS

People involved with the system and its development are:

a) System end-users

These are the employees of Heltz car hire company and the clients

b) Domain experts

This include the main staff in Heltz car hire company who have relevant knowledge which can be used in system development.

c) System developer

I am the developer but in consultation with my project coordinator.

d) System analyst

I will work hand in hand with the domain experts and the end users

DEVELOPMENT PLANS FOR THE NEW SYSTEM

-Acquire four more new computers
-Installation of Heltz car hire management system
-Preparing of physical site
-change over techniques
-Training of the users

BUSINESS PROCESS

- ♦ Upon arrival ,there is enquiry from the receptionist
- ♦ Explaining to client about the Heltz car hire services
- ♦ The data clerk entry checks if the client exists in the database
- ♦ Client registration
- ♦ Checking if the client has a legal driving license
- ♦ Client selecting a car to hire
- ♦ Inspection of the car by the client and supervisor
- ♦ Payment for the car hired
- ♦ Issuing a receipt after payments have been made
- ♦ Inspection of the car after it has been returned

BUSINESS RULES

- The client and supervisor must inspect the car before hire and after it has been returned
- The client must pay 80% of the amount before the car is hired
- The client must return the car in the condition it was hired
- Upon delaying to return the car on the specified date, 20% of the total cost is charged per day
- To be eligible for hire, you must be 18 years old and above with a valid ID or Passport

FUNCTIONAL REQUIREMENTS

User authentication

The system will validate users accessing data in the car hire management system through use of passwords and the user name validation and verification. The categories of users allowed to access data in the system are:

- Project supervisor
- Developer
- Authorized employees in the Heltz car hire company.

Preparation of reports

The system will be able to generate payment reports which will be needed to show how much money has been paid by the client, customer report and cars on hire report based on the existing data that has already been entered in the respective database files.

Inputs

Data such as client details, car details, employee details, payment, details, hiring and returning dates will be input directly through the keyboard by the employees. The data should contain necessary fields as displayed by the forms.

Processing

Data processing will be carried out according to the manner in which it is entered into the system like total amount payable, amount paid and the balance.

Data output

Output of the information will be displayed on the monitor so that the employees will check to ascertain that the information is correct; printing can be done for purposes of record keeping and for report analysis.

User interface

The system will communicate with the user through graphical user interface. The graphical user interface will be represented by a set of controls.

- ♦ Forms and frames for holding controls
- ♦ Textboxes, inputboxes and labels for input and output.
- ♦ Command buttons for initiating processes
- ♦ An MDI form, which will act as a link to the various form

NON-FUNCTIONAL REQUIREMENTS

There will be a login dialog box where users will enter their username and password which will be validated and verified by the system.

Extensibility
The system will be extended by addition of forms and controls as user requirements changes and increase.

Portability
The system will be in a compact disc from where it will be installed and transported from one computer to another.

Compatibility
The database system developed using Microsoft access will be compatible with all application that support database e.g. SQL and Oracle.

Reliability
There will be a backup of the system at more than one site incase of database collapse or accident. This will ensure that the system is online at all times.

Maintainability
Changes can be made in future by upgrading or degrading. It will facilitate in the versions and configuration management.

Reusability
The system will have the ability to use all or generate part of the same programming code or system design in other application. This will help in future modification of the system due to changes in the environment or user requirements.

PERFORMANCE REQUIREMENTS

Hardware platform
The system will require the following hardware components for the high performance capabilities:

- Pentium processor1.6 GHZ
- 512 MB RAM
- 40GB hard disk
- Keyboard
- Hp laser jet printer2100 series

Software platform
The system should run on the following platforms to enhance security and portability:

- Visual basic 6.0 for programming
- Microsoft access for creating the database
- Windows XP for the operating system

Time
The system should load fast enough hence it requires fast connection cables with a big bandwidth.

Space
Files should be PDF format to allow small use of memory space

Standards
The system should conform to national, international and more especially the organization standards

Other requirements
Safety requirements;

- Uninterrupted power supply to allow users to save their work incase of power supply faults.
- To install antivirus programs to protect the documents from computer viruses and scanning the computer daily before using it.
- Create backups for the system incase of natural calamities or accidents, it can be installed afresh.

CONCLUSION

From the analysis collected above, I would recommend for Heltz car hire company:

- To create a database for storing the required information in a central storage for easy retrieval.
- To improve file sharing between departments, data flow efficiency and utilize storage space.
- To create a friendly user interface for better interaction between the endusers and the database.

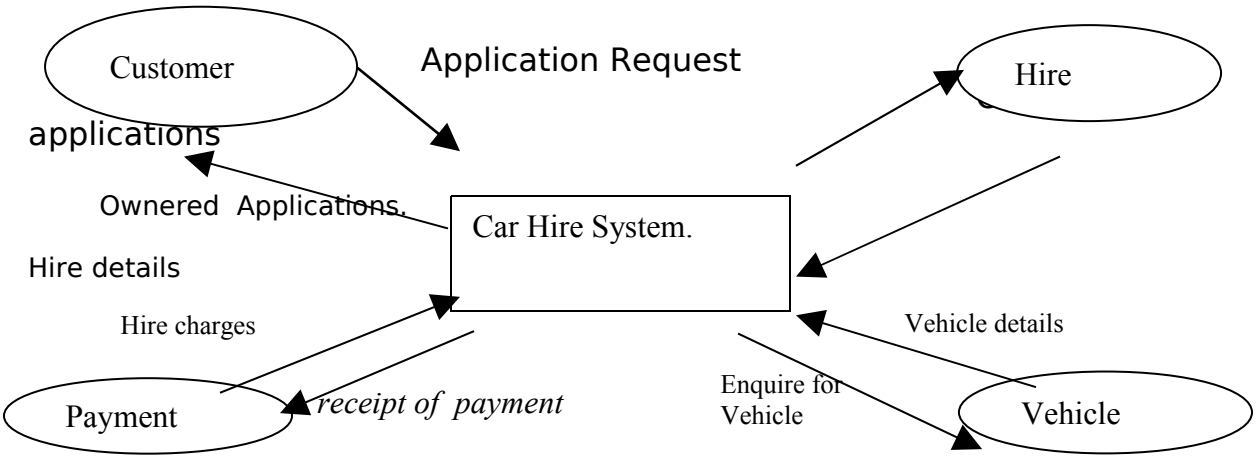
REFERENCE

- Heltz car hire company
- Internet
- Project supervisor
- Software engineering by Summerville

LOGICAL DESIGN

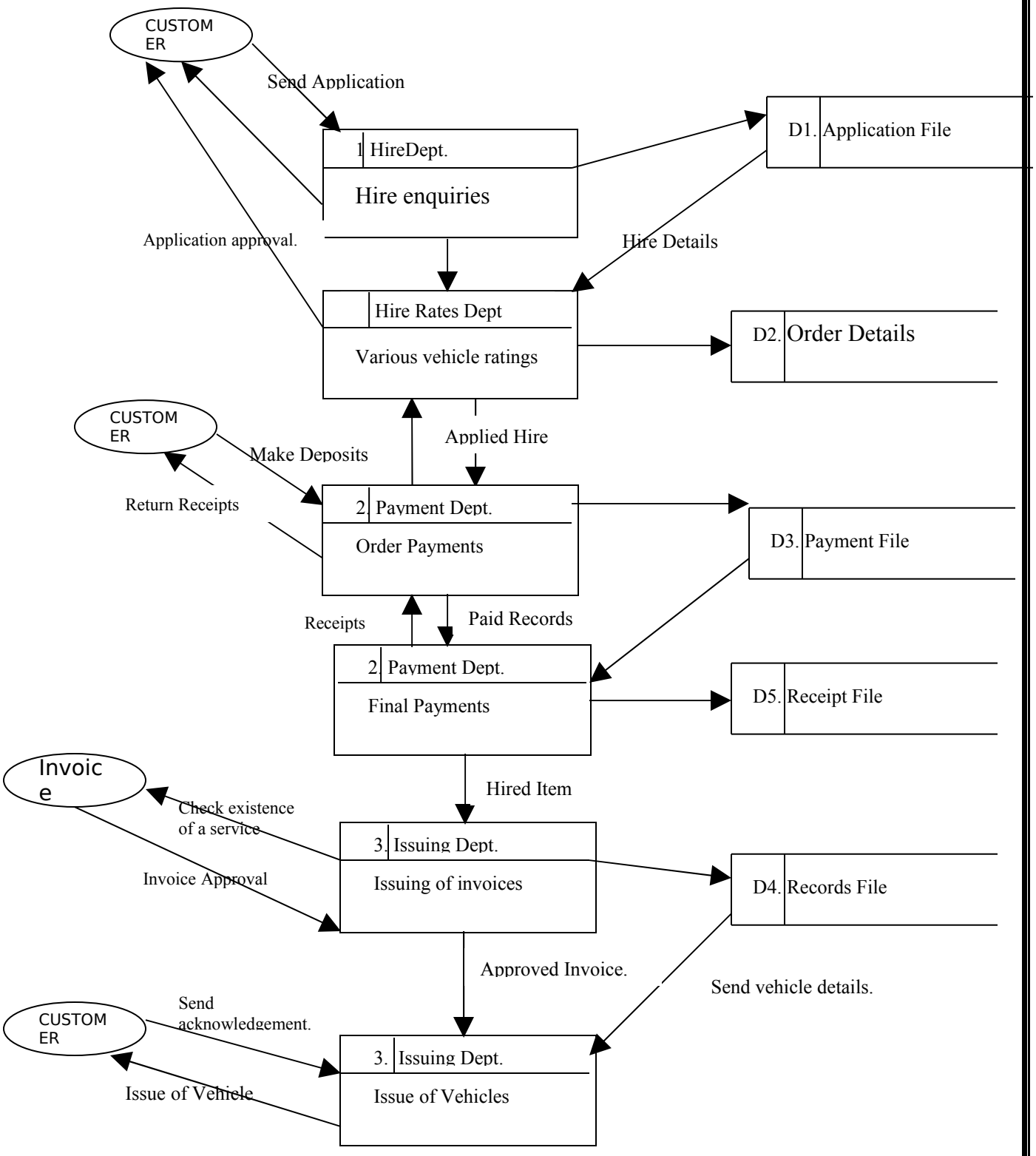
CONTEXT DIAGRAM

The diagram below shows the interfaces between the system under investigation and the external entities with which it communicates. It also focuses the attention of the system boundary and helps to clarify the precise scope of analysis.



DATAFLOW DIAGRAM

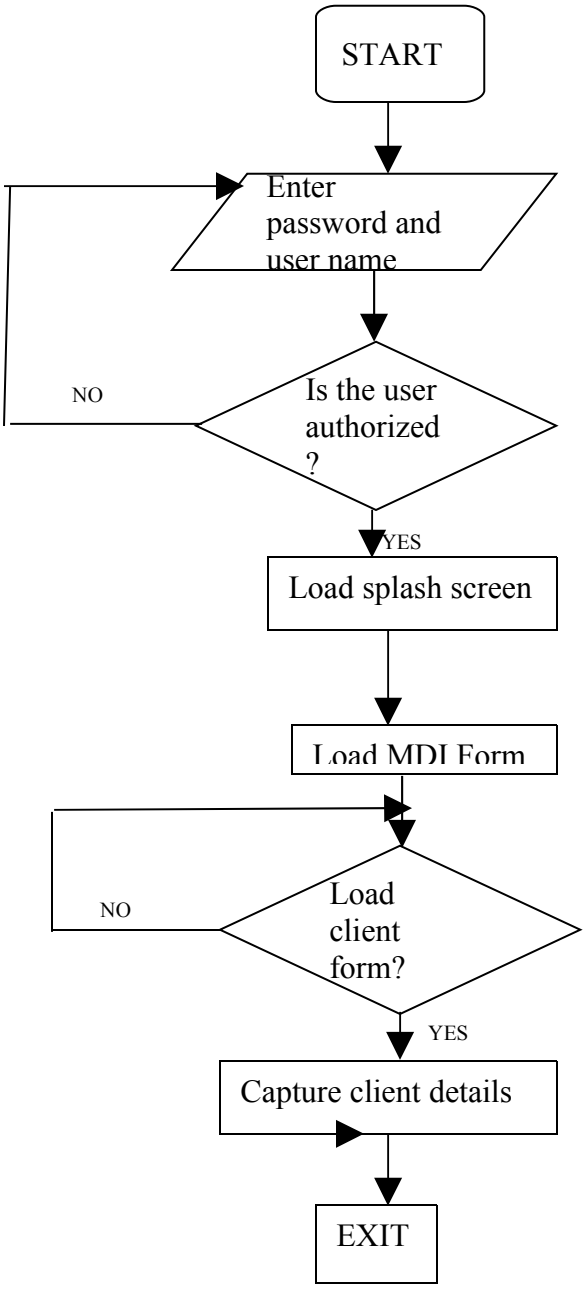
This is a representation of any business function. The technique starts with an overall picture of the business and continues by analyzing each of the functional area of interest.


CUSTOM ER
Send Application
1 HireDept.
Hire enquiries
D1. Application File
Application approval.
Hire Details
Hire Rates Dept
Various vehicle ratings
D2. Order Details
CUSTOM ER
Make Deposits
Applied Hire
Return Receipts
2. Payment Dept.
Order Payments
D3. Payment File
Receipts
Paid Records
2. Payment Dept.
Final Payments
D5. Receipt File
Invoic e
Hired Item
Check existence of a service
3. Issuing Dept.
Issuing of invoices
Invoice Approval
D4. Records File
Approved Invoice.
Send vehicle details.
CUSTOM ER
Send acknowledgement.
3. Issuing Dept.
Issue of Vehicles
Issue of Vehicle

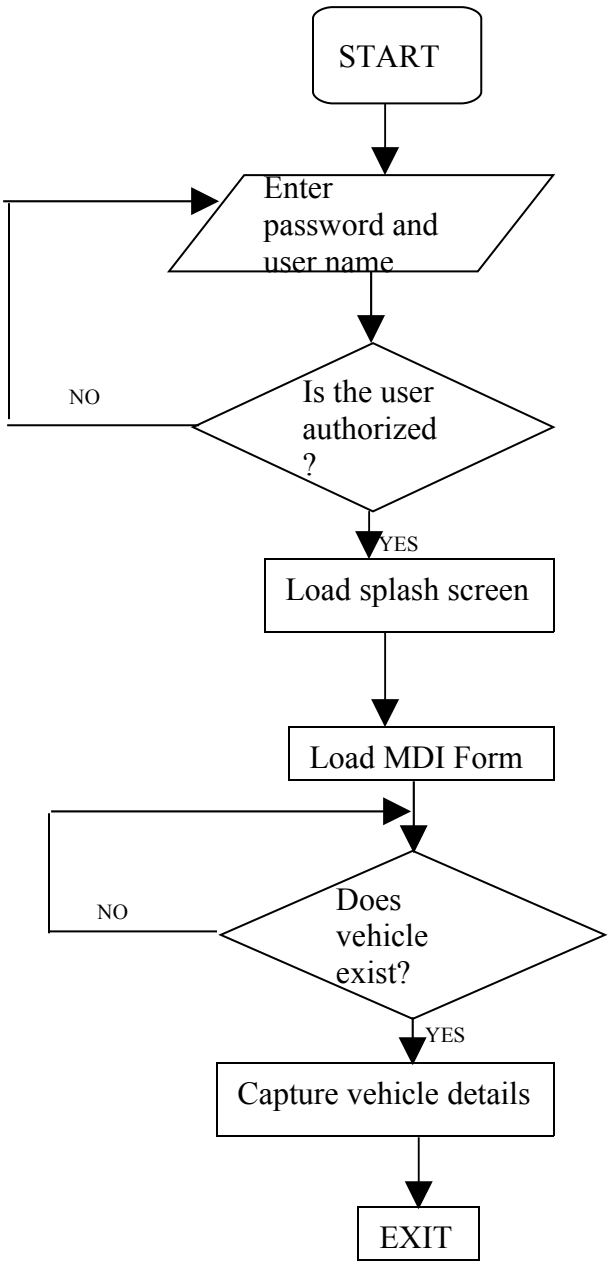
SYSTEM FLOW CHARTS

This following is a visual presentation flow of data through an information processing system, the operations performed through the system and the sequence in which they are performed.

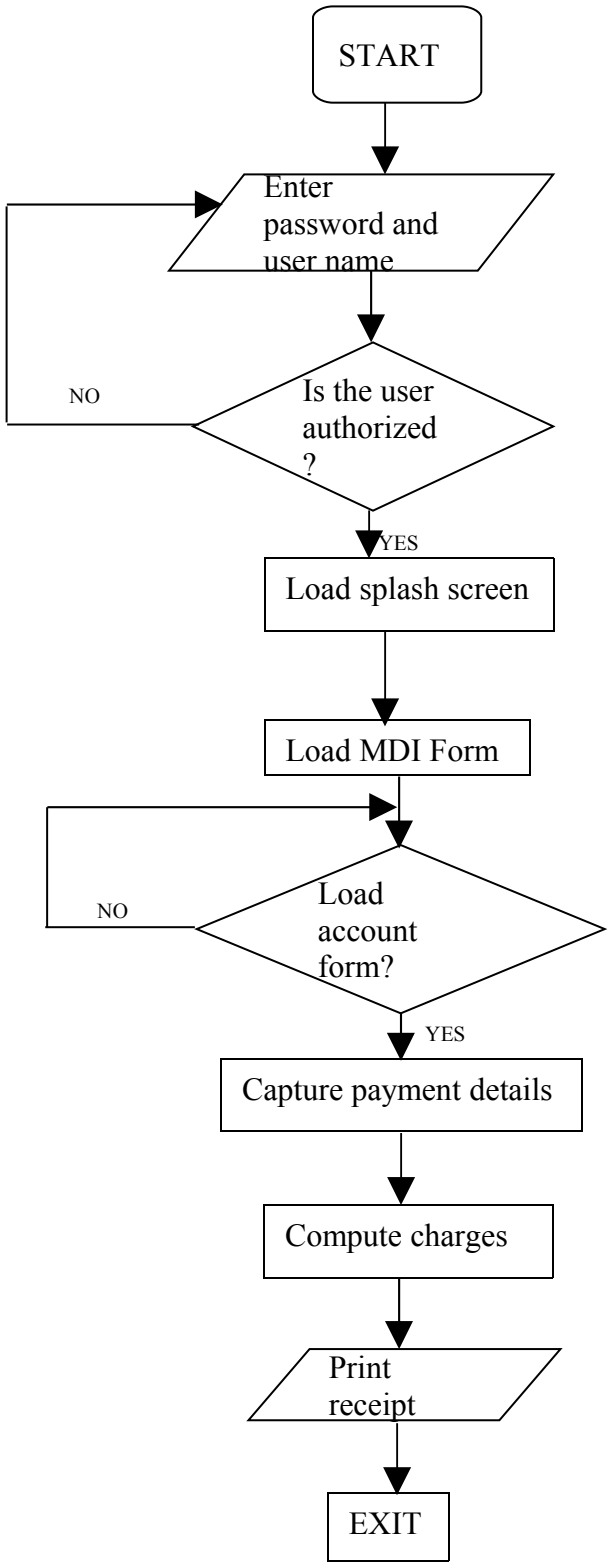
CUSTOMER DETAILS



VEHICLE DETAILS



3. ACCOUNTS DETAILS



ENTITY ATTRIBUTES IDENTIFICATION

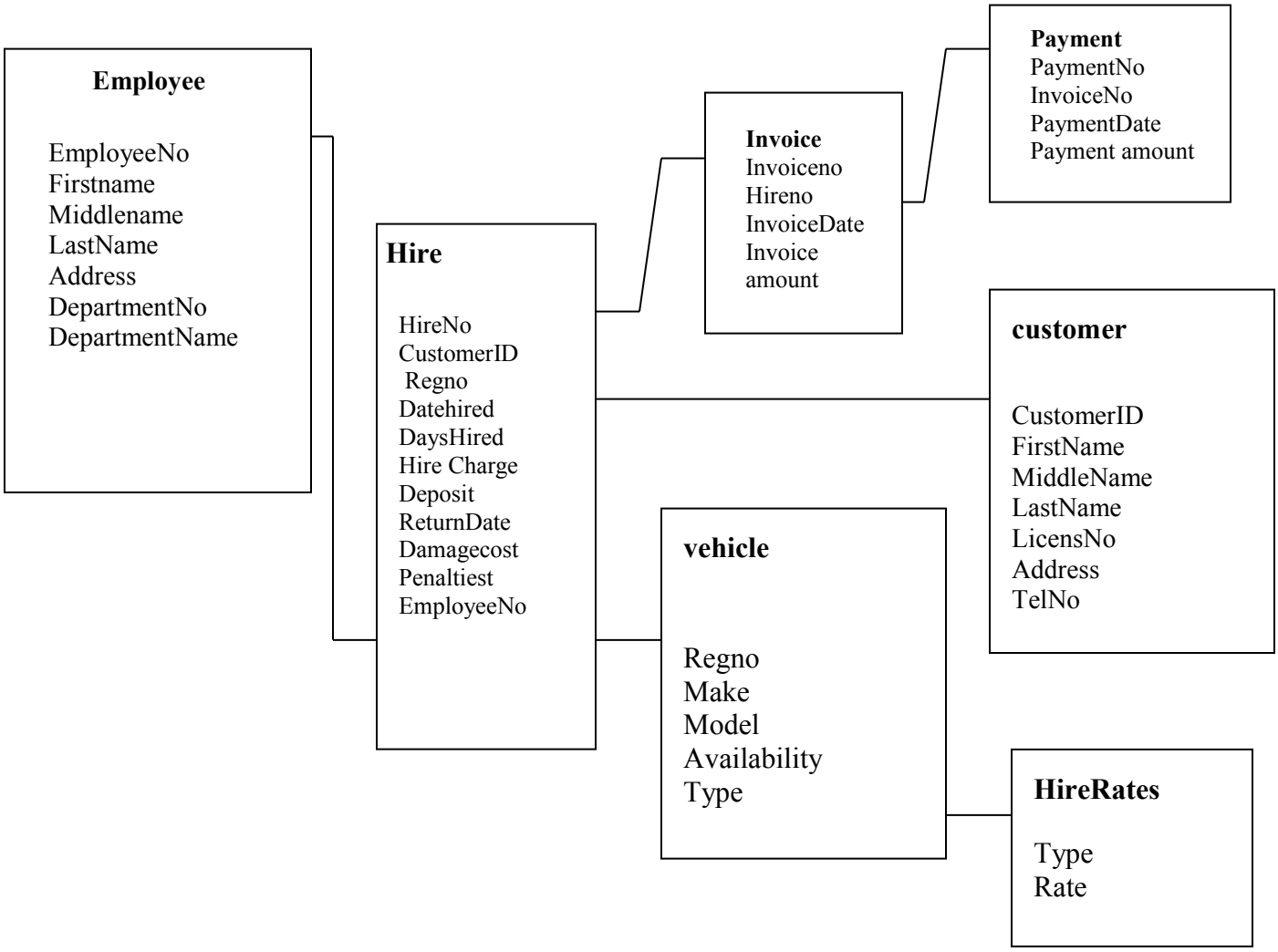
ENTITY	ATTRIBUTES
Customer	CustomerID,FirstName,MiddleName,LastName,TelphoneNo,Address,LicenseNo
vehicle	RegNo,Make,Availability,TypeModel
payment	PaymentNo,AmountPayable,PaymentAmount,Balance
Hire	HireRate,HireNo,IvoiceNo,InvoiceDate,InvoiceAmount,DateHired,HireCharge ReturnDate,DamageCost,PaymentNo

NORMALIZATION

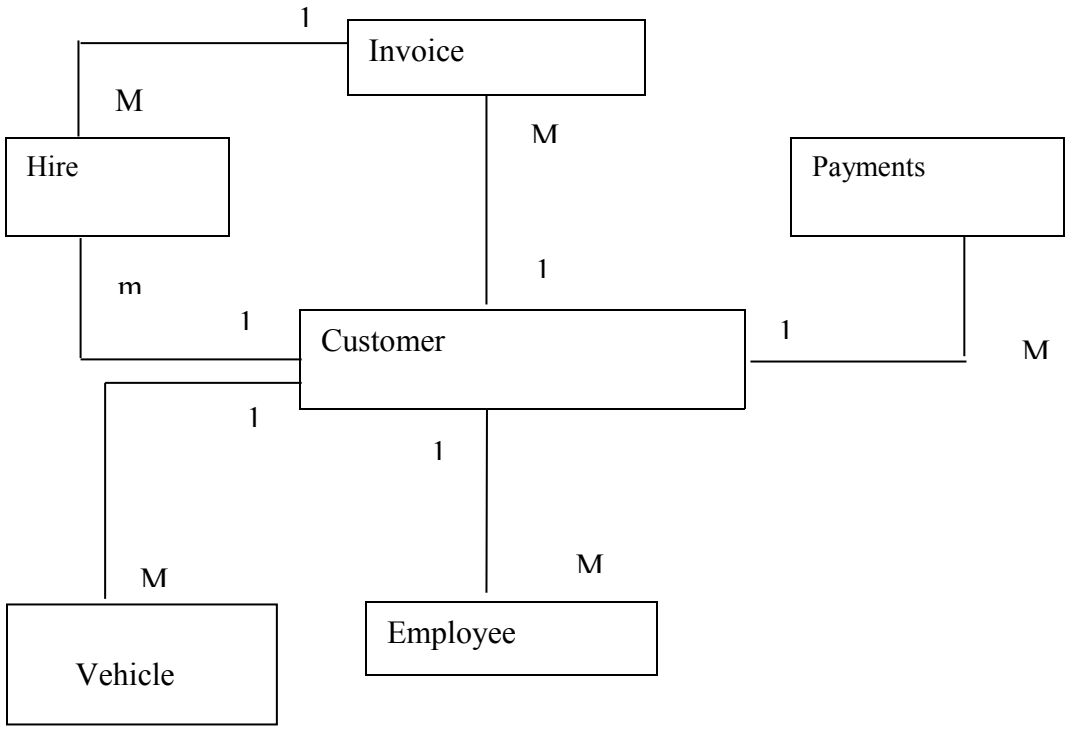
UNF	**1NF**	**2NF**	**3NF**
CustomerID	CUSTOMER	CUSTOMER	**CUSTOMER**
FirstName	CustomerID	CustomerID	CustomerID
MiddleName	FirstName	FirstName	Hireno*
LastName	MiddleName	MiddleName	Type*
TelphoneNo	LastName	LastName	FirstName
Address	TelphoneNo	TelphoneNo	MiddleName
LicenseNo	Address	Address	LastName
RegNo	LicenseNo	LicenseNo	TelphoneNo
Make	RegNo	RegNo	Address
Availability	Make	Make	LicenseNo
Type	Availability	Availability	**VEHICLE**
Model	Type	Type	RegNo
HireRate	Model	Model	Hireno*
HireNo	HireRate	HireRate	Invoiceno*
IvoiceNo	HireNo	HireNo	Make
InvoiceDate	IvoiceNo	IvoiceNo	Availability
InvoiceAmount	InvoiceDate	InvoiceDate	Type
DateHired	InvoiceAmount	InvoiceAmount	Model
HireCharge	DateHired	DateHired	**HIRERATES**
ReturnDate	HireCharge	HireCharge	Type
DamageCost	ReturnDate	ReturnDate	Regno*
PaymentNo	DamageCost	DamageCost	HireRate
AmountPayable	PaymentNo	**PAYMENT**	**INVOICE**
PaymentAmount	AmountPayable	PaymentNo	InvoiceNo
Balance	PaymentAmount	AmountPayable	Paymentno*
EmployeeNo	Balance	PaymentAmount	Hireno*
EmployeeName	EmployeeNo	Balance	InvoiceDate
FirstName	EmployeeName	**EMPLOYEE**	InvoiceAmount
MiddleName	FirstName	EmployeeNo	**HIRE**
LastName	MiddleName	EmployeeName	HireNo
DepartmentNo	LastName	FirstName	Employeeno*
DepatmentName	DepartmentNo	MiddleName	Invoiceno*
	DepatmentName	LastName	Regno*
		DepartmentNo	CustomerID

		DepatmentName	RegNo DateHired HireCharge ReturnDate DamageCost EmployeeNo **PAYMENT** PaymentNo Invoiceno* AmountPayable PaymentAmount Balance **EMPLOYEE** EmployeeNo Hireno* EmployeeName FirstName MiddleName LastName DepartmentNo DepatmentName

RELATIONAL SCHEMA



ENTITY RELATIONSHIP MODEL.



DATABASE SCHEMA

Invoice Table

Field Name	Type	Size	Required
Invoice No	Number	20	Yes
Hire No	Number	20	Yes
Invoice Date	Date	4	Yes
Invoice Amount	currency	4	Yes

Customer Table

Field Name	Type	Size	Required
Customer Id	Number	20	Yes
Firstname	Text	20	Yes
Middlename	Text	20	Yes
lastname	Text	20	Yes
Address	Text	10	Yes
License Number	Number	20	No
Telephone Number	Number	10	Yes
Town	Text	20	Yes

Employee Table

Field Name	Type	Size	Required
Address	Number	20	Yes
FirstName	Text	20	Yes
MiddleName	Text	20	Yes
Department	Text	20	Yes
EmployeeNo	number	20	Yes

Hire Rates

Field Name	Type	Size	Required
Rate.	Number	4	Yes
Type	Text	20	No

Payment table

Field Name	Type	Size	Required
Payment No.	Number	4	Yes
Invoice No	Number	10	Yes
Payment Date	Date/Time	4	Yes
Payment Amount	Currency	20	No

Vehicle table

Field Name	Type	Size	Required
RegNo.	Number	10	Yes
Make	Text	10	Yes
Model	Text	10	Yes
Availability.	Yes/No	12	Yes
Type	Text	4	Yes

Hire table

Field Name	Type	Size	Required
Hire No	Number	4	Yes
Customer Id	Number	10	Yes
Vehicle RegNo	Number	4	Yes
Date Hired	Date	Short	Yes
Days Hired	Number	Long integer	Yes
Hire Charge	Currency	Long integer	Yes
Deposit	Currency	Long	Yes
Return Date	Date	Short	Yes
Damage Cost	Currency	4	Yes
Penalties	Currency	4	Yes
EmployeeNo	Number	10	Yes

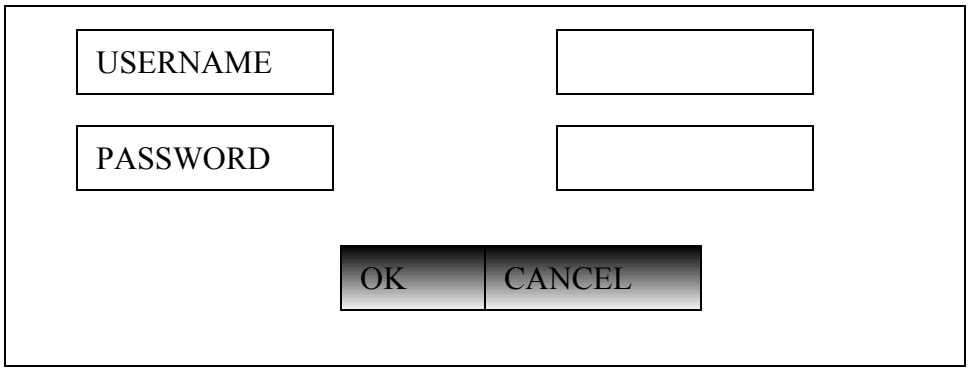
DATA DICTIONARY

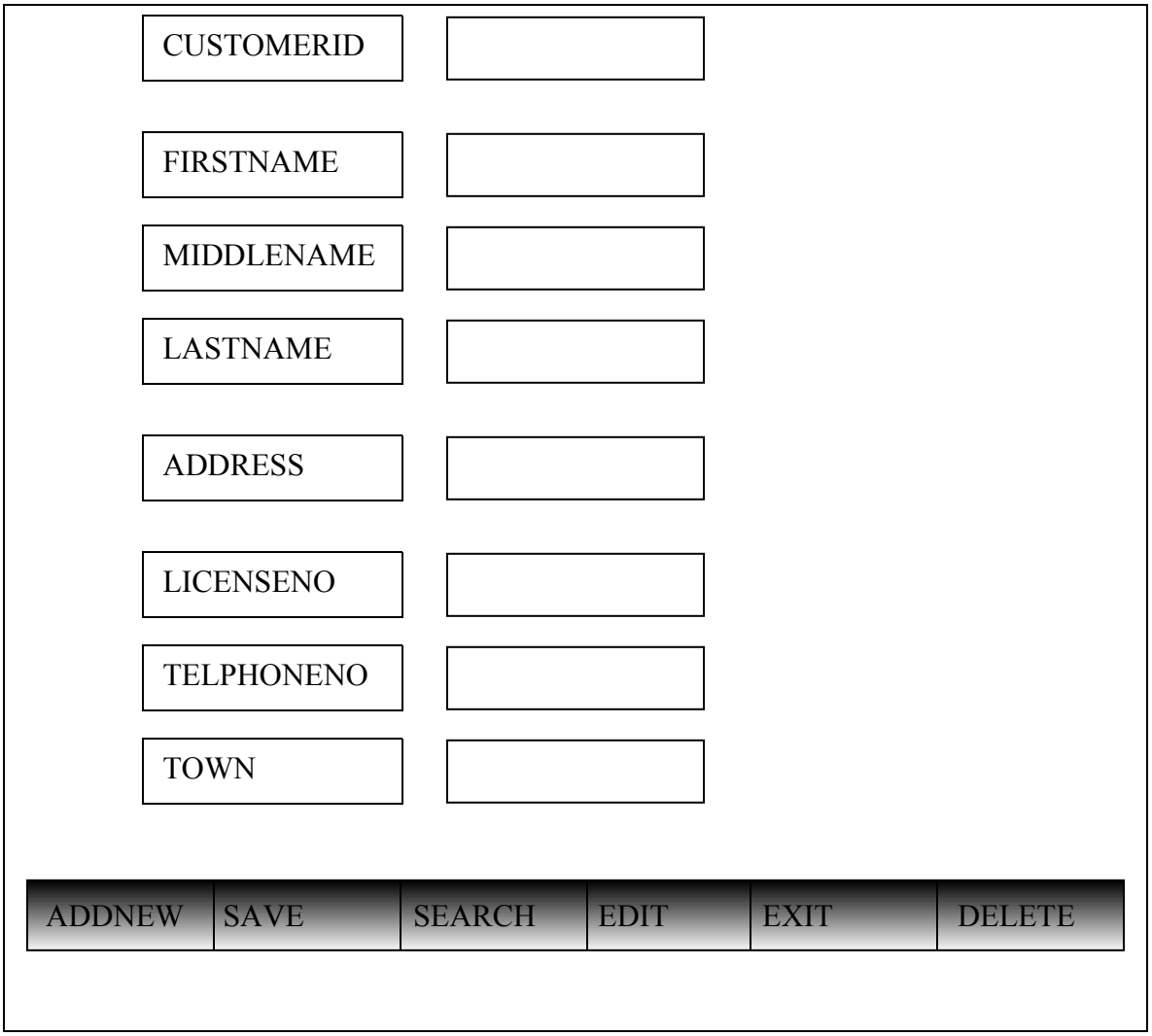
TABLE NAME	FIELDS	DESCRIPTION
Customer details	CustomerID	Stores the customer unique number
	FirstName	The customer first name
	MiddleName	The customer middle name
	LastName	The customer last name
	LicenseNo	The customer license number
	Address	Shows customer address
	TelNo	Shows the customer telephone number
Payment details	PaymentNo	Stores the unique payment number
	InvoiceNo	Stores invoice number
	PaymentDate	Shows the payment date
	amountpayable	Stores the net payable amount
Vehicle details	Regno	Shows the vehicle registration number
	Make	Shows the make of the vehicle
	Model	Shows the model of the vehicle
	Availability	Shows the availability of the vehicle
	Type	Shows the type of the vehicle
Hire details	HireNo	Stores the hire number
	CustomerID	Stores the customer unique number
	Regno	Stores the vehicle registration number
	Datehired	Shows the date the vehicle was hired
	DaysHired	Shows the duration the vehicle is on hire
	Hire Charge	Shows the amount charged on hire
	ReturnDate	Shows the date the vehicle is to be returned
	Damagecost	Shows the cost of damage
	Penalties	Amount charged on irregularities
	EmployeeNo	Shows the employee who served the customer
Hire rate details	Type	Shows the type of hire
	Rate	Shows the rate charged for the hire
Invoice	Invoiceno	Shows the invoice number of the customer
	Hireno	Shows the hire number of the car
	InvoiceDate	Shows the invoice date
	Invoiceamount	Shows the amount of the invoice

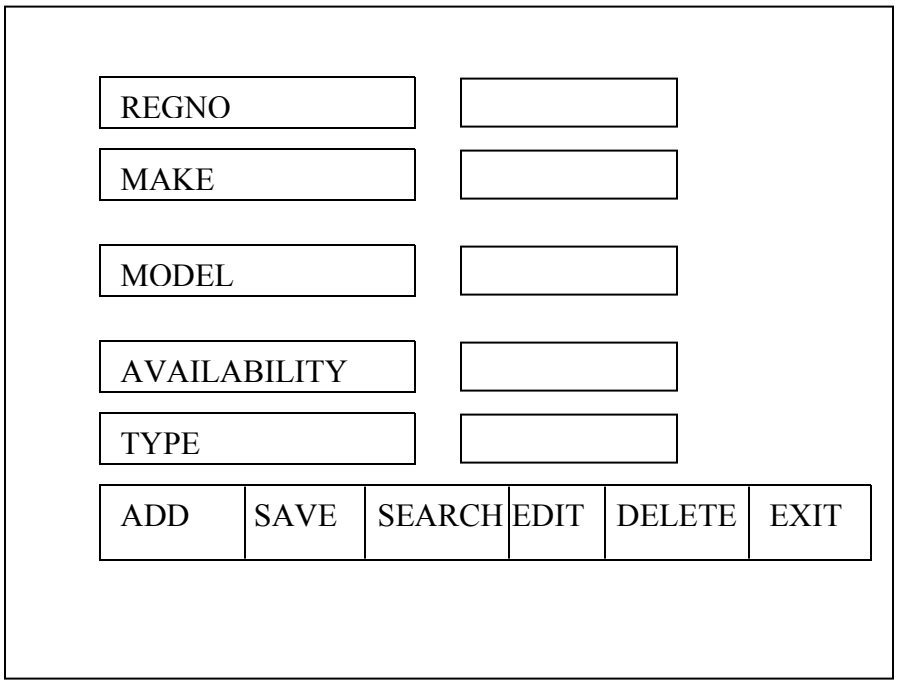
REFERENCE

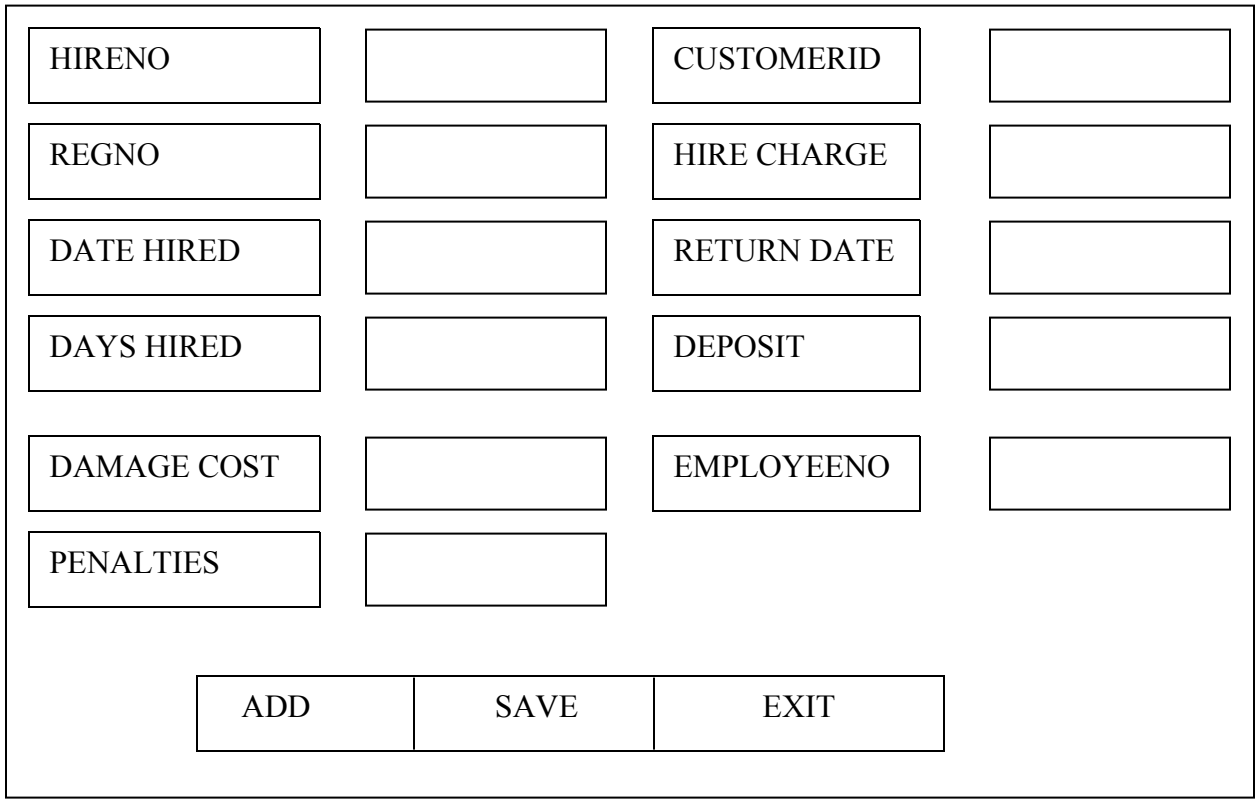
- Heltz car hire company
- Internet
- Project supervisor
- Software engineering by Summerville

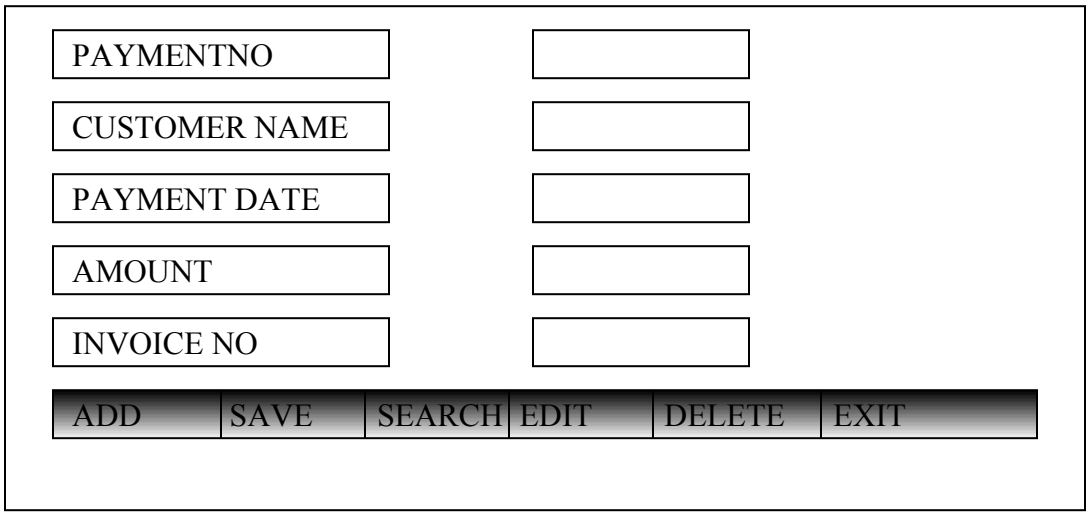
INPUT DESIGN
LOGIN INPUT






REGNO
MAKE
MODEL
AVAILABILITY
TYPE
ADD
SAVE
SEARCH
EDIT
DELETE
EXIT


HIRENO
CUSTOMERID
REGNO
HIRE CHARGE
DATE HIRED
RETURN DATE
DAYS HIRED
DEPOSIT
DAMAGE COST
EMPLOYEENO
PENALTIES
ADD
SAVE
EXIT



OUTPUT DESIGN

CAR DETAILS REPORT

REG NO	MAKE	MODEL	TYPE	AVAILABILITY
KAT 098				

CUSTOMER DETAILS REPORT

CUSTOMERID	FNAME	MIDNAME	LNAME	ADDRESS	TOWN	LICENSENO	TELNO
CMD-001	DENIS	ONG'UTI	ORINA	4096	NAIROBI		