Department of Computer Science and Engineering

KUMARAGURU COLLEGE OF TECHNOLOGY

(Affiliated to Bharathiar University)
Coimbatore – 641 006

P-801

CERTIFICATE

This is to certify that the project work entitled

"VEHICLE LOAN / RE-IMBURSEMENT INFORMATION SYSTEM"

Done By

C. Ravi Kumar
Reg. No: 9938M0654

Submitted in partial fulfillment of the requirements for the award of the

degree of

Master of Computer Applications of Bharathiar University.

S. Jh 30/4/02
Professor and Head

Internal Guide

Submitted to University Examination held on 10-05-2002

10/5/02
Internal Examiner

External Examiner

CERTIFICATE

हिन्दुस्तान एरोनाटिक्स लिमिटेड
HINDUSTAN AERONAUTICS LTD.
कारपोरेट आफिस
Corporate Office

4th April 2002

CERTIFICATE

This is to certify that the project entitled **VEHICLE LOAN / REIMBURSEMENT INFORMATION SYSTEM**, being submitted to the Department of Computer Science, Kumaraguru College Of Technology, Coimbatore , by **C.Ravikumar** in partial fulfillment of the requirement for the award of **Master of Computer Applications**, is a bonafide work carried at **Hindustan Aeronautics Limited, Corporate Office Bangalore** from Dec -2001 to Mar- 2002 under our guidance.

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DECLARATION

DECLARATION

I hereby declare that the project entitled "***VEHICLE LOAN / RE-IMBURSEMENT INFORMATION SYSTEM***" submitted to Bharathiar University as the project work of Master Of Computer Application Degree, is a record of original work done by me under the supervision and guidance of **Mr.B.Krishna Kumar B.E, MBA**, Senior Manager (Computers), Hindustan Aeronautics Limited, Corporate Office, Bangalore and **Ms.P.Parameswari MCA**, Lecturer, Department of Computer Science and Engineering, Kumaraguru College Of Technology, Coimbatore and this project work has not found the basis for the award of any Degree/ Diploma/ Associate ship/ Fellowship or similar title to any candidate of any University.

C. Ravikumar.

Place:
Date:

(C.Ravi Kumar)
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ACKNOWLEDGEMENT

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Next, my sincere thanks to all the Staffs of MSD who were kind enough to support me with all necessary support and all other needs.

SYNOPSIS

SYNOPSIS

The Objective of the project entitled Vehicle Loan / Re-imbursement Information System is to develop a software which provides for data entry with all the required checks build in, generation of statistical and analytical reports of the employees working in Hindustan Aeronautics Limited. The aim of this software is to develop an interactive system that can be used by various departments with more efficiency and with more accuracy

The project has three Modules:

I. Interest Subsidy Scheme:

This Scheme is valid to grade officers who are having the grade from 1 to 12.

II. Employee Loan Scheme:

This Scheme is valid to employees who are having the grade from 21 to 33.

III. Re-imbursement Scheme:

This scheme is valid to the officers who are having the vehicles already and not interested in buying new vehicles.

To maintain the data the advanced database Oracle 8i is used and software is being developed using the powerful front - end Visual Basic 6. The Software that is being created is user friendly with all the necessary checks build in.

CONTENTS

CONTENTS

	PAGE NO.
1. INTRODUCTION	
1.1 PROJECT OVERVIEW	1
1.2 ORGANISATION PROFILE	2
2. SYSTEM STUDY & ANALYSIS	
2.1 EXISTING SYSTEM	5
2.2 PROPOSED SYSTEM	6
3. PROGRAMMING ENVIRONMENT	
3.1 HARDWARE CONFIGURATION	10
3.2 DESCRIPTION OF SOFTWARES & TOOLS USED	11
4. SYSTEM STUDY & DEVELOPMENT	
4.1 INPUT DESIGN	14
4.2 OUTPUT DESIGN	16
4.3 DATABASE DESIGN	17
4.4 PROCESS DESIGN	23
5. SYSTEM IMPLEMENTATION	
5.1 SYSTEM IMPLEMENTATION	26
5.2 SYSTEM TESTING	28
6. CONCLUSION	32
BIBLIOGRAPHY	33
APPENDICES A. SCREEN LAYOUTS B. SAMPLE REPORTS	34

INTRODUCTION

1. INTRODUCTION

1.1 PROJECT OVERVIEW

The project has three Modules:

I. Interest Subsidy Scheme:

This Scheme is valid to grade officers who are having the grade from 1 To 12.They can get Loan from other resources .The company gives subsidy amount according to the officer's grade and type of vehicle.

II. Employee Loan Scheme:

This Scheme is valid to employees who are having the grade from 21 to 33. The company gives advance amount from its own fund according to the employee's type of vehicle.

III. Re-imbursement Scheme:

This scheme is valid to the officers who are having the vehicles already and not interested in buying new vehicles. For these employees, The Company gives allowance according to the grade and type of vehicle.

To maintain the data the advanced database Oracle 8i is used and software is being developed using the powerful front - end Visual Basic 6. The Software that is being created is user friendly with all the necessary checks build in.

1.2 ORGANISATION PROFILE

HISTORY OF H.A.L.GROWTH

Late Shri set up Hindustan Aeronautics Limited. Walchand Hirachand in December 1940, in association with Government of Mysore. The company was registered on 23rd December 1940 as a private company. It was concentrated on the repair and overhaul of military aircraft and engines to support Second World War efforts.

To fulfill the fresh mandate of post independent India, the mission of the company has been redefined as

> "To become a globally competitive aerospace industry, while working as an instrument for achieving self reliance in design, manufacture and maintenance of aerospace defense equipment and diversifying to related areas, managing the business on commercial lines in a climate of growing professional competence."

The Company installed machines and runway and commenced production with the aim of manufacturing

1. HARLOW TRAINER
2. CURTIS HAWK FIGHTER
3. VULTEE BOMBER

In collaboration with INTER _CONTINENTAL AIR CRAFT COMPANY OF U.S.A.

The Government took over the management of H.A.L .in 1945, after Second World War. The activities became

- Reconditioning and Conversion of war supplies.
- Introduction of Dacota for use by civil operations,
- Reconditioning of fighters and bombers for the I.A.F

ORGANISATION OF H.A.L

The H.A.L. is organized into four major complexes. Under each complex several divisions are grouped depending upon its function. They are

BANGALORE COMPLEX

Aircraft,
Engine,
IMGT (Industrial Marine Research & Development Center),
ETBEDC (Engine Test Bed Research & Development Center),
Overhaul,
Barrakpore Division,
Foundry & Forge and
Aerospace Division.

MIG COMPLEX

Nasik and
Koraput Division.

ACCESSORIES COMPLEX

Hyderabad,
Lucknow,
Korwa and
Kanpur Division

DESIGN COMPLEX

Helicopter Design Bureau
Aircrafts Research & Development Center and
Rotary Wing Research & Development Center.

In six decades H.A.L. has spread its wings to cover various activities in the area of design, Development, Manufacture and Maintenance.

The core business of H.A.L. include

1. Design and development of fixed and rotary wing aircraft, Avionics and Accessories.

2. Manufacture, maintenance, repair, and overhaul of :
   - -Fighter, Transport and Trainer aircraft
   - -Helicopters
   - -Aero-Engines
   - -Avionics
   - -Accessories
   - -Ground support equipment

3. Manufacture of structural components for satellites and launch vehicles

4. Software development and Maintenance

5. Design consultancy

FUNCTIONS OF CORPORATE OFFICE

- To develop policy matters for the effective functioning of the company.
- To direct the growth and future development plans of the company.
- To act as a single point contact for the liaisoning with external agencies such a Indian Air Force, Military etc.,
- To act as a coordinating agency for inter divisional requirements.

SYSTEM STUDY AND ANALYSIS

2. SYSTEM STUDY AND ANALYSIS

2.1 EXISTING SYSTEM

The **Vehicle Loan / Re-imbursement Information System** is developed with a view to provide a user friendly atmosphere in which the staff of the P&A department can perform operations on the vehicle database and can provide a statistical and analytical report of employees working in **HAL - Corporate Office**.

The existing system now in **H.A.L Corporate Office** was developed in C, UNIFY (RDBMS) on the Sco - Unix platform (Old –Version).UNIFY (RDBMS) is presently out of the market. So now its maintenance is a major head - ache. The Company has currently implemented a Novell Netware Server and had discontinued with the present Unix server. As a part of the migration plans of the HAL Corporate Office, all the projects currently in the Unix platform are being ported to Novell platform. Moreover, the Unix system presently at work has a character - based Interface and it does not provide a GUI interface to the user. HAL Corporate Office has been planning to build an intra - net and it has a LAN with around 125 PC's connected to it. Hence it was decided to shift to the Novell platform where this networking facility is available with the presentable and user–friendly front – end VB and powerful Back end Oracle. Using this, they can provide information to the concerned persons through the Intra – net.

Procedures Currently In Place

Data Entry:

As a part of the standard MIS, Corporate Office of HAL receives data from the employees with checking some conditions.

Date Storage:

After the data entry, data were stored in the vehicle database.

Report Generation:

The needed reports are generated from this Vehicle Database.

2.2 PROPOSED SYSTEM

The proposed system is going to be implemented on Novell platform with VB6 as the front end that provides GUI features and MS - ACCESS as the back end data storage. The user can perform any operation, retrieve or provide the required information at his fingertips on the click of a mouse, which was impossible using the existing system.

The Project is implemented in three Modules,

1. Interest Subsidy Scheme
2. Employee Loan Scheme
3. Re – imbursement Scheme

Module I

1. Interest Subsidy Scheme

1.1 Design Issues

The design of this Interest subsidy scheme module includes various options, which are the operations that have to be performed on any database such as adding new records, modifying the existing records, enquiring about records, and deleting unwanted records.

In this Module, two tables are used. One is for storing interest subsidy master data and another is for storing subsidy payment for each employee who is included in interest subsidy master table.

1.2 Algorithms

. Addition

Step 1: Input the Badge Number, Vehicle Type and so on.

Step 2: Process the Input data with some conditions and

This Scheme is valid only once.

So don't allow entering duplicate record.

Step 3: Check all the entries made correctly or not.

Step 4: If it is correct then add to ismaster table.

Modification

Step 1: Input Badge Number of the employee.

Step 2: Traverse through the database

Step 3: Select and display the selected record.

Step 4: Make the required Modification.

Step 5: Save the modified data into the database.

Inquire

Step 1: Input Badge Number of the employee.

Step 2: Traverse through the database.

Step 3: If the key value of Badge Number is present then

Select and display all information about that

particular badge number.

Else

Display the error message.

Deletion

Step 1: Input the Badge Number of the employee.

Step 2: Traverse through the database

Step 3: Select the specified record.

Step 4: Remove it from the database after the confirmation from the user.

Here one more form is used for subsidy payment calculation.

These Subsidy Payments are stored in spmaster table.

Module II

Employee Loan Scheme

In this module, One table is used for storing the application forms of the employees. That is who are applied for the advance.

After received the applications, they are processed with some conditions like, who are applied for the first time, second time and so on. Depending upon the funds, Applications are sanctioned. The sanctioned applications are stored in Vlmaster database and rejected applications are stored in vlreject database.

Then the data from the vlapplication are removed.

The remaining operations are the same as module I. That is Addition, Modification, Deletion and Inquire.

Module III

Re – Imbursement Scheme

In this module, one table is used for storing the option from employee whether he is interested in getting the allowance or reimbursement and another table maintains the data that are applied for the reimbursement option.

Conclusion

These newly designed modules are easy to handle. The user can enter the data with ease as the provision of tab key or enter key has been provided to automatically switch between fields. As all the validations and checks are built-in there is hardly any chance for invalid or missing entries. As it is necessary to keep the information intact, utmost care has been taken in the design of the database

PROGRAMMING ENVIRONMENT

3. PROGRAMMING ENVIRONMENT

3.1 HARDWARE CONFIGURATION

RAM	128 MB
HARD DISC	20 GB
PROCESSOR	Intel Pentium III 833 MHz.
CLOCK SPEED	133 MHz.
TERMINAL	VGA/EGA Monitor
PRINTER	Epson FX 100 (Line Printer)
NETWORKING	Novell Netware 5.0

3.2 DESCRIPTION OF SOFTWARE AND TOOLS USED

Introduction To VB 6.0:

Visual Basic is a High-level language that allows us to create several windows applications easily. It comes in three editions.

- The Learning Edition
- The Professional Edition
- The Enterprise Edition

Depending upon the users application one of the edition is used. Visual Basic provides advanced features such as tools to develop ActiveX and Internet Controls. It also lets the programmers to build distributed application in team environment. VB is a strong front-end tool for Database applications.

Tools And Controls Used In This Project:

Form Designer:

It is the main window in the middle of the screen that lets us to design and edit the application user interface. The Form designer displays two windows for each form. The form itself (the elements of the VUI) and a code window (the code behind the elements of the form).

Multiple Document Interface (MDI):

It is designed to simplify the exchange of information among the documents all under the same roof. The MDI form can't be duplicated but it acts as a container for all other windows & it's called the parent window and the other windows called the child windows. Here in this project one MDI form is used.

ActiveX Data Objects:

ADO provides a minimum number of layers between the front-end application and the data source to provide a high performance interface. It gives a greater control over how an application interacts with the data source and enables us to create more powerful and flexible applications than ADODC. An application trying to access data from a database using ADO involves the creation of three objects- Connection, Command and Record Set.

Label:

This control displays text on the form that the user cannot edit and is mainly used to identify other controls.

Text Box:

It is a mini text editor that a user can edit.

Frame:

This is used to group other controls.

Command Button:

It represents an action that the user carried out when clicks on it.

List Box:

It allows a user to choose an item from a list of items.

Option Button:

Option button provides a set of choices from which a user can select only one button by clicking it at run time.

Menu:

This offers a convenient and consistent way to group commands and an easy way for users to access them.

Common Dialog Control:

This is a custom control that displays the commonly used dialog boxes such as Save As, Color, Font, Print and File open.

Tools Used In This Project:

SQL*Plus:

SQL*Plus is a structured query language supported by Oracle. Through SQL*Plus we can store, retrieve, edit, enter and run SQL commands and PL/SQL blocks. Using SQL*Plus we can perform calculations, list column definitions for any table and can also format query results in the form of a report.

SYSTEM DESIGN AND DEVELOPMENT

4. SYSTEM DESIGN AND DEVELOPMENT

4.1 INPUT DESIGN

The input design is the important phase in the design of software because the design for handling input data specifies how data are accepted for computer processing. Generally the computer System has intensive interaction with the outside world; mostly this interaction takes place through visual terminals such as monitors. So while developing a software system we have to take care of efficient development of interactive input design. The main objective of our input design is it should be interactive and user friendly.

The quality of input system determines the quality of the system output. Input design features can ensure the reliability of the system and produce results from accurate data.

The Input Design focus on

- Effectiveness - Input forms of screens serve specific purpose
- Accuracy - Design that assures proper completion
- Easy to use - The forms of the screens are straightforward and required no extra time to understand.
- Simplicity - This refers to keeping the forms and screen simple and understandable

Besides knowing what to enter, what should not be entered is equally important. Input design ensures that our software perfectly performs various validations and constant options are filled only with the help of popup selections.

Validation

This is the important factor in input design. The input data is the main source of the system, so proper validation for input data is needed in both field level and form level these are accomplished in our software by including appropriate validation procedures.

Data validation ensures that every value that the user enters into the application is accurate. Visual basic provides two data validation methods:

- Form Level Validation takes place after a user has filled in all fields in the form.
- Field Level Validation takes place as each field on a form is filled in.

When the user types the invalid data into fields on your form, you should provide an audio and/or visual notification of the invalid data entry. With either form level or Field level validation, you should always set focus back to the field that contains invalid data.

4.2 OUTPUT DESIGN

Characteristics of the output system:

- Fit for user needs - The output will produce what the user needs.
- The output should abstract the complexity of the system.
- The output should be accurate and easy to understand.
- Output should be properly formatted.

4.3 DATABASE DESIGN

SCHEME TABLES

Loan Scheme
Vlscheme

Sl_No	Name	Type	Width	Description
1	Vlgrd	Number		Grade / Group
2	Vlyear	Number		Year End March
3	Vlvtype	Number		Vehicle Type
4	Vlloan	Number		Advance Amount
5	Vlnoi	Number		No of Installments

Interest Subsidy Scheme
Isscheme

Sl_No	Name	Type	Width	Description
1	Issgrd	Number		Grade / Group
2	Issyear	Number		Year End March
3	Issvtype	Number		Vehicle Type
4	Isssub	Number		Sub/10000/month
5	Issceil	Number		Ceiling amount

CODE TABLES

Insurance Codes
Inscodes

Sl_No	Name	Type	Width	Description
1	Inscode	Number		Insurance Code
2	Insname	Text	25	Insurance Name

Vehicle Type Codes
Vtpcodes

Sl_No	Name	Type	Width	Description
1	vtpcode	Number		Vehicle Type Code
2	vtpname	Text	20	Vehicle Type Name

Loan Budget
Vlbudget

Sl_No	Name	Type	Width	Description
1	Vlbyear	Number		Year End March
2	Vlbamt	Number		Total Budget Amount

MASTER TABLES

Re-imbursement Master
C_rmst

Sl_No	Name	Type	Width	Description
1	Crpbno	Text	10	Badge Number
2	Crslno	Number		Serial Number
3	Crfrdate	Date/Time		From Date
4	Crtodate	Date/Time		To Date
5	Croption	Text	1	Option (A/R)

Vehicle Loan Master

Vlmaster

Sl_No	Name	Type	Width	Description
1	Vlmpbno	Text	10	Badge Number
2	Vlmslno	Number		Serial Number
3	Vlmyear	Number		Year Ending March
4	Vlmvtype	Number		Vehicle type
5	Vlmadamt	Number		Advance Amount
6	Vlmsurety	Text	10	Badge Number of Surety
7	Vlmnoi	Number		No Of Installments
8	Vlmsdate	Date		Date Of Sanction
9	Vlmddate	Date		Date Of drawl Of Advance
10	Vlmon	Text	1	Old / New Vehicle
11	Vlmpname	Text	25	If Old, Name From Whom Purchased
12	Vlmregno	Text		Registration Number
13	Vlmmodel	Text	25	Vehicle Model
14	Vlmyom	Number		Year Of Manufacturing
15	Vlmvcost	Number		Cost Of Vehicle
16	Vlmmname	Text	25	Manufacturer Name
17	Vlmitype	Number		Insurance Type
18	Vlmicname	Text	50	Insurance Company Name
19	Vlmedins	Date/Time		Expiry Date Of Insurance
20	Vlmcldate	Date/Time		Date of Closure of Loan
21	Vlmnot	Number		No of times Advance taken earlier
22	Vlmflag	Number		Flag of Printing

Vehicle Loan Master
Vlreject

Sl_No	Name	Type	Width	Description
1	Vlrpbno	Text	10	Badge Number
2	Vlrslno	Number		Serial Number
3	Vlryear	Number		Year Ending March
4	Vlrvtype	Number		Vehicle type
5	Vlradamt	Number		Advance Amount
6	Vlrsurety	Text	10	Badge Number of Surety
7	Vlrnoi	Number		No Of Installments
8	Vlrsdate	Date		Date Of Sanction
9	Vlrddate	Date		Date Of drawl Of Advance
10	Vlron	Text	1	Old / New Vehicle
11	Vlrpname	Text	25	If Old, Name From Whom Purchased
12	Vlrregno	Text		Registration Number
13	Vlrmodel	Text	25	Vehicle Model
14	Vlryom	Number		Year Of Manufacturing
15	Vlrvcost	Number		Cost Of Vehicle
16	Vlrmname	Text	25	Manufacturer Name
17	Vlritype	Number		Insurance Type
18	Vlricname	Text	50	Insurance Company Name
19	Vlredins	Date/Time		Expiry Date Of Insurance
20	Vlrcldate	Date/Time		Date of Closure of Loan
21	Vlrflag	Number		Flag of Printing

Interest subsidy master

Ismaster

Sl_No	Name	Type	Width	Description
1	Ispbno	Text	10	Badge Number
2	Isvtype	Number		Vehicle Type
3	Ison	Text	1	New/Old Vehicle
4	Ispname	Text	25	If old, name from whom purchased
5	Ismodel	Text	25	Vehicle Model
6	Isyom	Number		Year of Manufacturing
7	Ismname	Text	25	Manufacturer Name
8	Isvcost	Number		Vehicle Cost
9	Isitype	Number		Insurance Type
10	Isicname	Text	50	Insurance Company Name
11	Isedins	Date/Time		Expiry Date Of Insurance
12	Isbname	Text	25	Source Of Loan(Name of institution.)
13	Islamt	Number		Loan Amount
14	Isldate	Date/Time		Loan Drawn Date
15	Isnoi	Number		No of Installments (months)
16	Isemi	Number		Equated Monthly Installment
17	Isfrdate	Date/Time		Date Of Repayment Of First Emi
18	Iscldate	Date/Time		Date of Closure of Loan

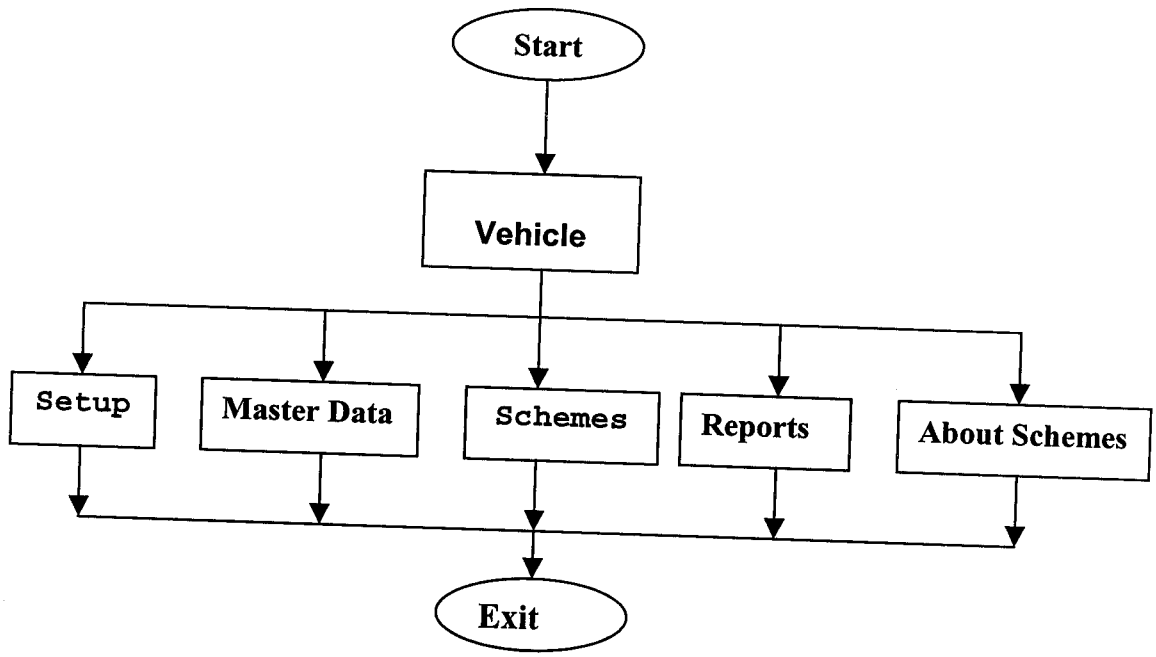
Interest Subsidy Payment Details
Spmaster

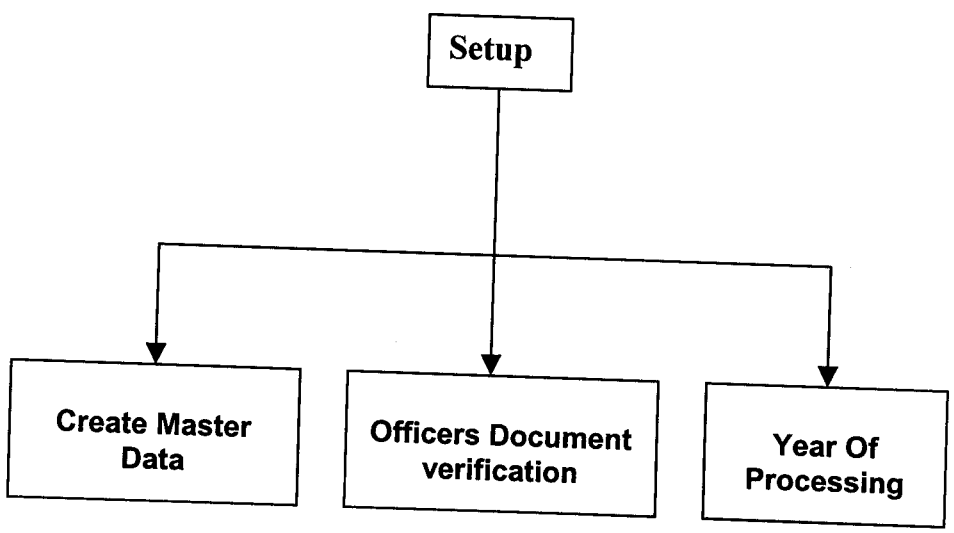
Sl_No	Name	Type	Width	Description
1	Sppbno	Text	10	Badge Number
2	Spyear	Number		Year Ending March
3	Spapr	Number		April
4	Spmay	Number		May
5	Spjun	Number		June
6	Spjul	Number		July
7	Spaug	Number		August
8	Spsep	Number		September
9	Spoct	Number		October
10	Spnov	Number		November
11	Spdec	Number		December
12	Spjan	Number		January
13	Spfeb	Number		February
14	Spmar	Number		March

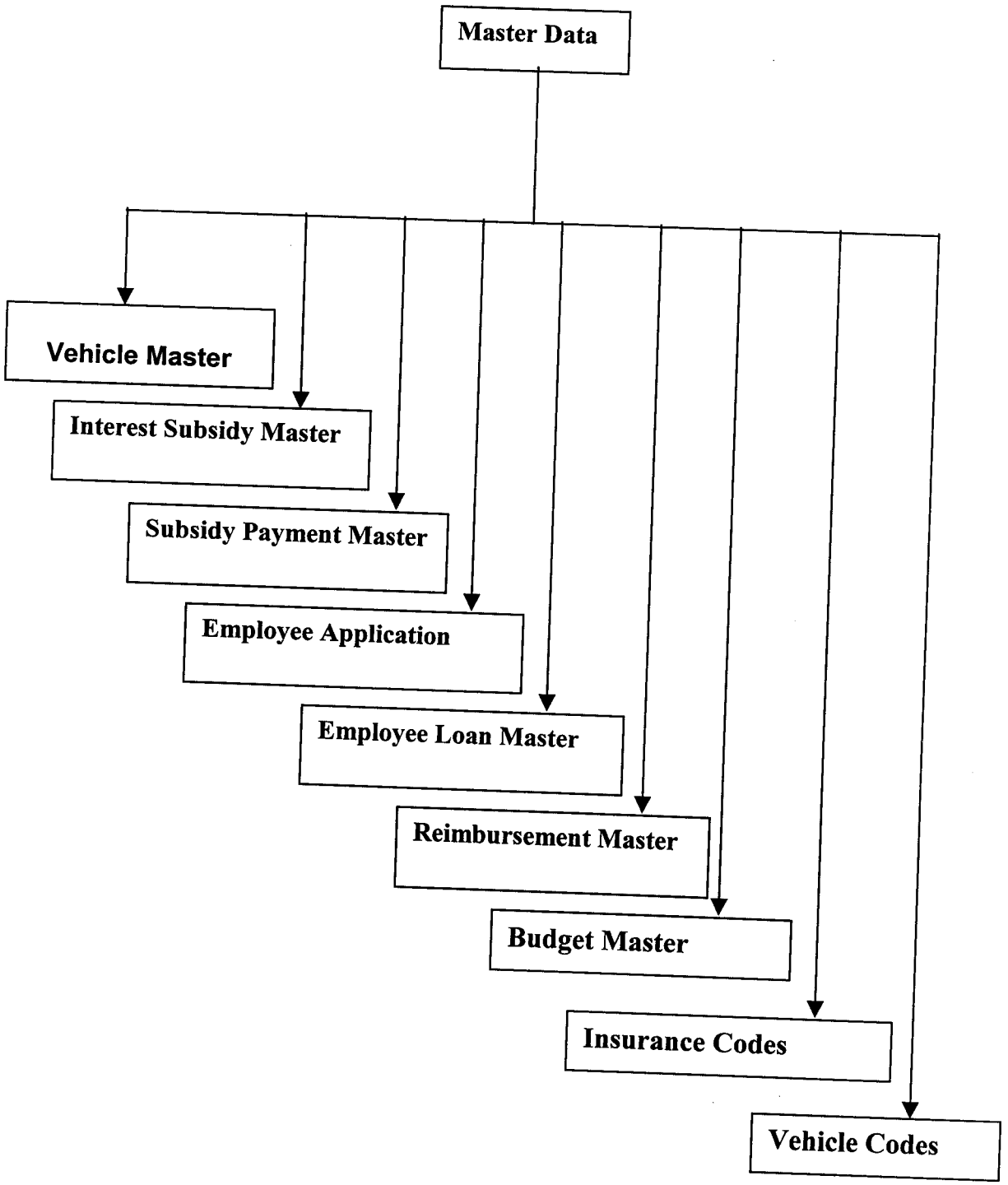
Vehicle Master
Vehmst

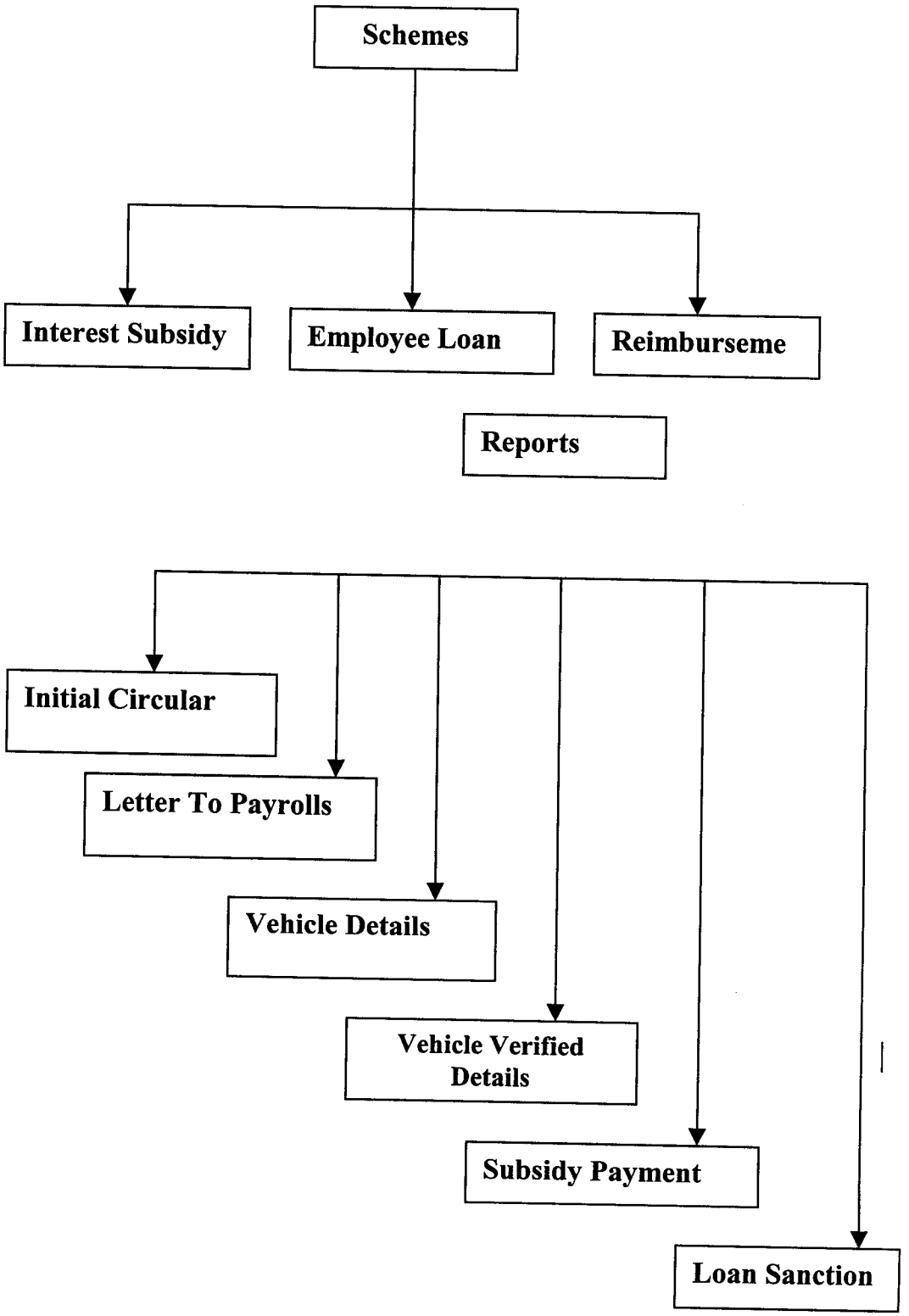
Sl_No	Name	Type	Width	Description
1	Vmpbno	Text	10	Badge Number
2	Vmyear	Number		Year Ending March
3	Vmregno	Text		Registration Number
4	Vmtype	Number		Vehicle type
5	Vmmanf	Text	25	Manufacturer Name
6	Vmmodel	Text	25	Vehicle Model
7	Vmyom	Number		Year Of Manufacturing
8	Vmvcost	Number		Cost Of Vehicle
9	Vmitype	Number		Insurance Type
10	Vmedins	Date/Time		Expiry Date Of Insurance
11	Vmicname	Text	50	Insurance Company Name
12	Vmedtax	Date/Time		Expiry Date Of Tax
13	Vmedreg	Date/Time		Expiry Date Of Registration
14	Vmvdate	Date/Time		Verified Date
15	Vmvby	Text	20	Verified By
16	flag	Number		Flag of Printing

4.4 PROCESS DESIGN






Master Data
Vehicle Master
Interest Subsidy Master
Subsidy Payment Master
Employee Application
Employee Loan Master
Reimbursement Master
Budget Master
Insurance Codes
Vehicle Codes


Schemes
Interest Subsidy
Employee Loan
Reimburseme
Reports
Initial Circular
Letter To Payrolls
Vehicle Details
Vehicle Verified Details
Subsidy Payment
Loan Sanction

SYSTEM IMPLEMENTATION AND TESTING

5. SYSTEM IMPLEMENTATION AND TESTING

5.1 SYSTEM IMPLEMENTATION

As a policy every product in the company ready for release undergoes a versioning and release management process. The product is versioned and then implemented in the client location. A complete set of operational documentation, user's manual and guidelines are supplied. Professionals exclusively give user training to a few in the client place from the company.

Implementation Procedures

The project undergoes a versioning and release management before it is delivered to the client. It is a process of identifying and keeping track of different versions and releases of the system. And the released product usually includes Configuration files defining how the release should be configured for particular installations. Data files needed for successful operations. An Installation Program, which is used to help install the system on the target hardware. Electronic and paper documentation describing the system. All these information are made available on a medium, which can be read and understood by the customer for the software.

The following factors are considered before implementation. Checking if all the components which make up the system been included, if the appropriate version of each required component been included, are the data objects included, etc... An installation program is created and the entire kit is delivered to the client.

User Training

The kit delivered consists of a complete guide on the new system developed. A through training on the new system is given to a representative from each of the user area and an overall demo given to the entire team. The

queries from the audience were answered and hints given on various issues. Special training was given to the admin staff that is to play the role of super user. The configuration details and trouble shooting methodologies were explained and his performance absorbed. The user manual was completely explained and doubts cleared for the same. Installing and uninstalling the package and taking a backup of the data were demonstrated to the super user. Various possible exceptions and the possible causes for it from the user's end were explained. The various user environments and the right of access specified to each user was clearly explained and demonstration given to the team on different user environments. Instructions on successful operation of the system and trouble shooting methodologies were thus discussed.

Operational Documentation

Properly produced and maintained system documentation is a tremendous aid to maintenance engineers. The system documentation includes all of the documents describing the implementation of the system from the requirements specification to the final acceptance test plan.

A complete set of Operational Documentation was prepared for the client, who included the features of the system, the access rights allocated for various users and trouble shooting details. The special features of the system were highlighted. A step-by-step procedure was included in the documentation for data entry, report generation and saving reports in text, html or rich text format. The documentation is prepared keeping in mind users who have little or no knowledge of computers.

5.2 SYSTEM TESTING

Testing Process

Except for small software, systems should not be tested as a single, monolithic unit. Large systems are built out of sub-systems, which are built out of sub-systems, which are composed of procedures and functions. The testing process should therefore proceed in stages where testing is carried our incrementally in conjunction with the system implementation.

There are the five test stages and defects are discovered at any stage, they require program modifications to correct them and this may require other stages in the testing process to be repeated. The process therefore is an iterative one with information being fed back from later stages to earlier parts of the process.

The stages in the testing process are:

- Unit Testing
- Module Testing
- Sub-system Testing
- System Testing
- Acceptance testing

Unit Testing

Individual components are tested to ensure that they operate correctly. Each component is tested independently, without other system components. With respect to this project, the individual functions are treated as component and were tested.

Module Testing

A module is a collection of dependent components such as an object class, an abstract data type or some looser collection of procedures and functions. A module encapsulates related components so it can be tested with other system components.

Sub-system Testing

This phase involves testing collection of modules, which have been integrated into sub-systems. Sub-systems may be independently designed and implemented. The most common problems that arise in large software system are sub-system interface mismatches. The sub-system test process should therefore concentrate on the detection of interface errors by rigorously exercising these interfaces. Both the modules are treated as a sub-system and tested in this stage.

System Testing

The sub-systems are integrated to make up the entire system. The testing process is concerned with finding errors, which result from unanticipated interactions between sub-system and system components. It is also concerned with validating that the system meets its functional and non-functional. After integration of the above sub-systems with the whole system, the entire system is tested for errors.

Acceptance Testing

This is the final stage in the testing process before the system is accepted for operational use. The system is tested with data supplied by the system procurer rather than simulated data. Acceptance testing may reveal errors and omissions in the system requirements definition because the real data exercises the system in different ways from testing the data. Acceptance testing may also reveal requirement problems were the system facilities do not really meet the users need or the system performance is unacceptable. Test and reveal data were provided to the system and checked for errors

Defect Testing

Defect testing is intended to exercise a system so that latent defects are exposed before the system is delivered. These contrasts with validation testing which is intended to demonstrate that the system meets its requirement. Validation testing requires the system to perform correctly using given acceptance test cases. A successful defect test is a test, which causes a system to perform incorrectly and hence exposes the defects. It demonstrates the presence, not absence of program faults.

Various values, within the limit and exceeding the limit were provided repeatedly to individual components of data acquisition. These brought out the defects in the system and were corrected.

Two approaches to defect testing are:

Black-box Testing

It relies on the specification of the system or component, which being tested to derive test cases. The system is 'black-box' whose behavior can only be determined by studying its inputs and the related outputs. This is also called as functional testing because mathematical functional can be specified using only inputs and outputs.

Following black-box methods were applied to both the modules to test arrays:

- Usage of only one value of entire array. This proved that the program works for an exceptional array.
- Usage of different arrays of different sizes. This decreased the chances that the program with defect would accidentally produce a correct output because of some characteristic of the inputs.

- First, middle and last elements were accessed and any problems due to the boundary effects were delivered.

Structural Testing

This is the complementary approach to black box testing and is sometimes called structural, white-box or glass-box testing. The tester can analyze the code and the use knowledge about the structure of the component to derive test data.

The advantage of structural testing is that an analysis of the code can be used to find how many test cases are needed to guarantee a given level of test courage. A dynamic analyzer can then used to measure the extent of this coverage and help with test case design.

Path Testing

Path testing is a white-box testing strategy whose objective is to exercise every independent execution path through the component. If every independent path is executed then all the statements in the program must have been executed at least one. Furthermore, all conditional statements are tested for both true and false cases. This helped to improve the program efficiency with respect to time complexity and memory usage

CONCLUSION

6. CONCLUSION

The Vehicle Loan / Reimbursement Information System is developed in such a manner that it is user friendly and menu driven. The GUI screens used for data entry make recording of data much flexible. One can easily operate the system, enter, modify, find, traverse and delete whenever he wants and can generate reports with out much knowledge of computer operations. All operations are simplified in such a way that simply simply pressing key/keys carries them out. All tasks regarding the Vehicle Loan / Reimbursement Information System can be carried out with out much effort. Mostly all problems that are present in the existing UNIX system are eliminated.

It is possible to enhance the system in future. This system is developed using a modular approach and also the modules are independent of one another. So, in future additional menus and options can be added with no or less modification to the present system.

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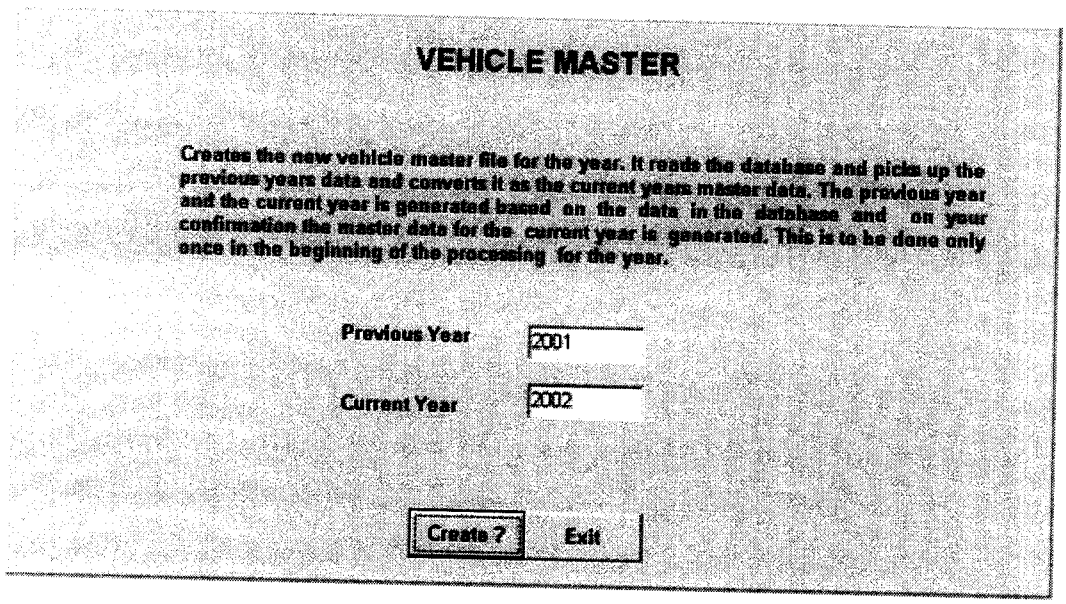
BIBLIOGRAPHY

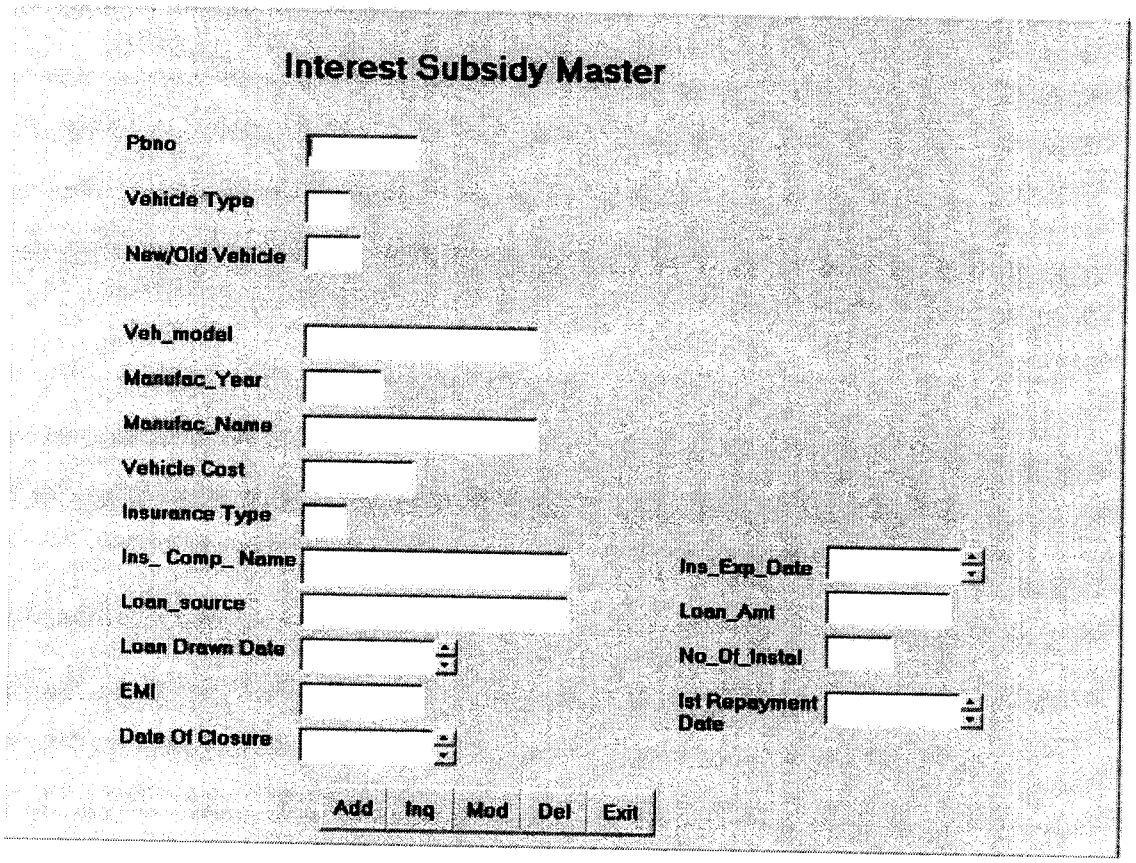
BOOKS	AUTHORS
VISUAL BASIC – 6 In 21 Days	Nathan Gurewich & Ori Gurewich
ORACLE 8i The Complete Reference TMH – Publication	Ivan Bayross
SOFTWARE ENGINEERING CONCEPTS TMH - Publication	Richard Fairly

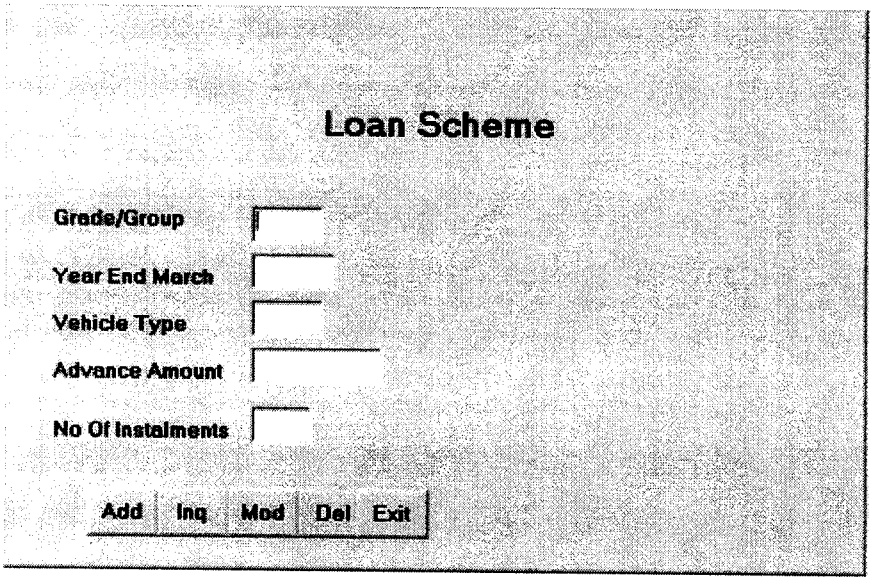
APPENDIX

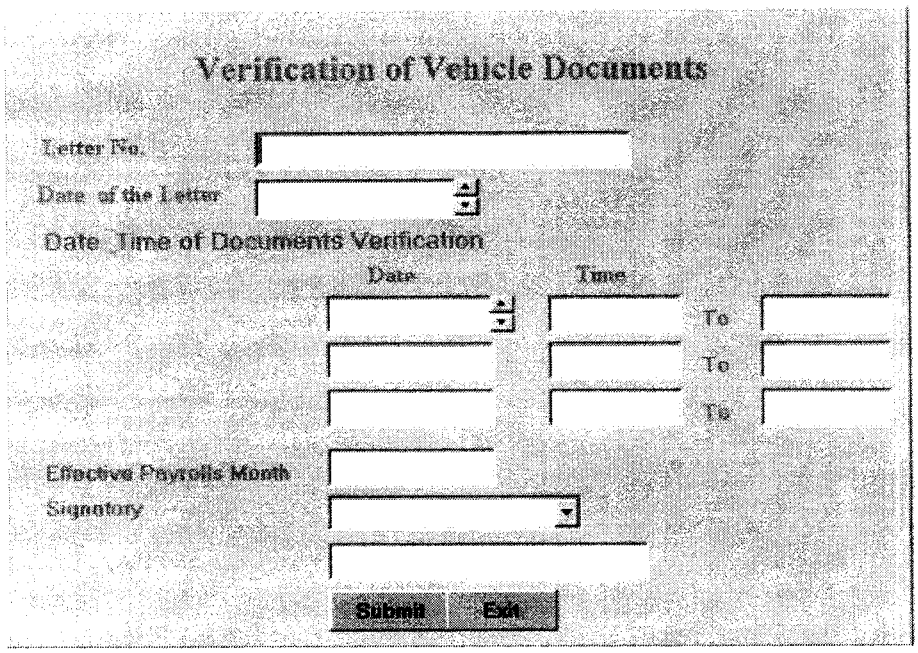
SCREENS

Vehicle Loan / Re-imbursement Information System


VEHICLE MASTER
Creates the new vehicle master file for the year. It reads the database and picks up the previous years data and converts it as the current years master data. The previous year and the current year is generated based on the data in the database and on your confirmation the master data for the current year is generated. This is to be done only once in the beginning of the processing for the year.
Previous Year
2001
Current Year
2002
Create ?
Exit


Interest Subsidy Master
Pbno
Vehicle Type
New/Old Vehicle
Veh_model
Manufac_Year
Manufac_Name
Vehicle Cost
Insurance Type
Ins_ Comp_ Name
Loan_source
Loan Drawn Date
EMI
Date Of Closure
Ins_Exp_Date
Loan_Amt
No_Of_Instal
Ist Repayment Date
Add
Inq
Mod
Del
Exit


Loan Scheme
Grade/Group
Year End March
Vehicle Type
Advance Amount
No Of Instalments
Add
Inq
Mod
Del
Exit


Verification of Vehicle Documents
Letter No.
Date of the Letter
Date_Time of Documents Verification
Date
Time
To
To
To
Effective Payrolls Month
Signatory
Submit
Exit

Vehicle Verified Documents

Enter the Year

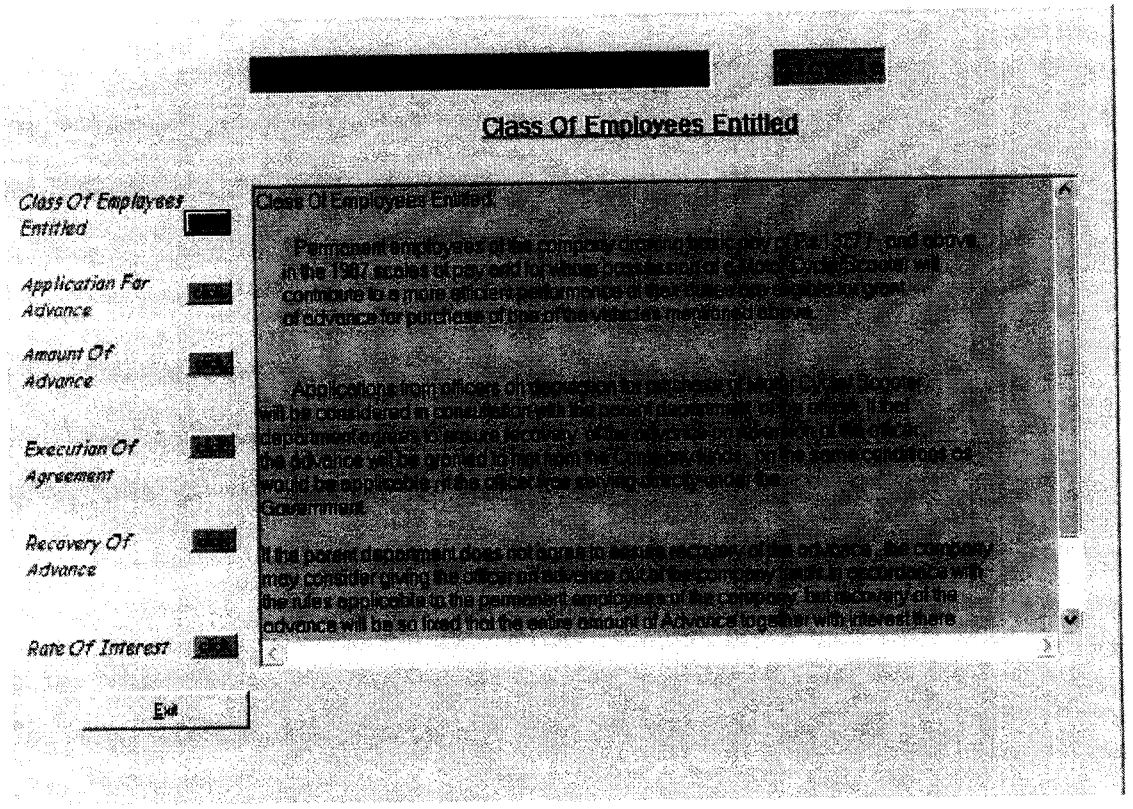
Verified Documents

Print

All Verified Documents

Print

Exit



3	BS	SUNANDA	Bi-Cycle	600	Y