

**MANAGEMENT AND CONTROL OF
CONSTRUCTION EQUIPMENT IN PROJECT
EXECUTION - COMPUTER APPROACH**

A CASE STUDY OF

**JDP CONSTRUCTION COMPANY
NIGERIA LIMITED, MINNA**

BY

**ETEFIA, MICAH BRANDY
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APPROVAL SHEET

This project has been duly supervised, examined and found acceptable in partial fulfillment of the requirement for the Post-Graduate Diploma in Computer Science of the Federal University of Technology, Minna.

PROJECT SUPERVISOR
MR. L.N. EZEAKO

DATE

HEAD OF DEPARTMENT
DR. S.A. REJU

DATE

EXTERNAL EXAMINER

DATE

DEDICATION

To God Almighty, who with His gracious strength and ability sees me all through the duration of the programme.

ACKNOWLEDGEMENT

I am grateful to the Department of Mathematics and Computer Science of the Federal University of Technology, Minna, with a particular mention of Mr. L.N. Ezeako, my able project supervisor, who had taken pains in reading through all the chapters in draft form and with his expertise ability encouraged and helped in no small way to a successful completion of this project.

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Among the many lecturers who through the dissemination of their wealth of knowledge had direct or indirect role in this material, a special mention must be made of: Messrs Kola Raimi, I.K. Adewale, M.I.B. Dogara, Dr. Yomi Aiyesimi and Dr. S.A. Reju.

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ABSTRACT

This Project has established the need for computerised procedures for the management and control of construction equipment in JDP Construction Company Limited, Minna Branch.

A dBASE IV Program was constructed to facilitate the requisite management and control of equipment. A documentation manual to assist the users of the program was also produced.

The manual system of management and control procedures cannot contend with its involving requirements to meeting the target, hence the persistent and/or intermittent loss that may lead to:

- i) The production of substandard work in order to recoup part of the envisaged loss;
- ii) Loss of goodwill;
- iii) Bottleneck on expansion;
- iv) Project abandonment and;
- v) Eventual determination of the contracts by the employer due to unnecessary delay in executing the job.

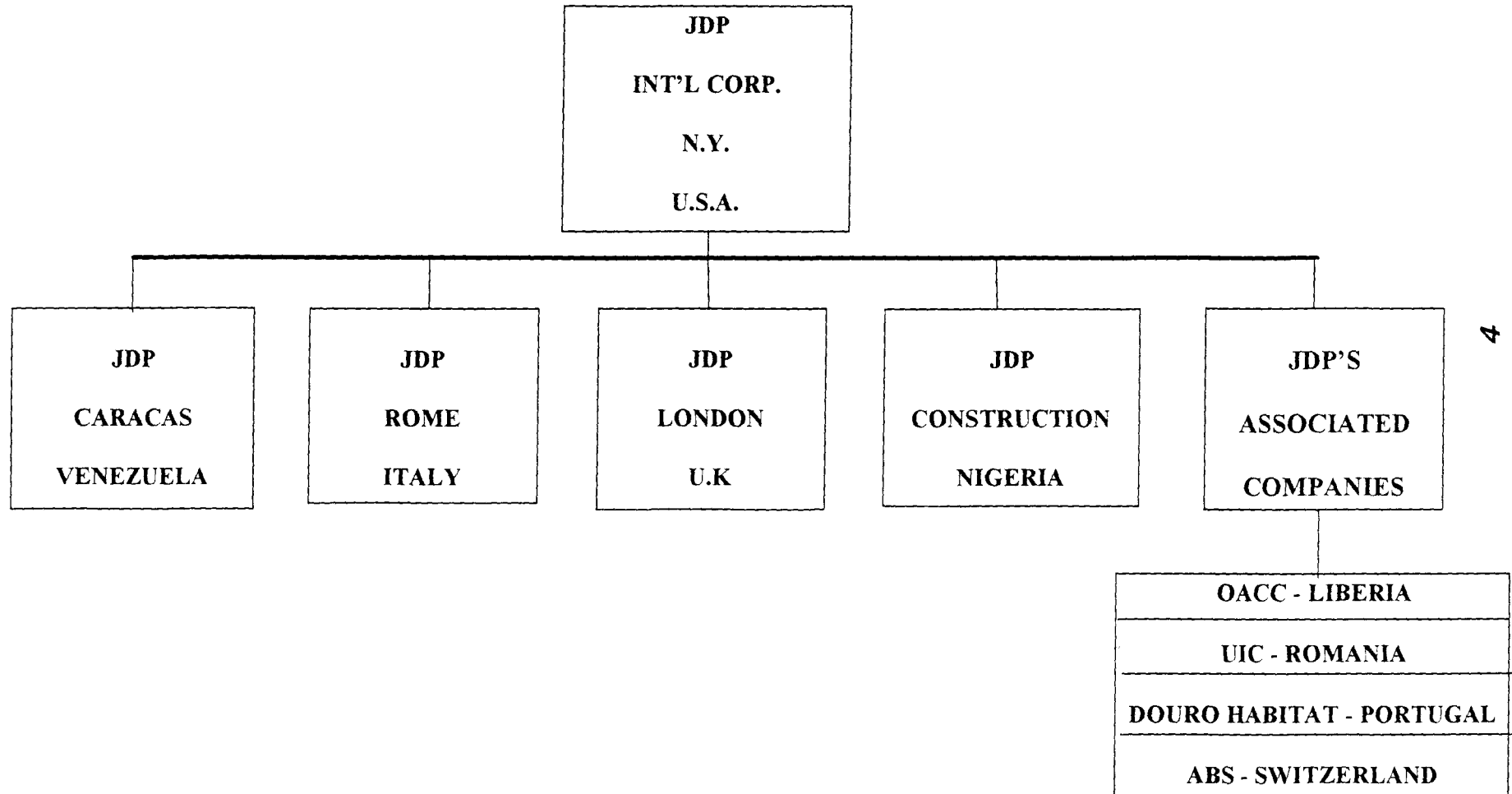
These prevalent problems may occur due to the inappropriateness of the manual management and control approach or that proper follow up of the adopted procedures is not given due to Laborious clerical work involved and moreso, the untimely production of the required information necessary for adequate and timely action.

But before any further analysis, it will be of utmost interest to have a brief history of the company in question to justify whether or not the scope or degree of managements and control involvements of these equipment necessitates using a computer approach.

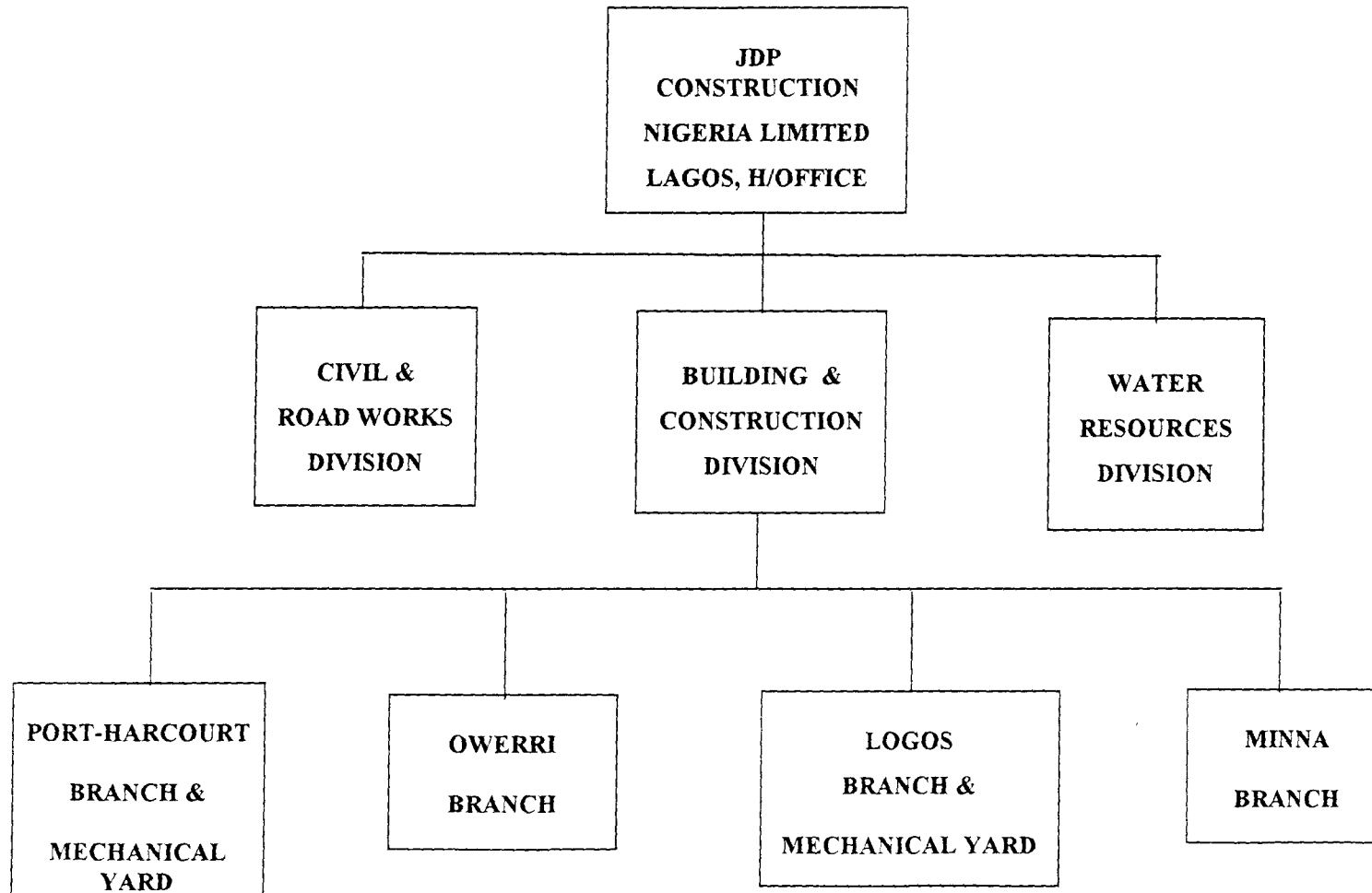
1.2 BRIEF HISTORY OF JDP CONSTRUCTION

JDP Construction Company is a multi-national company. It started as Johnson Drake and Piper International Corporation, a general contracting and construction

JDP INTERNATIONAL CORP. ORGANIZATION CHART



JDP CONSTRUCTION NIGERIA LIMITED ORGANIZATION CHART



1.4. OBJECTIVES OF JDP CONSTRUCTION

As a general contracting and construction management organisation, it is never a non-profit making venture. The paramount aim of such companies' existence is profit oriented. Thus the company seek to:

- i) Provide all kinds of civil engineering projects including roads, bridges, airfields, water supply, treatment and distribution systems, sewage, drainage and irrigation as well as public utilities using modern technique and equipment;
- ii) Execute building projects such as:
 - a) Commercial (Hotels, Offices);
 - b) Public (Schools, Universities, Hospitals);
 - c) Industrial (Factories, Warehouses);
- iii) Construct housing Scheme ranging from apartment building of luxury standard to mass-housing projects of medium and low cost with all external works inclusive;
- iv) Act as developer i.e., building on its own account for sale to the public;
- v) Provide a complete Turnkey service to the Government and clients for projects including all electrical and mechanical systems; that is, a complete service embracing all aspects of a project from preliminary studies through design construction, finishing, fitting out and commissioning of equipment and plant. In the case of a turnkey buildings, they are handed over to the client as fully operational, complete and ready for occupation. Other objectives include:

- vi) FEASIBILITY STUDIES: These cover technical possibilities, financial viability, capital and running cost studies, site location and investigation, assessment of site potential, comparison of alternative schemes and design approaches and established performance criteria for projects;
- vii) DESIGN: - The provision of complete design services from initial briefing through outline proposal, scheme planning, detailed design and working drawings, bills of quantities and contract documents.
- viii) FINANCING:- Advising and assisting clients in arranging finance for projects involving them, including obtaining loans, preparation of loan documents, negotiation with bank and financial institutions.

1.5 **OBJECTIVES OF THE STUDY**

The existing manually operated system of control is laborious in terms of clerical work involvement. The critical aspects of the exercise are overlooked thereby crippling the timely production or flow of vital information necessary for the managerial decisions. For instance:

- i) What assets are at which location and in what condition?
- ii) Was any transfer effected and from where to which destination (place & division)?
- iii) Are there obsolete equipment?
- iv) Was there any disposal and or additions and at what period?
- v) At what stage do we replace an asset (equipment)?

The assessments necessary for the provision of answers to the above question may not be a once and for all yearly stock taking exercise.

If the expected yields must be in place the assessment should be continuous.

This project therefore, aims at achieving the following:

- i) To study and analyse the existing system in order to know the basis of the new system;
- ii) To design a computerised procedures for the management and control of construction equipment;
- iii) To provide detailed and informative computerised assets register;
- iv) To provide computerised information on the expected relief or savings available to the company from capital allowance. This will enable the company to take advantage of initial and annual allowances allowed on qualifying capital expenditure i.e., assets, by the Nigeria Tax Law, either to increase or enhance their stock of equipment for expansion purpose and or excellent performances;
- v) To collate the costs on each asset and carrying out replacement analysis for the company to be informed of the appropriate stage which might pay off to replace its assets;
- vi) To provide a documentation manual which will serve as a reference for the end users of the new system.

1.6

METHODOLOGY OF THE STUDY

This material is the product of many years of observing the trend of things in the company, as well as information gathered from key personnels interviewed.

Ideas are obtained, too, through books, Journals, magazines, and other secondary materials such as lecture notes handouts, internal memo, and a host of others.

CHAPTER TWO

2.0 REVIEWING THE CONCEPTS OF CONTROL AND MANAGEMENT

In this chapter, consideration will be given to the concepts of control and management, aims of control and management, machinery as a tool of a construction firm and the control and management of machines: the need for computerisation.

2.1 THE CONCEPTS OF CONTROL AND MANAGEMENT

Control is concerned with determining whether the results are achieved whereas management coordinates such activities: planning, organizing, controlling and leading to achieve the expected results of an organization. Control thus plays functional and vital roles in the management system, in the following wise:

- i) The establishment of standard of performance.
- ii) The provision of information that indicate deviations between actual performance and the established standards.
- iii) The provision of feedback that necessitates action to correct performance that does not meet the standards.

Control means that it is necessary to assess current performance and to make continuing adjustments in the activities of an organization to ensure that the set objectives or goals are achieved. Considering control as single procedures and not as a whole system and in relation to what the project aims at, it can be defined as

"measure or standards established by the management of an organization in order to safeguard the assets or ensure adherence to stipulated procedures to safeguard the assets or equipment.

But what then is management? This could be defined as "the process undertaken by one or more persons to coordinate the activities of other persons to achieve results not attainable by any one person acting alone". These coordinated activities include:

- (a) PLANNING: This determines the organizational objectives and establish the appropriate strategies for achieving these objectives. Planning therefore, determines what results the organization will achieve. At this stage what the organization must do to be successful must be outlined.
- (b) ORGANIZING: This is concerned with turning plans into action by specifying how it will achieve the results and as well providing an organizational structure that enables the organization to function effectively as a cohesive whole.
- (c) LEADING: Once objectives have been developed and organizational structure has been designed and staffed, the next step is to begin to move the organization towards the objectives. This function is sometimes referred to as directing or motivating. This involves influencing the members of the organization to perform in ways that accomplish the set objectives. Its major purpose is to channel human behaviour towards accomplishing organizational goals or objectives with the understanding that what results that are recorded of the organizational set goals are determined by the workability of control and management system enforced, the expected aim include:

- i. To channel human behaviour towards accomplishing organizational set goals;
 - ii. To make work productive and workers achieving;
 - iii. On general terms, control seeks to ensure adherence to stipulated procedures to achieving the set goals and;
 - iv. Specifically, to safeguard the assets or equipment of the organization.
- (d) CONTROLLING: The determination of whether the planned results are achieved largely rest on controlling activities or functions. The designated staff or manager must make sure that the actual performance conforms with the performance that was planned for. This makes possible for a follow up of the overall objectives or goals to ensure that the organization stays on the path that was planned for it.

2.2 AIMS OF CONTROL AND MANAGEMENT

Managerial activities and control exercised within any organizational set up are dependent on the set goals of such an organization. It activities are dependent in the sense that, the organization sets the goals but control and management function to the successful and fulfilling accomplishment of the set objectives.

2.3

MACHINERY AS A TOOL OF A CONSTRUCTION FIRM

The importance of equipment or machinery in terms of the roles played in a construction firm are stressed here.

Construction may be broadly defined as the assembling or erecting of structures which cannot be readily moved once completed. This entails the use of equipment and machinery.

Construction falls into four categories namely: light, heavy industrial and civil. All these structures require equipment and machinery of varying types and nature to achieve the set targets at economical cost. Furthermore, depending on the nature of construction, the right choice of equipment can:

- i. Save cost;
- ii. Save time;
- iii. Make work easy;
- iv. Result in precision and high quality of job;
- v. Generate reasonable profit and;
- vi. Improve human condition by the use of less labour, that is, cutting down man-hour to achieve a table.

There are areas in construction, however, where the use of machinery and equipment are indispensable. These areas include: heavy building construction; industrial and civil works construction.

2.4 CONTROL AND MANAGEMENT OF MACHINES:

THE NEED FOR COMPUTERIZATION

In chapter one under the objectives of the study, it was said that the existing manually operated system of control may be laborious. This was seen in terms of the clerical work involvement that might eventually result to critical aspects of the exercise being over looked. And the resultant effect may be that the timely production or flow of information necessary for managerial decisions can be crippled.

Assets or Equipment Register, for instance is to avail the organization visa-vis the project managers with the situation report about the machinery in terms of:

- i) The condition or useful life;
- ii) The model
- iii) The make
- iv) The capacity and,
- v) The physical locations.

This information will help in the maintenance plan, out right acquisition or hiring decisions to be made well a head of time. The project managers know the stages of work for which what equipment may be needed. The plant managers must have to carry out regular assessment of these equipment and identify obsolete ones, suggest the disposal of these assets where their conditions may warrant such decision to be taken and as well submitting on regular basis the real situational report of other assets.

The responsible officers for Assets (Equipment) Register will have to update these records as to in turn avail the projects managers and other user of such information readily with authentic list of useful equipment as at when needed. This involves alot of filing of pieces of papers which may be subject to mis-placement thereby thwarting the efforts and the expected results. It may be time consuming and laborious. This could better be accomplished using a computer taking cognizance of its speed and storage advantages.

A professional accountant prepares and furnishes the management of an organization with how much tax relief a company can claim as capital allowance from qualifying capital expenditure. The time lapse between the accounting year of an organization and when the audit work will commence and a Final Account is prepared makes such vital information untimely for managerial usage.

Even if a tax expert may have to be employed for just that, the tendency that the result of the exercise will be accepted by the Tax Authority in their first value is debatable.

Moreso, the management may wish to apply a quantitative technique, say, asset replacement analysis to determine or establish a point where replacement decision could be taken, that is, the least cost point; an expert in that field will be needed to provide such service to enhance the management taking decisions on outright purchase of equipment or to maintain that particular machinery.

But once a computer is programmed using the adequate software with a trained operator or a computer personnel, the whole job can be done accurately and easily without the use of those experts and professionals.

We must remember that a computer is useful too in the areas of work that are repetitive in nature and the calculation of capital allowance is a process that calls for repetition.

CHAPTER THREE

3.0 SYSTEMS ANALYSIS AND DESIGN

This chapter considers the analysis of the existing system in order to serve as the basis for the design of the new system. In addition, it intends to describe the design of the system in terms of software required for the development, the logical and physical requirements.

3.1 ANALYSIS OF THE EXISTING SYSTEM

The existing system is a manual procedure. The company maintains records of construction plant and equipment in the form of Asset Register. This register gives such information as:- the date of purchase; equipment category; quantity; size and capacity; and the physical condition.

The Register is subjected to annual review following the yearly stock taking for the ascertainment of the physical existence and condition of the assets. Delivery notes are used in the event of transferring of any equipment from one site to another. On receipt, a copy of the issued delivery note is signed and returned to the transferor site-office as an evidence of delivery. In any event, the authentic list of these equipment may be required, in which case the storekeepers have to manually extract them.

For the calculation of depreciation on those equipment, the process is carried out manually also and entries are made into the books. Other information such as the details of the maintenance cost of the equipment are filed up in the cabinet for the sake of reference.

3.2 PROBLEMS OF THE EXISTING SYSTEM

The use of Manual Operation of equipment control in JDP Construction, Minna has created some fundamental problems as regards the operation of the organisation. Some of these problems are as highlighted below:-

- (i) The current system is laborious in terms of the clerical work required. The timely production of the required information is hindered thereby slowing down the process of decision making;
- (ii) At times the pace of works is slowed due to breakdown of equipment either in transit or otherwise.
- (iii) Lack of proper procedure for an outright replacement of equipment;
- (iv) Uneconomical maintenance of equipment as a result of unavailability of proper asset history.

3.3 THE DESIGN OF THE NEW SYSTEM

As stated above, the existing manual operation is faced with some problems which hinder the proper management and control of the organisation. This leaves the organisation with no other option than to adopt the computerised system of equipment control.

The new system is expected to be presented using a menu-driven format. In this case, the system would prompt the users to select an appropriate menu and the appropriate action is invoked.

3.4

CHOICE OF SOFTWARE

For the purpose of achieving the intended design, the proposed system is to be designed using Database Management System (DBMS). A database can be defined as a mechanised shared and centrally controlled collection of useful information organised in a systematic and consistent manner.

A DBMS is defined as a suite of program used to manipulate the content of a database. A DBMS performs the following functions:-

- (i) Create a database;
- (ii) Retrieve data from the database;
- (iii) Generate report from the database;
- (iv) Update information in the database;
- (v) Organise the data in the database.

Examples of DBMS packages are:- dBASE, Foxpro, Clipper, Oracle, etc.

However, the new system is intended to be designed using dBASE IV and Clipper. The instructions will be coded in dBASE IV and compiled with Clippers for efficient operation of the system.

3.5

FEATURES OF DBMS

The introduction of the fourth generation language in which DBMS falls into, replace the development of program in a file processing environment. In this

environment, users requirements are in isolation with various application program operating almost independently. Files and records are designed in such a way as to satisfy individual operational needs, thus imposing organizational barriers with regards to the data. However, in most information systems, it is desirable to have the ability to jump over those imposed barriers and access data across the information.

This led to the introduction of database environment. In database processing environment, data are viewed as a whole irrespective of type. Furthermore, the integration of data of different types are linked by logical relationship through a DBMS.

The prominent features of database packages are as follows:-

DATA INTEGRATION

In a database processing environment, information from several files is coordinated, accessed and operated upon as though it is in a single file. Logically the information is centralised, while physically, the data may be located in different files. In addition, it is possible for two or more applicants to share comparative data.

DATA INDEPENDENCE

One important feature of the DBMS is that it ensures data independence because application programs are isolated from the physical storage of data. This feature seeks to allow for changes in the content and organisation of physical data without re-programming the application program using it, and also to allow for modification of application program without re-organising the physical data.

FIELD	FIELD NAME	TYPE	WIDTH
1	CODE	CHARACTER	2
2	DESC	CHARACTER	20
3	DEP	NUMERIC	4/1
4	IAR	NUMERIC	4/1
5	AAR	NUMERIC	4/1

3.8.3 EQUIP. DBF

Detailed information of the available equipment used in the organisation are contained in this database file. Each equipment is described in terms of its Name, Cost, Capacity, Model Number, Date of Purchase, Location, Condition and other relevant information required.

3.8.4 REVENUE. DBF

In the design, the use of the equipment is expected to generate revenue. This revenue is associated with the particular equipment used. The details of the revenue is entered into the REVENUE. DBF in order to serve as a reference. The file has information such as Equipment Name, Name of Project, Allocation, Date of Allocation, Charges Rate, Number of Days, etc. The structure of the file is as given below:-

S/NO	FIELD NAME	TYPE	WIDTH
1	ECODE	CHARACTER	8
2	EDESC	CHARACTER	30
3	PCODE	CHARACTER	6
4	PDESC	CHARACTER	30
5	DATEA	DATE	8
6	DATER	DATE	8
7	ERATE	NUMERIC	10/2
8	DAYS	NUMERIC	3
9	REVENUE	NUMERIC	12/2

CHAPTER FOUR

4.0 SYSTEMS APPLICATION AND IMPLEMENTATION

4.1 INTRODUCTION

The design of the proposed system was completed in the last chapter and the required physical and logical design were described. The aspect of implementing the proposed system is the major task that will follow.

The system implementation stage involves the description of the environment needed for the successful implementation of a system.

This chapter describes the implementation of the proposed system in terms of the hardware configuration and the various software that needs to be installed into the computer. The testing of the system is also described as a way to give confidence to the potential users of the system. The mode of conversion and changeover to the new system is also recommended. All these are done in order to achieve a successful systems implementation.

4.2 COMPUTER HARDWARE CONFIGURATION

The new system is designed to work on a stand alone Micro-computer. The computer configuration which describes the computer and its peripheral should include a Micro-computer, Printer and Uninterrupted Power Supply (UPS). All these are necessary requirements for a successful implementation of the proposed system. The description and capacity of each of these are as follows:-

(i) **MICRO-COMPUTER:**

A micro-computer of Pentium micro-processor with a minimum Random Access Memory (RAM) of 16 megabytes (MB) and a speed of about 133 megahertz (MHz). In addition, it should possess a hard disk storage capacity of not less than 1.7 Gigabytes (GB) and a floppy disk drive unit providing for 3.5 inches diskettes. The features of the proposed micro-computer is to ensure speedy retrieval of information, ability to execute modern software which require large memory and disk space, and to meet up the future computer needs of the organisation when all other operations would be fully computerized.

ii) **PRINTER:**

A Printer which is an output device is required for the production of hardcopy reports. This is intended to be used to generate the required reports in the proposed system and printing of other important documents which are useful in the organisation. For this purpose, two types of printers are recommended, namely:- Epson Printer (LQ 1170) and Laserjet Printer (Laserjet 6L). The Epson Printer which has an additional advantage of printing on computer paper is required to produce the various reports of the new system while the Laserjet printer is only required for the printing of other forms of official documents and text.

iii) **UNINTERRUPTED LOWER SUPPLY (UPS):-**

This is required for the purpose of ensuring that the danger of interruption of power supply to the system is minimized. It is designed to

4.4 SYSTEMS TESTING AND RESULTS

A newly developed software is not assumed to be working effectively until a confirmed test is carried out. This is the aim of system testing which is the process of confirming whether a system is working in order or not. Since a computer system is expected to assist computer users in executing the required task with all the necessary speed and accuracy, it is essential to properly test a newly designed system to ensure that it is working according to the set objectives.

Specifically, this new system has been tested using the old data. The computer process of this data gives the same result with that of the manual operation carried out earlier.

However, the reliability of the test emanates from the fact that the testing was carried out for the system cycle which is one year (1997). Apart from the month by month comparison, the end of the year reports are also the same. In view of this, the new system is recommended for full implementation without any further testing.

4.5 SYSTEM CONVERSION AND CHANGEOVER

The confirmation of the workings of the new system allow for its full conversion and live operation. This requires the conversion of the necessary information and files which is intended to aid the transformation from the existing system to the newly developed one.

Specifically, system conversion and changeover are performed in three modes namely:- file setup, file conversion and system changeover. The file setup is required

- would be emphasised. The training of the computer supervisor has to be a continuous process since the officer has to keep abreast of latest development.
- (iii) Organising Computer Workshop on a regular basis is also recommended. This should emphasise on appreciation of computers and its latest developments and discoveries. The workshop should be organised to educate the management staff on the need for computerisation.
 - (iv) A good security system is also required. This is intended to ensure the security of the computer hardware and its peripherals as well as the confidentiality of the information contained therein. In doing this unauthorised persons should not be allowed into the computer room.
 - (v) The recommended hardware configuration and software type should be procured. This is based on the fact that the selection of the computer system made in the last chapter was done to meet the needs of the organisation.

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J.D.P. CONSTRUCTION NIGERIA LIMITED

COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL SYSTEM

PROJECT MANAGEMENT MENU

PROJECT
MANAGEMENT

EQUIPMENT
ALLOCATION

EQUIPMENT
UPDATE

REPORT
GENERATION

OTHER
OPTIONS

SYSTEMS
EXIT

↓

NEW PROJECT DETAIL
CHANGE PROJECT DETAIL
VIEW PROJECT DETAIL
DELETE PROJECT DETAIL
LIST PROJECT DETAIL
SUBMENU EXIT

Pick choice:

Figure II

ELIMINATION OF DATA REDUNDANCY

Data redundancy occurs when the same data appears in one or more files. This leads to wastage of storage space and duplication of efforts during data entry. One basic feature of DBMS is that it eliminates data redundancy since data are not duplicated in different files.

In addition to the above features, the security measures provided by most DBMS packages make it relevant in the design of the propose system. The security measures range from the application of password to controlling access level to files as well as a particular set of data.

3.6 OUTPUT REQUIREMENT

Output refers to the results and information that are generated by a system in order to communicate the result of processing to the users. The proposed system is expected to generate hard copy reports which include: Asset Register, Capital Allowance Report, Least Cost Report (on each equipment as one of the modalities to establish a point where replacement may be necessary) and other details on each available equipment.

3.7 INPUT REQUIREMENT

The proposed system requires some data to be supplied before the processing can be done. This will serve as input into the system. The input requirement states the source and type of data that needs to be supplied into the system. This is

considered important because the efficiency of the system depends to a large extent, on the type of data entered and the mode of entry.

In recognition of the above, the design of input form is to be done based on the following considerations:-

- (i) Reduction of data entries in order to ensure the rate of making error.
- (ii) data validation which ensures that correct data are supplied into the system.
- (iii) The input form and data requirements are acceptable and understandable to the users.

Specifically, the proposed system requires information to be supplied on such details like:-

- the details on project undertaking in the organisation;
- details on equipment used in construction, etc.

For the project details, it is useful as data input for the purpose of registering projects. The details required include the following:-

- (i) Project description
- (ii) Client Name
- (iii) Project cost
- (iv) Date of commencement, etc.

The input specification of the equipment details is expected to contain the following information:-

- (i) Equipment description
- (ii) Equipment cost
- (iii) Date of purchase
- (iv) Model No.
- (v) Capacity, etc.

However, it is important to note that the designing of these input is in an interactive mode where the system would prompt the user for entries.

3.8 DATABASE FILE DESIGN AND STRUCTURE

The design of the new system using a DBMS package requires data and information to be stored in a database file. This section intends to describe the structure of all the database files required along with the programs specification. This includes the description of field names, field type and filed width.

Specifically, the Computerised Equipment Management and Control System in JDP Construction Company Limited, Minna requires six database files, namely:

- * PROJECT.DBF
- * GROUP.DBF
- * EQUIP.DBF
- * REVENUE.DBF
- * EXPENSES.DBF
- * DISPOSAL.DBF.

Each of these files is described as follows:

3.8.1 PROJECT. DBF

This database file consists of the details of all the projects currently undertaking by the company. The details include information on the Project Description, Cost, Client Name, Date of Commencement, etc. The structure of the file is as follows:-

S/No	FIELD NAME	TYPE	WIDTH
1	PCODE	CHARACTER	6
2	PDESC	CHARACTER	30
3	CNAME	CHARACTER	30
4	DATE1	DATE	8
5	DATE2	DATE	8
6	COST	NUMERIC	15/2
7	CONSULT	CHARACTER	30

3.8.2 GROUP. DBF

This contains information about the category of the assets. The depreciation rate, initial allowance rate, annual allowance rate of each of the category are stated in the file. The structure is as given below:-

for existing files in the computer format. The file conversion which is faster than file setup is only applicable if the existing system is already computerised. In this case, the existing and relevant files are converted to the new formats automatically and other files would have to be newly created. For the new system, file setup becomes relevant because of the existing manual operation.

The system changeover which is the complete conversion from the old procedures to the new one can be done in four ways, namely:-

- i) Direct Changeover
- ii) Pilot Running Changeover
- iii) Parallel Changeover
- iv) Staged Changeover

For the newly developed system, a direct changeover mode is recommended. Though it is dangerous, but the reliability of the testing which was thorough gives the confidence and the workability of the system.

4.6 POST IMPLEMENTATION REVIEW

After the system is implemented and conversion is completed, provision needs to be made for a review of the system. This has to do with the maintenance of the system against environmental changes which may affect either the computer or other parts of the computer based system. This may lead to the improvement of the system functions and the correction of faults which may arise during the operation of the system.

The objectives, in specific terms, of the post implementation review are to:

- i) Determine whether the system goals and objectives have been achieved.
- ii) Determine whether personnel procedure operating activities and other control have been achieved or improved.
- iii) Determine whether user service requirements have been met while simultaneously errors and cost are reduced.
- iv) Determine whether known or unexpected limitations of the system need attention.

However the amendment procedure agreed upon with the use of this system is directly through the users. The users are expected to identify any problem areas or external requirement of the system. Based on this, the system will further be designed to meet the requirements of the organization.

CHAPTER FIVE

5.0 DOCUMENTATION AND CONCLUSION

5.1 DOCUMENTATION

Documentation is the process of describing how a system works. It serves as a reference point for the end users in case they run into one problem or the other.

In documenting the new system, the mode of starting the system as well as the description of the new menu structure is considered. This is to enable the potential users understand the full operational mode of the system and the required steps of getting the job done.

5.1.1 STARTING THE SYSTEM

Once the system is installed, it occupies a directory of its own. Starting the system then involves the following steps:-

- * Boot the system to get the operating system prompt (i.e. C\>)
- * Type CD\CEMACS + (Enter key)
- * Type CEMACS + (Enter key)

At this point, the main menu is presented on the computer screen from where the users will be prompted to pick a choice.

5.1.2 DESCRIPTION OF THE MENU STRUCTURE

The menu structure will be discussed using the screen design contained in Appendix 1. This will be referred to as figure in the description below:-

The new system is composed of six options which reflect the various facilities provided by the system. The options as contained in Figure 1 are PROJECT MANAGEMENT, EQUIPMENT ALLOCATION, EQUIPMENT UPDATE, REPORT GENERATION, OTHER OPTIONS and SYSTEM EXIT.

At the main menu, the user will be prompted to enter a letter out of the specified ones and an appropriate action will be taken. Each of the options has a sub-menu with the exception of SYSTEM EXIT. On selection, the sub-menu appears prompting the users to make another selection. Each of the listed option in the main menu is described below:

PROJECT MANAGEMENT

This option is used to manipulate the project details of all the projects currently undertaken by the organization as represented by Figure II. It has six submenu, namely:- NEW PROJECT DETAIL, CHANGE PROJECT DETAIL, VIEW PROJECT DETAIL, DELETE PROJECT DETAIL, LIST PROJECT DETAIL, and SUB-MENU EXIT. These options enable the users to carry out various forms of manipulations of project details in the form of entering the details of existing project, viewing the details of a project, removing a project details from the project file, listing of codes and description of all the available projects, and quitting the submenu respectively. Each of these are represented on various screen design on Figures I to VII.

EQUIPMENT ALLOCATION

Construction Equipment are allocated and taken from one project to the other. This option as represented by Figure VIII contains the various operations that can

carried out. The NEW ALLOCATION option represented by Figure IX is used to allocate equipment to various projects undertaken by JDP Construction Company Limited, Minna. The CHANGE ALLOCATION is used when equipment is allocated to a project so that the correct allocation would be affected as represented on Figure X. The DELETE ALLOCATION (Figure XI) is activated when an equipment allocated is cancelled while LIST Allocation (Figure XII) is used to display all the equipment and the various project they are currently allocated to. The RETURN EQUIPMENT (Figure XIII) is activated when an equipment is returned from a project and SUBMENU EXIT for quitting the sub-menu.

EQUIPMENT UPDATE

This option is used to update the details of the available equipment in the organisation and it is represented by Figure XIV in the appendix. It contains options such as NEW EQUIPMENT DETAIL as shown on Figure XV for the entering details of new equipment; CHANGE EQUIPMENT DETAILS as represented by Figure XVI for modifying an equipment detail; VIEW EQUIPMENT DETAIL on Figure XVII for displaying the details of an equipment and DELETE EQUIPMENT DETAIL (Figure XVIII) for removing the details on equipment. Others are LIST EQUIPMENT DETAIL (Figure XIX) for displaying the list of equipment available and SUB-MENU EXIT for Quitting Equipment Update Menu.

REPORT GENERATION

This option shows the list of available reports on the system as represented by Figure XX. The reports are similar to the needed and format stated under output specification in Chapter Three.

OTHER OPTIONS

This contains all other facilities which include RATES UPDATE, EQUIPMENT REPAIRS, EQUIPMENT DISPOSAL, and SUB-MENU EXIT as shown on Figure XXI in the Appendix. Rates Update is an option used to display and modify some equipment rates such as Depreciation Rate, Initial Allowance Rate and Annual Allowance Rate as represented by Figure XXII. EQUIPMENT REPAIRS OPTION is used to enter the details of any maintenance carried out on any equipment as displayed on figure XXIII. The Equipment Disposal option on Figure XXIV in the Appendix is used to enter the details of equipment disposed.

SYSTEM EXIT

Is the last option in the menu and when selected, it takes the user out of the system to the operating system prompt.

5.2

CONCLUSION

The aspect of equipment control and management is difficult manually. This is because it requires some details which have to be noted and effected correctly without which the retrieval of a reliable result for the purpose of decision making would not be possible. This makes it compulsory for the application of a computer approach to equipment management and control in JDP Construction Company Limited, Minna Branch.

Furthermore, the present state of technology in the world which calls for computer application to all profession is a matter of concern to all professionals in any field whatsoever.

From the foregoing issues, it becomes imperative for the development and installation by this new system designed to carry out the necessary operation on equipment management and control. The inevitability bothers on the expected benefits highlighted in the work.

5.3 RECOMMENDATIONS

The newly developed Computerized Equipment Management and Control System (CEMACS) for JDP Construction Company Limited, Minna is expected to greatly benefit the organisation. It is aimed at solving the current problem of the existing manual procedures as summarized in chapter three. However, for proper execution of the new system, the following recommendations need to be considered:

- (i) The organisation needs to create a computer section which will see to the day-to-day operations of the computer usage. This section is expected to be headed by supervisor who should be a qualified computer professional. The supervisor should be assigned the responsibility of maintaining the computer as well as designing and development of software for local use in the organisation.
- (ii) A computer training program is also recommended for the staff that would be working in the proposed computer section. This should be in the form of a Computer Appreciation Course where the benefit and operation of computers

3.8.5 EXPENSES. DBF

The usage of the equipment calls for occasional maintenance and replacement of worn out items in addition to the yearly depreciation rate based on the category of the equipment. The EXPENSES.DBF contains the details of all the repairs effected on the equipment in the organisation. The structure of this file is as shown below:-

S/NO	FIELD NAME	TYPE	WIDTH
1	ECODE	CHARACTER	8
2	EDESC	CHARACTER	30
3	RDESC	CHARACTER	50
4	RAMOUNT	NUMERIC	8/2
5	RDATE	DATE	8

3.8.6 DISPOSAL. DBF

The disposal of equipment requires details to be entered into a database file. This is done to ensure that company is able to know the activities and operations of the equipment while in use. The DISPOSAL.DBF is designed to contain such details and once a reference is made, the file is activated and the necessary information is extracted. The structure is as shown below:

S/N0	FIELD NAME	TYPE	WIDTH
1	ECODE	CHARACTER	8
2	DESC	CHARACTER	20
3	EDESC	CHARACTER	30
4	MAKE	CHARACTER	5
5	MODE	CHARACTER	5
6	CAPA	CHARACTER	5
7	COST	NUMERIC	15/2
8	INITIAL	NUMERIC	13/2
9	ANNUAL	NUMERIC	13/2
10	WDU	NUMERIC	13/2
11	CAP	NUMERIC	13/2
12	DEP	NUMERIC	4/1
13	IAR	NUMERIC	4/1
14	AAR	NUMERIC	7/2
15	RV	NUMERIC	15/2
16	TREV	NUMERIC	15/2
17	TCOST	CHARACTER	1
18	DATEP	DATE	8
19	DISPOSE	NUMERIC	15/2
20	DATED	DATE	8

3.9

PROGRAM DOCUMENTATION

The program documentation contains the methodology use in the program as well as the source code developed for the necessary manipulations. The methodology used for the program design is a modular system where the system is developed in modules. Specifically, the new system has 28 modules with each having its own program which are co-ordinated by the main program. The source codes are contained in the Appendix II.

COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL SYSTEM

NEW PROJECT DETAIL FORM

PROJECT CODE (Press ENTER KEY to Exit): 98/023

PROJECT DESCRIPTION: SECONDARY SCHOOL BUILDING

PROJECT CLIENT NAME: NIGER STATE GOVERNMENT

NAME OF CONSULTANT: BOLO ASSOCIATES

COST OF PROJECT: # 25,000,000.00

COMMENCEMENT DATE: 02/05/98 COMPLETION DATE: 02/02/99

SAVE PROJECT DETAILS (Y/N):

Figure III

COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL SYSTEM

PROJECT DETAIL VIEWING FORM

PROJECT CODE (Press ENTER KEY to Exit): 98/023

PROJECT DESCRIPTION: SECONDARY SCHOOL BUILDING

PROJECT CLIENT NAME: NIGER STATE GOVERNMENT

NAME OF CONSULTANT: BOLO ASSOCIATES

COST OF PROJECT: # 25,000,000.00

COMMENCEMENT DATE: 02/05/98 COMPLETION DATE: 02/02/99

VIEWING PROJECT DETAILS - Press any key ...

Figure V

COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL SYSTEM

PROJECT DETAIL DELETION FORM

PROJECT CODE (Press ENTER KEY to Exit): 98/023

PROJECT DESCRIPTION: SECONDARY SCHOOL BUILDING

PROJECT CLIENT NAME: NIGER STATE GOVERNMENT

NAME OF CONSULTANT: BOLO ASSOCIATES

COST OF PROJECT: # 25,000,000.00

COMMENCEMENT DATE: 02/05/98 COMPLETION DATE: 02/02/99

TO DELETE THIS RECORD (Y/N):

Figure VI

PROJECT LISTING

PROJECT CODE	PROJECT DESCRIPTION
98/006	SCHOOL BUILDING
98/007	COLLEGE OF EDUCATION BUILDING
98/008	BUILDING OF PRIMARY SCHOOL
98/013	HOUSE OF ASSEMBLY
98/023	SECONDARY SCHOOL BUILDING

LISTING PROJECT DETAILS - Press any key

Figure VII

J.D.P. CONSTRUCTION NIGERIA LIMITED

COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL SYSTEM

EQUIPMENT ALLOCATION MENU

PROJECT
MANAGEMENT

EQUIPMENT
ALLOCATION

EQUIPMENT
UPDATE

REPORT
GENERATION

OTHER
OPTIONS

SYSTEMS
EXIT

↓

NEW ALLOCATION
CHANGE ALLOCATION
DELETE ALLOCATION
LIST ALLOCATION
RETURN EQUIPMENT
SUBMENU EXIT

Pick choice:

Figure VIII

COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL SYSTEM

EQUIPMENT ALLOCATION ENTRY FORM

EQUIPMENT CODE: EQ/PM/05

CATEGORY: PLANT & MACHINERY

EQUIPMENT DESCRIPTION: TOWER CRANES

COST OF PURCHASE: # 1,500,000.00

DATE OF PURCHASE: 21/02/98

ALLOCATION DETAILS:

PROJECT CODE: 98/023 DESCRIPTION: SECONDARY SCHOOL BUILDING

CLIENT: NIGER STATE GOVERNMENT

COST: # 25,000,000.00

DATE OF ALLOCATION: 20/08/98

EQUIPMENT RATE: # 20,000.00

SAVE DETAIL CHANGES (Y/N):

Figure IX

COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL SYSTEM

EQUIPMENT ALLOCATION EDITING FORM

EQUIPMENT CODE: EQ/PM/05

CATEGORY: PLANT & MACHINERY

EQUIPMENT DESCRIPTION: TOWER CRANES

COST OF PURCHASE: # 1,500,000.00

DATE OF PURCHASE: 21/02/98

ALLOCATION DETAILS:

PROJECT CODE: 98/023

DESCRIPTION: SECONDARY SCHOOL BUILDING

CLIENT: NIGER STATE GOVERNMENT

COST: # 25,000,000.00

DATE OF ALLOCATION: 20/08/98

EQUIPMENT RATE: # 20,000.00

SAVE DETAIL CHANGES (Y/N) :

Figure X

COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL SYSTEM

EQUIPMENT ALLOCATION DELETING FORM

EQUIPMENT CODE: EQ/PM/05

CATEGORY: PLANT & MACHINERY

EQUIPMENT DESCRIPTION: TOWER CRANES

COST OF PURCHASE: # 1,500,000.00

DATE OF PURCHASE: 21/02/98

ALLOCATION DETAILS:

PROJECT CODE:

DESCRIPTION: SECONDARY SCHOOL BUILDING

CLIENT: NIGER STATE GOVERNMENT

COST: # 25,000,000.00

DATE OF ALLOCATION: 20/08/98

EQUIPMENT RATE: # 20,000.00

TO CANCEL ALLOCATION (Y/N):

Figure XI

EQUIPMENT ALLOCATION LISTING

EQ. CODE	EQUIPMENT DESCRIPTION	P.CODE	PROJECT DESCRIPTION
EQ/PM/04	INDUSTRIAL MACHINE	98/007	COLLEGE OF EDUCATION BUILDING
EQ/PM/01	PEELING MACHINE	STORE	
EQ/PM/03	TOWER CRANES	STORE	
EQ/PM/05	TOWER CRANES	98/023	SECONDARY SCHOOL BUILDING

LISTING EQUIPMENT DETAILS - Press any key

Figure XII

COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL SYSTEM

EQUIPMENT RETURNS FORM

EQUIPMENT CODE: EQ/PM/05

CATEGORY: PLANT & MACHINERY

EQUIPMENT DESCRIPTION: TOWER CRANES

COST OF PURCHASE: # 1,500,000.00

DATE OF PURCHASE: 21/02/98

ALLOCATION DETAILS:

PROJECT CODE: 98/023 DESCRIPTION: SECONDARY SCHOOL BUILDING

DATE OF ALLOCATION: 20/08/98 EQUIPMENT RATE: # 20,000.00

DATE OF RETURNS: 20/10/98 DAYS: 61 REVENUE: # 1,220,000.00

TO RETURN EQUIPMENT (Y/N):

Figure XIII

J.D.P. CONSTRUCTION NIGERIA LIMITED

COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL SYSTEM

EQUIPMENT UPDATE MENU

PROJECT EQUIPMENT EQUIPMENT REPORT OTHER SYSTEMS
MANAGEMENT ALLOCATION UPDATE GENERATION OPTIONS EXIT

↓

NEW EQUIPMENT DETAIL
CHANGE EQUIPMENT DETAIL
VIEW EQUIPMENT DETAIL
DELETE EQUIPMENT DETAIL
LIST EQUIPMENT DETAIL
SUBMENU EXIT

Pick choice:

Figure XIV

COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL SYSTEM

EQUIPMENT ENTRY FORM

EQUIPMENT CODE: EQ/PM/05 CATEGORY: PLANT & MACHINERY
EQUIPMENT DESCRIPTION: TOWER CRANES
COST OF PURCHASE: # 1,500,000.00 DATE OF PURCHASE: 21/02/98
EQUIPMENT MAKE: T0045 MODEL NO: 5345 CAPACITY: 8080
INITIAL ALLCE: # 750,000.00 ANNUAL ALLCE: # 187,497.50
CAPITAL ALLCE: # 937,497.50 RESIDUAL VALUE: # 10.00
WRITTEN DOWN VALUE: # 562,502.50 EXPECTED RATE: # 20,000.00

SAVE EQUIPMENT DETAILS (Y/N):

Figure XV

COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL SYSTEM

EQUIPMENT EDITING FORM

EQUIPMENT CODE: EQ/PM/05 CATEGORY: PLANT & MACHINERY
EQUIPMENT DESCRIPTION: TOWER CRANES
COST OF PURCHASE: # 1,500,000.00 DATE OF PURCHASE: 21/02/98
EQUIPMENT MAKE: T0045 MODEL NO: 5345 CAPACITY: 8080
INITIAL ALLCE: # 750,000.00 ANNUAL ALLCE: # 187,497.50
CAPITAL ALLCE: # 937,497.50 RESIDUAL VALUE: # 10.00
WRITTEN DOWN VALUE: # 562,502.50 EXPECTED RATE: # 20,000.00

SAVE DETAIL CHANGES (Y/N):

Figure XVI

COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL SYSTEM

EQUIPMENT VIEWING FORM

EQUIPMENT CODE: EQ/PM/05 CATEGORY: PLANT & MACHINERY
EQUIPMENT DESCRIPTION: TOWER CRANES
COST OF PURCHASE: # 1,500,000.00 DATE OF PURCHASE: 21/02/98
EQUIPMENT MAKE: T0045 MODEL NO: 5345 CAPACITY: 8080
INITIAL ALLCE: # 750,000.00 ANNUAL ALLCE: # 187,497.50
CAPITAL ALLCE: # 937,497.50 RESIDUAL VALUE: # 10.00
WRITTEN DOWN VALUE: # 562,502.50 EXPECTED RATE: # 20,000.00

VIEWING PROJECT DETAILS - Press any key ...

Figure XVII

COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL SYSTEM

EQUIPMENT DELETING FORM

EQUIPMENT CODE: EQ/PM/05 CATEGORY: PLANT & MACHINERY
EQUIPMENT DESCRIPTION: TOWER CRANES
COST OF PURCHASE: # 1,500,000.00 DATE OF PURCHASE: 21/02/98
EQUIPMENT MAKE: T0045 MODEL NO: 5345 CAPACITY: 8080
INITIAL ALLCE: # 750,000.00 ANNUAL ALLCE: # 187,497.50
CAPITAL ALLCE: # 937,497.50 RESIDUAL VALUE: # 10.00
WRITTEN DOWN VALUE: # 562,502.50 EXPECTED RATE: # 20,000.00

TO DELETE THIS RECORD (Y/N) :

Figure XVIII

EQUIPMENT LISTING

EQUIPMENT CODE	EQUIPMENT CATEGORY	EQUIPMENT DESCRIPTION
EQ/PM/04	PLANT & MACHINERY	INDUSTRIAL MACHINE
EQ/PM/01	PLANT & MACHINERY	PEELING MACHINE
EQ/PM/03	PLANT & MACHINERY	TOWER CRANES
EQ/PM/05	PLANT & MACHINERY	TOWER CRANES

LISTING EQUIPMENT DETAILS - Press any key

Figure XIX

J.D.P. CONSTRUCTION NIGERIA LIMITED

COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL SYSTEM

REPORT GENERATION MENU

PROJECT
MANAGEMENT

EQUIPMENT
ALLOCATION

EQUIPMENT
UPDATE

REPORT
GENERATION

OTHER
OPTIONS

SYSTEMS
EXIT

↓

EQUIPMENT REGISTER
EQUIPMENT HISTORY
CAPITAL ALLOWANCE
SUBMENU EXIT

Pick choice:

Figure XX

J.D.P. CONSTRUCTION NIGERIA LIMITED

COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL SYSTEM

OTHER OPTIONS MENU

PROJECT
MANAGEMENT

EQUIPMENT
ALLOCATION

EQUIPMENT
UPDATE

REPORT
GENERATION

OTHER
OPTIONS

SYSTEMS
EXIT

↓

RATES UPDATE
EQUIPMENT REPAIRS
EQUIPMENT DISPOSAL
SUBMENU EXIT

Pick choice:

Figure XXI

RATES UPDATE SCREEN

ASSET CATEGORY	DEPRECIATION (%)	INITIAL ALLOWANCE RATE (%)	ANNUAL ALLOWANCE RATE (%)
MOTOR VEHICLE	25.0	50.0	25.0
FURNITURE & FITTINGS	15.0	25.0	20.0
PLANT & MACHINERY	20.0	50.0	25.0
OFFICE BUILDING	5.0	15.0	10.0
INDUSTRIAL BUILDING	10.0	15.0	10.0

SAVE PROJECT DETAILS (Y/N) :

Figure XXII

COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL SYSTEM

EQUIPMENT MAINTENANCE FORM

EQUIPMENT CODE: EQ/PM/05

CATEGORY: PLANT & MACHINERY

EQUIPMENT DESCRIPTION: TOWER CRANES

COST OF PURCHASE: # 1,500,000.00

DATE OF PURCHASE: 21/02/98

DETAILS OF REPAIR:

DESCRIPTION: SERVICING

AMOUNT EXPENDED: # 25,000.00

DATE OF REPAIRS: 11/12/98

SAVE DETAIL CHANGES (Y/N) :

Figure XXIII

COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL SYSTEM

EQUIPMENT DISPOSAL FORM

EQUIPMENT CODE: EQ/PM/05

CATEGORY: PLANT & MACHINERY

EQUIPMENT DESCRIPTION: TOWER CRANES

COST OF PURCHASE: # 1,500,000.00 DATE OF PURCHASE: 21/02/98

TOT EXPENSES: # 25,000.00 TOT REVENUE: # 1,220,000.00

DISPOSE VALUE: # 950,000.00 DATE OF DISPOSAL: 23/12/98

OVERALL PROFIT: # 645,000.00

TO EFFECT EQUIPMENT SALES (Y/N):

Figure XXIV

APPENDIX II (PROGRAM DOCUMENTATION)

CEMACS.PRG

```
set talk off
set status off
set scoreboard off
set bell off
set date british
do while .t.
  clear
  @ 0,1 to 24,78 double
  @ 1,22 say 'J.D.P. CONSTRUCTION NIGERIA LIMITED'
  @ 2,22 to 2,56 double
  @ 3,14 say 'COMPUTERISED EQUIPMENT MANAGEMENT AND
CONTROL SYSTEM'
  @ 4,14 to 4,65 double
  @ 6,35 say "MAIN MENU"
  @ 5,34 to 7,44
  @ 9,6 say 'PROJECT '
  @ 9,19 say 'EQUIPMENT '
  @ 9,32 say 'EQUIPMENT'
  @ 9,44 say ' REPORT'
  @ 9,57 say ' OTHER'
  @ 9,67 say 'SYSTEMS'
  @ 10,6 say 'MANAGEMENT'
  @ 10,19 say 'ALLOCATION'
  @ 10,32 say ' UPDATE '
  @ 10,44 say 'GENERATION'
  @ 10,57 say 'OPTIONS'
  @ 10,67 say ' EXIT '
  @ 22,19 say 'Pick your choice (P, A, U, R, O, or S):'
  @ 21,18 to 23,60
do while .t.
  choice1=' '
  @ 22,59 get choice1 picture '! '
  read
  if choice1 $ 'PAUORS'
    exit
  endif
enddo
@ 21,18 clear to 23,60
do case
  case choice1= 'P'
```

```

do manage
case choice1 = 'A'
do alloca
case choice1 = 'U'
do update
case choice1 = 'O'
do others
case choice1 = 'R'
do report
otherwise
exit
endcase
enddo
clear
return

```

MANAGE.PRG

```

@ 5,34 clear to 7,44
@ 11,10 say chr(25)
do while .t.
@ 6,28 say 'PROJECT MANAGEMENT MENU'
@ 5,27 to 7,51
@ 12,5 to 21,27
@ 13,6 say 'NEW PROJECT DETAIL'
@ 14,6 say 'CHANGE PROJECT DETAIL'
@ 15,6 say 'VIEW PROJECT DETAIL'
@ 16,6 say 'DELETE PROJECT DETAIL'
@ 17,6 say 'LIST PROJECT DETAIL'
@ 18,6 say 'SUBMENU EXIT'
@ 20,9 say 'Pick choice:'
do while .t.
choice2 = ' '
@ 20,22 get choice2 picture '!'
read
if choice2 $ 'NCVDLS'
exit
endif
enddo
do case
case choice2 = 'N'
do manage1
case choice2 = 'C'

```

```

do manage2
case choice2= 'V'
do manage3
case choice2= 'D'
do manage4
case choice2= 'L'
do manage5
otherwise
exit
endcase
enddo
return

```

ALLOCA.PRG

```

@ 5,34 clear to 7,44
@ 11,23 say chr(25)
do while .t.
@ 6,27 say 'EQUIPMENT ALLOCATION MENU'
@ 5,26 to 7,52
@ 12,18 to 21,36
@ 13,19 say 'NEW ALLOCATION'
@ 14,19 say 'CHANGE ALLOCATION'
@ 15,19 say 'DELETE ALLOCATION'
@ 16,19 say 'LIST ALLOCATION'
@ 17,19 say 'RETURN EQUIPMENT'
@ 18,19 say 'SUBMENU EXIT'
@ 20,21 say 'Pick choice:'
do while .t.
choice2=' '
@ 20,34 get choice2 picture '!'
read
if choice2 $ 'NCDLRS'
exit
endif
enddo
do case
case choice2= 'N'
do alloca1
case choice2= 'C'
do alloca2
case choice2= 'D'
do alloca3

```

```

    case choice2 = 'L'
      do alloca4
    case choice2 = 'R'
      do alloca5
    otherwise
      exit
    endcase
  enddo
return

```

UPDATE.PRG

```

@ 5,34 clear to 7,44
@ 11,35 say chr(25)
do while .t.
  @ 6,29 say 'EQUIPMENT UPDATE MENU'
  @ 5,28 to 7,50
  @ 12,31 to 21,55
  @ 13,32 say 'NEW EQUIPMENT DETAIL'
  @ 14,32 say 'CHANGE EQUIPMENT DETAIL'
  @ 15,32 say 'VIEW EQUIPMENT DETAIL'
  @ 16,32 say 'DELETE EQUIPMENT DETAIL'
  @ 17,32 say 'LIST EQUIPMENT DETAIL'
  @ 18,32 say 'SUBMENU EXIT'
  @ 20,36 say 'Pick choice:'
  do while .t.
    choice2 = ' '
    @ 20,49 get choice2 picture '!'
    read
    if choice2 $ 'NCVDLS'
      exit
    endif
  enddo
  do case
    case choice2 = 'N'
      do update1
    case choice2 = 'C'
      do update2
    case choice2 = 'V'
      do update3
    case choice2 = 'D'
      do update4
    case choice2 = 'L'

```



```

    do update5
  otherwise
    exit
  endcase
enddo
return

```

OTHERS.PRG

```

@ 5,34 clear to 7,44
@ 11,60 say chr(25)
do while .t.
  @ 6,31 say 'OTHER OPTIONS MENU'
  @ 5,30 to 7,49
  @ 12,57 to 19,76
  @ 13,58 say 'RATES UPDATE'
  @ 14,58 say 'EQUIPMENT REPAIRS'
  @ 15,58 say 'EQUIPMENT DISPOSAL'
  @ 16,58 say 'SUBMENU EXIT'
  @ 18,60 say 'Pick choice:'
  do while .t.
    choice2=' '
    @ 18,73 get choice2 picture '!'
    read
    if choice2 $ 'REDS'
      exit
    endif
  enddo
  do case
    case choice2= 'R'
      do others1
    case choice2= 'E'
      do others2
    case choice2= 'D'
      do others3
    otherwise
      exit
  endcase
enddo
return

```

REPORT.PRG

```
@ 5,34 clear to 7,44
@ 11,48 say chr(25)
do while .t.
  @ 6,29 say 'REPORT GENERATION MENU'
  @ 5,28 to 7,51
  @ 12,44 to 19,63
  @ 13,45 say 'EQUIPMENT REGISTER'
  @ 14,45 say 'EQUIPMENT HISTORY'
  @ 15,45 say 'CAPITAL ALLOWANCE'
  @ 16,45 say 'SUBMENU EXIT'
  @ 18,47 say 'Pick choice:'
  do while .t.
    choice2=' '
    @ 18,60 get choice2 picture '!'
    read
    if choice2 $ 'EHICS'
      exit
    endif
  enddo
  do case
    case choice2= 'E'
      do report1
    case choice2= 'H'
      do report2
    case choice2= 'C'
      do report3
    otherwise
      exit
  endcase
enddo
return
```

MANAGE1.PRG

```
use project
do while .t.
  clear
  @ 0,10 to 23,69 double
  @ 19,11 to 19,68 double
  @ 1,14 say 'COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL
SYSTEM'
```

```

@ 2,14 to 2,65 double
@ 4,28 say "NEW PROJECT DETAIL FORM"
@ 3,27 to 5,51
mpcode=space(6)
@ 7,13 say 'PROJECT CODE (Press ENTER KEY to Exit):' get mpcode picture
'99/999'
read
if mpcode=space(6)
  exit
endif
go top
locate for pcode=mpcode
if found()
  @ 21,17 say 'PROJECT CODE ALREADY EXIST - Press any key ...'
  set console off
  wait
  set console on
  loop
endif
store space(30) to mpdesc,mcname,mconsult
store ctod(' / / ') to mdate1,mdate2
mcost=0
@ 9,13 say 'PROJECT DESCRIPTION: ' get mpdesc picture '@!'
@ 11,13 say 'PROJECT CLIENT NAME:' get mcname picture '@!'
@ 13,13 say 'NAME OF CONSULTANT: ' get mconsult picture '@!'
@ 15,13 say 'COST OF PROJECT: #'
@ 15,31 get mcost picture '999,999,999,999.99'
@ 17,13 say 'COMMENCEMENT DATE:' get mdate1
@ 17,43 say 'COMPLETION DATE:' get mdate2
read
@ 21,25 say 'SAVE PROJECT DETAILS (Y/N):'
do while .t.
  choice3=' '
  @ 21,53 get choice3 picture '! '
  read
  if choice3 $ 'YN'
    exit
  endif
enddo
if choice3='Y'
  append blank
  replace pcode with mpcode,pdesc with mpdesc
  replace cname with mcname,consult with mconsult
  replace date1 with mdate1,date2 with mdate2

```

```
    replace cost with mcost
  endif
enddo
use
clear
return
```

MANAGE2.PRG

```
use project
do while .t.
  clear
  @ 0,10 to 23,69 double
  @ 19,11 to 19,68 double
  @ 1,14 say 'COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL
SYSTEM'
  @ 2,14 to 2,65 double
  @ 4,26 say "PROJECT DETAIL EDITING FORM"
  @ 3,25 to 5,53
  mpcode = space(6)
  @ 7,13 say 'PROJECT CODE (Press ENTER KEY to Exit):' get mpcode picture
'99/999'
  read
  if mpcode = space(6)
    exit
  endif
  go top
  locate for pcode = mpcode
  if .not. found()
    @ 21,16 say 'PROJECT CODE DOES NOT EXIST - Press any key ...'
    set console off
    wait
    set console on
  loop
endif
mpdesc = pdesc
mcname = cname
mconsult = consult
mdate1 = date1
mdate2 = date2
mcost = cost
@ 9,13 say 'PROJECT DESCRIPTION: ' get mpdesc picture '@!'
@ 11,13 say 'PROJECT CLIENT NAME:' get mcname picture '@!'
```

```

@ 13,13 say 'NAME OF CONSULTANT: ' get mconsult picture '@!'
@ 15,13 say 'COST OF PROJECT: #'
@ 15,31 get mcost picture '999,999,999,999.99'
@ 17,13 say 'COMMENCEMENT DATE:' get mdate1
@ 17,43 say 'COMPLETION DATE:' get mdate2
read
@ 21,25 say 'SAVE DETAILS CHANGES (Y/N):'
do while .t.
  choice3=' '
  @ 21,53 get choice3 picture '!'
  read
  if choice3 $ 'YN'
    exit
  endif
enddo
if choice3='Y'
  replace pcode with mpcode,pdesc with mpdesc
  replace cname with mcname,consult with mconsult
  replace date1 with mdate1,date2 with mdate2
  replace cost with mcost
endif
enddo
use
clear
return

```

MANAGE3.PRG

```

use project
do while .t.
  clear
  @ 0,10 to 23,69 double
  @ 19,11 to 19,68 double
  @ 1,14 say 'COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL
SYSTEM'
  @ 2,14 to 2,65 double
  @ 4,26 say "PROJECT DETAIL VIEWING FORM"
  @ 3,25 to 5,53
  mpcode=space(6)
  @ 7,13 say 'PROJECT CODE (Press ENTER KEY to Exit):' get mpcode picture
'99/999'
  read
  if mpcode=space(6)

```

```

    exit
endif
go top
locate for pcode=mpcode
if .not. found()
    @ 21,16 say 'PROJECT CODE DOES NOT EXIST - Press any key ...'
    set console off
    wait
    set console on
    loop
endif
mpdesc = pdesc
mcname = cname
mconsult = consult
mdate1 = date1
mdate2 = date2
mcost = cost
@ 9,13 say 'PROJECT DESCRIPTION: ' get mpdesc picture '@!'
@ 11,13 say 'PROJECT CLIENT NAME:' get mcname picture '@!'
@ 13,13 say 'NAME OF CONSULTANT: ' get mconsult picture '@!'
@ 15,13 say 'COST OF PROJECT: #'
@ 15,31 get mcost picture '999,999,999,999.99'
@ 17,13 say 'COMMENCEMENT DATE:' get mdate1
@ 17,43 say 'COMPLETION DATE:' get mdate2
clear gets
@ 21,18 say 'VIEWING PROJECT DETAILS - Press any key ...'
set console off
wait
set console on
enddo
use
clear
return

```

MANAGE4.PRG

```

use project
do while .t.
    clear
    @ 0,10 to 23,69 double
    @ 19,11 to 19,68 double
    @ 1,14 say 'COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL
SYSTEM'

```

```

@ 2,14 to 2,65 double
@ 4,26 say "PROJECT DETAIL DELETION FORM"
@ 3,25 to 5,54
mpcode = space(6)
@ 7,13 say 'PROJECT CODE (Press ENTER KEY to Exit):' get mpcode picture
'99/999'
read
if mpcode = space(6)
  exit
endif
go top
locate for pcode = mpcode
if .not. found()
  @ 21,16 say 'PROJECT CODE DOES NOT EXIST - Press any key ...'
  set console off
  wait
  set console on
  loop
endif
mpdesc = pdesc
mcname = cname
mconsult = consult
mdate1 = date1
mdate2 = date2
mcost = cost
@ 9,13 say 'PROJECT DESCRIPTION:' get mpdesc picture '@!'
@ 11,13 say 'PROJECT CLIENT NAME:' get mcname picture '@!'
@ 13,13 say 'NAME OF CONSULTANT:' get mconsult picture '@!'
@ 15,13 say 'COST OF PROJECT: #'
@ 15,31 get mcost picture '999,999,999,999.99'
@ 17,13 say 'COMMENCEMENT DATE:' get mdate1
@ 17,43 say 'COMPLETION DATE:' get mdate2
clear gets
@ 21,25 say 'TO DELETE THIS RECORD (Y/N):'
do while .t.
  choice3 = ' '
  @ 21,54 get choice3 picture '! '
  read
  if choice3 $ 'YN'
    exit
  endif
enddo
if choice3 = 'Y'
  delete

```

```
pack
@ 21,21 say 'RECORD IS DELETED - Press any key ...'
set console off
wait
set console on
endif
enddo
use
clear
return
```

MANAGE5.PRG

```
clear
@ 0,31 to 2,47 double
@ 1,32 say 'PROJECT LISTING'
@ 3,11 to 24,67 double
@ 4,15 say 'PROJECT CODE'
@ 4,38 say 'PROJECT DESCRIPTION'
@ 4,30 to 21,30
@ 5,12 to 5,29
@ 5,31 to 5,66
@ 22,12 to 22,66
row=6
use project
do while .not. eof()
  mpcode=pcode
  mpdesc=pdesc
  @ row,18 say mpcode
  @ row,34 say mpdesc
  row=row+1
  skip
enddo
@ 23,20 say 'LISTING PROJECT DETAILS - Press any key'
set console off
wait
set console on
use
clear
return
```


ALLOCA1.PRG

```
select 1
  use equip
select 2
  use project
do while .t.
  clear
  @ 1,3 to 24,76 double
  @ 21,4 to 21,75 double
  @ 2,14 say 'COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL
SYSTEM'
  @ 3,14 to 3,65 double
  @ 5,24 say "EQUIPMENT ALLOCATION ENTRY FORM"
  @ 4,23 to 6,55
  mcode = space(8)
  @ 8,6 say 'EQUIPMENT CODE (Press ENTER KEY to Exit):' get mcode picture
'!!!/99'
  read
  if mcode = space(8)
    exit
  endif
  select 1
  go top
  locate for ecode = mcode
  if .not. found()
    @ 23,15 say 'EQUIPMENT CODE DOES NOT EXIST - Press any key ...'
    set console off
    wait
    set console on
  loop
endif
mdesc = desc
mcost = cost
mdatep = datep
medesc = edesc
mlocate = locate
merate = erate
mcrate = erate
@ 8,6 clear to 8,68
@ 8,6 say 'EQUIPMENT CODE:' get mcode
@ 8,40 say 'CATEGORY:' get mdesc
@ 10,6 say 'EQUIPMENT DESCRIPTION:' get medesc picture '@!'
@ 12,6 say 'COST OF PURCHASE: #'
```

```

@ 12,25 get mcost picture '999,999,999,999.99'
@ 12,48 say 'DATE OF PURCHASE:' get mdatep
clear gets
@ 13,4 to 13,75
if mlocate < > 'STORE'
    @ 23,16 say 'EQUIPMENT ALREADY ALLOCATED - Press any key ...'
    set console off
    wait
    set console on
    loop
endif
select 2
@ 14,4 say 'ALLOCATION DETAILS:'
@ 15,4 to 15,22
@ 16,6 say 'PROJECT CODE:'
select 2
do while .t.
    mpcode = space(6)
    @ 16,20 get mpcode picture '99/999'
    read
    go top
    locate for pcode = mpcode
    if .not. found()
        @ 23,16 say 'PROJECT CODE DOES NOT EXIST - Press any key ...'
        set console off
        wait
        set console on
        @ 23,14 clear to 23,66
        loop
    endif
exit
enddo
mpdesc = pdesc
mcname = cname
mcost = cost
mdatea = ctod(' / / ')
@ 16,30 say 'DESCRIPTION:' get mpdesc
@ 18,6 say 'CLIENT:' get mcname picture '@!'
@ 18,49 say 'COST: #'
@ 18,56 get mcost picture '999,999,999,999.99'
clear gets
@ 20,6 say 'DATE OF ALLOCATION:' get mdatea
@ 20,38 say 'EQUIPMENT RATE: #'
@ 20,55 get mcrate picture '9,999,999.99'

```

```

read
@ 23,26 say 'SAVE DETAIL CHANGES (Y/N):'
do while .t.
  choice3=' '
  @ 23,53 get choice3 picture '!'
  read
  if choice3 $ 'YN'
    exit
  endif
enddo
select 1
if choice3='Y'
  replace datea with mdatea,crate with mcrate,locate with mpcode
  replace pdesc with mpdesc
endif
enddo
close all
clear
return

```

ALLOCA2.PRG

```

select 1
  use equip
select 2
  use project
do while .t.
  clear
  @ 1,3 to 24,76 double
  @ 21,4 to 21,75 double
  @ 2,14 say 'COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL
SYSTEM'
  @ 3,14 to 3,65 double
  @ 5,23 say "EQUIPMENT ALLOCATION EDITING FORM"
  @ 4,22 to 6,56
  mecode=space(8)
  @ 8,6 say 'EQUIPMENT CODE (Press ENTER KEY to Exit):' get mecode picture
'!!!/99'
  read
  if mecode=space(8)
    exit
  endif
select 1

```

```

go top
locate for ecode=mecode
if .not. found()
  @ 23,15 say 'EQUIPMENT CODE DOES NOT EXIST - Press any key ...'
  set console off
  wait
  set console on
  loop
endif
mdesc=desc
mcost=cost
mdatep=datep
medesc=edesc
mlocate=locate
mpcode=locate
mcrate=crate
mdatea=datea
@ 8,6 clear to 8,68
@ 8,6 say 'EQUIPMENT CODE:' get mecode
@ 8,40 say 'CATEGORY:' get mdesc
@ 10,6 say 'EQUIPMENT DESCRIPTION:' get medesc picture '@!'
@ 12,6 say 'COST OF PURCHASE: #'
@ 12,25 get mcost picture '999,999,999,999.99'
@ 12,48 say 'DATE OF PURCHASE:' get mdatep
clear gets
@ 13,4 to 13,75
if mlocate='STORE'
  @ 23,20 say 'EQUIPMENT NOT ALLOCATED - Press any key'
  set console off
  wait
  set console on
  loop
endif
@ 14,4 say 'ALLOCATION DETAILS:'
@ 15,4 to 15,22
@ 16,6 say 'PROJECT CODE:'
select 2
go top
locate for pcode=mpcode
mpdesc=pdesc
mcname=cname
mcost=cost
@ 16,30 say 'DESCRIPTION:' get mpdesc
@ 18,6 say 'CLIENT:' get mcname picture '@!'

```

```

@ 18,49 say 'COST: #'
@ 18,56 get mcost picture '999,999,999,999.99'
@ 20,6 say 'DATE OF ALLOCATION:' get mdatea
@ 20,38 say 'EQUIPMENT RATE: #'
@ 20,55 get mcrate picture '9,999,999.99'
clear gets
do while .t.
  @ 16,20 get mpcode picture '99/999'
  read
  go top
  locate for pcode=mpcode
  if .not. found()
    @ 23,16 say 'PROJECT CODE DOES NOT EXIST - Press any key ...'
    set console off
    wait
    set console on
    @ 23,14 clear to 23,66
  loop
endif
exit
enddo
mpdesc=pdesc
mcname=cname
mcost=cost
@ 16,30 say 'DESCRIPTION:' get mpdesc
@ 18,6 say 'CLIENT:' get mcname picture '@!'
@ 18,49 say 'COST: #'
@ 18,56 get mcost picture '999,999,999,999.99'
clear gets
@ 20,6 say 'DATE OF ALLOCATION:' get mdatea
@ 20,38 say 'EQUIPMENT RATE: #'
@ 20,55 get mcrate picture '9,999,999.99'
read
@ 23,26 say 'SAVE DETAIL CHANGES (Y/N):'
do while .t.
  choice3=' '
  @ 23,53 get choice3 picture '! '
  read
  if choice3 $ 'YN'
    exit
  endif
enddo
if choice3='Y'
  select 1

```

```

    replace datea with mdatea,crate with mcrate,locate with mpcode
    replace pdesc with mpdesc
endif
enddo
close all
clear
return

```

ALLOCA3.PRG

```

select 1
  use equip
select 2
  use project
do while .t.
  clear
  @ 1,3 to 24,76 double
  @ 21,4 to 21,75 double
  @ 2,14 say 'COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL
SYSTEM'
  @ 3,14 to 3,65 double
  @ 5,23 say "EQUIPMENT ALLOCATION DELETING FORM"
  @ 4,22 to 6,57
  mcode=space(8)
  @ 8,6 say 'EQUIPMENT CODE (Press ENTER KEY to Exit):' get mcode picture
'!!!/!!!/99'
  read
  if mcode=space(8)
    exit
  endif
  select 1
  go top
  locate for ecode=mcode
  if .not. found()
    @ 23,15 say 'EQUIPMENT CODE DOES NOT EXIST - Press any key ...'
    set console off
    wait
    set console on
  loop
endif
mdesc=desc
mcost=cost
mdatep=datep

```

```

medesc = edesc
mlocate = locate
mpcode = locate
mcrate = crate
mdatea = datea
@ 8,6 clear to 8,68
@ 8,6 say 'EQUIPMENT CODE:' get mcode
@ 8,40 say 'CATEGORY:' get mdesc
@ 10,6 say 'EQUIPMENT DESCRIPTION:' get medesc picture '@!'
@ 12,6 say 'COST OF PURCHASE: #'
@ 12,25 get mcost picture '999,999,999,999.99'
@ 12,48 say 'DATE OF PURCHASE:' get mdatep
clear gets
@ 13,4 to 13,75
if mlocate = 'STORE'
    @ 23,20 say 'EQUIPMENT NOT ALLOCATED - Press any key'
    set console off
    wait
    set console on
    loop
endif
@ 14,4 say 'ALLOCATION DETAILS:'
@ 15,4 to 15,22
@ 16,6 say 'PROJECT CODE:'
select 2
go top
locate for pcode = mpcode
mpdesc = pdesc
mcname = cname
mcost = cost
@ 16,30 say 'DESCRIPTION:' get mpdesc
@ 18,6 say 'CLIENT:' get mcname picture '@!'
@ 18,49 say 'COST: #'
@ 18,56 get mcost picture '999,999,999,999.99'
@ 20,6 say 'DATE OF ALLOCATION:' get mdatea
@ 20,38 say 'EQUIPMENT RATE: #'
@ 20,55 get mcrate picture '9,999,999.99'
clear gets
@ 23,25 say 'TO CANCEL ALLOCATION (Y/N):'
do while .t.
    choice3 = ' '
    @ 23,53 get choice3 picture '!'
    read
    if choice3 $ 'YN'

```

```

medesc = edesc
mlocate = locate
mpcode = locate
mcrate = crate
mdatea = datea
@ 8,6 clear to 8,68
@ 8,6 say 'EQUIPMENT CODE:' get mcode
@ 8,40 say 'CATEGORY:' get mdesc
@ 10,6 say 'EQUIPMENT DESCRIPTION:' get medesc picture '@!'
@ 12,6 say 'COST OF PURCHASE: #'
@ 12,25 get mcost picture '999,999,999,999.99'
@ 12,48 say 'DATE OF PURCHASE:' get mdatep
clear gets
@ 13,4 to 13,75
if mlocate = 'STORE'
    @ 23,20 say 'EQUIPMENT NOT ALLOCATED - Press any key'
    set console off
    wait
    set console on
    loop
endif
@ 14,4 say 'ALLOCATION DETAILS:'
@ 15,4 to 15,22
@ 16,6 say 'PROJECT CODE:'
select 2
go top
locate for pcode = mpcode
mpdesc = pdesc
mcname = cname
mcost = cost
@ 16,30 say 'DESCRIPTION:' get mpdesc
@ 18,6 say 'CLIENT:' get mcname picture '@!'
@ 18,49 say 'COST: #'
@ 18,56 get mcost picture '999,999,999,999.99'
@ 20,6 say 'DATE OF ALLOCATION:' get mdatea
@ 20,38 say 'EQUIPMENT RATE: #'
@ 20,55 get mcrate picture '9,999,999.99'
clear gets
@ 23,25 say 'TO CANCEL ALLOCATION (Y/N):'
do while .t.
    choice3 = ' '
    @ 23,53 get choice3 picture '!'
    read
    if choice3 $ 'YN'

```



```

        exit
    endif
enddo
if choice3='Y'
    select 1
        replace datea with ctod(' / / '),crate with 0,locate with 'STORE'
        replace pdesc with space(30)
    endif
enddo
close all
clear
return

```

ALLOCA4.PRG

```

clear
@ 0,25 to 2,54 double
@ 1,26 say 'EQUIPMENT ALLOCATION LISTING'
@ 3,0 to 24,78 double
@ 4,1 say 'EQ. CODE'
@ 4,14 say 'EQUIPMENT DESCRIPTION'
@ 4,41 say 'P.CODE'
@ 4,50 say 'PROJECT DESCRIPTION'
@ 4,9 to 21,9
@ 4,40 to 21,40
@ 4,47 to 21,47
@ 5,1 to 5,8
@ 5,10 to 5,39
@ 5,41 to 5,46
@ 5,48 to 5,77
@ 22,1 to 22,77
row=6
use equip
do while .not. eof()
    mcode=ecode
    medesc=edesc
    mlocate=locate
    mpdesc=pdesc
    @ row,1 say mcode
    @ row,10 say medesc
    @ row,41 say mlocate
    @ row,48 say mpdesc
    row=row+1

```

```

    skip
enddo
@ 23,19 say 'LISTING EQUIPMENT DETAILS - Press any key'
set console off
wait
set console on
use
clear
return

```

ALLOCA5.PRG

```

select 1
    use equip
select 2
    use project
select 3
    use revenue
do while .t.
    clear
    @ 1,3 to 24,76 double
    @ 21,4 to 21,75 double
    @ 2,14 say 'COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL
SYSTEM'
    @ 3,14 to 3,65 double
    @ 5,29 say "EQUIPMENT RETURNS FORM"
    @ 4,28 to 6,51
    mocode = space(8)
    @ 8,6 say 'EQUIPMENT CODE (Press ENTER KEY to Exit):' get mocode picture
'!!!/99'
    read
    if mocode = space(8)
        exit
    endif
    select 1
    go top
    locate for ecode = mocode
    if .not. found()
        @ 23,15 say 'EQUIPMENT CODE DOES NOT EXIST - Press any key ...'
        set console off
        wait
        set console on
    loop

```

```

endif
mdesc = desc
mcost = cost
mdatep = datep
medesc = edesc
mlocate = locate
mpcode = locate
mcrate = crate
mdatea = datea
mtrev = trev
@ 8,6 clear to 8,68
@ 8,6 say 'EQUIPMENT CODE:' get mcode
@ 8,40 say 'CATEGORY:' get mdesc
@ 10,6 say 'EQUIPMENT DESCRIPTION:' get medesc picture '@!'
@ 12,6 say 'COST OF PURCHASE: #'
@ 12,25 get mcost picture '999,999,999,999.99'
@ 12,48 say 'DATE OF PURCHASE:' get mdatep
clear gets
@ 13,4 to 13,75
if mlocate = 'STORE'
    @ 23,20 say 'EQUIPMENT NOT ALLOCATED - Press any key'
    set console off
    wait
    set console on
    loop
endif
@ 14,4 say 'ALLOCATION DETAILS:'
@ 15,4 to 15,21
@ 16,6 say 'PROJECT CODE:' get mpcode
mpdesc = pdesc
@ 16,30 say 'DESCRIPTION:' get mpdesc
@ 18,6 say 'DATE OF ALLOCATION:' get mdatea
@ 18,40 say 'EQUIPMENT RATE: #'
@ 18,57 get mcrate picture '9,999,999.99'
clear gets
mdater = ctod(' / / ')
@ 20,6 say 'DATE OF RETURNS:'
@ 20,35 say 'DAYS:'
@ 20,48 say 'REVENUE: #'
@ 20,23 get mdater
read
mdays = mdater - mdatea
mrevenue = mdays * mcrate
mtrev = mtrev + mrevenue

```

```

@ 20,41 get mdays picture '999'
@ 20,58 get mrevenue picture '999,999,999.99'
clear gets
@ 23,26 say 'TO RETURN EQUIPMENT (Y/N):'
do while .t.
  choice3=' '
  @ 23,53 get choice3 picture '!'
  read
  if choice3 $ 'YN'
    exit
  endif
enddo
if choice3='Y'
  select 1
  replace datea with ctod(' / / '),crate with 0,locate with 'STORE'
  replace pdesc with space(30),trev with mtrev
  select 3
  append blank
  replace ecode with mocode,edesc with medesc,pcode with mpcode
  replace pdesc with mpdesc,datea with mdatea,dater with mdater
  replace erate with mcrate,days with mdays,revenue with mrevenue
endif
enddo
close all
clear
return

```

REPORT1.PRG

```

@ 19,10 say 'PRINTING IN PROGRESS ...'
*set device to printer
clear
@ 1,22 say 'J.D.P. CONSTRUCTION NIGERIA LIMITED'
@ 2,22 to 2,56 double
@ 3,31 say 'EQUIPMENT REGISTER'
@ 4,31 to 4,48 double
@ 5,1 say replicate('-',78)
@ 6,1 say '≡ '
@ 6,2 say 'PURCH. DATE'
@ 6,13 say '≡ '
@ 6,16 say 'CODE'
@ 6,22 say '≡ '
@ 6,27 say 'DECRPTION'

```

```

@ 6,53 say '␣ '
@ 6,54 say 'CONDITION'
@ 6,63 say '␣ '
@ 6,64 say 'MAKE'
@ 6,69 say '␣ '
@ 6,70 say 'MODEL NO'
@ 6,78 say '␣ '
@ 7,1 say '␣ '+replicate('-',11)+'␣ '+replicate('-',8)
@ 7,22 say '␣ '+replicate('-',30)+'␣ '+replicate('-',9)
@ 7,63 say '␣ '+replicate('-',5)+'␣ '+replicate('-',8)+'␣ '
r=7
use equip
do while .not. eof()
  r=r+1
  mdatep=datep
  mcode=ecode
  medesc=edesc
  mcond=cond
  mmake=make
  mmode=mode
  skip
  if mcond='Y'
    mcond='GOOD'
  else
    mcond='BAD'
  endif
  @ r,1 say '␣ '
  @ r,3 say mdatep
  @ r,13 say '␣ '
  @ r,14 say mcode
  @ r,22 say '␣ '
  @ r,23 say medesc
  @ r,53 say '␣ '
  @ r,56 say mcond
  @ r,63 say '␣ '
  @ r,64 say mmake
  @ r,69 say '␣ '
  @ r,71 say mmode
  @ r,78 say '␣ '
  r=r+1
  if .not. eof()
    @ r,1 say '␣ '
    @ r,13 say '␣ '
    @ r,22 say '␣ '

```

```

    @ r,53 say '␣ '
    @ r,63 say '␣ '
    @ r,69 say '␣ '
    @ r,78 say '␣ '
endif
enddo
@ r,1 say replicate('-',78)
*set device to screen
@ 19,10 clea to 19,40
@ 17,10 say 'PRINTING IS COMPLETED'
@ 20,7 say 'Press any key to continue ...'
set console off
wait
set console on
@ 17,7 clear to 20,40
use
return

```

UPDATE1.PRG

```

select 1
  use equip
select 2
  use group
select 1
do while .t.
  clear
  @ 1,3 to 24,76 double
  @ 21,4 to 21,75 double
  @ 2,14 say 'COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL
SYSTEM'
  @ 3,14 to 3,65 double
  @ 5,30 say "EQUIPMENT ENTRY FORM"
  @ 4,29 to 6,50
  mocode=space(8)
  @ 8,6 say 'EQUIPMENT CODE (Press ENTER KEY to Exit):' get mocode picture
'!!!!/99'
  read
  if mocode=space(8)
    exit
  endif
  go top
  locate for ecode=mocode

```

```

if found()
  @ 23,16 say 'EQUIPMENT CODE ALREADY EXIST - Press any key ...'
  set console off
  wait
  set console on
  loop
endif
subcode = substr(mecode,4,2)
select 2
go top
locate for subcode = code
mdesc = desc
miar = iar
maar = aar
mdep = dep
select 1
@ 8,6 clear to 8,68
@ 8,6 say 'EQUIPMENT CODE:' get mecode
@ 8,40 say 'CATEGORY:' get mdesc
clear gets
store 0 to mcost, minitial, manual, mwdv, merate
store space(5) to mmake, mmode, mcapa
mdatep = ctod(' / / ')
medesc = space(30)
mrv = 10
@ 10,6 say 'EQUIPMENT DESCRIPTION:' get medesc picture '@!'
@ 12,6 say 'COST OF PURCHASE: #'
@ 12,25 get mcost picture '999,999,999,999.99'
@ 12,48 say 'DATE OF PURCHASE:' get mdatep
@ 14,6 say 'EQUIPMENT MAKE:' get mmake picture '@!'
@ 14,33 say 'MODEL NO:' get mmode
@ 14,54 say 'CAPACITY:' get mcapa picture '@!'
@ 16,6 say 'INITIAL ALLCE: #'
@ 16,42 say 'ANNUAL ALLCE: #'
@ 18,6 say 'CAPITAL ALLCE: #'
@ 18,46 say 'RESIDUAL VALUE: #'
@ 20,6 say 'WRITTEN DOWN VALUE: #'
@ 20,46 say 'EXPECTED RATE: #'
read
minitial = miar/100*mcost
manual = (mcost-(minitial + mrv))*maar/100
mcap = minitial + manual
mwdv = mcost - mcap
@ 16,22 get minitial picture '9,999,999,999.99'

```

```

@ 16,57 get manual picture '9,999,999,999.99'
@ 18,22 get mcap picture '999,999,999,999.99'
@ 18,63 get mrv picture '999.99'
@ 20,27 get mwdv picture '999,999,999.99'
clear gets
@ 20,62 get merate picture '9,999,999.99'
read
@ 23,24 say 'SAVE EQUIPMENT DETAILS (Y/N):'
do while .t.
  choice3=' '
  @ 23,54 get choice3 picture '!'
  read
  if choice3 $ 'YN'
    exit
  endif
enddo
if choice3='Y'
  append blank
  replace ecode with mocode,edesc with medesc,datep with mdatep
  replace make with mmake,mode with mmode,initial with minitial
  replace capa with mcapa,cost with mcost,annual with manual
  replace wdv with mwdv,cap with mcap,cond with 'Y',rv with mrv
  replace dep with mdep,iar with miar,aar with maar,desc with mdesc
  replace locate with 'STORE',erate with merate
  replace tcost with 0,trev with 0
endif
enddo
close all
clear
return

```

UPDATE2.PRG

```

use equip
do while .t.
  clear
  @ 1,3 to 24,76 double
  @ 21,4 to 21,75 double
  @ 2,14 say 'COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL
SYSTEM'
  @ 3,14 to 3,65 double
  @ 5,29 say "EQUIPMENT EDITING FORM"
  @ 4,28 to 6,51

```



```

mecode = space(8)
@ 8,6 say 'EQUIPMENT CODE (Press ENTER KEY to Exit):' get mecode picture
'!!!/!!!/99'
read
if mecode = space(8)
  exit
endif
go top
locate for ecode = mecode
if .not. found()
  @ 23,15 say 'EQUIPMENT CODE DOES NOT EXIST - Press any key ...'
  set console off
  wait
  set console on
  loop
endif
mdesc = desc
miar = iar
maar = aar
mdep = dep
mcost = cost
minitial = initial
mannual = annual
mwdv = wdv
mmake = make
mmode = mode
mcapa = capa
mdatep = datep
medesc = edesc
mdatep = datep
merate = erate
mcap = cap
mriv = rv
@ 8,6 clear to 8,68
@ 8,6 say 'EQUIPMENT CODE:' get mecode
@ 8,40 say 'CATEGORY:' get mdesc
@ 10,6 say 'EQUIPMENT DESCRIPTION:' get medesc picture '@!'
@ 12,6 say 'COST OF PURCHASE: #'
@ 12,25 get mcost picture '999,999,999,999.99'
@ 12,48 say 'DATE OF PURCHASE:' get mdatep
@ 14,6 say 'EQUIPMENT MAKE:' get mmake picture '@!'
@ 14,33 say 'MODEL NO:' get mmode
@ 14,54 say 'CAPACITY:' get mcapa picture '@!'
@ 16,6 say 'INITIAL ALLCE: #'

```

```

@ 16,42 say 'ANNUAL ALLCE: #'
@ 18,6 say 'CAPITAL ALLCE: #'
@ 18,46 say 'RESIDUAL VALUE: #'
@ 20,6 say 'WRITTEN DOWN VALUE: #'
@ 20,46 say 'EXPECTED RATE: #'
@ 16,22 get minitial picture '9,999,999,999.99'
@ 16,57 get mannual picture '9,999,999,999.99'
@ 18,22 get mcap picture '999,999,999,999.99'
@ 18,63 get mrv picture '999.99'
@ 20,27 get mwdv picture '999,999,999.99'
clear gets
@ 10,29 get medesc picture '@!'
@ 12,25 get mcost picture '999,999,999,999.99'
@ 12,66 get mdatep
@ 14,22 get mmake picture '@!'
@ 14,43 get mmode
@ 14,64 get mcapa picture '@!'
read
minitial = miar/100*mcost
mannual = (mcost-(minitial + mrv))*maar/100
mcap = minitial + mannual
mwdv = mcost - mcap
@ 16,22 get minitial picture '9,999,999,999.99'
@ 16,57 get mannual picture '9,999,999,999.99'
@ 18,22 get mcap picture '999,999,999,999.99'
@ 18,63 get mrv picture '999.99'
@ 20,27 get mwdv picture '999,999,999.99'
clear gets
@ 20,62 get merate picture '9,999,999.99'
read
@ 23,26 say 'SAVE DETAIL CHANGES (Y/N):'
do while .t.
  choice3 = ' '
  @ 23,53 get choice3 picture '!'
  read
  if choice3 $ 'YN'
    exit
  endif
enddo
if choice3 = 'Y'
  replace edesc with medesc, datep with mdatep, erate with merate
  replace make with mmake, mode with mmode, initial with minitial
  replace capa with mcapa, cost with mcost, annual with mannual
  replace wdv with mwdv, cap with mcap, cond with 'Y', rv with mrv

```



```
    replace dep with mdep,iar with miar,aar with maar
  endif
enddo
close all
clear
return
```

UPDATE3.PRG

```
use equip
do while .t.
  clear
  @ 1,3 to 24,76 double
  @ 21,4 to 21,75 double
  @ 2,14 say 'COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL
SYSTEM'
  @ 3,14 to 3,65 double
  @ 5,29 say "EQUIPMENT VIEWING FORM"
  @ 4,28 to 6,51
  mcode=space(8)
  @ 8,6 say 'EQUIPMENT CODE (Press ENTER KEY to Exit):' get mcode picture
'!!!/99'
  read
  if mcode=space(8)
    exit
  endif
  go top
  locate for ecode=mcode
  if .not. found()
    @ 23,15 say 'EQUIPMENT CODE DOES NOT EXIST - Press any key ...'
    set console off
    wait
    set console on
  loop
endif
mdesc=desc
miar=iar
maar=aar
mdep=dep
mcost=cost
minitial=initial
mannual=annual
mwdv=wdv
```

```

mmake = make
mmode = mode
mcapa = capa
mdatep = datep
medesc = edesc
mdatep = datep
mcap = cap
merate = erate
mrv = rv
@ 8,6 clear to 8,68
@ 8,6 say 'EQUIPMENT CODE:' get mecode
@ 8,40 say 'CATEGORY:' get mdesc
@ 10,6 say 'EQUIPMENT DESCRIPTION:' get medesc picture '@!'
@ 12,6 say 'COST OF PURCHASE: #'
@ 12,25 get mcost picture '999,999,999,999.99'
@ 12,48 say 'DATE OF PURCHASE:' get mdatep
@ 14,6 say 'EQUIPMENT MAKE:' get mmake picture '@!'
@ 14,33 say 'MODEL NO:' get mmode
@ 14,54 say 'CAPACITY:' get mcapa picture '@!'
@ 16,6 say 'INITIAL ALLCE: #'
@ 16,42 say 'ANNUAL ALLCE: #'
@ 18,6 say 'CAPITAL ALLCE: #'
@ 18,46 say 'RESIDUAL VALUE: #'
@ 20,6 say 'WRITTEN DOWN VALUE: #'
@ 20,46 say 'EXPECTED RATE: #'
@ 16,22 get minitial picture '9,999,999,999.99'
@ 16,57 get mannual picture '9,999,999,999.99'
@ 18,22 get mcap picture '999,999,999,999.99'
@ 18,63 get mrv picture '999.99'
@ 20,27 get mwdv picture '999,999,999.99'
@ 20,62 get merate picture '9,999,999.99'
clear gets
@ 23,18 say 'VIEWING PROJECT DETAILS - Press any key ...'
set console off
wait
set console on
enddo
use
clear
return

```

UPDATE4.PRG

```
use equip
do while .t.
  clear
  @ 1,3 to 24,76 double
  @ 21,4 to 21,75 double
  @ 2,14 say 'COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL
SYSTEM'
  @ 3,14 to 3,65 double
  @ 5,28 say "EQUIPMENT DELETING FORM"
  @ 4,27 to 6,51
  mcode = space(8)
  @ 8,6 say 'EQUIPMENT CODE (Press ENTER KEY to Exit):' get mcode picture
'!!!!/99'
  read
  if mcode = space(8)
    exit
  endif
  go top
  locate for ecode = mcode
  if .not. found()
    @ 23,15 say 'EQUIPMENT CODE DOES NOT EXIST - Press any key ...'
    set console off
    wait
    set console on
  loop
endif
mdesc = desc
miar = iar
maar = aar
mdep = dep
mcost = cost
minitial = initial
mannual = annual
mwdv = wdv
mmake = make
mmode = mode
mcapa = capa
mdatep = datep
medesc = edesc
mdatep = datep
mcap = cap
merate = erate
```

```

mrv=rv
@ 8,6 clear to 8,68
@ 8,6 say 'EQUIPMENT CODE:' get mecode
@ 8,40 say 'CATEGORY:' get mdesc
@ 10,6 say 'EQUIPMENT DESCRIPTION:' get medesc picture '@!'
@ 12,6 say 'COST OF PURCHASE: #'
@ 12,25 get mcost picture '999,999,999,999.99'
@ 12,48 say 'DATE OF PURCHASE:' get mdatep
@ 14,6 say 'EQUIPMENT MAKE:' get mmake picture '@!'
@ 14,33 say 'MODEL NO:' get mmode
@ 14,54 say 'CAPACITY:' get mcapa picture '@!'
@ 16,6 say 'INITIAL ALLCE: #'
@ 16,42 say 'ANNUAL ALLCE: #'
@ 18,6 say 'CAPITAL ALLCE: #'
@ 18,46 say 'RESIDUAL VALUE: #'
@ 20,6 say 'WRITTEN DOWN VALUE: #'
@ 20,46 say 'EXPECTED RATE: #'
@ 16,22 get minitial picture '9,999,999,999.99'
@ 16,57 get manual picture '9,999,999,999.99'
@ 18,22 get mcap picture '999,999,999,999.99'
@ 18,63 get mrv picture '999.99'
@ 20,27 get mwdv picture '999,999,999.99'
@ 20,62 get merate picture '9,999,999.99'
clear gets
@ 23,25 say 'TO DELETE THIS RECORD (Y/N):'
do while .t.
    choice3=' '
    @ 23,54 get choice3 picture '!
    read
    if choice3 $ 'YN'
        exit
    endif
enddo
if choice3='Y'
    delete
    pack
    @ 23,21 say 'RECORD IS DELETED - Press any key ...'
    set console off
    wait
    set console on
endif
enddo

```

```
use
clear
return
```

UPDATE5.PRG

```
clear
@ 0,30 to 2,48 double
@ 1,31 say 'EQUIPMENT LISTING'
@ 3,3 to 24,76 double
@ 4,5 say 'EQUIPMENT CODE'
@ 4,22 say 'EQUIPMENT CATEGORY'
@ 4,48 say 'EQUIPMENT DESCRIPTION'
@ 4,20 to 21,20
@ 4,43 to 21,43
@ 5,4 to 5,19
@ 5,21 to 5,42
@ 5,44 to 5,75
@ 22,4 to 22,75
row=6
use equip
do while .not. eof()
  mcode=ecode
  mdesc=desc
  medesc=edesc
  @ row,8 say mcode
  @ row,22 say mdesc
  @ row,45 say medesc
  row=row+1
  skip
enddo
@ 23,19 say 'LISTING EQUIPMENT DETAILS - Press any key'
set console off
wait
set console on
use
clear
return
```


OTHERS1.PRG

```
clear
@ 1,1 to 22,78 double
@ 20,2 to 20,77 double
@ 3,30 say "RATES UPDATE SCREEN"
@ 2,29 to 4,49
@ 5,2 to 5,77
@ 6,24 to 19,24
@ 6,39 to 19,39
@ 6,59 to 19,59
@ 6,3 say ' ASSET'
@ 6,26 say 'DEPRECIATION'
@ 6,41 say 'INITIAL ALLOWANCE'
@ 6,61 say 'ANNUAL ALLOWANCE'
@ 7,2 say ' CATEGORY'
@ 7,30 say '(%)'
@ 7,45 say 'RATE (%)'
@ 7,64 say 'RATE (%)'
@ 8,2 to 8,77
row = 10
n = 0
use group
declare mdep[5],miar[5],maar[5]
do while .not. eof()
  n = n + 1
  mdesc = desc
  mdep[n] = dep
  maar[n] = aar
  miar[n] = iar
  @ row,3 say mdesc
  @ row,29 get mdep[n] picture '99.9'
  @ row,47 get miar[n] picture '99.9'
  @ row,66 get maar[n] picture '99.9'
  row = row + 2
  skip
enddo
clear gets
n = 0
row = 10
go top
do while .not. eof()
  n = n + 1
  @ row,29 get mdep[n] picture '99.9'
```

```

@ row,47 get miar[n] picture '99.9'
@ row,66 get maar[n] picture '99.9'
read
row=row+2
skip
enddo
@ 21,25 say 'SAVE PROJECT DETAILS (Y/N):'
do while .t.
  choice3=' '
  @ 21,53 get choice3 picture '!'
  read
  if choice3 $ 'YN'
    exit
  endif
enddo
if choice3='Y'
  n=0
  go top
  do while .not. eof()
    n=n+1
    replace dep with mdep[n],aar with maar[n],iar with miar[n]
    skip
  enddo
endif
use
clear
return

```

OTHERS2.PRG

```

select 1
  use equip
select 2
  use expenses
do while .t.
  clear
  @ 2,3 to 23,76 double
  @ 20,4 to 20,75 double
  @ 3,14 say 'COMPUTERISED EQUIPMENT MANAGEMENT AND CONTROL
SYSTEM'
  @ 4,14 to 4,65 double
  @ 6,27 say "EQUIPMENT MAINTENANCE FORM"
  @ 5,26 to 7,53

```

```

mecode = space(8)
@ 9,6 say 'EQUIPMENT CODE (Press ENTER KEY to Exit):' get mecode picture
'!/!/!/99'
read
if mecode = space(8)
    exit
endif
select 1
go top
locate for ecode = mecode
if .not. found()
    @ 22,15 say 'EQUIPMENT CODE DOES NOT EXIST - Press any key ...'
    set console off
    wait
    set console on
    loop
endif
mdesc = desc
mcost = cost
mdatep = datep
medesc = edesc
mlocate = locate
mtcost = tcost
@ 9,6 clear to 9,68
@ 9,6 say 'EQUIPMENT CODE:' get mecode
@ 9,40 say 'CATEGORY:' get mdesc
@ 11,6 say 'EQUIPMENT DESCRIPTION:' get medesc picture '@!'
@ 13,6 say 'COST OF PURCHASE: #'
@ 13,25 get mcost picture '999,999,999,999.99'
@ 13,48 say 'DATE OF PURCHASE:' get mdatep
clear gets
mrdesc = space(50)
mramount = 0
mrdate = ctod(' / / ')
@ 14,4 to 14,75
select 2
@ 15,4 say 'DETAILS OF REPAIR:'
@ 16,4 to 16,20
@ 17,7 say 'DESCRIPTION:' get mrdesc picture '@!'
@ 19,7 say 'AMOUNT EXPENDED: #'
@ 19,25 get mramount picture '999,999.99'
@ 19,40 say 'DATE OF REPAIRS:' get mrdate
read
mtcost = mtcost + mramount

```

```

@ 22,26 say 'SAVE DETAIL CHANGES (Y/N):'
do while .t.
  choice3=' '
  @ 22,53 get choice3 picture '!
  read
  if choice3 $ 'YN'
    exit
  endif
enddo
if choice3='Y'
  select 1
  replace tcost with mtcost
  select 2
  append blank
  replace rdate with mrdate,ecode with mecode,edesc with medesc
  replace ramount with mramount,rdesc with mrdesc
endif
enddo
close all
clear
return

```

OTHERS3.PRG

```

@ 5,34 clear to 7,44
@ 11,60 say chr(25)
do while .t.
  @ 6,31 say 'OTHER OPTIONS MENU'
  @ 5,30 to 7,49
  @ 12,57 to 19,76
  @ 13,58 say 'RATES UPDATE'
  @ 14,58 say 'EQUIPMENT REPAIRS'
  @ 15,58 say 'EQUIPMENT DISPOSAL'
  @ 16,58 say 'SUBMENU EXIT'
  @ 18,60 say 'Pick choice:'
  do while .t.
    choice2=' '
    @ 18,73 get choice2 picture '!
    read
    if choice2 $ 'REDS'
      exit
    endif
  enddo

```

```
do case
  case choice2= 'R'
    do others1
  case choice2= 'E'
    do others2
  case choice2= 'D'
    do others3
  otherwise
    exit
endcase
enddo
return
```