

**DESIGN AND IMPLEMENTATION OF AN AUTOMATED  
INVENTORY CONTROL SYSTEM FOR A MANUFACTURING  
ORGANISATION**

**(A CASE STUDY OF NIGERIAN BREWERIES PLC, ENUGU)**

**BY**

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## CERTIFICATION PAGE

This is to certify that this project research work from the department of Computer Engineering, Caritas university, Amorji-Nike, Emene, Enugu was solely and entirely carried out by Ebunobi Obianuju Roseline with the registration number CE/2007/180.

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## **DEDICATION**

This report is dedicated to God Almighty who is the ultimate giver of wisdom and to my beloved parents for their constant support and encouragement.

## ACKNOWLEDGEMENT

I am most grateful to the Almighty God who has been my most gracious guardian and source of strength throughout this course.

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## **ABSTRACT**

This research work is concise and generally summarizes the activities duly carried out in the design and implementation of an automated inventory control system for a manufacturing organization. The system is designed to efficiently handle the movement and tracking of goods through the replacement of human workers by technology. The manual method or intervention is labour intensive, costly, and error prone and cannot ensure the inventory remains up-to-date due to oversight and internal shrinkage. With the proposed new system, inventory can be updated in real time without product movement, scanning, or human involvement. The automated system allows inventory status to be determined and shipping and receiving documents to be generated automatically triggering automatic orders for products that are low in inventory. The study outlines the main concepts of the analysis and design methodology of the proposed system, compares it to the existing and goes further to explain the design and implementation of the system using Visual Basic 6.0 for the database. The fact finding techniques employed is interview, observation, online and library research.

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## **CHAPTER ONE**

### **1.0 INTRODUCTION**

An inventory control system contains a list of orders to be filled and then prompts workers to pick the necessary items, and provides them with packaging and shipping information. Inventory control may be used to automate sales order fulfilment process and also manage in and outward material of hardware. Automation is the replacement of human workers by technology. For optimal sales and inventory management process, robust functionality is needed for managing logistics facilities. Warehouse management functions for inventory control cover internal warehouse movements and storage and its support helps in the recording and tracking of materials on basis of both quantity and value.

This application takes care of all supply orders reducing cost for warehousing, transportation while improving customer service. It significantly improves inventory turns, optimizes flow of goods. It also improves cash flow, visibility and decision making providing efficient execution of tasks using this fast and reliable computerised method

## **1.1 BACKGROUND OF THE STUDY**

The Nigerian Breweries PLC was established in the year 1946. It aims at providing satisfaction and nourishment to the Nigerian population through the distribution of drinks like beer, coca-cola, fanta, sprite etc. It is second to none and for this reason, the demand is high and the company responds to the increasing demand by stabilizing supply to strike a balance.

Justifiably, the company has the problem of keeping adequate record of goods transfer and since it is done manually, associated problems of insecurity, high cost of operation and delay in supply arise. Data processing in Nigerian Breweries PLC is presently carried out using people, pens, and paper to control stock and inventory.

The design and development of an automated inventory control system for the Nigerian Breweries PLC will no doubt bring immeasurable relief from the problems associated with the manual system.

## 1.2 STATEMENT OF THE PROBLEM

The Nigerian Breweries PLC is to an extent manually operated and reveals a number of problems.

- ❖ The recording of sales and cash received are done manually on a book that appears rough. Thus, the books are exposed to physical damage, information can be lost and dust particles are accumulated.
- ❖ The long list of supply orders waiting to be attended to on daily basis.
- ❖ The control system is time consuming, less accurate and less efficient, and the environment is not user friendly.
- ❖ Inaccuracies often ensue from human error.

The manual system is quite tedious and can be reduced or eliminated with the introduction of the proposed system.

### **1.3 PURPOSE OF THE STUDY**

The purpose of this study is to improve current operational process in the Nigerian Breweries PLC to its full capacity by developing efficient computer software that can handle inventory in a computerised fashion.

### **1.4 SIGNIFICANCE OF THE STUDY**

This study is primarily aimed at increasing efficiency in operations, reducing maintenance and running cost, monitoring the supply of goods and its distribution and increase profit in the Nigerian Breweries PLC by introducing an automated inventory control system.

### **1.5 OBJECTIVES OF THE STUDY**

The main objective of this study is to develop a computerised inventory control management system. Others include;

- i. It provides total asset visibility.
- ii. It allows reduced inventory stocking levels giving full inventory history.

- iii. It reduces lead time, shelf space, and errors due to damage, fatigue of staff and overall cost of operations.
- iv. It facilitates “just in time” deliveries.
- v. It provides full process control for products.
- vi. It provides higher level security as the system would be passworded to prevent unauthorised access.
- vii. It shortens cross docking time and speeds up sort/pick up rate.
- viii. It helps the management plan, monitor, optimize resources and ascertain their financial position at any time.

## **1.6 SCOPE OF THE STUDY**

The scope of this study covers the Nigerian Breweries PLC as a whole, and its customers which include retailers, distributors and the general public.

## **1.7 LIMITATIONS OF THE STUDY**

This project was constrained by the following factors:

### **(a) Financial Constraints**

Bearing in mind the economic state of the nation, it was found difficult in making both ends meet, because of the exorbitant nature of things nowadays in travelling for the collection of data needed for the project.

### **(b) Time Constraints**

Looking at the interval between the resumption and vacation of the final semester for the project to be completed, the time given seemed to be short for the collection of required information for better work to be done.

### **(c) Non-Availability of Material**

During this project, it was noticed that the required materials needed for the project are not documented. Those that were documented lacked storage facilities where they can be reached.

## **1.8 DEFINITION OF BASIC CONCEPTS**

**Automation:** This is the use of technology or computers to control and process data reducing the need for human intervention.

**Database:** This refers to a large store of related data on a computer that a user can access and modify.

**Password:** This is a secret code that must be entered into a computer to enable access to its applications. It is made up of numbers, letters, special characters or a combination of any of the above categories.

**Inventory Control System:** A list of orders to be filled, and prompts workers to pick the necessary items and provides them with packaging and shipping information.

**Computerization:** This is the conversion of a manually operated system to a controlled, organized and automated system.

**Research:** A careful study of a subject to discover facts, establish a theory or develop a plan of action based on the facts discovered.

**System:** A set of computer components functioning together.

**Technology:** The study of techniques of mobilizing resources such as information for accomplishing objectives that benefit man and his environment.

**Software:** A computer program or set of instructions that direct a computer to perform processing functions.

**Information System:** A collection of procedures, people, instructions and equipment to produce information in a useful form.

**Processing:** This is dealing with something according to an established procedure.



## **CHAPTER TWO**

### **2.0 LITERATURE REVIEW**

#### **2.1 COMPREHENSIVE OVERVIEW**

According to Microsoft Encarta (2009), Inventory is the quantity of goods and materials on hand that a manufacturer uses to represent those items that are ready and available for sale.

An inventory control system is a set of hardware and software based tools that automate the process of tracking inventory. The kinds of inventory tracked with an inventory control system can include almost any kind of quantifiable goods including food, clothing, books, equipment and other items that consumers, retailers, or wholesalers may purchase. Modern inventory control systems are exclusively based on using technology to track and control inventory. (Kotler, 2003)

Inventory control systems work in real time using technology to transmit information to a central computer system as inventory is monitored and as transactions occur to ensure an organised management system and generate

detail-oriented records and reports that cover all aspects of the business.

(Harry, 2005)

### **2.1.1 Purpose**

Companies often use inventory control systems to reduce their carrying costs. The system is used to track products and parts as they are transported from a vendor to a warehouse, between warehouses, finally to a retailer or directly to a customer. The purpose of a good inventory control system is to maintain a balance between too much and too little inventory. It provides the foundation for monitoring product sales and measuring inventory levels. Inventory control systems acts as a blueprint for picking, packing and shipping items from a warehouse and receiving items into a warehouse or other storage locations to cut down product obsolescence and spoilage. (Monzerka, 2002)

## **2.2 TYPES OF INVENTORY CONTROL SYSTEMS**

Properly managing inventory requires a system of some sort. It does not matter if the system consists of writing inventory levels on the back of an

envelope or using the most sophisticated radio frequency identification system. As the old saying goes, “there are many ways to skin a cat”, the different types of inventory control systems all have pros and cons. choosing the right one boils down to which system holds the most value for the company. (Rubin, 2007)

### **2.2.1 Basically, there are four types of inventory control systems:**

- ❖ Manual inventory management system
- ❖ Barcode technology
- ❖ Radio Frequency Identification (RFID)
- ❖ Warehouse Management System

#### **2.2.1.1 Manual Inventory Management System**

Many small business owners, especially if the business has very few products, keep track of inventory manually using a spreadsheet. Spreadsheets are set up to calculate when products need to be reordered. At the start of each week, the owner manually counts products and materials

that are on hand and enters the values in the spreadsheet and also enters expected usage based on existing orders. Using the appropriate spreadsheet formulas, the owner can determine if he has enough materials for the week or if purchases should be made. Manual systems allow the small business owner to manage inventory with very little investment in systems or training. Maintaining data integrity is a major downside to manual inventory management as a single data entry or formula error can cause major inaccuracies in the data output. (Lysons, 2001)

#### **2.2.1.2 Barcode Technology**

Barcodes consist of series of parallel vertical lines, or bars, used to assign a unique identification code to an item. The major use of barcode identification system is to track inventory automatically. A barcode combines several sequences to create a unique set of numbers or characters that identifies the item. (Encarta, 2009)

All major retailers use barcode technology as part of an overall inventory control system because it increases the accuracy and efficiency of managing inventory. When a barcode is read at the point of sale, inventory sales data is

immediately read and sent to a broader system that maintains usage statistics. Barcodes manage inventory at the warehouse level as it facilitates movement of inventory within the confines of the warehouse. (Kenneth, 2002)

### **2.2.1.3 Radio Frequency Identification (RFID)**

This technology is relatively new and it works by having a tag that emits information that can be collected by a reader from a distance. RFID uses two types of technology to manage inventory movement; active and passive technology. Active RFID technology uses fixed tag readers assigned throughout a warehouse such that anytime an item with an RFID tag passes the reader, the movement of the item is recorded in the inventory management software. Active systems work best in environments that require real time inventory tracking or where inventory security problems exist. Passive RFID technology requires the use of handheld readers to monitor inventory movement. Because RFID technology has a reading range of up to 40 feet using passive technology and 300 feet using active

technology, it greatly increases the accuracy of moving inventory around a warehouse. (Hamlett, 2006)

#### **2.2.1.4 Warehouse Management System**

This is the management of storage of products and services rendered on the product within the four walls of a warehouse. (Sande, 2003)

It is a key part of the supply chain and primarily aims to control the movement and storage of materials within a warehouse and process the associated transactions including shipping, receiving, putaway and picking. It can be described as the legs at the end of the line that automates the store, traffic and shipping management. Warehouse management systems help to efficiently monitor the flow of products. Once data has been collected, there is either batch synchronization with, or a real time wireless transmission to a central database. The database can then provide useful reports about the status of goods in the warehouse. The Warehouse management system would be discussed further to reflect its mode of operation.

The types of inventory control systems are used generally to track and control inventory. Many companies are now using sophisticated Warehouse Management Systems integrated with Supply Chain Systems, Enterprise Systems and Electronic Data Interchange (EDI). The movement and tracking of goods through the manufacturing and supply chain process is still a complex procedure which is difficult to manage. In many instances, the goods being distributed to the retailer must go through one or more third party distribution processes before they reach their final destination.

Currently, most material tracking systems employ two dimensional barcodes that must be close to and within the “line of sight” of the barcode reader. This requires manual scanning or a conveyor like process to position the barcode and scanner. Barcodes can run the risk of getting wet or scratched due to mishandling or a harsh environment, which often prevents accurate reading by the scanner. Manual intervention is labour intensive, costly and error prone. In addition, scheduled scanning or manual method cannot ensure the inventory remains up to date, due to oversights, errors and internal shrinkage. With RFID, inventory can be updated in real time

without product movement, scanning or human involvement. The fully automated system allows inventory status to be determined and shipping and receiving documents to be generated automatically. The system also triggers automatic orders for products that are low in inventory.

### **2.3 HOW INVENTORY CONTROL SYSTEMS REALLY WORK**

The systems work like this, first, barcodes or RFIDs tell scanners which items consumers are buying. The scanners transmit the information to computers by reading the barcodes and sending that information to the software. The software then interprets the numbers from the barcodes and matches those numbers to the type of merchandise they represent. This allows the merchant to track sales and inventory either at the checkout counter or with a handheld scanner keeping the store abreast of which items are selling. (Zenz, 2004)

Specialized software keeps track of how much stock is going out the door via purchases and how much remains on shelves and in the warehouse, giving managers a real time picture of what is happening. The software analyzes the data and makes recommendations for reordering strategies.



Sometimes they are programmed to automatically order at a certain point. It is important to note, however, that good systems leave room for human decision making. The systems provide good information to support decisions but leave the final call up to managers. Once managers make a reorder decision, the system uses Electronic Data Interchange (EDI) to communicate its needs for additional merchandise to a vendor. Electronic Data Interchange is the process of sending and receiving data between two parties, a retailer and a vendor, for example using data transmission lines, such as the internet. The data is stored in a computer's memory bank and read by managers at both ends of the line.

While inventory management systems offer retailers and vendors many advantages, there are some pitfalls. Because the system aims to keep a bare minimum of stock in store, retailers can be caught short if an item unexpectedly becomes a big seller. Retailers traditionally have additional stock on hand known as safety stock or buffer to prevent that occurrence but many have discontinued the practise. And as with all technology, these types

of systems are subject to the effects of a wide spread computer crash or software failure.

Some computer groups have objected to RFID technology too, claiming it invades their privacy by providing additional information about their buying habits and personal data. They argue that the information could be used to push other products on individual customers, or be sold to other businesses for similar purchases. The RFID signals can also “step on” or “collide” with each other, making accurate readings difficult.

Most retailers, however, have bought into the vast advantages offered by such systems. They include the high efficiency, the need for less warehouse space, less cash tied up in inventories and better sales. The systems also promote better information sharing between the retailer and the vendor, which helps drive down cost for both, as well as for the consumer. Inventory control systems can help a worker locate the items on the order list in the warehouse, it can encode shipping information like tracking numbers and delivery addresses, and it can remove these purchased items from the inventory tally to keep an accurate count of in-stock items. The benefits of

modern inventory control systems are not just for the retail and manufacturing sectors. They also offer great advantages for any organization that manages a supply chain for consumable items. (Michael, 2002)

Everywhere you look, inventory control systems are making sure the products are there when we need them by providing businesses with real time inventory tracking information which makes it simple to locate and analyze inventory information in real time with a simple database search.

## **2.4 WHAT INDUSTRIES USE INVENTORY CONTROL SYSTEMS**

Inventory control systems are employed in a wide variety of applications, but they all revolve around tracking delivery of goods to customers. Inventory control is crucial in retail stores especially to those with a large number or variety of merchandise items for sale. Inventory control also used in warehouses to track orders and shipments, and for automated order processing. Other important applications of inventory control systems are in manufacturing, shipping and receiving.

### **2.4.1 Application of Inventory Control Systems in the Manufacturing Industry**

Manufacturers mainly use inventory control systems to create work orders and bills of materials. This facilitates the manufacturing process by helping manufacturers efficiently assemble the tools and parts they need to perform certain tasks. For more complex manufacturing jobs, manufacturers can create multilevel work orders and bills of materials which have a timeline of processes that need to happen in the proper order to build a final product. Other work orders that can be created using inventory control systems include reverse work orders and automatic work orders. (Bolton, 2001)

#### **Its advantages include;**

- a) **Cost Savings:** It helps companies cut expenses by minimizing the amount of unnecessary parts and products in storage and helps keep lost sales to a minimum by having enough stock on hand to meet demand.

- b) **Warehouse organisation:** It helps distributors, wholesalers, retailers, manufacturers optimize the warehouses. If certain products are often sold together or are more popular than others, those products can be grouped together or placed near the delivery area to speed up the process of picking, packing and shipping to customers.
- c) **Time Savings:** It gives employees enough information access to receive products, make orders, transfer products and do other tasks without compromising company security by issuing administrator passwords to prevent unauthorised access.

The disadvantages of its application are mostly cost and complexity. Many large companies use inventory control systems but small businesses may not afford it and if an IT technician leaves, the system might be too complex for the users except another technician is employed.

**2.4.2 Importance of Inventory Control Systems:** Inventory control is important to ensure quality control in businesses that handle transactions revolving around consumer goods. (Benson, 1999) Without proper inventory control, a large retail store may run out of stock on an important item. A

good inventory control system will alert the retailer when it is time to reorder. Inventory control systems are important means of automatically tracking large shipments. For example, if a business orders ten pairs of socks for retail resale but only receives nine pairs, this will be obvious on inspecting the contents of the package, and error is not likely. On the other hand, say a wholesaler orders 100,000 crates of malt and 10,000 crates are missing, manually counting each crate of malt is likely to result in error.

An automated inventory control system helps to minimize the risk of error. In retail stores, an inventory control system also helps track theft of retail merchandise, providing valuable information about store profits and the need for theft-prevention systems.

## **2.5 WAREHOUSE MANAGEMENT SYSTEMS**

A warehouse consists of area, equipment, items, devices and people. According to Microsoft Encarta 2009, it is a large building or store in which goods, commodities, or raw materials are stored. Within this warehouse, the processes of purchasing, receiving, putaway, storage, value added services, picking, packing and shipping are constantly taking place. To aid in this

endeavour, the use of Warehouse Management Systems have been introduced. It spans the areas of warehouse resource management, warehouse configuration, task management, advanced pick methodologies and value added services. Warehouse Management Systems optimize the material handling business processes for warehouses, manufacturing facilities and distribution centres, as well as, providing integrated barcode scanning and label generation to improve material transactions and advanced shipping process. (Gramaccioni, 2009)

A crucial part of a manufacturing organisation's supply chain inventory management involves proper storage and transportation of products to a chain of retailers and wholesalers. Poor supply chain inventory management could spell disaster for any company. The higher the inventory investment as a percentage of total assets of a company, the higher the damage caused by poor inventory control. To ensure that this does not happen, Warehouse Management System uses a user defined rules engine coupled with its Advanced Task Framework to ensure inventory accuracy.

### **2.5.1 Warehouse Management Rules Engine**

Warehouse Management System can provide rules driven processes meaning that flexibility meets needs without customizations. The rules driven processes eliminates customization, can easily be changed or evolved, increases long-term flexibility, and accelerates implementation. They are also supported for directed picking, directed putaway, task assignment, costing and labelling. Through the rules engine, companies can enforce proper work processes and employees interact with the system with instructions that are fed and tasks that follow a predefined work process based on conditions found in the warehouse. (Finchley, 2001)

The Rules Engine can be used to create six different types of rules including picking, putaway, task type assignment, cost group assignment, label format assignment, and operation plan assignment in a Warehouse Management System enable environment. It is seeded with several default rules which allows for material organisation. Rules must be defined in a strategy and enabled using the rules workbench.



### **2.5.1.1 Rules Workbench**

The Rules Workbench is used to create rules to effectively dispatch tasks and manage inventory. It can be used to streamline picking and putaway of goods, assign newly received products to a cost group, ensure customer complaint labelling, assign tasks to a resource with the appropriate training and equipment, and select the correct operation plan for tasks.

### **2.5.1.2 Warehouse Management System Strategy**

A strategy is a sequence of rules that the rules engine runs to try to allocate products, space, or fulfil a request. Picking, putaway, cost group assignment rules use strategies. Strategies are constructed from one or more rules and rules can be reused for multiple strategies. If a strategy cannot find enough products to fulfil an order or find enough space for a putaway, the product is backordered or the putaway fails.

## **2.5.2 Importance of Warehouse Management Systems**

Warehouse Management Systems provides for daily businesses with access to real time and complete business information. With this information,

employees receive real time feedback on activities they perform and their impact on operations. The system has an in-built performance management tool that enable managers to proactively manage warehouse performance. The Board Management can view the company's current financial status, perform transactions, and calculate product availability. It is also used to monitor and refine facility activity thereby providing real time status with active alerts and notifications to handle last minute changes and keep key personnel informed with multiple reporting options.

The warehouse management systems enable warehouses to maintain accurate, real time inventory information through physical inventory management and cycle counts. The warehouse would manage inventory levels using automated replenishment and transfers between facilities. It enables companies to maximize their utilization of labour, space and equipment by coordinating and optimizing resource usage. The systems also direct and optimize stock putaway based on real time information about the status of bin utilization. It provides a set of computerised procedure to handle the receipt of stock and returns into a warehouse facility, model and

manage the logical representation of the physical storage facilities, manage the stock within the facility and enable a seamless link to order processing and logistics management in order to pick, pack and ship product out of the facility.

Warehouse management system is not just managing within the boundaries of a warehouse; it is much wider and goes beyond the physical boundaries. It acts as an interpreter and message buffer between existing systems. It does not just start with receipt of products but with actual initial planning. It monitors the progress of products through the warehouse. It uses the physical warehouse infrastructure, tracking systems and communication between product stations to monitor and deal with receipt, storage and movement of normally finished goods to intermediate storage locations or to a final customer. It helps in optimal cost of timely order fulfilment by managing the resources economically. (Haywood, 1985)

### **2.5.3 Inventory Control Systems vs. Warehouse Management Systems**

An inventory control system can be extended by the warehouse management system which manages to store bins in complex warehouse structures.

While inventory control systems manage stock by quantity and value, the warehouse management system reflects the special structure of a warehouse, and monitors the allocation of storage and transfer transactions in the warehouse.

## **2.6 AUTOMATED INVENTORY CONTROL SYSTEM SOFTWARE**

The automated inventory control system software is a computer based system for tracking product levels, orders, sales and deliveries. It can also be used in the manufacturing industry to create a work order, bill of materials and other production related documents. Companies use inventory management software to avoid product overstock and outages and also, as a tool for organizing inventory data that was generally stored in hardcopy form.

The software is made up of components working together to create a cohesive inventory control system which include;

- i. **Asset tracking:** This involves tracking products via its barcodes and other tracking criteria such as serial number when they are in a warehouse or store.
- ii. **Order management:** Once products reach a certain low level, a company's inventory control system can be programmed to tell managers to reorder that product. This helps companies to avoid running out of products or tying up too much capital in inventory.
- iii. **Service management:** Companies that are primarily service oriented rather than product oriented can use this software to track the cost of the materials they use to provide services. This way, they can attach prices to their services that reflect the total cost of performing them.

Automated inventory control systems are efficient, effective and have helped to improve the manufacturing industry thereby providing more security to warehouses while improving customer service.

## **CHAPTER THREE**

### **3.0 SYSTEM ANALYSIS AND DESIGN**

#### **3.1 METHODOLOGY**

This involves the specification of procedures for collecting and analyzing data necessary to define or solve the problem for which the research is embarked upon. The scope of this research covers the Nigerian Breweries PLC, 9<sup>th</sup> mile corner, Enugu in particular.

#### **3.2 DATA COLLECTION**

The major source in data collections and facts findings used is primary source.

- **Primary Source**

This involves oral interviews conducted with various personnel in the Nigerian Breweries PLC, Enugu, reviewing and sharing their experience about the difficulties they undergo in using the manual inventory control system.

### **3.3 ANALYSIS OF THE EXISTING SYSTEM**

The existing system is one that has been manually operated over the years. It is a system in which all the methods of controlling inventory is of a manual approach. Critical analysis of this system reveals that it is prone to errors. Careful analysis also shows that due to the complexities of the manual system, records of inventory kept are inaccurate and manually operated in such a way that requires the clerk to register sales on a book, thereby making a staff handle two or three jobs at a time. An example is a staff trying to register sales and at the same time rushing back to face a queue of impatient retailers waiting to be attended to. This makes the place so crowded with customers with just one person attending to them. Sometimes, due to unavailability of staff, customers who have other things to do, end up missing their various appointments. As a result of this, the attendant finds it very difficult to have an accurate record as pressure is being mounted on him. The attendant might end up writing an order meant for another customer and have it delivered to the wrong person.

The Nigerian Breweries PLC operates manually and has not adopted a computerised mode of operation. This generates inadequate records or exercise improper management of the company and in extreme cases, the company may lose her customers.

### **3.4 LIMITATION OF THE EXISTING SYSTEM**

As we know, manual inventory control systems are quite tedious, time consuming and less efficient and accurate in comparison to the computerised system. The Nigerian Breweries PLC has the following problems/weaknesses.

- a) The system cannot inventory stocks by its self or without human help.
- b) Compilation of inventory records consumes a lot of time and manpower.
- c) Some records get lost over time while some are not easily found.
- d) It involves lot of paperwork and data processing is very slow.



- e) The environment is not user friendly.
- f) The system does not calculate and give financial reports at a glance and as such, the degree of decision making in urgent matters is not applicable.
- g) The system is unable to detect faults within the system in case of rectifying fraud.
- h) It takes a long time for mistakes to be rectified and sometimes throws the system into confusion.

### **3.5 SYSTEM DESIGN**

**TRANSACTION/MOVEMENT FILES:** These are files used to update a master file which contains new records to be added into the master file or to be deleted from a master file. This file contains all order received at a particular time.

**MASTER FILES:** These are files of the company's permanent nature. It involves the regulars updating of these files to show a current position. It has been seen therefore that master record will contain both data of a static

nature e.g. a customer name and data which changes each time transaction occurs.

**METHOD OF FILE OPERATION AND ACCESS:** I explained some ways a file can be organized depending on the storage medium and the way the file can be processed. The objective of the designer is to organize the file in such a way as to give a user the facilities he requires while using minimum computer resources access time.

**RANDOM ACCESS:** Here files are not accessed serially or sequentially. Records are accessed and likewise stored in direct access device like magnetic diskettes, the arrangement; records are stored without regard to the sequence of their control field.

**SEQUENTIAL ACCESS:** This is simply the assessment of file using the sort key on the record are after the other either on a magnetic tape or tapes. It provides fast access of records stored sequentially relative to its position.

**INDEXED SEQUENTIAL:** This combines the time feature of both the random and sequential process records that can be accessed both

sequentially and randomly as the need arises. Records are indexed at the same time taking note of their locations thus allowing them to run one after the other. Reference to record and direct of its position.

**SERIAL ACCESS:** Here, assessment can be on any storage medium without referencing any particle sequence. To access first the records in the serial file are arranged in manner to help for easy sorting.

### 3.6 DATA BASE DESIGN

The operational data base is designed below using the format of the INS.DBD. The design is made to accommodate, database design, representation, character type, field size and decimal where necessary.

**TABLE 3.6: LOGIN TABLE**

FIELD DESCRIPTION	FIELD TYPE	FIELD SIZE
USERNAME	TEXT	15
PASSWORD	TEXT	15

**3.6.1 TRANSACTION TABLE; SUPPLY FORM**

<b>FIELD DESCRIPTION</b>	<b>FIELD TYPE</b>	<b>FIELD SIZE</b>
CATEGORIES  (BRANDS)	TEXT	15
PRICE PER CRATE	CURRENCY	10
QUANTITY SUPPLIED  (IN CARTONS)	NUMBER	10
PRICE OUTCOME	CURRENCY	10
QUANTITIY IN STOCK	NUMBER	20
TOTAL PRICE	CURRENCY	20

### 3.6.2 SALES TABLE

FIELD DESCRIPTION	FIELD TYPE	FIELD SIZE
CATEGORIES IN BRAND	TEXT	15
PRICE PER CRATE	CURRENCY	10
QUANTITY NEEDED  (IN CARTONS)	NUMBER	10
PRICE OUTCOME	CURRENCY	10
QUANTITIY AVAILABLE  (IN STOCK)	NUMBER	15
TOTAL PRICE	CURRENCY	20
DISCOUNT	TEXT	7
TOTAL BALANCE	CURRENCY	20

### 3.6.3 CUSTOMERS TABLE

FIELD DESCRIPTION	FIELD TYPE	FIELD SIZE
CUSTOMER CODE	TEXT	15
CUSTOMER NAME	TEXT	15
CUSTOMER ADDRESS	TEXT	15
PHONE NUMBER	NUMBER	10
TOTAL	CURRENCY	15
DISCOUNT	TEXT	9
TOTAL BALANCE	CURRENCY	20

## 3.7 ORGANIZATIONAL STRUCTURE

### NIGERIAN BREERIES PLC, 9th MILE, CORNER, ENUGU.

The organization chart contains the hierarchy of the various head of services in Nigeria Breweries Plc., Enugu, they are;

**Board of directors:** These are the bodies of appointed members in the organisation who jointly overseas the activities carried out.

The bodies likewise have subdivisions with different duties assigned to each body. In NBL Plc we have:

**Personnel manager:** He is in charge of the department that deals with employment, training, support, records etc. Collaborately the Assistant general finance manager, the Assistant general manager, the administrative manager and the technical manager form this department.

**Administrative manager:** He oversees the support operations of the organisation. He is also known as office manager. He keeps a department running smoothly. He was collaborately with the Chief accountant, Sales manager, Admin clerk, Purchase manager, Admin supervisor.

**Technical manager:** A technical manager with his team support which are Quantity control manager, Advert manager, Production manager, Supervisor, Production operator, Store keeper and Store clerk collaborately and critically sees to the overall technical issues, trouble shoots and resolves technical problems. He gives technical training to the co-team mates in design and system integration in the organization.

**Sales manager:** the sales manager works collaborately with the Depot manager and sales executives. He is responsible for keeping the sales team up and doing. He assigns sales territories, setting quotas, mentoring the members of her sales team, building a sales plan, hiring and firing sales people.

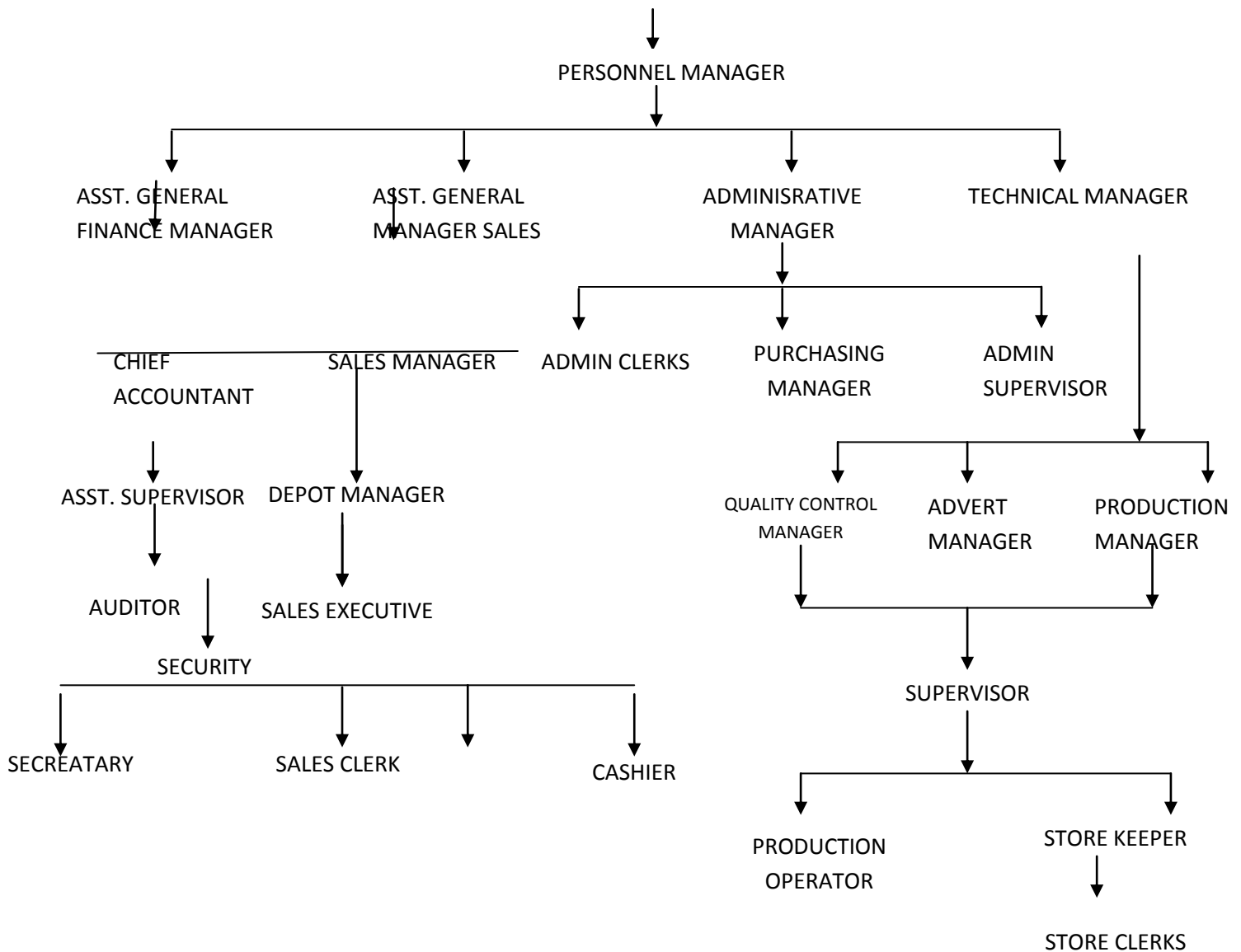
**Sales executive:** he is one among the team of the sales manager. The sales executive works collaborately with the secretary, security, sales clerk, casual, cashier to see to the maximization of sales and likewise to see to the commercial success of the company's goods and services.

Below is the figure organizational structure of the Nigeria Breweries Plc., 9<sup>th</sup> Mile Corner, Enugu:



## ORGANIZATIONAL STRUCTURE

**NIGERIAN BREERIES PLC, 9<sup>th</sup> MILE, CORNER, ENUGU.**



**FIG 3.7 ORGANIZATIONAL STRUCTURE**

**3.8 SYSTEM FLOW CHART :** The diagram (fig 3.6) below shows the flow of control through a system while specifying all programs, inputs, input from keyboard, cpu, disk storage, report and output.

This flow chart is to be the basis for communication among system analyst, and users, applications programmers and computer operators. It serves as a technical blue print for implementation. This chart represents how the program starts operation, the operation that suites the intended task is then selected, they are:

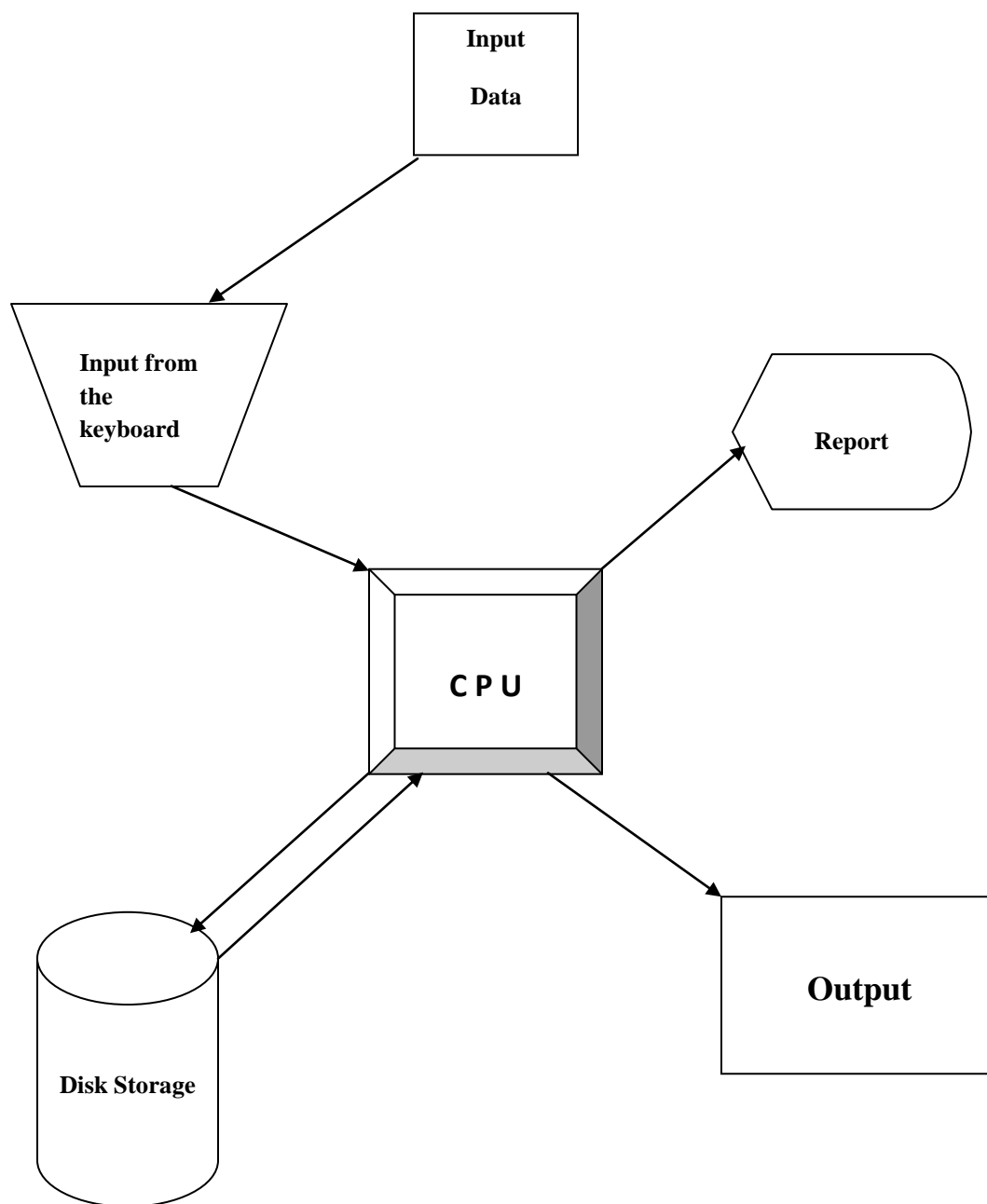
**Input:** the quantity of goods available in the database.

**CPU:** Central Processing unit is responsible for processing the input and sending it to the disc storage device for easy accessibility.

**Disk storage:** Data inputs are stored in the disc storage.

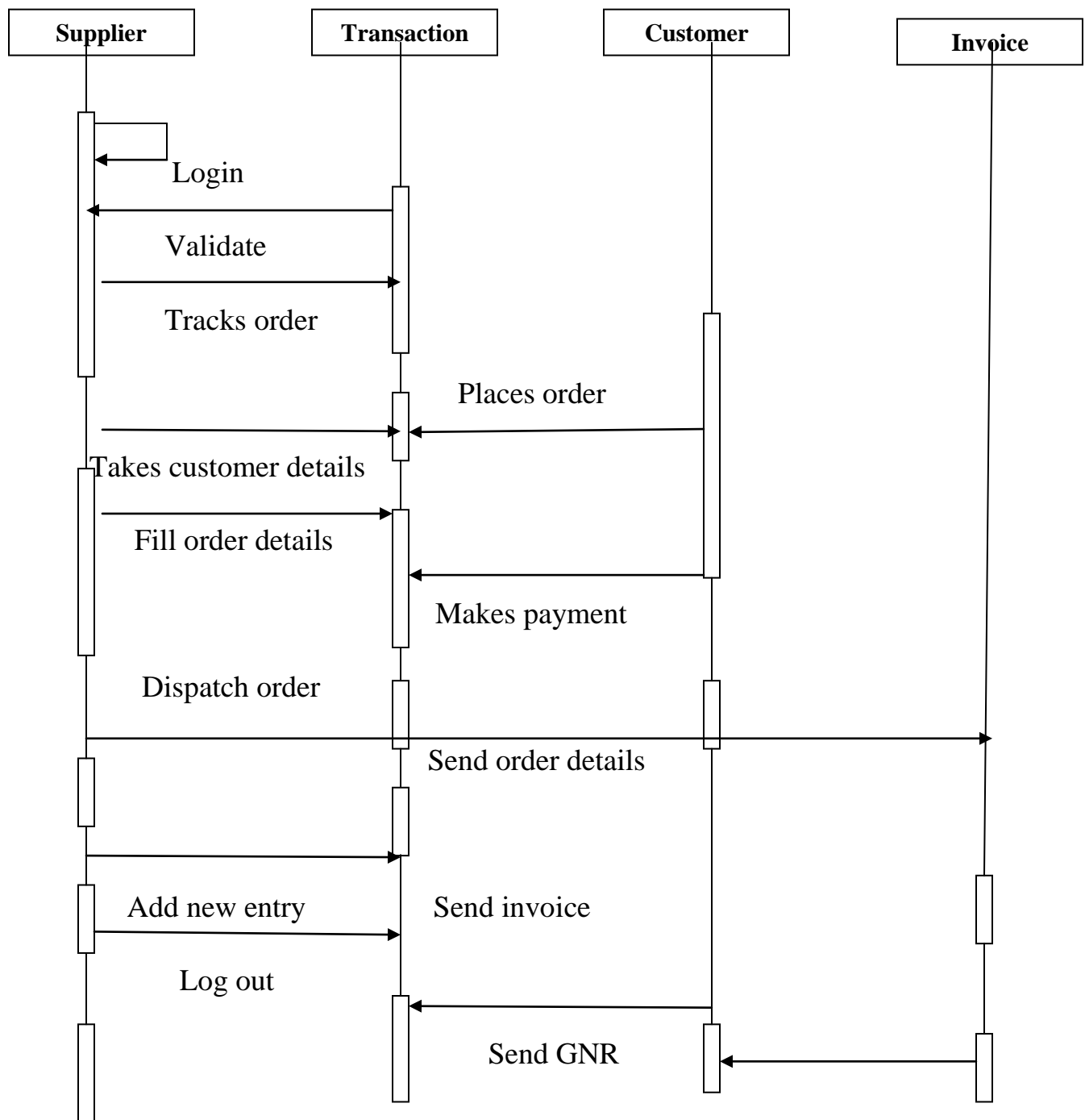
**Report:** final analysis of goods going in and out of the ware house.

**Output:** the final stage on the flow chart where the data is read as information and can thereby be printed and filed for record purpose.



**Fig 3.8 System Flowchart**

### 3.9 TOP DOWN DESIGN DIAGRAM



**Fig 3.9 Top down Design Diagram**

The figure above is a Top down design diagram which orderly represents the step by step activities of the automated inventory control software system and the sequence at which it operates. This diagram enables the operator to efficiently understand, capture and record the flow and functionality of the software.

Now, from the above diagram, it is noticed that each system (supplier, transaction, customer and invoice) is broken down to gain insights into compositional subsystems thereby enabling an operator to easily access the software with ease.

## **CHAPTER FOUR**

### **4.0 IMPLEMENTATION, TESTING AND PACKAGING**

#### **4.1 CHOICE OF DEVELOPMENT TOOLS**

To ensure as standardized object oriented in this entire ramification, Visual Basic (VB) 6.0, Microsoft Access and Font page was used.

#### **4.2 SYSTEM REQUIREMENTS**

The requirements for the implementation of this system are as follows;

- ❖ Software requirement.
- ❖ Hardware requirement.

##### **4.2.1 Software Requirements**

The following specification is needed:

- a) Operating system- Certified distribution of Windows.
- b) Front end- Visual Basic 6.0 Professional edition.
- c) Back end- Microsoft Access 2007

Some additional features of VB like Datagrind, DataReport.

#### **4.2.2 Hardware Requirements**

For effective operation of the newly designed system, the following minimum hardware specifications are recommended:

- a) The computer system to use should be 100% IBM compatible since they are considered done systems.
- b) The computer system processor to be used should be Intel Pentium technology.
- c) The minimum Random Access Memory (RAM) should be 128MB.
- d) The system should have a hard disk of at least 20GB, 3.5 floppy drive and CD-ROM drive.
- e) The system to use should be equipped with 14" VGA or SVGA monitor (colored).
- f) The mouse, keyboard and printer are also required.

The listed configurations are the minimum requirements, but if the configurations are of higher versions, the processing derived will definitely be better and the program will run faster.

### **4.3 IMPLEMENTATION**

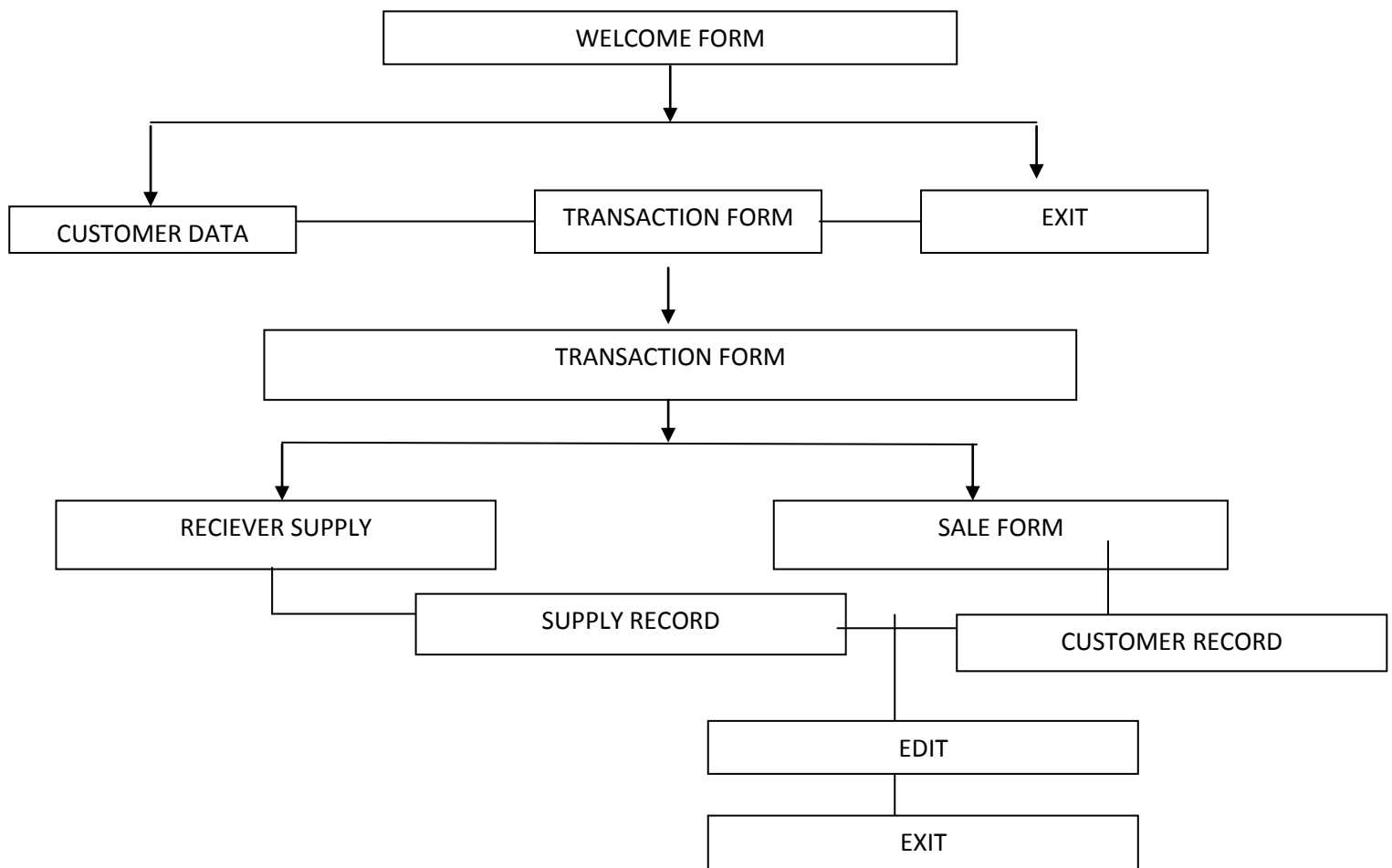
The new system is designed to be put into efficient use. Here, we will look into the various technical aspects that influenced the successful implementation of this system and determine the effective operation of the system. System implementation follows the approval of the system proposals and its objectives, thus it is to arrive at a satisfactory, implemented, completed, and function evaluated automated system. It also embodies the preparation of resources including equipment and personnel.

The supplier login password and identification is entered, he checks, tracks order, dispatch order on customer and sends invoice after which he updates records. The customer studies and makes a list of requirement, places the order, makes payment and receives his invoice. However, this also includes the steps taken after the final coding of the program.



## Program design

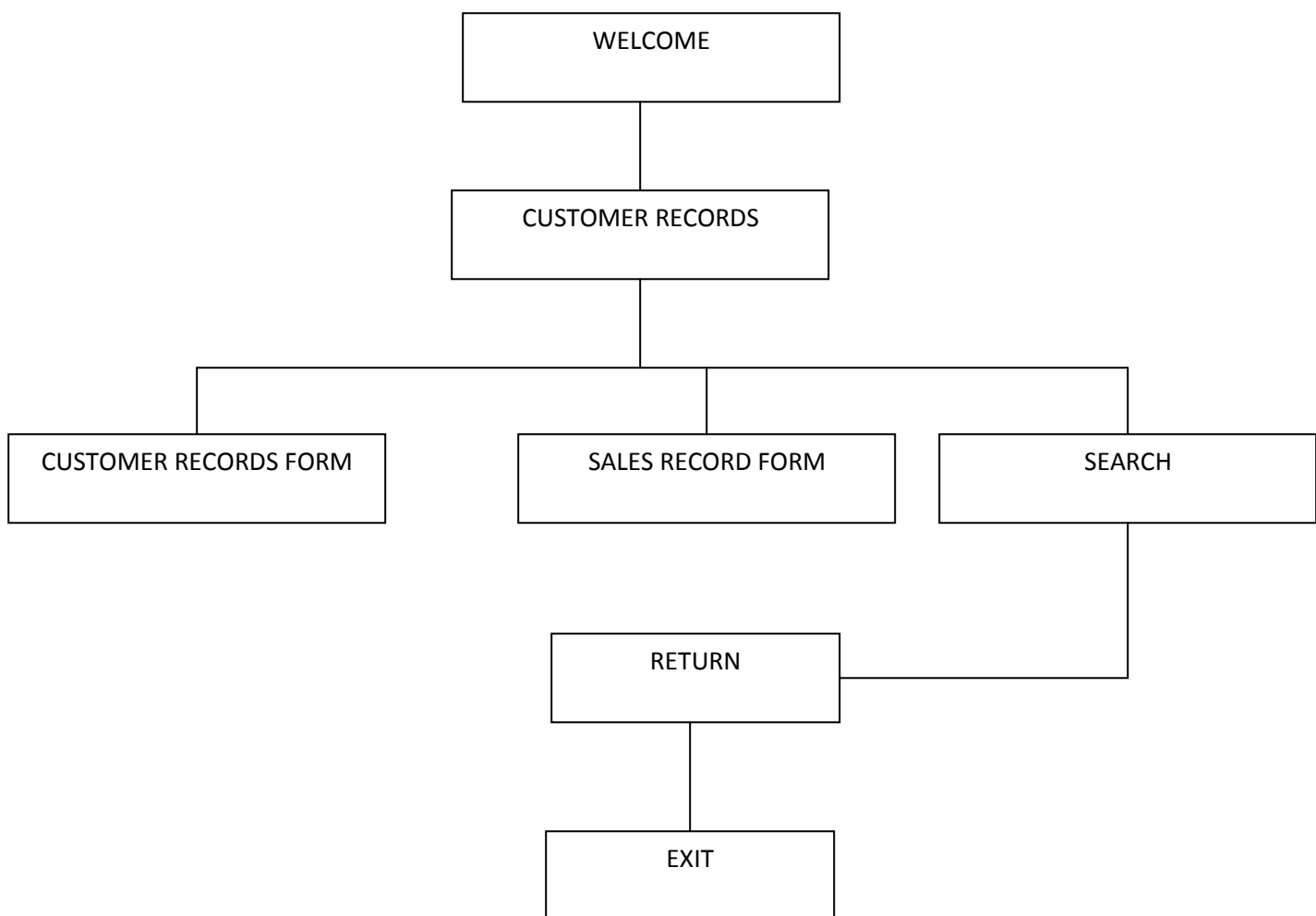
The program for this study was designed using the top down approach. The entire problem associated with the existing system were broken down in smaller unit and processed differently. The units were developed into modules and there are total of three modules in all. However, the implementation of this process follows a certain procedure to enable user access the program software with efficiency as shown in the diagram below:



**Fig: 4.3.1 IMPLEMENTATION OF THE PROGRAM DESIGN**

## Entry module

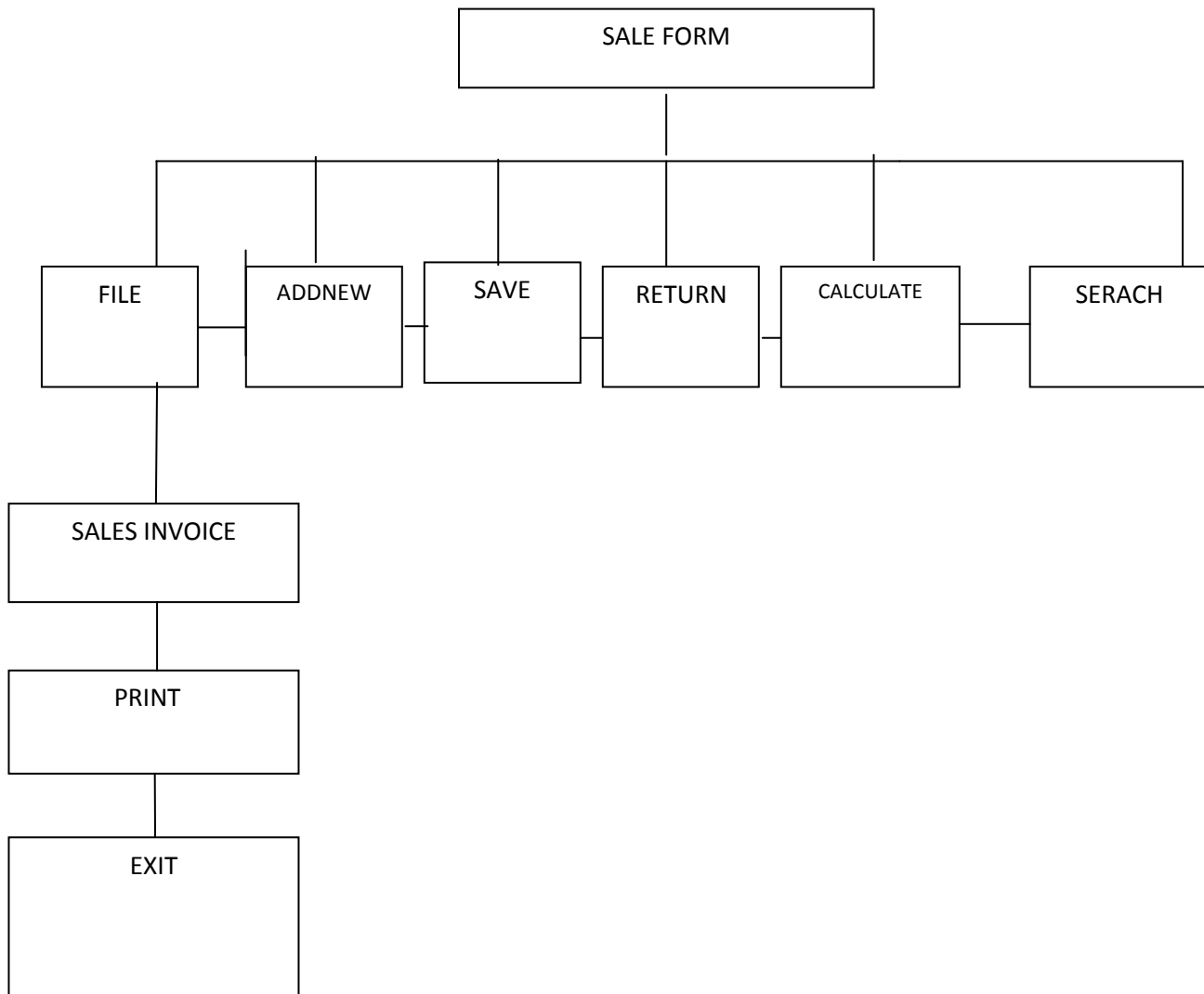
The entire module is responsible for all input data requirements. It receives input data from the computer users and stores them adequately into file. The entire provisions are made very flexible and precise as shown below:



**Fig 4.3.2** Data Base Entry and Search Engine

## Report module

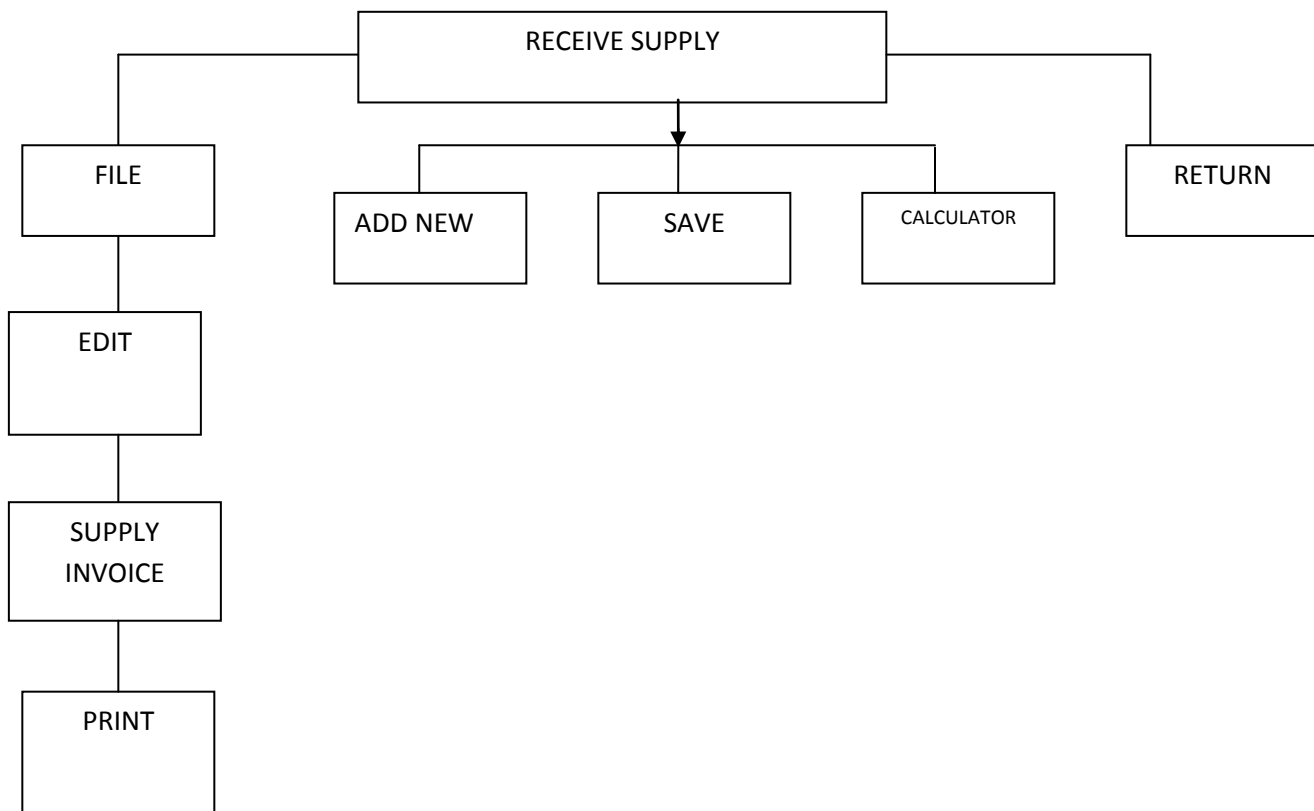
The report module, tables all forms of report generation. It displays conditional and unconditional reports. The reports are made comprehensive and timely as shown below:



**Fig 4.3.3 Main Menu Transaction Process (Receive supply)**

## Update module

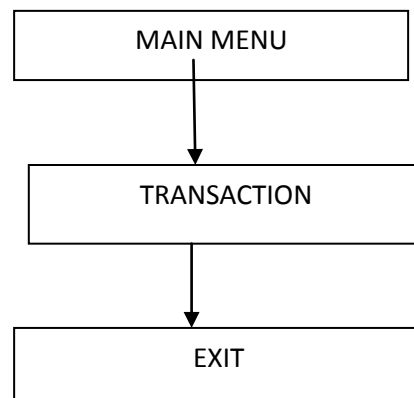
The update module is responsible for modifying stored data or record in the files. The records are searched for in the file and retrieved adequately and then, the update data are retrieved and necessary corrections are made automatically by the computer as adequate. However, it is responsible in keeping track of all the transactions that takes place. It is also known as main menu transaction process as shown below:



**Fig 4.3.4 Main Menu Transaction Process (Sales form)**

## Exit module

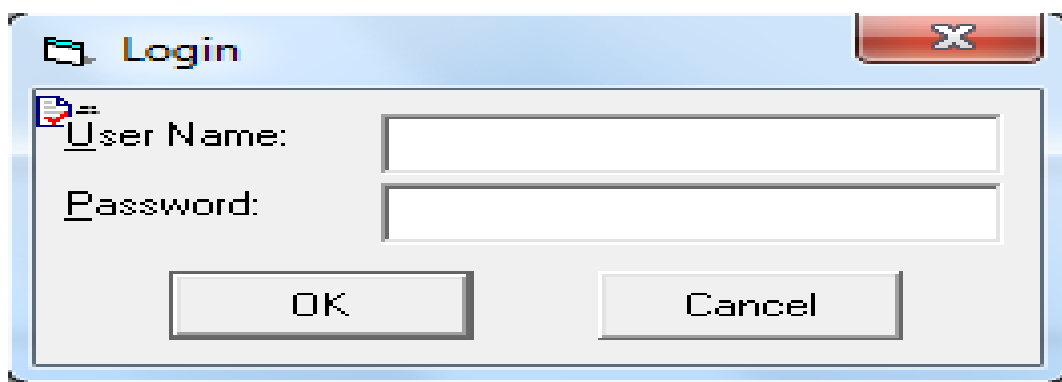
This is the module responsible for packing up or quitting the program entirely as shown below:



**Fig 4.3.5 Exit Process**

### 4.3.6 Implementation of the Login Form

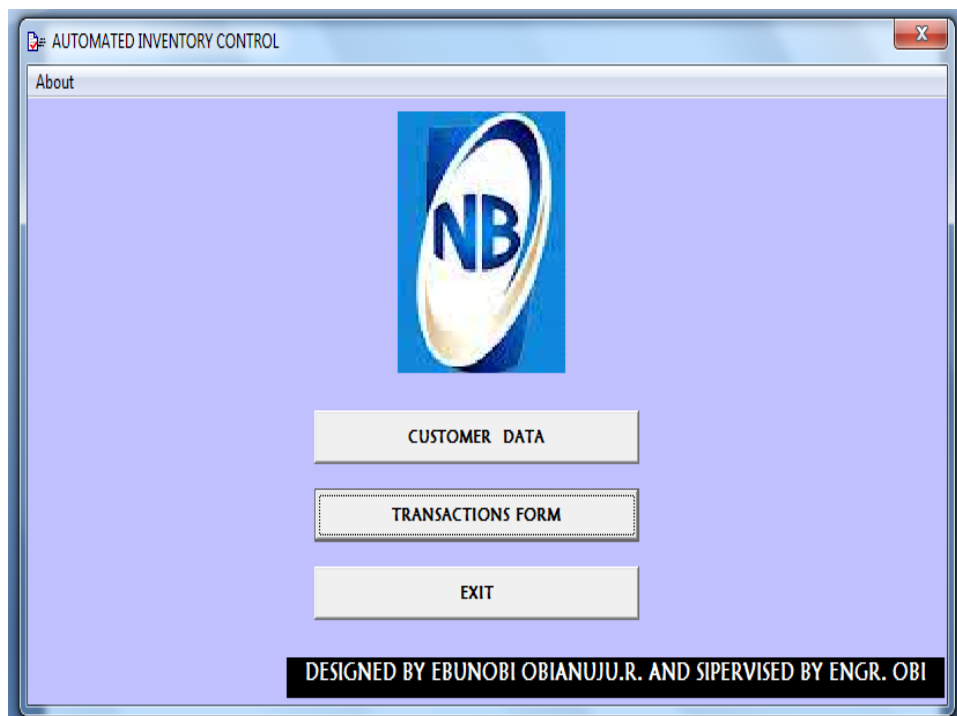
This form allows a user to input his or her username and password. After the username and password are implemented and the okay button pressed, the form automatically takes the user to the main menu. However, when a wrong user name and password is keyed in, a warning alert displays on the screen.



**Fig 4.3.6 Splash Screen: Login Screen**

#### 4.3.7 Implementation of the Main menu form

This form contains buttons which are Customer Data, Transaction form, and Exit button. The customer button when pressed, takes the user to the customers code, customer name, address and phone number. The Transaction form, simply takes the user to a form of listed options which are the receive supply, sales, supply records, customer record and the edit. Which a user can choose to perform any action from any of the listed options. The Exit button simply ends all the running process.



**Fig 4.3.7 Main menu form**

### 4.3.8 Implementation of the Receive Supply Form

This form is found in the transaction form. It is listed as one among the transaction options. Here all the inventories & supplies made are taken down. It contains list of drinks in stock, price for each drink, the quantity supplied & quantity in stock.

CATEGORIES	PRICE PER CRATE	QUANTITY SUPPLIED	PRICE OUTCOME	QUANTITY IN STOCK
STAR	4500			789
HIENEKEN	6000			789
GULDER	5600			780
GULDER MAX	5700			779
AMSTEL MALT	4000			678
FAYROUZ-PEAR	3600			791
FAYROUZ-PINAPPLE	3600			791
MALTINA-CLASSIC	3500			791
MALTINA-PINAPPLE	3500			791
MALTINA SIP-IT	3500			791
LEGEND STOUT	5600			791

PRICE TOTAL:      BALANCE TOTAL:     

10/2/2012 3:18:26 PM

**Fig 4.3.8 : Supplier form**

### 4.3.9 Implementation of Sales Form

Sales Form is found in the transaction form. It is one among the listed options on the option list. This form contains all the sales information carried out during the sales of drinks to the retailers for record purpose.

PROJECT\_2edited [Compatibility Mode] - Microsoft Word

Picture Tools

SALES FORM

File

CUSTOMER CODE: SSE22

CUSTOMER NAME: NNAMDÌ OBI

ADDRESS: NEW HAVEN

9/4/2012 12:39:16 PM

CATEGORIES	PRICE PER CRATE	QUANTITY NEEDED	PRICE OUTCOME	QUANTITY AVAILABLE
STAR	4500	12		18
HIENEKEN	6000	2		22
GULDER	5600	3		19
GULDER MAX	5700	2		19
AMSTEL MALT	4000	6		20
FAYROUZ-PEAR	3600	14		8
FAYROUZ-PINAPPLE	3600	14		8
MALTINA-CLASSIC	3500	7		21
MALTINA-PINAPPLE	3500	4		21
MALTINA SIP-IT	3500	6		18
LEGEND STOUT	5600	2		17

ADDNEW

SAVE

RETURN

CALCULATE

BALANCE TOTAL

181890

TOTAL: 202100

DISCOUNT: 10

SALES TOTAL AFTER DISCOUNT: 181890

Fig 4.3.9: Sales Form



## 4.4 Implementation of Supplier Record Form

The supplier form is a form found in the transaction form button. All transactions are made here by the supplier and are been stored for future references.

The screenshot shows a Microsoft Word document with two tables. The first table, titled 'SUPPLIER RECORDS', has columns for ID, SUPPLIER CODE, SUPPLIER NAME, SUPPLIER ADDRESS, and PHO. The second table, titled 'STOCK RECORDS', has columns for ID, STAR, HIENEKEN, GULDER, and GUL. Both tables contain data for various items and suppliers.

SUPPLIER RECORDS				
ID	SUPPLIER CODE	SUPPLIER NAME	SUPPLIER ADDRESS	PHO
46				
47				
48				
49				
50				
51				
52				
7	SP11			
8	DDW1			
9	SP12			
10				
11				
12	765			
13	34er			
14	635T			
15				
16	2345FGR			
17				
18				
19				
20				
21				
22				
23				
24				

STOCK RECORDS				
ID	STAR	HIENEKEN	GULDER	GUL
2	789	789	780	779
3	23	22	21	20
4	23	22	21	22
5	100	123	156	123
6			81	
7	546622	78	34	56
8	123	234	123	567
9	5678	8765	234	567
10	1245	678	456	2345
11	543	524	3444	156
12	4	4	5	8
13	2	2	2	2
14	12	12	12	12
15	1444	12	2354	7656
16	0	0	0	0
17	67676	7756	0	0
18	0	0	0	0
19	12	2	2	2
20	12	0	0	0
21	0	0	0	0

Fig 4.4: Supplier record form

#### 4.4.1 Implementation of the Edit Form

The edit form which is located below the options listed out in the transaction form allows the management to edit prices of items in stock.

The screenshot shows a software window titled "EDIT FORM". It is divided into two main sections: "EDIT CATEGORIES" on the left and "EDIT DISCOUNT" on the right. The "EDIT CATEGORIES" section contains a list of items with their corresponding prices in input fields:

Category	Price
STAR	4500
HIENEKEN	6000
GULDER	5600
GULDER MAX	5700
AMSTEL MALT	4000
FAYROUZ-PEAR	3600
FAYROUZ-PINAPPLE	3600
MALTINA-CLASSIC	3500
MALTINA-PINAPPLE	3500
MALTINA SIP-IT	3500
LEGEND STOUT	5600

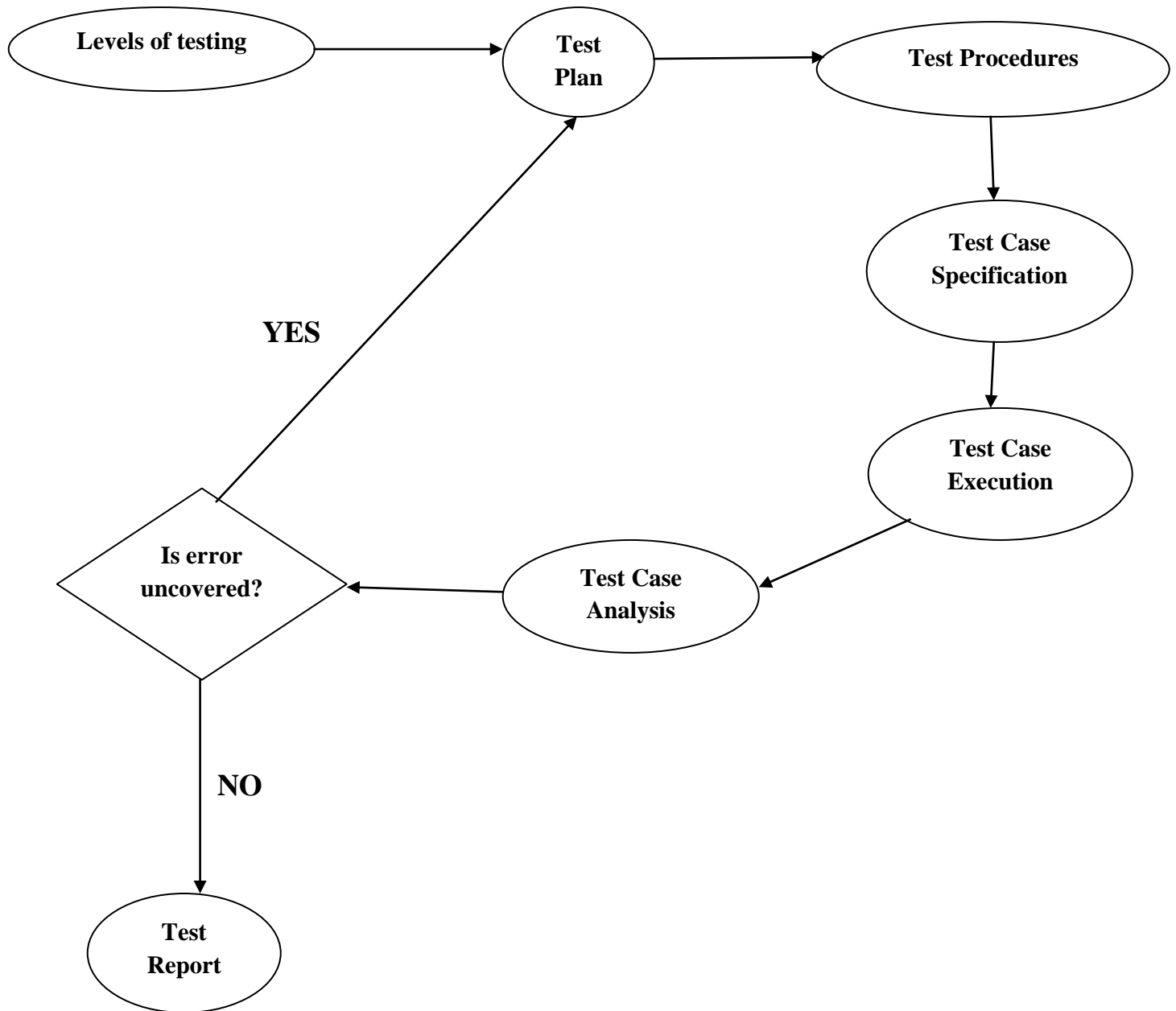
Below this list are buttons for "ADD NEW" and "SAVE". At the bottom left of the "EDIT CATEGORIES" section are navigation arrows. The "EDIT DISCOUNT" section has a single input field containing the value "10" and a "RETURN" button at the bottom. In the top right corner, there is a date and time display showing "10/2/2012" and "3:26:33 PM". The window is set against a light blue background.

**Fig4.4.1 Edit Form**

#### 4.5 TESTING

Testing is the last stage in the software development and it presents an interesting anomaly for the software engineer where he attempts to build software from an abstract concept to a tangible product. During testing, the engineer creates series of test cases to discard preconceived notions of the “correctness” of software just developed and overcome a conflict of interest that occurs when errors are uncovered. As a secondary benefit, testing demonstrates that the software functions appear to be working according to specification, that behavioural and performance requirements appear to have been met. In addition, data collected as testing is conducted provide a good indication of software reliability and quality as a whole.

Testing the software follows a certain process as shown below:



**Fig 4.5 System Testing Process**

#### **4.5.1 Unit Test**

Each unit of the new system was tested (test run) individually along side with the old system in order to identify areas of further enhancement and development.

#### **4.5.2 System Test**

The entire system was as well tested (test run) in general along side with the old system in order to identify areas of further enhancement and development.

#### **4.6 Packaging (Integration)**

The software will be designed using visual basic. After which will be compiled and packed for easy installation in any computer system and further use. The compiled software will be transferred in to a CD.

## **CHAPTER FIVE**

### **5.0 SUMMARY, LIMITATIONS, RECOMMENDATIONS, BEME AND CONCLUSION**

#### **5.1 SUMMARY**

Inventory proportionality is the goal of demand-driven inventory management. The primary optimal outcome is to have the same number of days' (or hours', etc.) worth of inventory on hand across all products so that the time of runout of all products would be simultaneous. In such a case, there is no "excess inventory," that is, inventory that would be left over of another product when the first product runs out. Excess inventory is sub-optimal because the money spent to obtain it could have been utilized better elsewhere, i.e. to the product that just ran out.

The secondary goal of inventory proportionality is inventory minimization. By integrating accurate demand forecasting with inventory management, replenishment inventories can be scheduled to arrive just in time to replenish the product destined to run out first, while at the same time balancing out the

inventory supply of all products to make their inventories more proportional, and thereby closer to achieving the primary goal. Accurate demand forecasting also allows the desired inventory proportions to be dynamic by determining expected sales out into the future; this allows for inventory to be in proportion to expected short-term sales or consumption rather than to past averages, a much more accurate and optimal outcome. With this new system, the difficulties encountered with the manual inventory control system are overcome. The automated inventory control system reduces the workload of the staff, saves time and increases efficiency. The records of the company are safe and secure, distribution process is well managed, errors are minimized, and reports generated for management are accurate thereby increasing the profit margin.

## **5.2 LIMITATION**

In this project, it is only restricted to the stock department of Nigeria bottling company Enugu depot. There are some limitations they encountered in the updating of some finished product supply into store house and are delivered to the customer who depends on demand and supply as a method of stock control the recorder stock level and economics order quantity.

Also, the administrative department orders materials for the production of the required product these materials could be gotten through local purchasing order. In addition, the project cannot run on its own without human involvement.

## **5.3 RECOMMENDATION**

Having carefully examined the usefulness of computer in eliminating most of the errors and hindrances that ensue from paper work, I recommend this automated inventory control system to Nigerian Breweries PLC, 9<sup>th</sup> mile corner, Enugu in order to enable them produce an efficient inventory management and likewise reduce the complexity of manual work.

Research and development being continuous processes; is the same in computer and software development. This system will be useful since it is computerized and will promote effective, efficient and improve service delivery thereby promoting profit oriented manufacturing. The employment of computer personnel for an effective maintenance of the system will enhance a maximum output of this package and the use of computer in inventory system.

Adopting this system, the following should be taken into consideration, training of staff, security measures, and the provision of dependable real time processing system for speedy responses.

Finally, the project work is likewise recommended to different sections in an organization and every other manufacturing organization that still carry out their operation manually because automated inventory control system handles the problem of time constraints and errors that arises when jobs are carried out manually.



## 5.4 BILL OF ENGINEERING MEASUREMENT AND EVALUATION (BEME)

The total expenses made at the cause of the design and implementation of this new software is analysed as follows:

**TABLE 5.1: BEME TABLE**

Item	Quantity	Unit price	Total amount (Naira)
VB software	1	N5,500	N5,500
Avast antivirus	1	N5000	N5000
Designing of the new software	1	N15,000	N15,000
Internet browsing	12	N12,000	N12,000
Phone calls	-	N4500	N4500
Transportation	-	N5000	N5000
Printing	-	N10,000	N10,000
Total	-	N61,500	N61,500

## **5.5 CONCLUSION**

Having carried out the required study of the design and implementation of an automated inventory control system for Nigerian Breweries, the organisation can now comfortably eliminate the manual method which have been proved inefficient, tedious, time consuming and prone to errors

The new automated system is the major target of this project. So the computerization activity depends on the maturity and honesty of the staff. Implementing the new system enables the worker to be well trained and creates new jobs for them.

## REFERENCES

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## **APPENDIX 1**

### **SOURCE CODE**

VERSION 6.0

Begin VB.Form Form1

BackColor = &H00FFC0C0&

BorderStyle = 1 'Fixed Single

Caption = "AUTOMATED INVENTORY CONTROL"

ClientHeight = 5595

ClientLeft = 45

ClientTop = 375

ClientWidth = 11925

Icon = "Form1.frx":0000

LinkTopic = "Form1"

MaxButton = 0 'False

MinButton = 0 'False

Moveable = 0 'False

ScaleHeight = 5595

ScaleWidth = 11925

StartPosition = 2 'CenterScreen

Begin VB.CommandButton Command5

Caption = "EXIT"

BeginProperty Font

Name = "Maiandra GD"

Size = 9

Charset = 0

Weight = 700

Underline = 0 'False

Italic = 0 'False

Strikethrough = 0 'False

EndProperty

Height = 495

Left = 3720

TabIndex = 2

Top = 4320

Width = 4215

End

Begin VB.CommandButton Command3

Caption = "TRANSACTIONS FORM"

BeginProperty Font

Name = "Maiandra GD"

Size = 9

Charset = 0

Weight = 700

Underline = 0 'False

Italic = 0 'False

Strikethrough = 0 'False

EndProperty

Height = 495

Left = 3720

TabIndex = 1

Top = 3600



Width = 4215

End

Begin VB.CommandButton Command1

Caption = "CUSTOMER DATA"

BeginProperty Font

Name = "Maiandra GD"

Size = 9

Charset = 0

Weight = 700

Underline = 0 'False

Italic = 0 'False

Strikethrough = 0 'False

EndProperty

Height = 495

Left = 3720

TabIndex = 0

Top = 2880

End Sub Width = 4215

End

Begin VB.Label Label1

Alignment = 2 'Center

BackColor = &H00000000&

Caption = "DESIGNED BY EBUNOBI OBIANUJU.R. AND  
SUPERVISED BY ENGR. OBI"

BeginProperty Font

Name = "Maiandra GD"

Size = 11.25

Charset = 0

Weight = 700

Underline = 0 'False

Italic = 0 'False

Strikethrough = 0 'False

EndProperty

ForeColor = &H00FFFFFF&

Height = 375

Left = 3360

TabIndex = 3

Top = 5160

Width = 8535

End

Begin VB.Image Image1

Height = 2415

Left = 4800

Picture = "Form1.frx":0442

Stretch = -1 'True

Top = 120

Width = 2175

End

End

Attribute VB\_Name = "Form1"

Attribute VB\_GlobalNameSpace = False

Attribute VB\_Creatable = False

Attribute VB\_PredeclaredId = True

Attribute VB\_Exposed = False

Private Sub Command1\_Click()

Form2.Show

End Sub

Private Sub Command2\_Click()

Form3.Show

End Sub

Private Sub Command3\_Click()

Form4.Show

End Sub

Private Sub Command4\_Click()

Form5.Show

End Sub

```
Private Sub Command5_Click()
```

```
End
```

# APPENDIX 1

## SUPPLY FORM

Local Disk (C:) > AUTOMATED INVENTORY CONTROL >

Burn New folder

SUPPLY FORM

File

SUPPLIER CODE SP11

CATEGORIES	PRICE PER CRATE	QUANTITY SUPPLIED	PRICE OUTCOME	QUANTITY IN STOCK
STAR	4500	33		18
HIENEKEN	6000	33		22
GULDER	5600	33		19
GULDER MAX	5700	33		19
AMSTEL MALT	4000	33		20
FAYROUZ-PEAR	3600	33		8
FAYROUZ-PINAPPLE	3600	33		8
MALTINA-CLASSIC	3500	33		21
MALTINA-PINAPPLE	3500	33		21
MALTINA SIP-IT	3500	33		18
LEGEND STOUT	5600	33		17

ADD NEW

SAVE

RETURN

9/4/2012

12:34:30 PM

« « « » » »

« « « » » »

« « « » » »

CALCULATE

BALANCE TOTAL

-1620300

PRICE TOTAL 1620300

modified: 9/4/2012 12:33 PM Date created: 9/4/2012 12:33 PM

Size: 188 KB

## APPENDIX 2

### SALES INVOICE

PROJECT\_2edited [Compatibility Mode] - Microsoft Word

Picture Tools

SALES FORM

File

CUSTOMER CODE: SSE22

CUSTOMER NAME: NNAMDI OBI

ADDRESS: NEW HAVEN

9/4/2012  
12:39:16 PM

CATEGORIES	PRICE PER CRATE	QUANTITY NEEDED	PRICE OUTCOME	QUANTITY AVAILABLE
STAR	4500	12		18
HIENEKEN	6000	2		22
GULDER	5600	3		19
GULDER MAX	5700	2		19
AMSTEL MALT	4000	6		20
FAYROUZ-PEAR	3600	14		8
FAYROUZ-PINAPPLE	3600	14		8
MALTINA-CLASSIC	3500	7		21
MALTINA-PINAPPLE	3500	4		21
MALTINA SIP-IT	3500	6		18
LEGEND STOUT	5600	2		17

ADDNEW  
SAVE  
RETURN  
CALCULATE

BALANCE TOTAL  
181890

TOTAL: 202100  
DISCOUNT: 10  
SALES TOTAL AFTER DISCOUNT: 181890

Windows taskbar icons: Internet Explorer, File Explorer, Google Chrome, Yahoo!, Outlook, iTunes, VLC, Microsoft Word, Microsoft Excel, Microsoft PowerPoint, Microsoft Access, Microsoft Word, Microsoft Word.

## APPENDIX 3

### SUPPLIER RECORD

Document5 - Microsoft Word

Page Layout References Mailings Review View

Calibri (Body) 11 A A

**SUPPLIER RECORDS**

ID	SUPLIER CODE	SUPPLIER NAME	SUPPLIER ADDRESS	PHO
46				
47				
48				
49				
50				
51				
52				
7	SP11			
8	DDW1			
9	SP12			
10				
11				
12	765			
13	34er			
14	635T			
15				
16	2345FGR			
17				
18				
19				
20				
21				
22				
23				
24				

DELETED SEARCH

**STOCK RECORDS**

ID	STAR	HIENEKEN	GULDER	GUL
2	789	789	780	779
3	23	22	21	20
4	23	22	21	22
5	100	123	156	123
6			81	
7	546622	78	34	56
8	123	234	123	567
9	5678	8765	234	567
10	1245	678	456	234E
11	543	524	3444	156
12	4	4	5	8
13	2	2	2	2
14	12	12	12	12
15	1444	12	2354	765E
16	0	0	0	0
17	67676	7756	0	0
18	0	0	0	0
19	12	2	2	2
20	12	0	0	0
21	0	0	0	0

DELETED SEARCH

RETURN



## APPENDIX 4

### CUSTOMAR RECORD

Form11

CUSTOMER RECORDS					SALES RECORDS				
ID	CUSTOMER NAME	CUSTOMER ADDRESS	PHONE NUMBER	TOTAL	ID	STAR	HIENKEN	GULDER	GULDE
3	uju	12 oka street	46678883	6421200	2	12	2	3	2
5	kuni	12 asata	08034231234	1193100	3	2	3	7	4
6	chichi	23 new heaven	08034231234	119900	4	1	6	4	8
7	uche	34 awka	6554435	98200	5	23	34	223	342
8	kelemu	45 we asa	234332234	98200	6	23	34	3	4
9	ada	12 achara, enugu	665432	148600	7	2	1	2	4
10	nkechi	asata	0802345423	142600	8	2	2	2	2
11	enrg cali	rd 15 trans ekulu, enugu		1313200	9	2	2	2	2
12	enrg calister	no 3 old school road em		7909000	10	3	2	3	4
13	OKORIE FELIX	NO 23 AGABANI ROAD		1882700	11	4	3	2	4
14	frank udeh	road 18, house 24, enug			12	121	2	12	11
					13	45	233	233	234
					14	22	11	12	34
					15	44	30	15	

DELETE SEARCH

DELETE SEARCH

RETURN