Sales and Distribution System

DISSERTATION SUBMITTED IN PARTIAL FULFILMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF COMPUTER APPLICATIONS
OF BHARATHIAR UNIVERSITY

By

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JUNE 1996

CERTIFICATE

This is to certify that this project work entitled

"SALES & DISTRIBUTION"

submitted to Kumaraguru College of Technology, Coimbatore (affiliated to Bharathiar University) in partial fulfillment of the requirements for the award of the Degree of Master of Computer Applications is record of original work done by Mr. A. KAMALAKKANNAN Reg No. 9338M0189 during his period of study in the Department of Computer Science and Engineering, Kumaraguru College of Technology, Coimbatore under my supervision and guidance and this project work has not formed the basis for the award of any Degree/Diploma/Associateship/Fellowship or similar title to any candidate of any University.

Professor and Head

Staff in-charge

Submitted for University Examination held on 11 / 6 */1996*

Internal Examiner

External Examiner

RAVICHANDRA

Systems and Computer Services Ltd

(A Joint Venture company of M/s. ELCOT - A Government of Tamilnadu undertaking)

Prof. P.Shanmugam,
Professor and Head,
Department of Computer Science & Engineering,
Kumaraguru College of Technology,
Chinnavedampatti Coimbatore 6.

29.05.1996.

Dear Sir,

This is to certify that Mr. A.Kamalakannan, Final MCA student of your college has done a project work titled **"Distribution and Sales "** in RPG/400 under AS/400 environment during January '96 to 15th May 1996 in our Company for his fulfillment of MCA degree . We wish him well in life.

Thanking You,

Sincerely Yours,
for M/S.RAVICHANDRA
SYSTEMS & COMPUTER SERVICES LTD

DIRECTOR - TECHNICAL.

DECLARATION

I here by declare that this project work entitiled

"SALES & DISTRIBUTION"

submitted to kumaraguru College of Technology, Coimbatore(affiliated to Bharathiar University) is a record of original work done by me under the supervision and guidance of Prof. P.SHANMUGAM M.Sc(Engg), M.S(Hawaii), SMIEEE, MISTE., Head of the Department, Department of Computer Science and Engg, Kumaraguru College of Technology, Coimbatore and that this project work has not formed the basis for the award of any Degree / Diploma / Associateship / Fellowship / or similiar titile to any candidate of any University.

Signature of the candidate

Place : Coimbatore.
Date :

(Mr. A. KAMALAKKANNAN)

Staff in-charge

Countersigned by.

Prof. P.SHANMUGAM
M.Sc(Engg), M.S(Hawaii), SMIEEE, MISTE.,
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SYNOPSIS

Sales & Distribution is one of the important areas in the marketing section of any business concern. The activities of marketing section are sales planning, market research, order processing, forecasting, sales analysis, sales quota control and advertising.

This project has been developed keeping in mind for requirements of the company Ravichandra Systems & Computer Services Ltd., Coimbatore.

This project carries out its operation in order processing, finished goods and inventory.

This system can execute the order processing operation, receive the goods and maintain the stock ledger for the products.

This software is a menu driven one consisting of Master Entries, Order processing Finished goods, Inventory, Reports and Exit options which is easy for the users t select and operate.

This software has been developed in RPG/400 on OS/400.

INTRODUCTION

1.1 ORGANIZATION PROFILE

Ravichandra Systems & Computer Services Ltd., is a rapidly developing and
ar software consultancy cum data processing house in south India. The origin
same, a joint venture company with Electronics Corporation of Tamilnadu Ltd.
OT) is currently engaged in software development, hi-tech training & data pro-
ng. It can be traced to a medium sized multidisciplined company started in the
1982 at the industrial city of Coimbatore.

RCS is a joint venture company with ELCOT, the agency of Government of Tamilnadu
d with the objective of promoting electronic industries in the state. Realising
rength of the Tamilnadu state, special priority for establishment of software
ts was pursued.

onscious of the pressing need of the hour, RCS, committed to computer and
re needs constantly endeavour to see how all of them can evolve better. Therefore
ontinously research and employ better methodology and tools. They strongly
e that there is always a better way of doing anything.

CS has it's marketing divisions in Madras, Bangalore, Calcutta, and Mumbai and
ave been accomplishing their operations successfully.

so RCS has tuned for its sister concerns in Mauritius and South Africa for
re Development on IBM AS/400.

RCS comprises of a group of professionals with varied experience in the fields
formation Technology, Education, Engineering, Finance & Management, and Sys-
Managers with an average post educational work experience of 15000 man hours.
The company has hardware and software facilities of IBM AS/400 with OS/400,
OL/400, RPG/400, Application Development Tools, SQL/400, CICS, ILE C/400, PC
PORT/400, PS/2 with OS/2 & AIX and 80x86 systems with terminals under UNIX
N Environment and with RDBMS, WINDOWS and OOPS experience supported by
st of off-line and on-line data entry machines.
The company will further forge ahead with ISO 9001 certification by 1996-'97.

1.2 SALES & DISTRIBUTION

Sales & Distribution is an important part of the business concern. Sales & Distribution is a part of the marketing branch of the company.

The operations done in the marketing department of a company are

1. Order Entry
2. Billing
3. Sales Analysis
4. Forecasting
5. Distribution Statistics
6. Demand History
7. Stock Availability
8. Sales Quota Control

In a Sales & Distribution system the steps involved are to enter a customer order or return data, getting information from the customer and product details, informing the warehouse workers how to fill and ship the order(or restock the return), prepare packing slip, back order file, and customer invoice.

The operations done in a Sales & Distribution are

1. Customer Order Processing.
2. Invoicing.
3. Sales Analysis.

Usually customer order processing is well suited for online interactive processing o that customer credit information and product availability can be checked as the order processed. In a business concern the orders may be placed in person or by mail by phone. If products requested are not currently on hand in the inventory, those ems are placed on back-order.

A marketing related system of immense important is inventory management, a rocess of vital important to the profitability. So the company should maintain the nventory for their products in an efficient manner.

Orders must be packed by the warehouse crew, then shipped or picked up by ne customer at his business address.

The invoice printing and sales analysis are well suited for batch processing. Sales nalysis can be done based on products and also by sales & customer.

Usually invoices are printed in batch at the end of the day and sent by seperate ail. Sales analysis reports are printed at the end of each week.

1.3 NEED FOR COMPUTERISATION

The benefits of Computerisation over the manual system is manyfolds. The benefits be stated as belows :

* SPEED - Computers enable us to do arithmatical calculations with fantastic eed and ease. It is possible to do things which so far no one could think of attempting, a manual system. Tasks involving large voluminous data porcessing are thus done n much accuracy and speed by the computers than by the manual system.

* ACCURACY - One of the greatest benefits which computers can give us is t of accuracy. Practical experience has already shown that these machines are able of achieving the degree of accuracy which hitherto has been unattainable in tain accounting processes into which the human brain enters at so many stages of complete cycle of operations.

* FLEXIBILITY - Flexibility in use is another important advantage of computers. put can be obtained almost in whatever form it is most suitable.

* MISCELLANEOUS - These include economies resulting from better managerial trol, saving in labour because it is fully automatic.

In the Sales and Distribution system, the computerisation speedens up the entry of the transactions into the respective files. Moreover, all the operations are done upto date. This ensures that important reports can be generated at any moment of time, thereby helping the management to make quick decisions. Overall, the computerisation of the manual system results in better maintenance and increases the profitability of the system using it.

1.4 HARDWARE ENVIRONMENT

MAINFRAMES, MIDRANGES & DESKTOPS

Mainframe systems are large, multi-user systems that historically have required ontrolled environment. Environment factors included are conditioning special power k ups, underfloor cabling etc. Mainframe systems require dedicated operations and tems support staff and often involve duplicated hardware. Mainframe systems have igh overhead costs. Software is of comparable complexity regardless of execution tform.

Midrange systems are multi-user systems. They also have capacity comparable mainframe systems. The principle factors separating modern midrange systems from inframe systems are the environmental and staff requirements. Also, where inframes usually service the entire company, midrange systems are frequently dedicated a single division or department. Midrange systems usually involve a much smaller pport staff than mainframe systems. This is a result of more modern and simpler erating system software. The operating systems of midrange computers are designed run less work at the same time than mainframe operating systems, which are simpler install plus configure, and are also easier to operate.

Desktop systems are usually single-user systems. No special environement is quired and these systems are found throughout modern organisations. Desktop stems are also interconnected to share application code. This may be done because the resource requirements of an application, or because of the application's data

cess/update requirements. When data is shared between systems, it is often easier/ eaper to run related applications on the server that manages the shared data rather an on each individual desktop system.

INTRODUCTION TO AS/400

Application System/400(AS/400) is a facility of IBM midrange computers based on single software architecture. It was launched on June 21, 1988 and is one of the world's ost popular *multi-user business computing system.* A follow up to the highly successful ystem/3x lines, it is based on new applications and advanced technology. It provides id-range users with a growth platform that features Integrated database, Advanced rchitecture and a wide range of Connectivity options.

The AS/400 is an entirely new design concept for computer systems. It provides much higher level of function and much easier access for the user than any other prior ystem. In 1990 the IBM laboratory in Rochester, Minnesota, that desinged and built he AS/400 system was awarded the U.S Government's prestigeous Malcolm Baldridge uality award for the designing and usability of this computer system.

AS/400 SYSTEM CONCEPTS

Layered Machine Architecture

The AS/400 system insulates users from hardware characteristics through the ayered Machine Architecture. The layered architecture raises the level of machine

erface creating high level machine instruction set that is independent of the underlying plementation. AS/400 is unusual in that the machine is defined by software, not by rdware. The instructions presented to the machine interface undergo a further ocess of translation before they are "understood" by the hardware characteristics ange as the technology changes; the user, however, still "sees" the same machine erface. The licensed internal code preserves this interface. Layered machine chitecture means that as new hardware and software technologies emerge, they can employed without affecting applications. The high-level machine provides the user h the ability to address 284 trillion bytes of storage.

Objects

What is an Object on AS/400 ? All things; programs, Control blocks, data format scriptions, system control block descriptions, space objects to house all of these ects, attribute tables, data system commands(each one is an object), system group- mechanisms(queues, chains of pointers, . . . etc) to name a few.

For Eg:

Libraries are objects that are collections of objects.

Every object must contain an object description information.

Object-Orientation

The system's addressing structure and operations are oriented more towards the cts than towards the byte strings. All data structures in the instruction interface alled objects. There are many types of objects, but they all have the same basic

acteristics. The internal details of an object can't be seen by the user.

Specific functionally oriented machine Instructions operate on objects. Once data

ce object has been created, the user can request that records be inserted in to it

Machine resource usage is not in the programmer's domain.

Some objects are QBATCH, QINTER, PROGRAM LIBRARY, SOURCE PHYSICAL

E, USER PROFILE.

. Objects can be of any size. There can be 16 million space segments of 16MB

ch at any one time. *Virtual addressing translation(VAT)* is now actively supported

use of 48 bits of hardware's 64-bit capability. The main memory is like cache. The

sk acts like main memory.

Space Management

The addressing capability of the AS/400 machine is 64 bits. That means 8 billion

ytes worth programming capability is possible.

Each user of the system is allocated a personal, protected 16MB virtual

address space, unreachable by other users.

I/O Independence

The intricacies of the devices, control units, channels, and networks are handled

by the AS/400 machine. The device dependent attributes will be described once for

all users, in separate objects called Device-Files, stored and managed at runtime. All

the AS/400 systems have this very highly architected user/system interface.

Single-Level Storage

All system storage(whether main storage or disk storage) is addressed in the same

. This single, device-independent addressing mechanism means that to run a

gram, a user calls its name. All objects are treated as if they reside in a 2^{64} byte

dress space.

The AS/400 system's virtual addressing is independent of an object's physical

cation, and the type, capacity and number of disk units on the system i.e., the

pplication programs do not require modification in order to take advantage of new

torage technologies. Users can leave all storage management entirely to the machine.

Hierarchy of Microprocessors

There is a range of processors each dedicated to a particular I/O device type. What

this means is that when the main system processor encounters a request for data to

be written to or read from any I/O device, that request is delegated to the particular

microprocessor dedicated to that I/O device. Meanwhile the system processor continues

with another application program. This design provides AS/400 with its outstandin

performance in the commercial, transaction based environment. It also means that th

latest miroprocessor technology can be easily utilised at any time without disruptin

the rest of the system.

Storage Pools

A pool is a division of main or auxiliary storage. On the AS/400 system, all m

storage can be divided into logical allocations called storage pools. There are two ty

ols in the AS/400 system.

- Shared Pools
- Private Pools

Benefits

You can control how much work can be done in a subsystem by controlling it, and ize of the pools. The greater the size of the pools in a subsystem, the more work be done in the subsystem.

Using shared storage pools allows the system to distribute the storage require- s of interactive users across multiple subsystems, still allowing their jobs to run e same storage pool.

AS/400 Machine Data Limits

Bytes in a record	32,766	
Fields per record	8,000	fields
Key-Fields in a record	120	fields
Key-Size in bytes	256	bytes
Records in a file	16,777,215	records
Bytes in a file	2,147,483,648	bytes
Database Size	size of disk storage	
Logical files from one physical file	3,686	files
Physical files used in a logical file	32	files
Maximum files in a Join logical file	32	files
Maximum size of field in bytes	32,766	bytes
Maximum size of a decimal number	31	digits

OPERATING SYSTEM OS/400

OS/400 is a *single integrated operating system*. With the basic operating system
ıer software components needed for providing facilities such as relational database
agement system, support for various communication environments, support for an
ractive environment, software to implement security are also included. OS/400 is
gned to support interactive use in multiple national languages for world-wide application.
ual data is stored separately from operational program code, permitting a system
perate concurrently in many national languages.

Connectivity

With continuous technological updates, the gap between different platforms are ing narrowed down. Standardisation of software makes it more portable. Recent velopments in communication protocols make access to different system almost ansparent to the user as to which system he/she is using or accessing. There are any ways to connect workstations to the AS/400 system to a system/36, a system/ 70 or a system/390 or another AS/400 system through Systems Network Architecture(SNA) U 6.2 protocol. The connections can be made through a local adapter(twinaxial or synchronous) the Token-ring Network, an Ethernet Network, or a communication line.

Distributed Processing

The individual strengths and weaknesses of the different platforms are being ecognised to strengthen and co-ordinate use of multiple systems in a network. The ıser friendliness of the lower end computer provides excellent user interface while the arger machines takes care of all high volume transaction processing.

System Application Architecture

SAA is a collection of selected sofware interfaces conventions and protocols. It provides a consistent frame work across the System/370, AS/400 and PS/2. The interfaces, conventions and protocols are designed to provide an enhanced level of consistency to the user access, programming interfaces, common support and applications.

Work Management on AS/400

A Unit of any work on AS/400 can be termed as a *job*.

Every job uses it's job description(an object of type *JOBD). A job description efines JOBQ, OUTQ and it's library. There are many types of jobs; Interactive job, atch job, spool job, Autostart job, communication job etc.

The flow of work parcels on the AS/400 is prescribed by

JOB-STEP, ROUTING-STEP, JOB, and program object definitions with in the ubsystems. The system comes with two running subsystems: one for Interactive jobs nd one for batch jobs.

Subsystems

A Subsystem is a single, predefined operating environment through which system o-ordinates the work flow and resource use.

The run-time characteristics of a subsystem are defined in an object called a ubsystem description.

Each subsystem can run unique operations. For instance, you can set up one ubsystem to handle only interactive jobs, while another subsystem handles only batch obs. Subsystems can also be designed to handle many types of work. The system llows you to decide the number of subsytems and what types of work each sybsystem vill handle.

The system relies on subsystem descriptions when starting subsystems. erefore, if you want to change the amount of work(no. of jobs) coming from a queue, for example you need only to change the job queue entry in the sub-stem description.

A subsystem description consists of three parts:

* Subsystem attributes(overall subsystem characteristics),
* Work entries(sources of work), and
* Routing Entries.

Common User Access(CUA)

Provides transparent access to any system user in a SAA enterprise.

Graphical User Interface(GUI)

All user interface is governed by graphic displays in total conformance with latest in windows and point-and-click user interaction.

Expert System Capability

Geared towards creation and management of database model that allow ex- handling of information using artificial intelligence.

MACHINE CONFIGURATION

IBM AS/400 Advanced Series consists of :

* AS/400 Advanced System
* AS/400 Advanced Server
* AS/400 Advanced portable

The entire AS/400 family is managed by the same operating system, thus allowing plication programs to be moved, without any changes, from model to model. /400 combines the benefits of both IBM standards and of openness based on industry andards, while still maintaining the highest level of system integrity and data security. rting of UNIX and POSIX complaint applications is greatly simplified through the hanced ILE/C (Integrated Language Environement/C)language.

AS/400 family comprises of seven models. The smallest processor is the 9401 stem unit. The next is the 9402 processor. There are two models of 9402. One odel is designed for traditional interactive data processing. The other model is tuned provide excellent performance in client/server computing. The largest processors e the 9406 models. The 9406 models can be easily upgraded and at the top end ovide substantial processing power,memory and disk storage.

CONFIGURATION OF THE MACHINE USED IN THE PROJECT

Model	9402 - 200	
Processor	#2030	
Main Storage	24	MB
Disk Storage	2	GB
Maximum no. of Work Stations	64	
Communication Lines	20	
LAN Adapters	2	

1.5 SOFTWARE ENVIRONMENT

OPERATING SYSTEM/400

The AS/400 operating system OS/400 is conceived as a single integrated operating
em. Facilities such as relational database, communications and networking
ities on-line education and much are integrated into the operating system.
OS/400 contains more and better hardware failure survivability features than
ating systems used in mainframe systems. OS/400 uses a *single-level memory*
el. This means that the operating system is responsible for tracking whether data
memory or in disk. The user simply thinks of all data as residing in a very large
al storage address space. Actually, the user does not even have to think of
esses, only the name and desired use of a data item is necessary. All storage
ation is done automatically by the OS/400 operating system and all data is
diately available upon request. The OS/400 is more flexible than conventional
frame operating systems. For example, new a communication hardware may be
hed without regenerating the system, or even telling the system that the hardware
attached. OS/400 automatically determines many characteristics of its hardware
onment.

Productive Application Development Environment

AS/400 has many functions such as interactive debug, command prompting and cross reference capability to assist in programming the machine. A programmer menu, a data dictionary and the Application development tools are integrated with the operating system to form an application development environment. This environment permits the rapid development of new applications and the easy maintenance of existing programs.

DB2/400 Support

The OS/400 database management system now as DB2/400 is integrated into both the licensed internal code and the operating system.

Electronic Customer Support

Provides an integrated set of service and support functions to assist user self sufficiency. This is a set of applications that interfaces with standard communication facilities for access to remote support systems.

Support for PCs

The Client Access/400 family is replacing the PC Support/400 product. OS/400 provides the platform for the distributed client serving environment.

OS/400 Graphical Operations

Graphical operations introduces a graphical user interface for selected functions of OS/400.It presents an iconic interface using PC's attached to AS/400.

Security

Comprehensive security to all system resources is provided. AS/400 has

ost efficient and unbreakable security system.

System Delivered Education

On-line education is available with AS/400 using either a host dependent

rminal or a programmable workstation.

System Availability

Various recovery functions are supported to assist a user in the case of failure.

Multiple Operating Environments

In addition to the execution of the native AS/400 application OS/400 allows ex-

ecution of applications migrated from System/36 or System/38.

Application Programming Interfaces

These are programs or commands supplied by OS/400 that provide access to

specific routines.

Expert Cache

A disk cache tuner option is provided which allows AS/400 to take additiona

advantage of available main storage capacity.

Ease of Installation and Use

The system supplied menus are provided so that the system can be set-up by one not familiar with the control language.

Integrated Operating System

The relational database support is integrated into both the machine and the ating system and provides functions that allow for a high degree of both data rity and programmer productivity. Both physical and logical files are supported data are stored in physical files or tables, which are similar to traditional files. Access paths are maintained when there is a change in the data. This allows iple users to be aware of changes in the database and to access the current rmation in the required sequence. Description of files can be entered by Data cription Specification(DDS), Interactive Data Description Utility(IDDU) or by IBM ctured Query Language/400. DDS supports the capability to define a Field Ref- nce file(a form of data dictionary) which can be used to describe in one place the ibutes of all data fields for use by multiple applications.

RPG/400

IBM introduced the *Report Program Generator(RPG)* programming language in the rly 1960's. RPG fitted a niche for providing a quick solution to common business sk generating reports needed within the business. Unlike other procedural languages PG does not require the programmer to detail each processing step required.

language has got a fixed logic cycle that automatically executes the normal cycle
ead, calculate and write.

Another unique characteristic of RPG was its use of a special class of built in
ables called *Indicators*. These indicators could be set on or off in one part of the
gram to determine what was to occur. It is easier for programmers to develop
ractive applications. Structured design is supported. Capability to call other pro-
ms is also there. RPG programs consist of different types of lines called specifi-
ons. The different specifications in RPG are as following:

File Specification

'F' in position 6 has to be entered for File specification entries. These entries
cribe the files being used in a program and defines how the files will be used within
rogram.

Extension Specification

Identified by 'E' in position 6. Extension specifications when used must follow
File specifications. Required entries on Extension specification vary depending
n the complexity and layout of data the user is storing in table format and where
table data values are coming from.

Input Specification

Identified by 'I' in position 6. Input specifications come after the File specifications(and
r Extension specifications when used). They describe the records with program

ribed input files and defines the fields within the records. Every program described
files defined on the File specification must be represented by a set of input
ification lines.

Calculation Specification:-

These specifications are identified by 'C' in position 6. They centre on operation
rocessing steps to be accomplished by the computer. Each Calculation specification
st include a RPG operation and may include additional entries depending on the
ecific operation. The computer executes operations in the order they are given on
Calulation specification, unless the computer encounter an operation that specifi-
ly alters this flow of control.

Output Specification:-

'O' should be entered in position 6 for Output entries. These entries provide details
out output of a file or files used in a program. When output is a report, one must
e a record identification line and corresponding field identification entries for each
nd of line to appear on the record.

Structured Programming Techniques in RPG/400 makes the programs easy to
nange and debug. The sequential flow of control is inherent in RPG like any other
rogramming language. In addition to this RPG includes a variety of operations to allow
ne programmer to express both decision and iteration logics. For these operations
has 6 two letter codes for the relational comparisions involved. All the command

ection or decision operations are also supported in RPG/400. This language uses
programmer's tools available on the AS/400 to maintain and debug programs.

External file description is another advantage of RPG. Externally defined files can
duce duplication of data across files. As all programs, using a given file use the
me field definitions and names, externally defined files impose a standardisation
nong programmers and also applications. Moreover, external file description
creases programmer's efficiency as programmers need not duplicate the file
finitions and names and the effort each time needed to refer a file within a program.
d, finally if it is necessary to make changes, it needs to be made only at one place.

In interactive applications, the dialogues between the user and the computer can
mediated through the use of display files on AS/400. These files can be defined
RPG programs and can be used for user input and output. But in the interactive
ograms, some kind of applications require the use of list panels, in which data from
any records need to be displayed on screen for review, selection or update. RPG
as a special concept called *Subfiles* to handle these kind of program requirements.

RPG also allows to define table data structures or arrays so that programs can
tract data in a way analogous to how tables are being used. Two types of tables
e there. Compile time tables in which data is hard-coded within the program or
e-run time table in which the computer can be instructed to obtain the data from a
eparate disk file each time program runs. An array is also a data structure similar
table.

Apart from this, RPG allows the user to break up an application system into small elf contained modules of code by including the CALL operation and in this way it upports the concept of modular programming. The CALL operation would be of limited alue if it did not permit the call and calling program to share data. RPG uses PARM peration to indicate which field values are to be shared between programs.

So in all, RPG/400 contains the features and facilities of a good programming anguage.

OPERATING SYSTEM AND PROGRAMMING LANGUAGE USED IN THE PROJECT

Operating System	OS/400 Version 3.0 Release 1.0
Programming Languages	RPG/400, CL/400

2. SYSTEM ANALYSIS

The system is titled Sales & Distribution. This system deals with the transac related with marketing arena.

The chief purpose of the system Sales & Distribution is to execute the ord receipt the goods and maintain the stock operations.

The functions of the Sales & Distribution are

1. Order Processing.
2. Finished Goods.
3. Inventory

2.1. ORDER PROCESSING

Order Registration

Customer have to give his/her order by specifying the required products by brow ing the product list and he/she should also specify the quantity needed on the product

Stock Allotment

Based on the customer, market demand of the product and the stock level of th product the allotment is made for the specified order. The order is allotted by verifyin the credit level of the customer. Product allotment is done manually.

While in a manual system before stock allotment is made the sales profession should go to warehouse to know the stock availability. But in the computerised syste to know the stock availability only few seconds is needed to know the product avai ability.

Allotment Listing

Customer's orders are executed by alloting the needed quantity on the produc specified.This statement will give the list of products allotted as per the order statu

In a manual system if the allotment is made for an order at different dates th sales professinal should search for the allotment details at the file. But in the com puterised system, the system itself give the details.

Invoice Preparation

Once the allotment is done invoice is prepared by calculating the total cost ar verifying with the balance amount if any to be paid. If the balance amount is prese that amount will be added with the current invoice.

In the manual system for preparing the invoice market professinal should ref customer details, product details and allottment details. So the preparation of invoi is getting late. In order to produce the invoice statement without any delay the co puterised system had eliminated the difficulties.

Invoice Cancellation

If the invoice is cancelled the allotted amount of stock are updated for the produ and the order status is changed to cancelled order.

In the manual system for cancelled invoice, the sales professinal should maint a separate file. But in the computerised system, the system itself will change the stat

Forward Note Printing

During invoice preparation if the customer is an outsider for the business conce the customer should give the transporter details for shipping the products.

In the manual system also time plays a major role for producing the forward n statement. Manually they have to refer the transporter file. But in the computeri system, the above said difficulty is eliminated.

The operations involved in the Order Processing can also be known by the d flow diagram.

2.2. FINISHED GOODS

Stock Receipts

When the goods are received from the suppliers, they should specify the document number and the location with the transporter details.

The operations involved in the Finished Goods can also be known by the data flow diagram.

2.3. INVENTORY

Stock Ledger

The receipts and issues of the products are maintained in the stock ledger with its transaction dates. The two transactions details such as order number and document number are also maintained with product details.

In the manual system hundreds of pages are used for maintaining the ledger. But in the computerised system paperless ledger is maintained without any difficulty.

Form - F

Whether the stock receipts or issue of stocks from/to other states a certificate for transferring the stock to other state is prepared by specifying the transporter details.

In the manual system for producing the Form - F statement we have to refer stoc receipts file, allotment file and transporter file. Here also time plays a major role But in the computerised system the above said difficulty eliminated.

The operations involved in the Inventory can also be known by the data flo diagram.

2.4. PROPOSED SYSTEM

The system is developed in RPG/400 on OS/400. This system has relationa database techniques and effective file operations. The use of software is restricte only to authorized persons by giving necessary securities.

This software is interactive menu oriented which has been developed by using SD utility of OS/400. This software produces the output in a standard format using th utility RLU.

3. SYSTEM DESIGN

The design of the system is completely based on the requistion of the concern This software is a menu driven one which helps the user to select the process according to their wish.

3.1. Input Design

The inputs will be provided with proper listing of possible values. For eg to allo the stocks , a list of customers and his/her orders will be displayed. So that the use cannot do mistakes.

The function keys were used in a IBM CUA (Common User Access) standard fo all the screens. This will be easier to remember to use the system.

Help messages are given at all levels. The user can change the value at any tim until he/she commits the entry.

Subfile Concept also present in this system. Using subfiles we can manipulat mulitple records at the same time. For eg we can change or delete any number o records at a time.

3.1.1.Master File Entry Design

Work with Customer Master

To process an order, the customer should be present for any business concer In this file the customers details are stored as per the requirement of the compar The entry screen is given in the Appendix.

Work with Product Master

To start a business, the products are the essential need of the company. Th file will contain the product details present in the company. The entry screen is giv in the Appendix.

Work with Transport Master

In the sales and distribution only two activities are happenning. They are issu and receipts of the stocks. To issue or receipt a product, transporters are playi an important role. So this file will contain the transporter details. The entry scre is given in the Appendix.

3.1.2.Transaction File Entry Design

Work with Order Registration file

When a customer is placing an order for his required products, details are sto in the order registration file. While placing an order, the order number is genera by the system itself.

Work with Stock Allotment file

An order is executed based on the market demand and the requirement of customer. The allotment of the product is stored in the file with amount of quan allotted.

Work with Stock Receipts file

When a stock is received from the suppliers, the senders location, docum number, product details and quantity received are stored in the stock receipts f

Work with Stock Ledger file

When the ledger is prepared the stock issues and receipts of the stock are sto with order number/document number, product details and quantity level.

3.2. Reports Design

The report is the all important in a system. This system provides the output in two forms. Reports can be viewed in the screen and also be taken a print.

Order Registration Report

When a customer requires products from the company, he places an order. For placing an order, the customer should have to give the required products and the quantity to be needed. After an order is placed, the company will give this registration report. A sample report is given in the Appendix.

Pending Order Postion Report

After placing an order, allotment is made based on the customer, market demand of the product, quantity on hand and credit level of the customer. This report will give the pending order details of a customer with the details about the products to be allotted and the remaining quantity level. A sample report is given in the Appendix.

Cancelled Order Report

After an allotment is made for an order and if the order is cancelled, this repor is prepared. This report will give the details about the allotment details of the orde with products and quantity allotted. A sample report is given in the Appendix.

Order Status Report

This report is a combination of details such as order registration, pending orders and cancelled orders.A sample report is given in the Appendix.

Sales Register

In the sales and distribution department after an order is shipped for a customer the sales details of the order are maintained in a register. The register should contain the products allotted, number of units allotted,total cost of the prodcuts are maintained for the orders made by the customer. A sample report is given in the Appendix.

3.3. File Design

File design is one of the important work that must be carried out before start codi
This system consists of the following files. The files are designed according to
standard normalization rules.

3.3.1.Master Files

CUSPF - Customer Master File

Field Name	Type	Length	Decimal	Description
CUSNUM	PACKED DECIMAL	5		Customer Number
CUSNAM	CHARACTER	20		Name
CUSADR	CHARACTER	20		Address
CUSTAT	CHARACTER	20		State
CUSCRL	PACKED DECIMAL	10	2	Credit Level
CUSBLA	PACKED DECIMAL	10	2	Balance Amount

PRDPF - Product Master File

Field Name	Type	Length	Decimal	Description
PMCODE	CHARACTER	5		Product Code
PMNAME	CHARACTER	20		Name
PMQTTY	PACKED DECIMAL	5		Available Quantity
PMRATE	PACKED DECIMAL	6	2	Rate per unit
PMPERT	PACKED DECIMAL	5	2	Tax percentage/unit

VECPF - Transport Master File

Field Name	Type	Length	Decimal	Description
VECNUM	PACKED DECIMAL	5		Transporter Code
VECNAM	CHARACTER	20		Transporter Name
VECADR	CHARACTER	20		Transporter Address

3.3.2.Transaction Files

PRDL - Order Registration file

Field Name	Type	Length	Decimal	Description
CUSNUM	PACKED DECIMAL	5		Customer Number
NUM	CHARACTER	5		Product Code
QTTY	PACKED DECIMAL	5		Quantity to be Allotted
ORDNUM	PACKED DECIMAL	5		Order Number
ORDEDT	PACKED DECIMAL	6		Expected date of order completion
NET	PACKED DECIMAL	5		Total quantity ordered
TRCODE	PACKED DECIMAL	5		Transporter Code

ALLF - Stock Allotment File

Field Name	Type	Length	Decimal	Description
CUSNUM	PACKED DECIMAL	5		Customer Number
NUMA	CHARACTER	5		Product Code
ORDN	*PACKED DECIMAL*	5		Order Number
QTTYA	PACKED DECIMAL	5		Quantity Allotted
AD	PACKED DECIMAL	6		Allottment Date
QAS	PACKED DECIMAL	1		Order cancel status

SRPF - Stock Receipts File

Field Name	Type	Length	Decimal	Description
DNO	PACKED DECIMAL	5		Document Number
LOC	CHARACTER	20		Location
STT	CHARACTER	20		State
SPN	CHARACTER	5		Product Code
SPQTY	PACKED DECIMAL	5		Quantity Received
DRD	PACKED DECIMAL	6		Product Received Date
TCD	PACKED DECIMAL.	5		Transporter Code

LGPF - Stock Ledger File

Field Name	Type	Length	Decimal	Description
ORDN	PACKED DECIMAL	5		Transaction Code (Order/Document Number)
QTYL	PACKED DECIMAL	5		Quantity Level (Issues/Receipts)
DL	PACKED DECIMAL	6		Date of transaction
DLD	PACKED DECIMAL	5		Total days
LB	PACKED DECIMAL	1		Transaction status Bit

3.4.Description of Physical files Used

The necessary physical files are created using SEU.

Master files created in the system are

CUSPF - Details about the Customers for their concern

PRDPF - Details about the Products of the concern

VECPF - Details about the Transporters

Transaction files used in the system are

PRDL - Details about the Order Registration for the Customers

ALPF - Details about the Allotment for an Order

SRPF - Details about the Stock Receipts

LGPF - Details about the Stock Ledger

3.5.Descriptions of Screens Used

The Sales & Distribution system is a interactive menu based application. The screens involved in the system are developed using the Application Development Tool called SDA (Screen Design Aid). The software contains many screens that can be subdivided as master and transaction screens (display files).

Display files for Masters

OP - This file is used to maintain Customer and Transporter details.

PMASDF - This file is used to maintain Product details.

All the above display files are used to enter the details for customers, products and transporters. It is used to perform file operations like insertion, updation, deletion and displaying of a record or multiple records.

Display files for Transactions

OP - This file is used to enter details for Order Processing.

FG - This file is used to enter details for Finished Goods and Inventory

MSD - This file is used to show the menus used in the system.

The above mentioned transaction display files are used to enter the details of Orde processing, Finished goods and Inventory. The entries made in the transaction screen are entered in the corresponding files.

Utilities Used

The Sales & Distribution system is developed in RPG/400 under OS/400 operatin system. Utilities used in this system are

* SEU (Source Entry Utility)
* SDA (Screen Design Aid)
* RLU (Report Layout Utility)
* DFU (Data File Utility)

SEU

SEU is used to enter or change source programs.

SDA

SDA is used to creat display files using which we can design user screens/menus

RLU

RLU is used to create printer files using which reports can be designed.

DFU

DFU is used to enter data into a database file or to display specific data.

4.IMPLEMENTATION

During implementation phase, the system should be fully operational. This involves programmers, users and operational management. It includes the final distinct of complete system to users satisfaction and supervision of operation of the new system.

Selection of staff and proper training to them is essential to achieve the objectives and benefits expected from computer based system. Training gives the staff to know about how the system works. Education gives the staff to know the background of the system.

System testing is the style of implementation, which is aimed at ensuring that the system works at all levels and effective before live operation starts. The system test in implementation should be a definite confirmation that all is correct and an opportunity to show the users that the system works.

4.1. TESTING

Any system that has been coded must pass all sorts of testing before it can be implemented. Only if the system is successfully tested it can be implemented. Further it gives an opportunity to know the behaviour of the system in extreme condition. More over it gives a chance to change some parts of the system so that it achieves the specified objective.

Validation

To study the behaviour of the system, all the physical files are tested. For exam during a file operation instead a product code its name was entered the messa INVALID PRODUCT CODE' is displayed. The error message is displayed because product codes are checked with the file before its operations.

Also the system requires the user to enter the date in the given format ie., MM-YY (for eg 19-02-96) when the user try to enter either the date in any other for or invalid date such as (for eg 29-02-95 or 31-04-96) it will display error mess as 'INVALID DATE'.

CONCLUSION

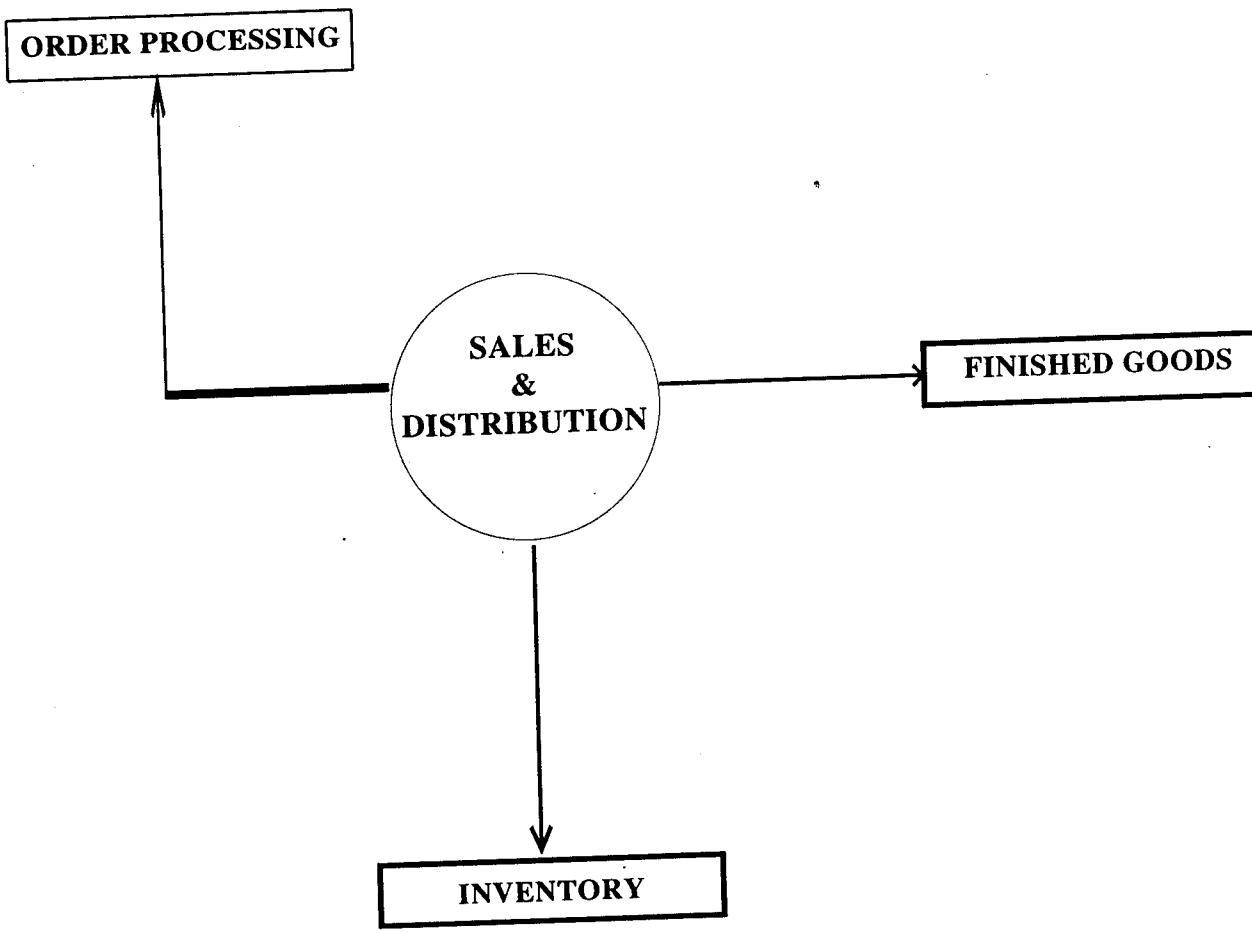
Sales & Distribution is an integral part of a business concern. It forms the essential backbone for the marketing system with maximum efficiency. The efficient functioning of the company or the marketing department can be credited to a computerised Sales & Distribution system.

The Sales & Distribution system has been succesfully carried out in order to meet the requirements of the company.

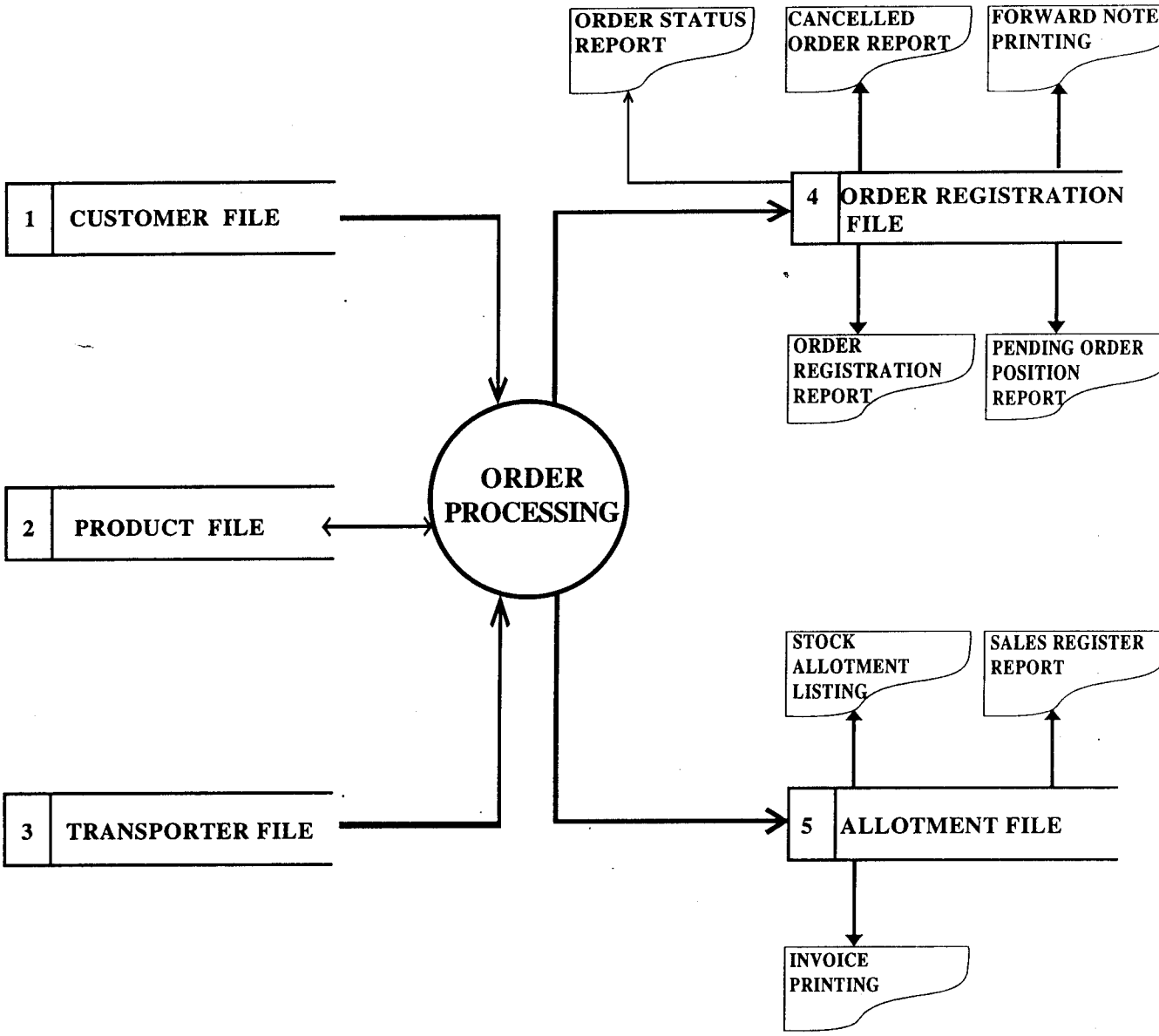
The system has been endeavoured throughout this software to provide the user with a competent, easy to use and sophisticated package for the sound functioning of the organization.

The system is tried to smoothen all possible rags in the system and this software is tested with volumes of input data of all possible conditions and results have been found to be excellent. The future expansion of this package can be extended to Sales Analysis.

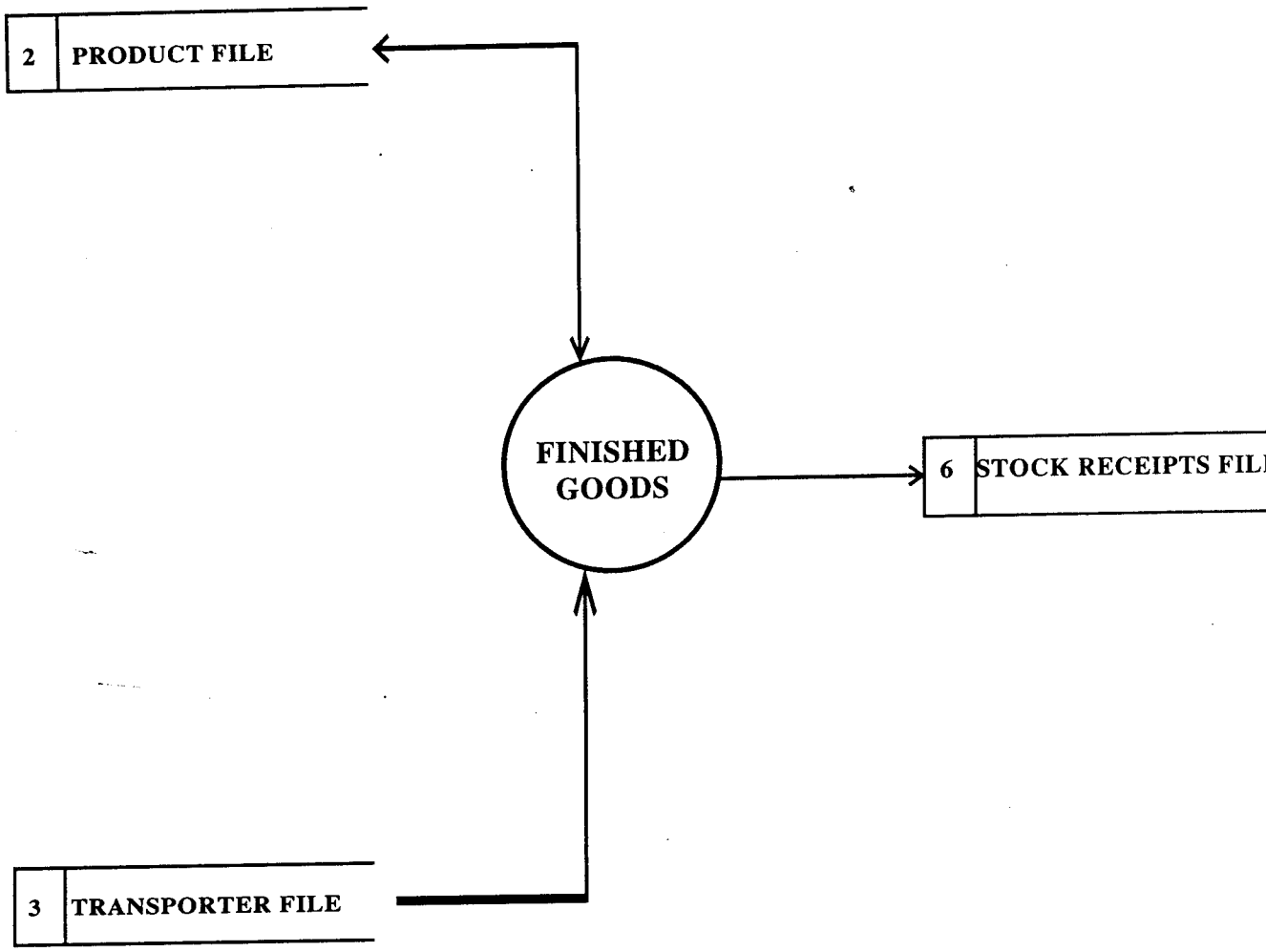
DATA FLOW DIAGRAM FOR SALES & DISTRIBUTION



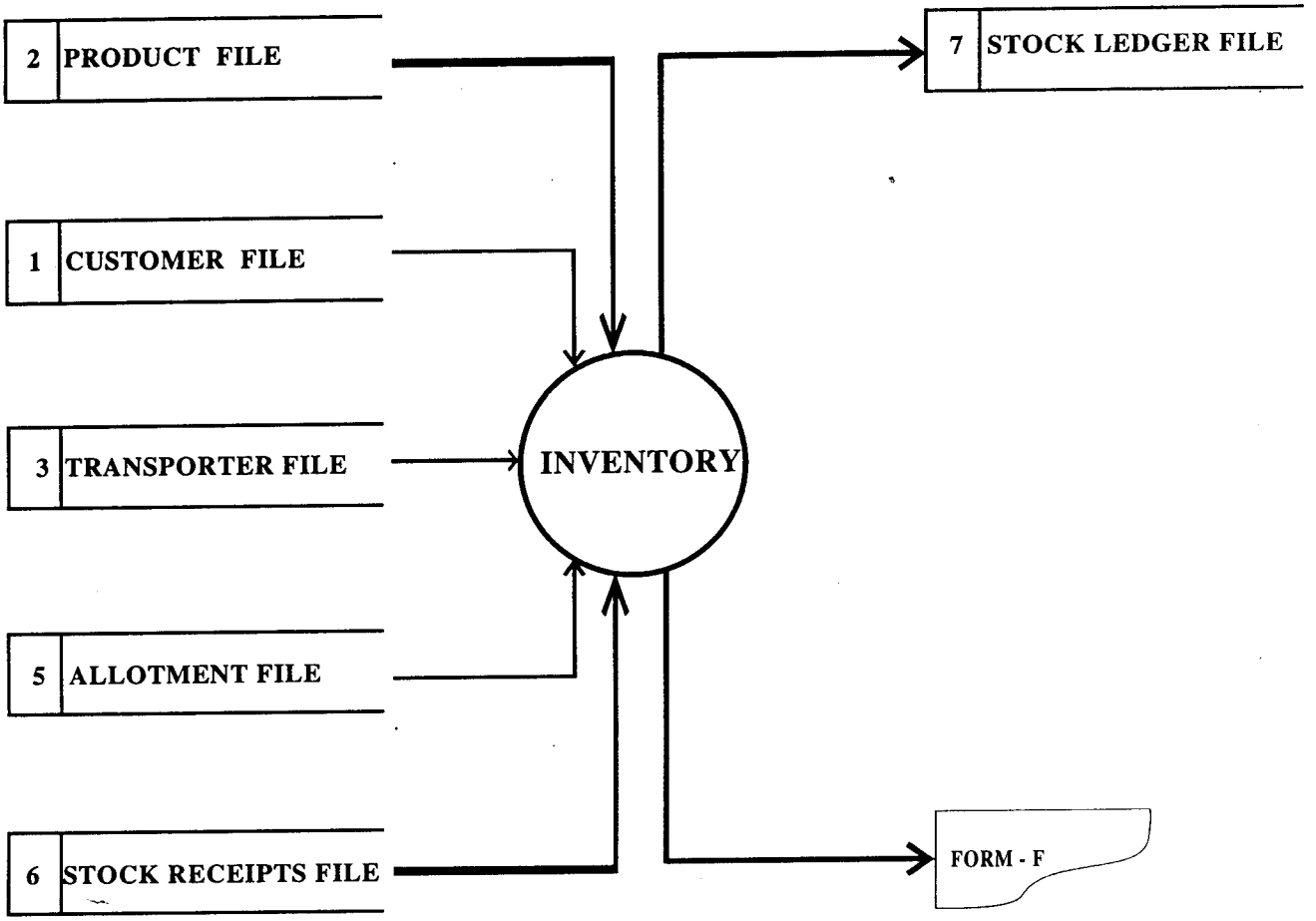
DATA FLOW DIAGRAM FOR ORDER PROCESSING



DATA FLOW DIAGRAM FOR FINISHED GOODS



DATA FLOW DIAGRAM FOR INVENTORY



SALES & DISTRIBUTION

MAIN MENU

Order Processing 1

Stock Receipts 2

Inventory 3

Reports 4

Work with Masters 5

Enter Your Option . . . .

F3=Exit

SALES & DISTRIBUTION

Order Processing

Registration 1

Stock Allotment 2

Allotment Listing 3

Invoice Printing 4

Invoice Cancellation 5

Forward Note Printing 6

ENTER YOUR OPTION . . . . . .

F3=exit

F3=Exit F10=Save Allotment F6=Next Customer

Stock Allotment

Customer Number 2
Customer Name . . . . . SIVAM
Order Number 7

Product Code	Product Name	Demanded Quantity	Quantity Available	Allotted
AD1	BPL AUDIO SERIES 1	67	155	
AD2	SONY AUDIO SERIES	78	36	
A1	FRAGRANCE POWDER	7	56	

Bottom

F3=exit F6=next customer

Invoice Printing

Customer Number 1
Customer Name . . . . . GANESH
Order Number 4

Product	Quantity (units)	Cost Rs	Tax Rs	Tax Amount Rs	Product Cost Rs
CD3	2	1000.00	2.00	40.00	2000.00
HA2	2	468.90	1.45	9.37	937.80

Bottom

Total		49.37	2937.80
Total Amount			2987.17
Balance Amount			
Payable Amount			2987.15

F3=exit F6=next customer

Invoice Cancellation

Customer Number 1
Customer Name . . . . . GANESH
Order Number 4

Product Code	Cancelled Quantity	Past Quantity	After Cancellation Quantity
CD3	2	8	8
HA2	2	8	8

Bottom

F3=Exit F6=Next Product

Stock Ledger

Prodcut Number CD4
Product Name . . . . . UNIV ENCYCLOPEDIA CD

Date	Particulars	Receipts Quantity	Issues Quantity	Balance Quantity
0/00/00	OPENING BALANCE			7
18/05/96	ORDER NUMBER	3	3	4
18/05/96	PRESENT LEVEL			4

Bottom

F3=Exit F6=Next Transaction

Form F Report

Transaction Type . . . . ISSUES
ORDER Number 5
Transporter Number. . . . 3
Transporter Name . . . . KING ROADWAYS
Transporter Address . . . MADURAI
Location . . . . Bangalore
Customer Number 2
Customer Name . . . . SIVAM

Product Code	Product Name	Quantity	Issue Date
CD3	LIMCA GUINESS CD	2	30/04/96
CD3	LIMCA GUINESS CD	2	30/04/96

Bottom

Customer Master Record Entry Module

Customer Number . . . . . .

Customer Name . . . . . .

Customer Address . . . . . .

Customer Credit Level . . . . . .

State . . . . . .

F3=Exit F6=Confirm F12=Cancel

Vechicle Details Entry Module

Transporter Number . . . . . .

Transporter Name . . . . . .

Transporter Address . . . . . .

F6=Confirm F3=Exit F12=Cancel

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Product Details

Product Code . . . . . .

Product Name . . . . . .

Quantity . . . . . .

Rate Per Unit . . . . . .

Tax Percentage . . . . . .

F3=exit F6=confirm F12=cancel

Order Registration Report

Customer Number 1
Customer Name . . . . . GANESH
Customer Address . . . . . CBE
Order Number 4

Product Number	Product Name	Quantity Ordered	Rate Per Unit
CD3	LIMCA GUINESS CD	10	1000.00
HA2	TTK HA SERIES	10	468.90

Bottom

F3=Exit F6=Next Customer

Pending Order Position

Customer Number 2
Customer Name . . . . . SIVAM
Order Number 3

Product Code	Product Name	Quantity To Be Delivered
CD5	GAMES CD	2
HA2	TTK HA SERIES	2
W1	TIMEX WATCHES	5
W2	TITAN WATCHES	2

Bottom

F3=exit F6=next customer

Invoice Cancellation Report

Customer Number 1
Customer Name . . . . . GANESH
Order Number 4

Product Code	Cancelled Quantity	Past Quantity	After Cancellation Quantity
CD3	2	8	

Bottom

F3=Exit F6=Next Customer

Order Status Report

Customer Number 1
Customer Name . . . . . GANESH
Order Number 4

Product Code	Product Name	Demanded Quantity	Allotted Quantity	Cancelled Quantity	Pending Quantity
CD3	LIMCA GUINESS CD	10	2	2	8
HA2	TTK HA SERIES	10	2	2	8

Bottom

F6=Next Customer

F3=Exit

Sales Register.

Customer Number 1
Customer Name . . . . . GANESH

Order Number	Prod Code	Prod Cost	Prod Tax %	Qty	Total Prod Rs	Total Tax Rs	Total Value Rs
1	HA1	267.00	1.20	5	1335.00	13.35	1348.3
1	TOTAL						1348.3
4	CD3	1000.00	2.00	2	2000.00	40.00	2040.0
4	HA2	468.90	1.45	2	937.80	9.37	947.1
							More...

F6=Next Customer

F3=Exit

Sales Register

Customer Number 1
Customer Name . . . . . GANESH

Order Number	Prod Code	Prod Cost	Prod Tax %	Qty	Total Prod Rs	Total Tax Rs	Total Value Rs
							2987.1
4	TOTAL						

Botto

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