

**PROJECT REPORT**  
(Vol. I)

**INFORMATION SYSTEM DEVELOPMENT  
FOR ASEA LTD; BANGALORE**

SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS  
FOR THE DEGREE OF  
**Master of Computer Applications**  
(M. C. A.)



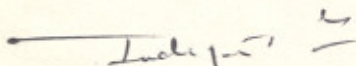
**Harsher Singh Grewal**  
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING  
THAPAR INSTITUTE OF ENGG. AND TECHNOLOGY, PATIALA  
(DEEMED TO BE A UNIVERSITY)  
**1988**

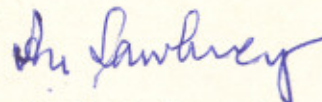
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C E R T I F I C A T E

This is to certify that the Project Report entitled 'Information System Development' for ASEA Ltd., Bangalore contains the work done by Harsher Singh Grewal under the guidance of Mr. G. Balasubba Raman of ASEA Ltd., Bangalore and Mr. Inderjeet Singh Sidhu of Thapar Institute of Engineering and Technology (TIET), Patiala.

This work has not been submitted to any other Intitution/University for the award of any degree.

  
(Inderjeet S. Sidhu)  
Project Co-ordinator  
EEE Department  
TIET, Patiala

  
(A K Sawhney)  
Head  
EEE Department  
TIET, Patiala

Dealt with by

Our date

Our reference

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## CERTIFICATE

Mr. Harsher S Grewal carried out Project work in System Development during the period 880104 to 880423 in computer department in our Peenya factory as a part of his academic programme leading to Master's degree in Computer applications.

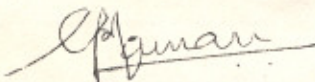
Mr. Grewal developed following systems during his stay :

1. Employee Overtime Computation System (OCS)
2. Employee Time Recording System (TRS)
3. Product Order Handling System (OHS)

He was actively involved in discussions with Users for system design. He has carried out an excellent job of the programming and documentation for the above systems. First two systems are already implemented and the third is under implementation.

We are impressed with Mr. Grewal's patience and perseverance during the period he has been with us. The systems he has developed will help us in personnel area and better follow-up of Orders.

We wish him well in his future career.



(G Balasubba Raman)  
Project Co-ordinator  
Computer Department



(K L Hira)  
General Manager  
Electronics Division

## PREFACE

This Project Report contains method of use, programs developed, their inputs and outputs and other essential information on application systems developed during the System Development Project undertaken by me at ASEA Ltd., Bangalore.

The report has been divided into several chapters and organised into an easily readable form. It contains reports on the following systems:

1. Overtime Calculation System
2. Order Handling System
3. Time Recording System

The systems have been developed using DBASEIII. Due to the decentralized structure of ASEA's computer systems, as they have PC's distributed in all the departments, it became necessary to make them in a PC based language.

*Harsher Singh*

(HARSHER SINGH GREWAL)

## ACKNOWLEDGEMENTS

I am grateful to the ASEA organisation for having given me a chance to work in a Swedish atmosphere. It has been a very fruitful project work where I was able to come in contact with various people from varied fields and I too could gain a lot about the organisational setup, its working and know how about its electro-technical products.

Extreme thanks are due to the employees in the users' departments who were very cooperative and helpful in providing essential information which helped in the development of the three systems I made. My thanks to the Personnel Department for looking into my welfare and seeing to it that I had no problems as regards my stay, food etc.

I am extremely grateful to Mr. Inderjeet Singh Sidhu, Lecturer, Thapar Institute of Engineering & Technology, my supervisor for the project from the institute side. He has greatly helped me in preparing and compiling the Project Report and in giving it, its present form. I also express my thanks to all others who have helped in this work providing moral support, computer time and suggestions for the report.

My sincere thanks to Mr. G. Balasubba Raman, my guide and Project-Coordinator here. He being the head of the Computer Department at Peenya, it was a pleasure working under his guidance. I also thank all others in the computer department who have off and on helped me and solved the problems I faced in developing the systems.

Harsher Singh

(HARSHER SINGH GREWAL)

## CONTENTS

Description	Page no.
Certificates	
Preface	
Acknowledgements	
1. INTRODUCTION	1
2. PROJECT I - OVERTIME CALCULATION SYSTEM	
2.1 ANALYSIS	4
2.1.1 Problem	4
2.1.2 Existing System	5
2.1.3 Proposed System	8
2.2 DESIGN	11
2.2.1 Structured Chart	12
2.2.2 Input/Output Formats	13
2.2.3 Database Structures	16
2.3 IMPLEMENTATION and TESTING	18
2.3.1 Processing Logic	18
2.3.2 Operational Procedure	22
2.3.3 Environment	31
2.4 APPENDIX 1	32
3. PROJECT II - ORDER HANDLING SYSTEM	
3.1 ANALYSIS	43
3.1.1 Problem	43
3.1.2 Existing System	44
3.1.3 Proposed System	48
3.2 DESIGN	52
3.2.1 Structured Chart	52
3.2.2 Input/Output Formats	54
3.2.3 Database Structures	58
3.3 IMPLEMENTATION and TESTING	60
3.3.1 Processing Logic	60
3.3.2 Operational Procedure	63
3.3.3 Environment	71
3.4 APPENDIX 1	72

4.	PROJECT III - TIME RECORDING SYSTEM	
4.1	ANALYSIS	81
4.1.1	Problem	81
4.1.2	Existing System	82
4.1.3	Proposed System	82
4.2	DESIGN	86
4.2.1	Structured Chart	86
4.2.2	Input/Output Formats	88
4.2.3	Database Structures	90
4.3	IMPLEMENTATION and TESTING	91
4.3.1	Processing Logic	91
4.3.2	Operational Procedure	93
4.3.3	Environment	101
4.4	APPENDIX 1	102
5.	CONCLUSION and REMARKS	107

## INTRODUCTION

### 1.1 Brief Profile of ASEA Ltd:

ASEA is an acronym for Allmänna Svenska Elektriska Aktiebolaget, meaning The General Electric Company of Sweden. In 1883, ASEA AB was founded in Sweden. It has since then come a long way and spread its arms in more than 120 countries, comprising of 350 companies. 71,000 employees are on its rolls and it has a turnover of 100 billion Sek ie. Rs. 24,000 Crores.

In India, ASEA AB started its operations in 1920 by opening a trading branch in Bombay. ASEA's presence here was made felt only in the last decade when the Switchgear and Industrial Electronics Divisions were set up at Nasik and Bangalore respectively. It is having a workforce of nearly 900 employees all over India. Most of the staff is highly educated since the products manufactured require great skill and know-how. They work on the philosophy "Offer Tomorrow's Technology Today".

At Bangalore itself there are 9 Divisions consisting mainly of Relays, Electronics, Power Projects and lately Capacitors. Some of the salient features of their products are:

- Switchgear - Operational reliability and personnel safety.
- Relays - Provide a comprehensive protection package with their uncompromising reliability.
- Weighing - Accurate, stable and highly reliable industrial weighing equipment.
- Automation - Electronic Process Control Systems i.e. AseaMaster introduced in 1984 are totally distributed and modular in nature.

Speed - AC and DC stepless variable speed Thyristor Drives provide excellent speed accuracy and control dynamics for optimising yield.

Presently research is on for newer and advanced products as AC Drives HVDC Transmission, Capacitors, Electric Furnaces and foremost of all, 6000 Hp locomotives are soon going to be on the Indian Railway Map.

On the new year day in 88, ASEA AB merged with BBC i.e. Brown Boveri Corporation of Switzerland to become ABB Asea Brown Boveri Ltd. with the corporate office being at Zurich. It is now the largest organisation in electro-technical field mainly Heavy Engineering.

## 2. Problem in Brief:

At the Peenya works, there is the latest WIPRO-386 mini-computer supporting 6 terminals which are soon to further increased in number. There are 7 PC XT's installed in various departments in the office building as well as at the shop floor. The PC's have been hooked up to the mini so that they serve dual purpose, as terminals and also as PC's.

At the Corporate office in the city centre there are 6 PC's and three terminals. The terminals are connected to a WIPRO-286 mini computer. I worked on the PC's at the Peenya works and did most of the work in DBASEIII.

At the time I joined this organisation there were several areas which were automated or marked for automation. Already covered areas were

- Generation of Pay Slips ie Payroll
- Financial Accounting
- Inventory Control
- Calculation of Quoted Factory Cost(QFC)
- Status of Enquiries Received

- Selling Price Computation
- Tender Generation
- Invoicing Schedule

The areas which were not covered by automation were the Personnel Department and also the Order Handling sections in Drives, Automation and Relay Departments. Thus, I was given the job of System Analysis & Design, Implementation & Testing of the following packages.

- OvertimeCalculationSystem
- Order Handling System
- Time Recording System

After analysis & design, implemetation has been done using dBASE III on IBM compatible PC's, namely a Microsense PC/XT and a WIPRO PC/XT.

### 3. Layout of Report:

The three application software packages are almost independent of each other. As such these packages are discussed separately in the following chapters.

Chp.2 deals with Overtime Calculation System(OCS)

Chp. 3 deals with Order Handling System(OHS)

Chp. 4 deals with Time Recording System(TRS)

Finally, the conclusions and recommendations are summed up in chapter 5.

## OVERTIME CALCULATION SYSTEM

This chapter deals with System Analysis & Design and Implementation of the "OCS" package.

## 2.1 ANALYSIS

This part is concerned with explaining the problem in detail, the existing manual system and the proposed new Overtime Calculation System i.e. (OCS). Here questions like what is the problem, what is the existing system and what is the proposed system for OCS will be discussed.

## 2.1.1 Problem:

In their existing payroll system, the Overtime part of the pay-slips of the employees was manually calculated and fed onto the computer at the time of generation of pay-slips. The time taken to do this job manually consumed more than two man-days every month. Also the amount calculated for the overtime done was not free from errors. Hence the Personnel Department wanted a computerized system which would be able to do the following tasks:

- a) Calculate the overtime hours worked in a month;
- b) Generate a working sheet for the OT hours worked;
- c) Calculate amount payable for these overtime hours; and
- d) Generate a summary report giving overtime hours and amount payable.

Keeping the considerations of time taken, manual errors and similar others, I was assigned the task of Analysis, Design and Implementation & Testing of a system which would take as input the overtimes for each employee for every month and output the total hours worked in overtime and the remuneration on account of the same.

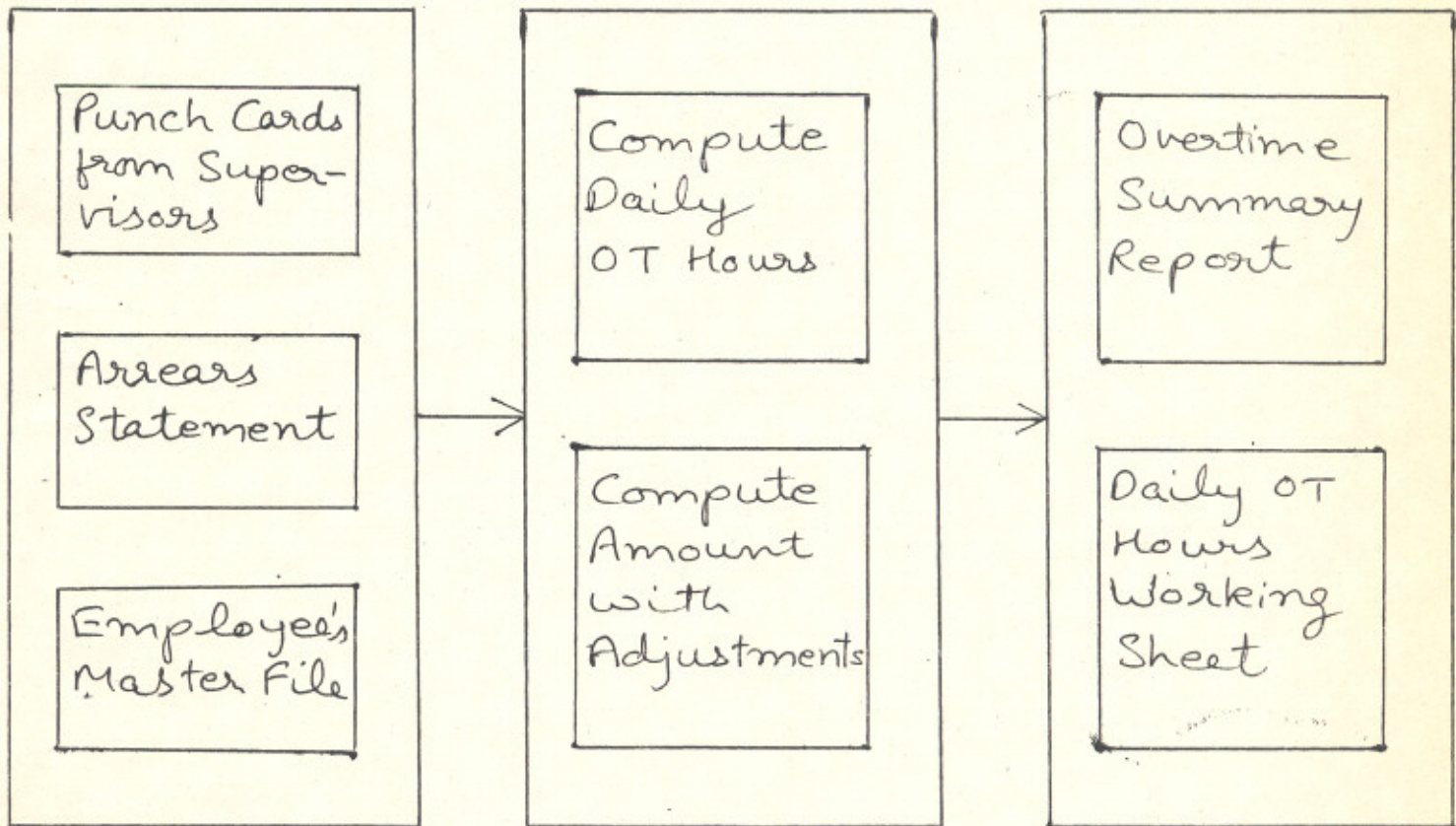
### 2.1.2 Existing System:

Presently, in the manual system each of the employees' doing overtime(OT) used to record their start and end overtimes on punch cards kept with their respective supervisors. At the end of a period (signifying a month, from 17th of one, to 16th of the next month), the calculation of OT was done and they used to follow the following steps.

- a) The cards were collected from the supervisors and the daily overtimes written down on a chart.
- b) For each employee the total time for that period was calculated.
- c) Deductions in overtime if any, due to leave taken in the next week after doing overtime on a Sunday, were made in the same statement.
- d) The D.A. applicable to them for that period for different classes of employees was noted down.
- e) The amount payable to each of them was calculated based on formulae for different categories of employees.
- f) Other considerations like arrears of previous months were added to the total amount.
- g) This was put into a hand written statement and sent to the main computer for entry into the payroll package.

These stages of their existing system are shown in the Hierarchy Input Process Output(HIPO) Chart and a Data Flow Diagram(DFD) on next two pages.

# HIPO CHART (EXISTING SYSTEM)

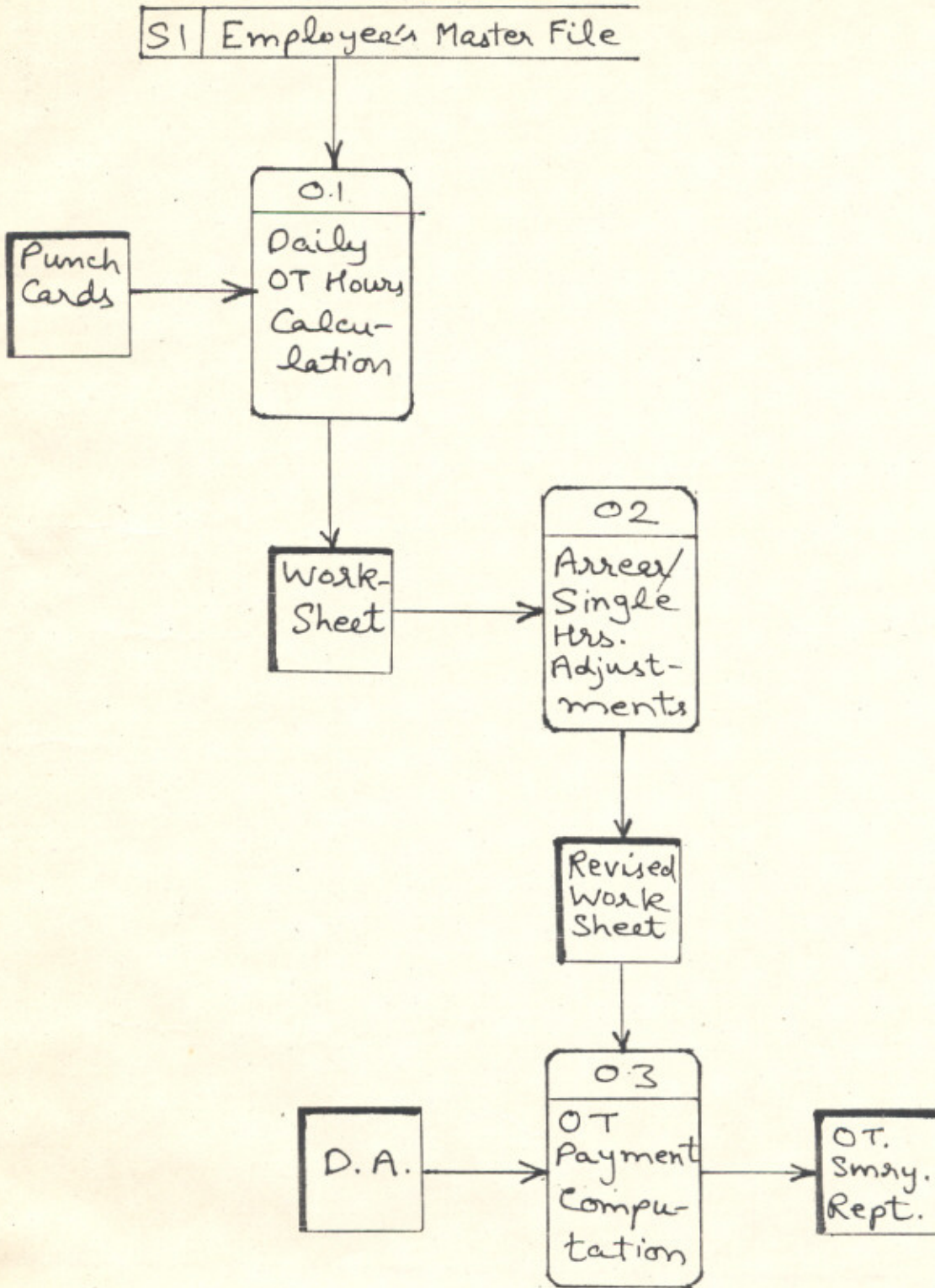


INPUT

PROCESS

OUTPUT

# DATA FLOW DIAGRAM (EXISTING MANUAL SYSTEM)



The problems faced in this manual system were

- a) Wastage of time
- b) Non-standard procedures
- c) Error-prone system
- d) Dis-organised reports

### 2.1.3 Proposed System:

The proposed system has been analysed keeping in view the problems of the existing system. In this new sub-system the users will not have to go through all the mathematics. Instead, the user friendly menu driven (OCS) will do it for them in a faster and accurate manner as represented in the following sections. It takes only one and a half hour time to do the job completely.

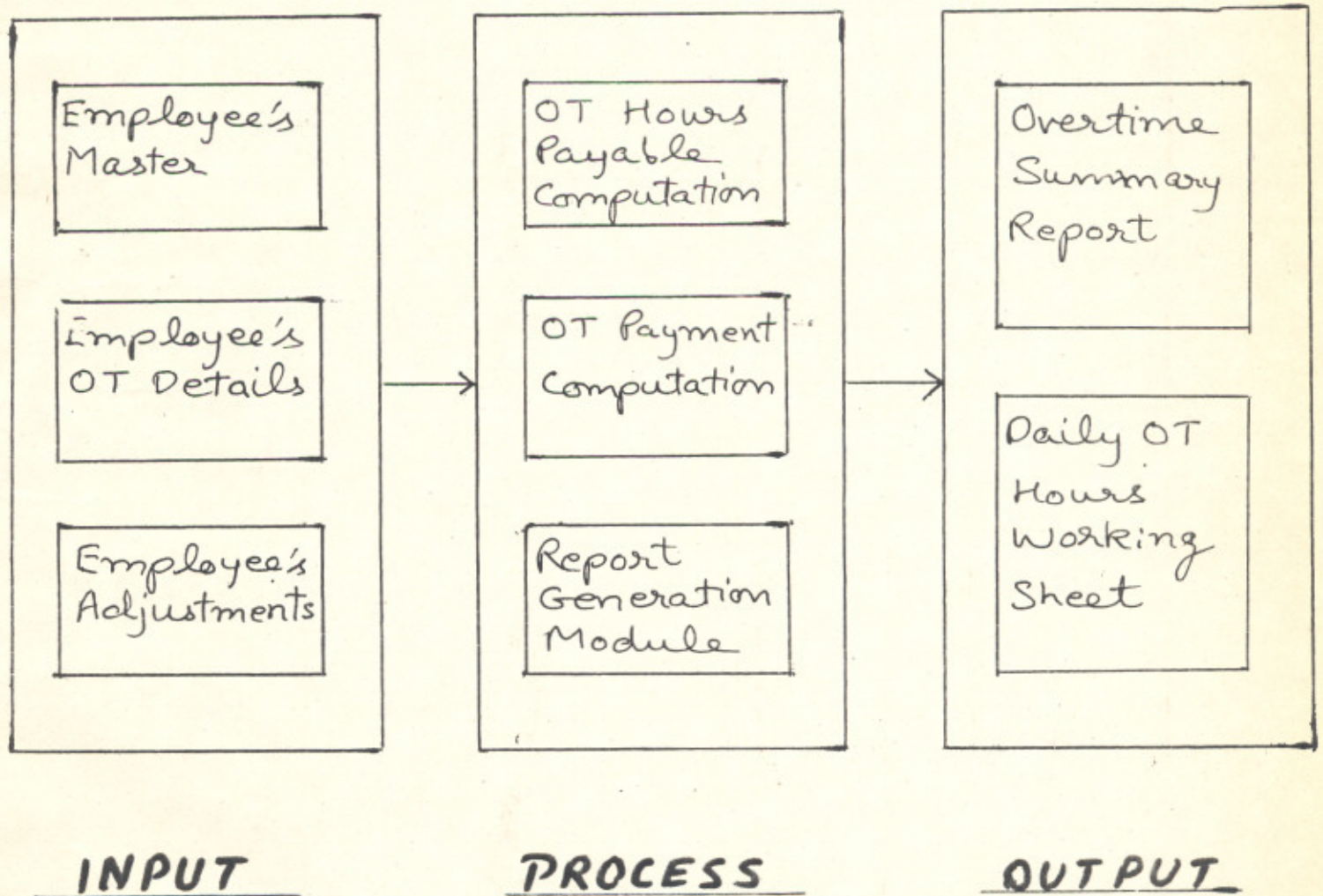
The tasks that were specified in defining the problem were implemented on the computer. The proposed system;

- a) Stores employees' information and takes in overtime details;
- b) Calculates the overtime hours worked in a month;
- c) Calculates the amount payable for these overtime hours after adjustments;
- d) Provides query on terminal facility to lookup OT details; and
- e) Generates working sheet for daily OT and summary report for total payable OT.

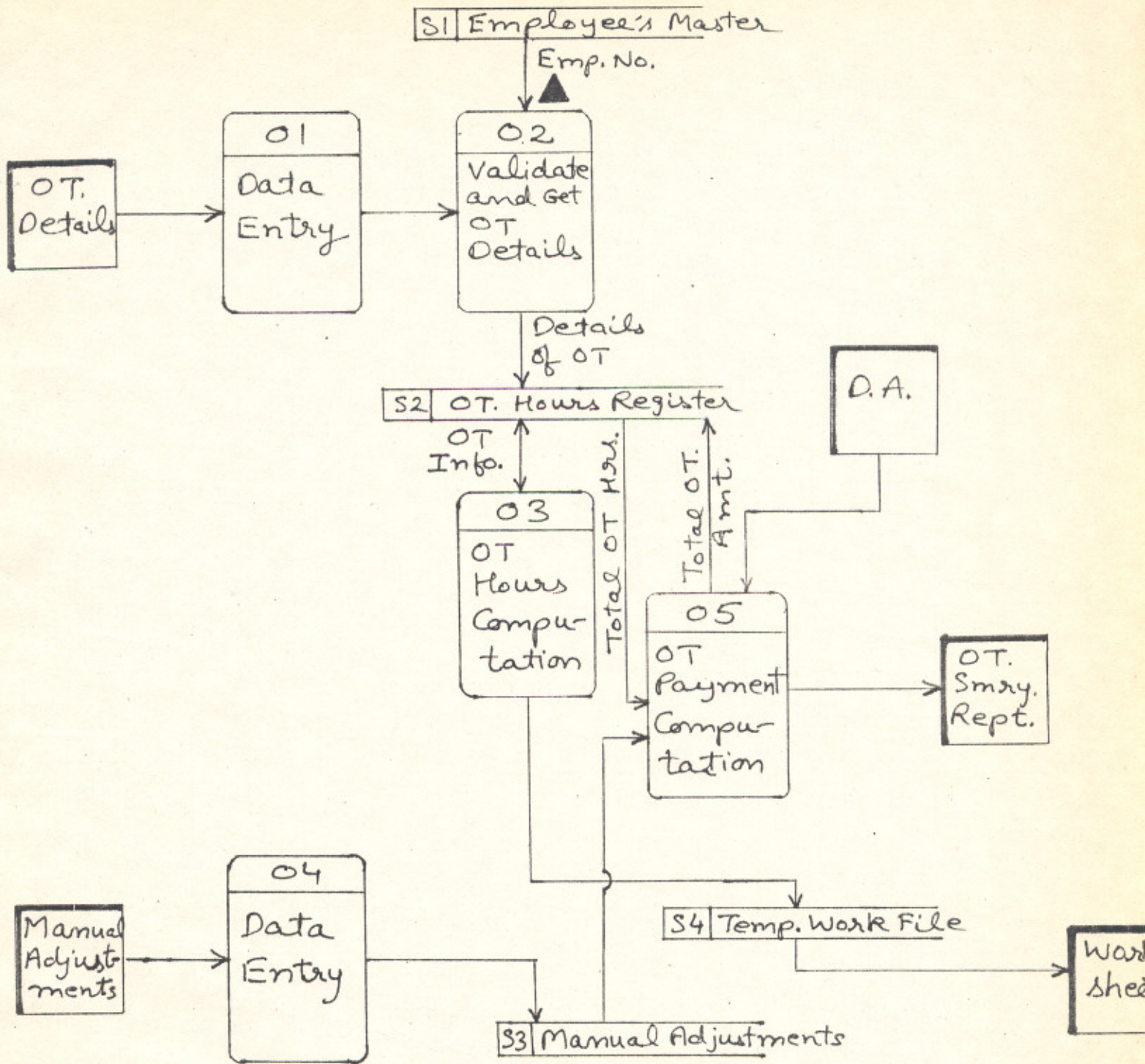
The system to be developed had to be simple to operate since the employees of the personnel department did not have all that much know-how about the computer. Thus, I developed a menu driven system which can be operated even by an un-experienced user.

The Data Flow Diagram (DFD) and the HIPO chart for the proposed system have been given on next two pages.

# HIPO CHART (PROPOSED SYSTEM)



# DATA FLOW DIAGRAM (PROPOSED SYSTEM)



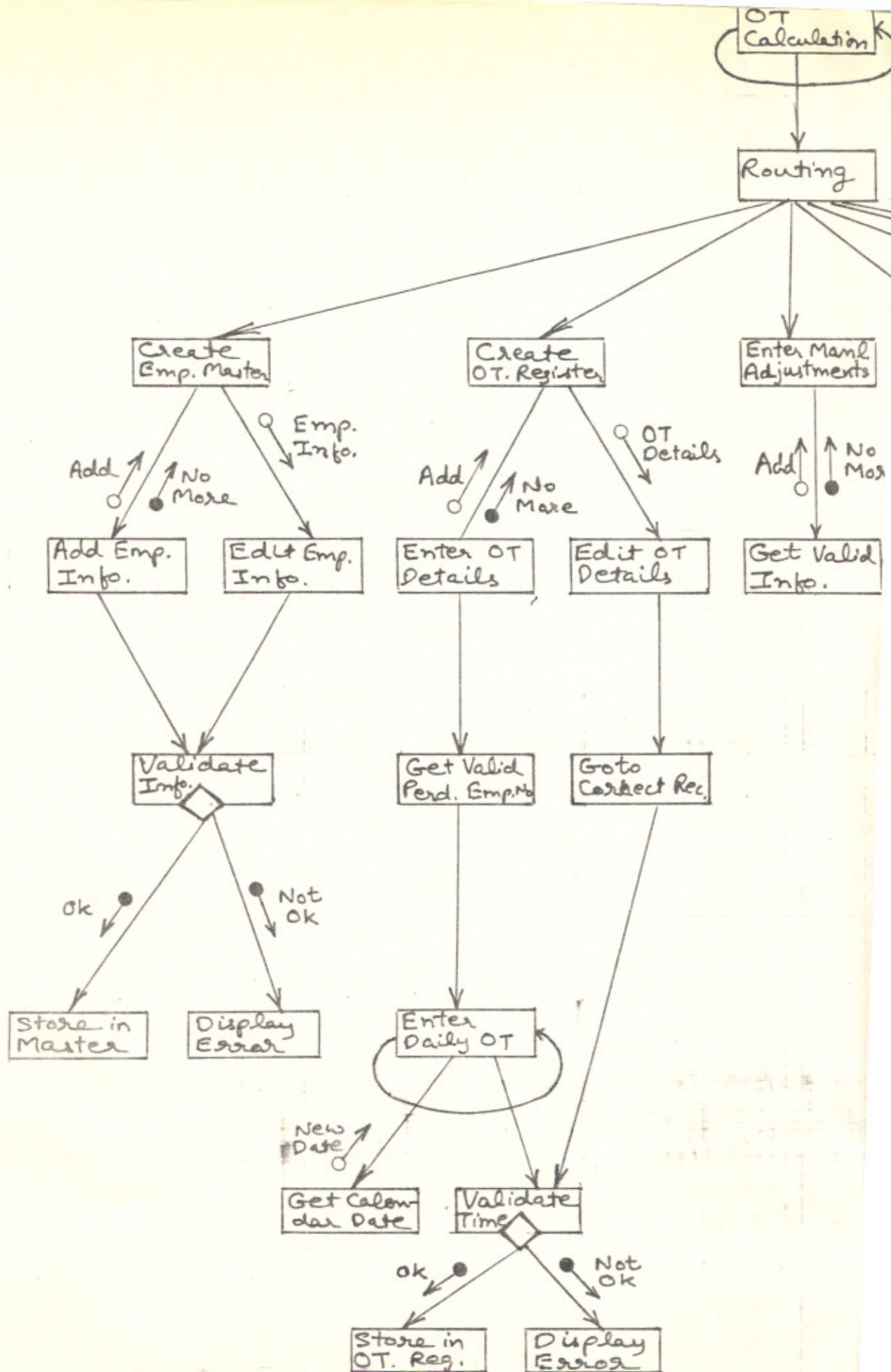
## 2.2 DESIGN

For presenting the design of sub-system OCS, I have used tool of structured methodology known as structured chart. For this sub-module the structured chart is shown on the coming page.

### 2.2.1 Structured Chart:

The structured design shown here has a top down design and shows how the OCS was designed. In the chart you will see only the major blocks, since otherwise the design became too complex to be represented in a single figure. The system is menu with the main menu supporting three menus and six other programs.

The routing block shows that one of the options can be chosen. The first three are for data entry. These include modules for data entry of employee information, daily overtime hours and manual adjustments. This also includes editing modules. The next printing a dump of inputs so as to check for data entry errors. After correct data entry, calculation for OT are done at the end of the month. The results are stored in various files. In case there is need to look at OT details, query on terminal module can be called. Finally, printing of overtime summary report for various categories division-wise is done and also the worksheet.



Print Check Listing

Info.

Ready Print  
er & Print

Month end Calculation

Get Period

Ok

Not Ok

Validate

Compute,  
Store OT

Query on Terminal

Ask for Type of Query

O.T. Info.

Display Info.

Print Reports

Ask Type of Report

O.T. Info

Print OT Info.

Get D.A.,  
for this Month

Total Hrs

Compute,  
Store OT Amt.

## 2.2.2 Input/Output Formats:

Only structures of input and output formats have been reported here. Actual complete output formats along-with test data are included in appendix 1.

a) The following are an example of the input screens formats available for entering the data in OCS.

i. Personnel Information data entry screen format was decided to be as -

```
Personnel Information - add screen
                                Cata
Emp-no      Name              Basic gory Cardno  Div  Dept
-----

```

---

---

ii. Personnel Information editing screen will be of the type shown below -

```
Personnel Information - Editing screen

N - Next  P - Previous  E - Edit  S - Seek  X - Exit

Emp. no.:      Name____:
Basic____:     Category:      Card no.:
Div____:       Dept____:
```

iii. Overtime hours entry screen was decided to have the following format -

OT Hours Add Screen

Period: (yymmdd) TO (yymmdd)

Emp\_no: Name:

Date	OT hours	
	From	To

---

17		
18		
.		
.		
.		
15		
16		

---

iv. Overtime hours editing screen has to have the following format -

OT Hours Edit Screen

Period: (yymmdd) TO (yymmdd) Emp\_no:

Name:

Date	OT hours	
	From	To

---

17		
18		
.		
.		
.		
15		
16		

---

b) Following are an example of the output formats available for printing the reports.

i. The output summary reports to be made division wise for the following classes of employees

- a) General staff
- b) Workers
- c) Temporary Employees

Format for a), b), c) above is

OT Details - GeneralStaff/Workers/  
Temporary Employee

Year:		Div:	
Period:			
Sl.		Total	Total
no.	Emp. no.	OT hours	OT amt
-----			

ii. The worksheet giving the total overtime hours worked daily and the total hours in a period is outputed as below

WORKSHEET - Period:                      to

Sl.	Emp.	No. of hours					Total	
no.	no.	17	18	19	....	15	16	hours
-----								

### 2.2.3 Database structures:

The system was found to be needing a relational database system after elaborate discussions with the users. The users in this case being the Personnel Department of ASEA Ltd. Hence DBASEIII has been used for this purpose.

The following four databases were created to store the information for overtime and the employees.

1. Personal Information of Employees - PERS .DBF
2. Overtime Hours Worked - OTREG .DBF
3. Working Sheet of Daily Overtime - TEMPWORK.DBF
4. Manual Adjustments - MAN\_ADJ .DBF

The file structures used for all these files have been shown on the following pages:

i. Personal Information File for Employees - PERS.DBF

	Field	Description	Type	Width	
1	EMP_NO	Employee's No.	C	4	
2	ENAME	Employee's Name	C	30	
3	CARD_NO	Employee's Card No.	N	3	
4	BASIC	Basic Salary	N	7	2
5	CATAGORY	Category	C	2	
6	DIV	Division	C	1	
7	DEPT	Department	C	3	

Total Width of a Record is 51 characters

This file is Indexed on EMP\_NO to PERS.NDX file

ii. Daily Overtime Hours Register - OTREG.DBF

1	EMP_NO	Employee's No.	C	4	
2	PERDFR	Period From Date	C	6	
3	PERDTO	Period To Date	C	6	
4	HRFR17	Time Overtime Began on 17th	N	5	2
5	HRT017	Time Overtime Ended on 17th	N	5	2
6	HRFR18	Time Overtime Began on 18th	N	5	2
7	HRT018	Time Overtime Ended on 18th	N	5	2
.....					
.....					
64	HRFR16	Time Overtime Began on 16th	N	5	2
65	HRT016	Time Overtime Ended on 16th	N	5	2
66	TOT_OT_HRS	Total OT Hours in Period	N	6	2
67	OT_AMT	Amount Payable for Period	N	7	2

Total Width of a Record is 340 characters

This file is Indexed on PERDFR+PERDTO+EMP\_NO  
to OTREG.NDX file

iii. Temporary Work-Sheet for Daily Overtime  
- TEMPWORK.DBF

1	EMP_NO	Employee's No.	C	4	
2	PERDFR	Period From Date	C	6	
3	PERDTO	Period To Date	C	6	
4	D17	OT Hours on 17th	N	5	2
5	D18	OT Hours on 18th	N	5	2
6	D19	OT Hours on 19th	N	5	2
7	D20	OT Hours on 20th	N	5	2
.....					
.....					
33	D15	OT Hours on 15th	N	5	2
34	D16	OT Hours on 18th	N	5	2
35	TOT_OT_HRS	Total OT Hours in Period	N	6	2
36	CALC_DATE	OT Hours Calculation Date	C	6	

Total Width of a Record is 184 characters

iv. Manual Adjustments File - MAN\_ADJ.DBF

1	EMP_NO	Employee's No.	C	4	
2	PERDFR	Period From Date	C	6	
3	PERDTO	Period To Date	C	6	
4	HRS_SGL	No. of Hours to be Taken as Single for Total OT Hrs.	N	5	2
5	AMT_ADJ	Amount to be Adjusted in Total for Arrears	N	7	2
6	REASON	Reason for Arrears and/or Single Hours	C	30	
7	ENTD_BY	Record Entered By - Name	C	10	

Total Width of a Record is 69 characters

### 2.3 IMPLEMENTATION AND TESTING

#### 2.3.1 Processing Logic:

The software package OCS has been developed in dBASE III and implemented on IBM PC compatible. Various programs and sub-programs developed for this purpose are briefly explained as under:

1. OTMAIN .PRG Main Menu for Overtime Calculation System giving nine options of which any can be chosen.
2. PRGDATE .PRG To test if today's date has been set and convert the date in format 'yymmdd'.
3. PRIMENU .PRG Menu to print output reports giving four options to print OT summary report and worksheet.
4. QMENU .PRG Query Menu for query on terminal to view OT details for an employee or OT details of employees a given date.
5. CKLSMNU .PRG Check list Menu to print dump of inputs made

6. PERSINFO.PRG To input the personnel information as Emp. no., name, basic salary, category, division, department validate and store in Employee info. file.
7. EDITPERS.PRG Edit personnel information, validate the fields edit and update the record.
8. OTGENIP .PRG To input Overtime done. It takes in daily start and end overtimes from 17th of one month to 16th of the next. The times are validated and stored in employee OT register.
9. EDOTREG .PRG Edit the OT hours in OTREG file, validate them and update the record.
10. VALIDPER.PRG Validate fields for PERS file, namely-employee no., category, division, department. It displays an error if status not OK or returns status OK to main program.
11. OTHRCHK .PRG Validate time inputed in OTREG file. If times are out of range an error is flashed, else status OK is given to main program OTGENIP.
12. MANADJT .PRG To input manual adjustments for arrears for previous months and hours to be made as single. It validates and stores in adjustment file.
13. OTCALC .PRG To do month end calculations. It takes in period for which calculation is to be done and calls WKSHEET program to compute the hours. Then it takes in D.A. for the three given types

General Staff with Basic < Rs. 101/-  
 General Staff with Basic >= Rs. 101/-  
 Workers

Calculations of total payable amount is done taking into account the single hours and arrears. The formula used is

$$OT\_AMT = (BASIC + DA)/208 * (TOT\_OT\_HRS*2)$$

But in case of NG and WT category, D.A. is not added to the Basic for computation. It stores total amount in OT Register.

14. WKSHEET .PRG To calculate time difference using HRSDIFF program for each day and deducting lunch hours where applicable. It stores this in temp. work file. This is done for all emp's in OTREG file
15. OTCKLST .PRG To print dump of OT hours entered. It gives daily start and end OT for a month for all employees doing OT.
16. PERCKLST.FRM To print dump of personnel information. It is similar to its input screen gives listing of emp. master file.
17. MANCKLST.FRM To print dump of manual adjustments entered
18. QEMPDT .PRG For seeing OT on a given date on terminal. The system prompts for a date, if OT is found, it displays details for all employees who have done OT on that date.
19. QOTEMP .PRG For seeing OT of a single person in a month. On the screen dates for the whole period and the corresponding OT will be available.
20. PRISUM .PRG To print the Overtime Summary Report. The report is given separately for

General Staff  
Workers  
Temporary Employees

and it is given division-wise.

The Div. name has to be entered to print the report.

21. PRIWKSH .PRG To print the Working Sheet from Tempwork file. It gives the daily OT done for each day and the total OT hours in the period.
22. CHKDATE .PRG Validate the date entered. An error is displayed and status 'L' for loop is returned to re-enter the date, otherwise status is 'E' for exit, to continue.
23. GETDAYS .PRG To get last days of month according to the calendar. It returns values 28, 29, 30, 31 depending upon the month.
24. GETNXTDT.PRG To get the next date from any date. It gets the next date in the month or changes the month using days variable from previous program.

- 25. GETPD .PRG It gets the from and to dates of the period, validates them and returns their value to main program.
- 26. HRSDIFF .PRG To calculate OT for a day for Wksheet program. It returns the decimal value of daily overtimes to WKSHEET program where they are added to the total of OT hours.

The contents of the database files are also briefly mentioned as under:

- 27. OTREG .DBF Overtime register to store Overtimes for each of the employees for the period
- 28. PERS .DBF Personnel Information file
- 29. MAN\_ADJ .DBF Manual Adjustments file
- 30. TEMPWORK.DBF Temporary working sheet file
- 31. OTREG .NDX Index file for OTREG file with index on Perdfr+Perdto+Emp\_no
- 32. PERS .NDX Index file for PERS file with index on Emp\_no

### 2.3.2 Operational Procedures

The steps involved in starting up the system are listed in sequence as under:

- Switch on the P.C. and also the terminal. Once the system gets booted and the C> prompt is displayed you are ready to work with the system
- Insert the OCS floppy in the floppy drive (A:drive) and type a:OT and press return to go the Main Menu.
- This will display the main menu which will appear as on the screen in the form below:

```
                OCS
            MAIN MENU                VERSION 0
```

1. Add Personnel Information
2. Edit Personnel Data
3. Input OT Hours
4. Edit OT Hours Details
5. Enter Manual Adjustments
6. Check List Menu
7. Month end Calculations
8. Query Menu
9. Print Menu
- Q. Exit

Enter your choice:

The system prompts for your choice. To exit type 'Q'.

The individual options are explained as under:

#### Personnel Information file

This file stores information about the employees. On pressing '1', you get an input screen where employees information can be entered.

Type in the information corresponding to the headings shown at the top of the screen. The headings are reproduced below.

#### Personnel Information - Add Screen

Emp. no.	Name	Basic	Cate- gory	Card no.	Div.	Dept.
----------	------	-------	------------	----------	------	-------

Validations will be performed as indicated. In case any error occurs, cursor returns to the current row and allows you to re-enter the fields correctly.

To exit this input screen leave the name field blank by simply pressing a return. A message will confirm your intention and return to the input screen or the main menu.

#### Editing Personnel Information

While keying in personnel information some data might have been entered wrongly or some of the information of an employee may have changed. Option 2 gives the choice of making changes in the data.

The screen displays the first record in the database. The options available here are displayed on the screen along with the headings as:



You can go to the particular record by giving N as your command, press E to change the time. The message 'Record Updated !' will be displayed after which you can go to another date or exit from this screen.

#### Enter Manual Adjustments

This is the option by which you can enter adjustments for single hours to be taken and for the arrears of previous months payable to the employees. These hours and amount are to be calculated manually and entered here.

#### Check list menu

The option 6 takes you to the Check list menu which is shown as below:

#### OCS Check list menu

1. Personnel Information
2. Overtime Hours Inputted
3. Manual Adjustments
0. Exit to previous menu

Enter your choice:

Three options are available here:

- i. The first for printing the personnel information file
- ii. The second one for printing the overtime hours entered in the overtime data file.
- iii. The final one is for printing the manual adjustment file.

In all cases, the printer is to be switched on. Press any key to start the printing.

## Month end Calculations

This option allows you to do the calculation part of the OCS. The system prompts for the period for which the OT is to be calculated. In case data is found for the said period, calculation of daily overtime hours and the total hours begins. The system tells you to wait till it calculates.

Upon storing the overtime hours in a temporary worksheet database the system prompts for the D.A. Enter the D.A. for the present period for the following types.

General Staff with Basic < Rs. 101/-  
General Staff with Basic >= Rs. 101/-  
Workers

The amount payable to the employees is calculated and stored in the overtime database.

## Query menu

The option 8 takes you to the Query menu which is shown as below:

### OCS Query menu

1. For a person give the overtime details for the given period
2. For a particular date give the overtime details of employees
0. Exit to previous Menu

Enter your choice:

This is the menu by which you can ask queries on the screen. The first option asks for the period and an employee no., and displays the overtime for the whole period done by the said employee.

The second option asks for a date. It then lists the employees and the time worked in overtime by them for that date.

After going through either of the queries the system asks you to press a key so as to exit from the screen and go to the query menu screen and subsequently call for another query or return to the main menu.

#### Print menu

Option 9 takes you to the Print menu as shown below:

#### OCS

#### Print menu

1. Overtime Summary Report-General staff
2. Overtime Summary Report-Workers
3. Overtime Summary Report-Temporary employees
4. Worksheet
0. Exit to previous Menu

Enter your choice:

The first three options are similar and call upon you to enter the period and then the division for whom you want the summary report printed. The categories have been specified in the options themselves.

Option 4 is for printing a worksheet for the specified period. This outputs the overtime for each date and the total overtime for that period. The worksheet can be used for checking the calculations.

In all cases the system expects the printer to be ready. Press any key to start printing.

## Validation of Fields

Here are listed the validations available in the various files used in this system:

Field Name	Description	Valid Data
EMP_NO	Employee no.	First Char. 'R' or 'Y' and the numeral part must be greater than 300 in both the cases. Duplicates are not allowed.
DIV	Division	Same as first character of Employee no.
DEPT	Department	First Char. same as division
CATEGORY	Category	One out of following types For General staff GA, GB, GC, GD, GE, NG For Workers W1, W2, W3, W4, W5, WT
PERIOD	Period	Year field not < 88 Format for period is 'yymmdd'
HRFR17	Overtime Hrs	In increments of 15 minutes and upto 24.00 only. Similar for other such fields for other dates
HRT017		
REASON	Reason for Arrear/Sgl Hrs	It should be brief and upto 30 Chars only

## 6.6 Error Messages

The error messages generated while running the programs and their remedies are listed as under:

Emp. no. entered already present, enter a new no.

Employee no. cannot be in duplicate. Cursor returns to the field, enter a new no. which is unique.

End of file, no more records after this

This indicates that end of file has come in case of editing and type some other command letter to do some operation.

Error in category type, give first letter only as 'G', 'W', 'M' or 'N'

When a wrong type of category is entered this message is shown. Enter one of a correct type and the message goes.

Error in dept. type, give first letter same as in Emp. no.

The department name should start with only R or Y. Type in the correct one and the error goes.

Error in division type, give only as 'R' or 'Y'

The division can only be either one of the two options said above. Control returns to the field, type R or Y.

Error in employee no., give only  $\geq$  R300 or  $\geq$  Y300

Error in Employee no., cursor returns to the field. Enter a new number of the valid type.

Error in given date

Do you want to give another date?(Y/N):

In case the date is not of a valid type, this error occurs. Type Y to enter a new date. Type N to exit the program.

Error in period, correct the field

The period entered is wrong, cursor returns to the field.  
Enter new period in the 'yymmdd' format.

Given Emp. no. for the said period not found

This indicates that there are no details for an employee in this period. Control returns you to the period field, where a new period or same period and new employee no. can be given.

Given Emp. no. not found

Do you want to give new Emp. no ?(Y/N):

The Employee no. entered does not lie in the employees' file. Type Y and enter a new Employee no. as cursor returns to that field. Otherwise type N and exit from the program

No data available for the given period

In case of printing if there is no data in the files for the given period then the above message appears and you can enter a new period.

No OT details found for this Category

Press any key to continue

In case of printing output summary report this error indicates that no data available in this category. Press any key and the menu appears again. Give a new option and continue

No OT details found for the given period

For the given period there are no OT details for any of the employees.

You are already at beginning of file

This shows the beginning of file condition.  
So another command letter can be entered.

### 2.3.3 Environment:

The overtime calculation system has been developed in dBASE-III on PC XT with 20 MB of hard-disk and 640K of main memory.

OCS comes on a floppy and can be used on any one of the various versions of MS-DOS from 3.0 onwards. It has been compiled through a compiler called clipper compiler. The executable version occupies around 147K of the floppy's space. Some of the used by the master file but the rest remains vacant for the databases to build-up. The system runs directly from the floppy and dBASE-III is not required to run it. A printer of 132 column print capability would be required to print the working sheet even though the others can be printed through a 80 column printer.

## OT details for an employee

Period: 880217 to 880316

Emp. no: Y332

Name : SRIKANT K S

Div : Y

Dept: YTZ

OT Hours			OT Hours			OT Hours			OT Hours		
Date	From	To	Date	From	To	Date	From	To	Date	From	To
880217	16.45	20.00	880225	0.00	0.00	880304	0.00	0.00	880312	0.00	0.00
880218	0.00	0.00	880226	0.00	0.00	880305	0.00	0.00	880313	12.00	17.30
880219	16.15	20.00	880227	17.30	20.45	880306	10.45	17.15	880314	17.30	19.45
880220	17.30	20.15	880228	10.30	17.15	880307	0.00	0.00	880315	0.00	0.00
880221	11.15	17.30	880229	17.45	20.00	880308	0.00	0.00	880316	0.00	0.00
880222	17.30	20.00	880301	0.00	0.00	880309	0.00	0.00			
880223	0.00	0.00	880302	0.00	0.00	880310	0.00	0.00			
880224	7.45	9.00	880303	0.00	0.00	880311	0.00	0.00			

Total OT Hours: 44.75

Total OT Amt: Rs. 374.88

Do you want to see OT Details for another employee N

## Overtime details

11:42:56

Date:880220

Emp. no	Name	OT Hours		Dept.
		From	To	
R606	RAMESH S	16.15	21.15	RPR
R607	NOUSHAD AHMED	16.15	21.15	RPR
R609	SELVARAJ B	16.15	21.15	RPR
R623	SRINIVASA T	16.15	21.15	RPR
R624	NAGARAJ T C	16.15	21.15	RPR
Y330	DASARATHY R	16.15	20.30	YPT
Y332	SRIKANT K S	17.30	20.15	YTZ
Y338	RAJENDRA SINGH	17.30	18.30	YTZ
Y348	JOHN D SOUZA	16.15	21.15	YTZ

Press space bar to continue

Personnel Information - Check list

Emp no	Name	Card no	Basic pay	Cate- gory	Div	Dept
R302	LAKSHMI KRISHNAMURTHY	0	295.00	GC	R	RFF
R305	BABU P N	0	130.00	GB	R	RKZ
R306	BABUDAYANANDA B S	0	255.00	GD	R	RMZ
R307	VENKATARAMAN P	0	408.00	GD	R	RMZ
R311	USHA M V	0	208.00	GC	R	RDZ
R312	SRINIVASAN D	0	300.00	GD	R	RKZ
R313	DAMODHAR M R	0	300.00	GD	R	RKZ
R314	NARENDRA K N	0	130.00	GB	R	RFZ
R315	SATHEESH S	0	300.00	GD	R	RKZ
R316	KUMAR G S	0	318.00	GD	R	RDZ
R320	MANGALA M P	0	265.00	GC	R	RCA
R321	SATHYANARAYANA RAO R K	0	90.00	GB	R	RCA
R323	GOVINDASWAMY S	0	140.00	GB	R	RCA
R324	RAMAKRISHNAN R	0	196.00	GC	R	RCA
R325	NARASHIMHA D B	0	172.00	GC	R	RMZ
R326	MEERA SESHACHALA	0	250.00	GC	R	RFF
R327	GANESH R	0	160.00	GC	R	RMZ
R328	PRAKASH S	0	80.00	GB	R	RKZ
R601	MICHEAL L	0	715.00	W3	R	RPR
R602	PAUL S	0	740.00	W4	R	RPR
R604	PRAKASH S	0	335.00	W2	R	RPR
R605	SHREENIVASA S R	0	315.00	W2	R	RPR



Manual Adjustments - Check list

Emp. no	Period from	Period to	Single Hours	Arrear Amount	Reason	Entered by-name
Y641	880217	880316	8.00	0.00	PL ON 19THMARCH	RRK
Y332	880217	880316	4.00	0.00	CL ON 4TH MARCH	RRK
R325	880217	880316	0.00	22.47	ARREARS FEB'88	RRK
Y626	880217	880316	0.00	30.00	ARREARS FEB'88	RRK
Y338	880217	880316	0.00	18.58	ARREARS FEB'88	RRK
Y609	880217	880316	0.00	30.94	ARREARS FEB'88	RRK
Y339	880217	880316	0.00	46.59	ARREARS FEB'88	RRK
R327	880217	880316	0.00	13.83	ARREARS FEB'88	RRK
R602	880217	880316	0.00	191.30	OT DONE AT SITE FEB'88	RRK
Y348	880217	880316	0.00	27.05	ARREARS FEB'88	RRK
R640	880217	880316	0.00	127.90	OT DONE AT SITE FEB&MAR'88	RRK
Y607	880217	880316	0.00	37.15	JAN '88 ARREARS	RRK
Y608	880217	880316	0.00	37.75	JAN '88 ARREARS	RRK

Date: 880326

Overtime Summary Report  
(General Staff)

Year : 1988  
Period: 880217 to 880316

Division: R

SNo	Emp. no	Total OT Hours	Total OT Amount
1	R305	8.25	71.55
2	R314	8.00	69.38
3	R323	5.75	50.42
4	R325	10.25	115.51
5	R326	18.75	184.25
6	R327	2.25	33.99

Date: 880326

Overtime Summary Report  
(General Staff)

Year : 1988  
Period: 880217 to 880316

Division: Y

SNo	Emp. no.	Total OT Hours	Total OT Amount
1	Y305	1.00	9.31
2	Y312	1.00	9.31
3	Y321	14.75	138.99
4	Y330	29.75	266.61
5	Y331	25.50	234.40
6	Y332	44.75	374.88
7	Y335	12.00	104.08
8	Y338	15.50	124.70
9	Y339	5.25	93.64
10	Y345	13.25	120.27
11	Y347	9.25	66.71
12	Y348	20.50	174.89
13	Y349	14.00	137.58

Overtime Summary Report  
(Workers)

Date: 880326

Year : 1988  
Period: 880217 to 880316

Division: R

SNo	Emp. no	Total OT Hours	Total OT Amount
1	R602	5.00	265.82
2	R606	8.75	94.65
3	R607	8.75	98.02
4	R609	10.00	110.10
5	R612	3.75	41.29
6	R613	16.00	173.08
7	R614	4.00	44.81
8	R615	1.25	14.00
9	R616	3.75	42.01
10	R621	1.25	16.17
11	R623	8.75	98.02
12	R624	5.00	56.01
13	R626	1.25	14.00
14	R636	11.25	119.53
15	R643	21.75	231.09

Overtime Summary Report  
(Workers)

Date: 880326

Year : 1988  
Period: 880217 to 880316

Division: Y

SNo	Emp. no	Total OT Hours	Total OT Amount
1	Y605	29.25	338.91
2	Y607	10.50	137.61
3	Y608	6.50	100.88
4	Y609	23.75	261.59
5	Y626	11.50	138.37
6	Y627	24.00	226.15
7	Y641	25.25	194.11

Overtime Summary Report  
(Temporary Employees)

Date: 880326

Year : 1988  
Period: 880217 to 880316

Division: Y

SNo	Emp. no	Total OT Hours	Total OT Amount
1	Y643	40.75	235.10
2	Y644	34.75	200.48
3	Y645	5.50	31.73

Report Date: 880326

WORKSHEET for Period: 880217 to 880316

OT in Hours for dates in first row

Emp. no	17	18	19	20	21	22	23	24	25	26	27	28	29	1	2	3	4	5	6
R305									3.00	3.00									
R314																			
R323									2.00										
R325					6.50			1.25	1.25						1.25				
R326					4.75														
R327						2.25													
R602												5.00							
R606				5.00					1.25	2.50									
R607				5.00					1.25	2.50									
R609				5.00								5.00							
R612																			
R613														1.25	1.25	1.25	1.25	1.25	
R614							4.00												
R615											1.25								
R616	1.25								1.25	1.25									
R621								1.25											
R623				5.00	3.75														
R624				5.00															
R626																			
R636														1.25	1.25	1.25	1.25	1.25	
R643	4.50	6.50	10.75																
Y305													1.00						
Y312												1.00							
Y321			3.75		0.75	2.00	0.75			1.75	3.75								
Y330				4.25	7.00			1.75			5.25	7.75	1.25						
Y331	1.00				6.00					4.25					2.50				
Y332	3.25		3.75	2.75	5.75	2.50		1.25			3.25	6.25	2.25						6.0
Y335												7.00							
Y338		2.50	2.50	1.00		2.25							1.50						
Y339												5.25							
Y345						1.25									1.25				
Y347			9.25																
Y348			9.25	5.00		1.25													
Y349														2.75					
Y605	2.00					1.25	1.00	1.50	1.25		5.00	8.50		1.25					5.0
Y607											1.00	8.50							
Y608												6.50							
Y609																			
Y626																			
Y627																			
Y641																			
Y643	2.75			1.25				1.25				7.75		1.25					
Y644																			4.00
Y645												5.50							



## PROJECT-II

### ORDER HANDLING SYSTEM

The Analysis Design and Implementation of the "OHS" package are explained in separate sections below:

#### 3.1 ANALYSIS

This phase of system study for OHS involved going into intricacies of the procedure followed in handling orders right from receipt of order to delivery of the final product. After analysing the problem, Swedish recommendations for order handling were also studied. A proposed system was put forward keeping both Indian and Foreign ideas in view. Here all the three sub-parts of analysis are explained in detail.

##### 3.1.1 Problem:

Each of the departments at ASEA have an order handling sub-department or section. These are headed by a group leader and supported by 3 or 4 others. They are responsible for seeing that an order placed on the firm goes through all its phases and the wanted product is delivered on schedule to the customer. While an order is processed it has to pass through many different departments. It is for the order handlers to see to it that none of the concerned departments delay an order and also that the customer does not cause any delay in approving designs and taking delivery. Otherwise ASEA will be losing money in terms of interest on the value of the product.

The Senior Managers and the General Manager wanted a system which could tell exactly what jobs in the execution of an order got delayed, name(s) of the responsible departments and number of weeks of delay caused. Order processing at ASEA in terms of weeks. The time plan chart which they made to record planned week no's of activities completed did not tell about delays and losses. The task of analysing, designing and implementing a flexible system for order handling was given to me.

The initial study was done on RF(Relay Marketing) and YT(Electronic Drive) departments. The system was to be so designed that it could work in the following departments.

YT - Electronic Drive  
YA - Electronic Automation  
RK - Relay Design  
RF - Relay Marketing  
RE - Relay Engineering

But later it was discussed at meetings with users that initially the system would be implemented in YT and RK only and later used in the various other departments of ASEA as the capabilities of the system come to be known.

The users from these two departments wanted a computerised order handling system which could handle the following jobs:

- a) Indicate the present status of an order as regards the activities concerned with that order.
- b) Indicate the department responsible for carrying out an order.
- c) Generate a report giving planned, revised and actual week no's for completion of an activity.
- d) Prepare a "Performance of Delivery Times" schedule at the end of a specified period for all completed orders during the period.

### 3.1.2 Existing System:

To analyse the existing manually operative order handling system, deliberations were organised, in which the users' departments were cooperative and explained their system in detail. They used to make a Time Plan Chart which was typed out every month and occasional cuttings and alterations made in the same. This time plan contained order information, activities involved in processing an order and department's responsible for each of them. The planned week no's when the activities were to be completed were noted down depending on the product and also the work-load.

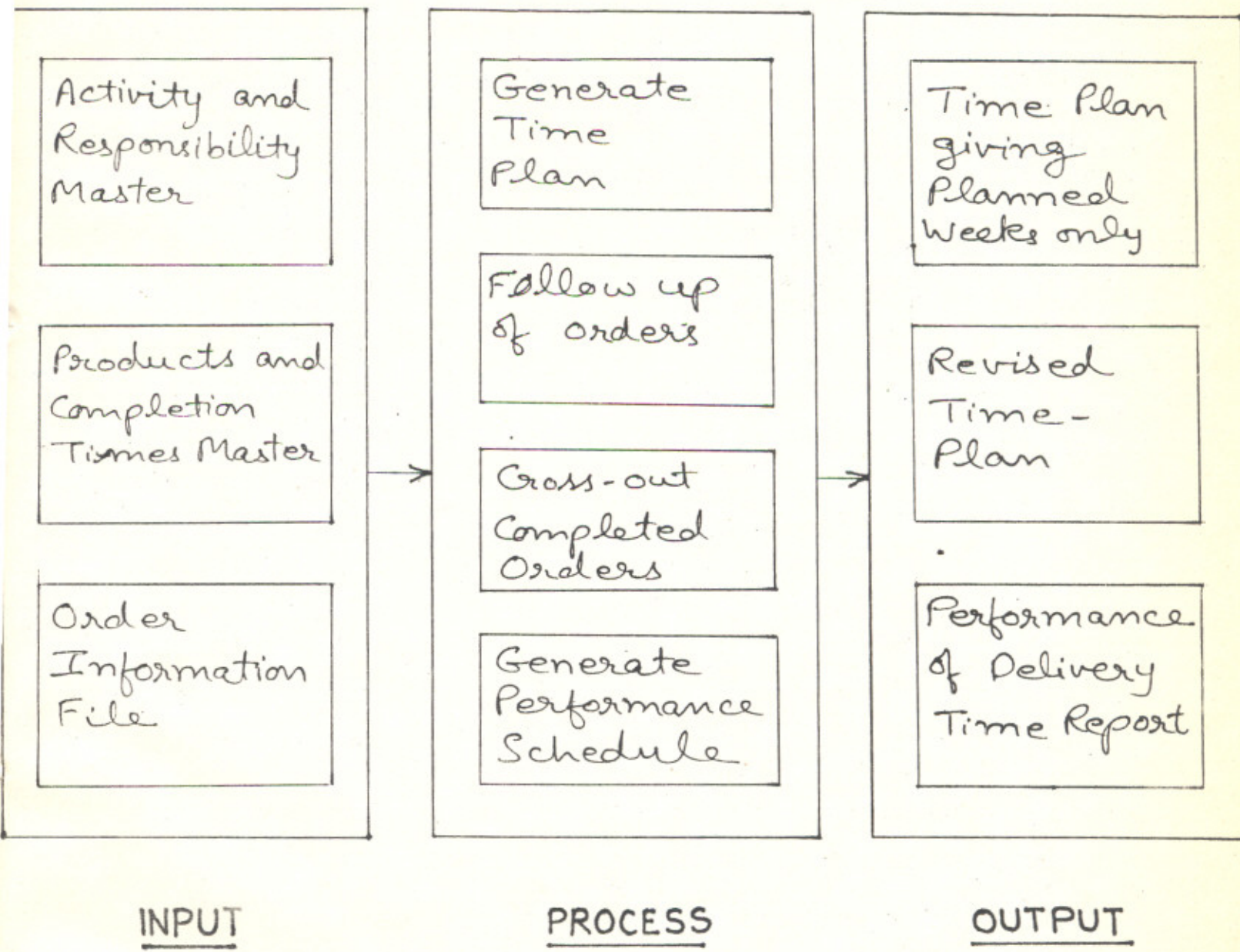
At meetings with the General Manager, the time plan was discussed. In case any delay occurred in executing an activity the previous figure was crossed out and a new planned figure typed in its place. At the completion of an order the actual week no when delivery was done was noted down and rest of the activities crossed out showing that the order is completed. To compute the overall delay in an order, a 'Performance of Delivery Times' schedule was made to report the +ve or -ve deviation between total actual completion time and the planned completion time for completed orders.

All this work done by the order handling section of a department is shown below in the form of points.

- a) Basic order information as order no., customer, product, quantity value noted down in the Time Plan table for new orders received.
- b) Depending on product and the workload, planned week no.s put in front of each activity and department responsible for that, for each of the orders.
- c) Discussions and follow-up done to complete activities in the stipulated time.
- d) In case of delay old week no's crossed out and new revised ones put in their place.
- e) Copies of time plans sent to all departments and regions concerned with the orders to take necessary action.
- f) On completion of orders all planned week no's crossed out and actual delivery week put in.
- g) Deviation in planned and actual despatch of an order noted down in "Performance of Delivery Times" report.

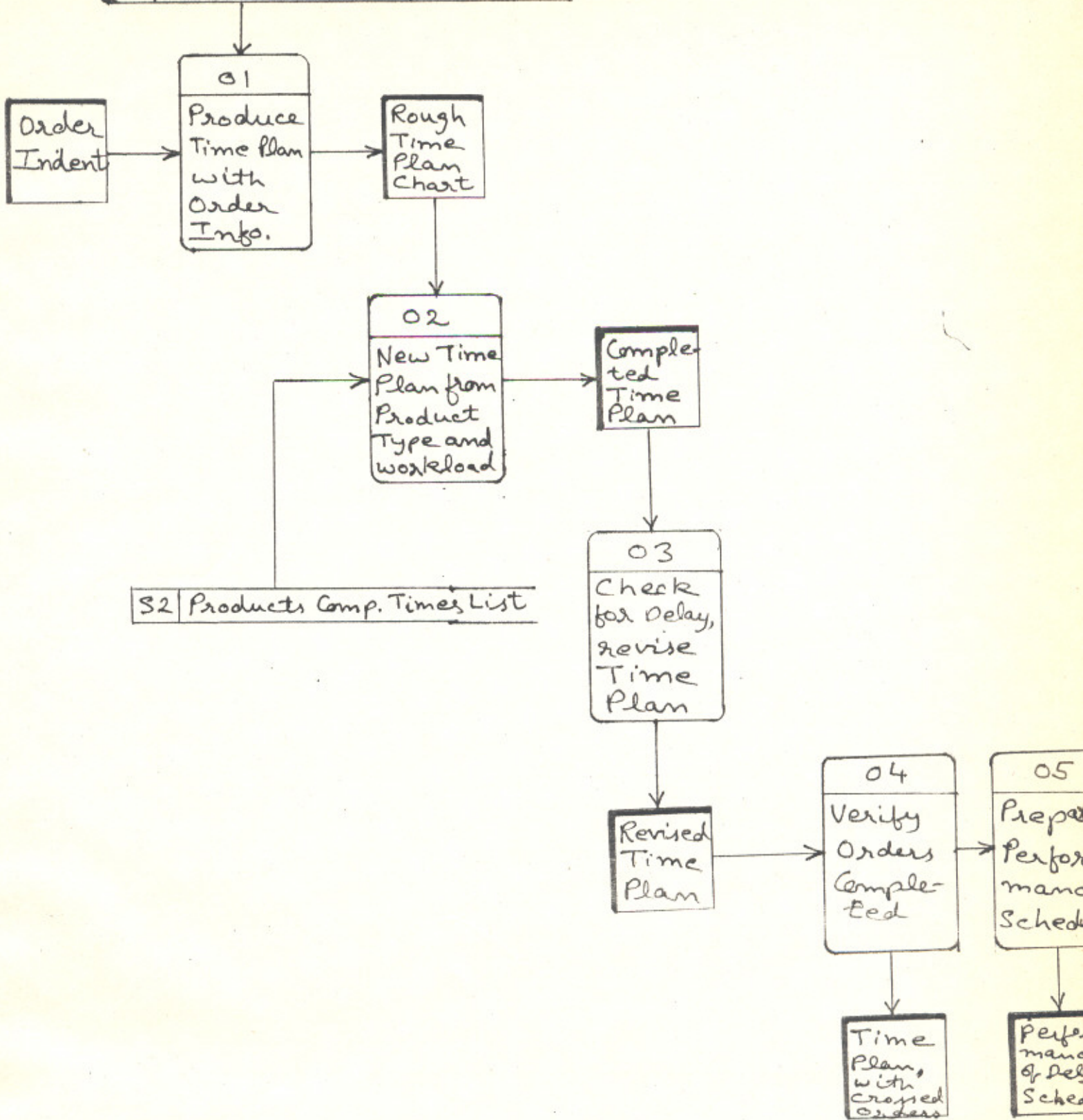
These steps undertaken manually by Order Handlers are shown in Hierarchy Input Process Output(HIPO) chart and a Data Flow Diagram(DFD) on coming two pages.

# HIPO CHART (EXISTING SYSTEM)



# DATA FLOW DIAGRAM (EXISTING SYSTEM)

S1 Activity and Resp. List



The problems faced in this manually operatable system are listed as under:-

- a) Excessive time taken to note down and compile and then revise the time plan chart.
- b) No comparative schedule giving the planned and/or revised and the actual weeks of completion of activities.
- c) Delay caused in activities is not known.
- d) The department(s) responsible for the delay are not listed out.
- e) No report sent as reminder to the various departments telling that when they are to do the activities.
- f) Loss suffered in terms of money for the delay is not calculated.

### 3.1.3 Proposed System:

Upon analysing the problem of the existing manual system and after discussions with users, a proposed computerised system was put forward. This new system has removed the problems of the existing system to the maximum extent. This system will store the order information, product information, activity information and the planned, revised and actual weeks for activities in separate files.

The proposed system will undertake the following jobs for all orders received:

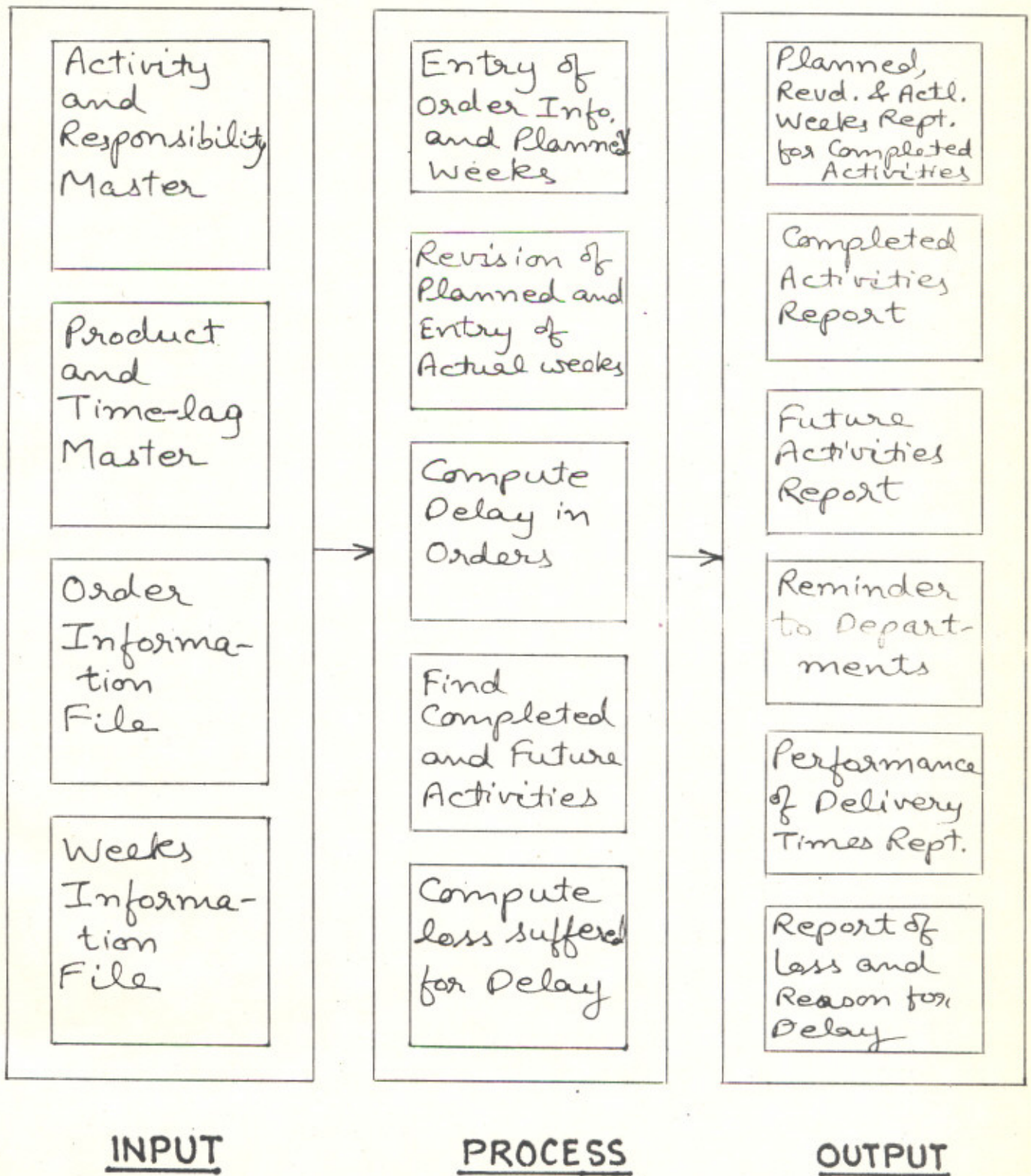
- a) Take an order information, and planned weeks for each order.
- b) Allow to edit all storage files.
- c) Allow to enter revised planned weeks, in case they change and to enter actual week no's when activities are completed.

Note - Planned weeks can only be entered once and remain unaltered throughout.

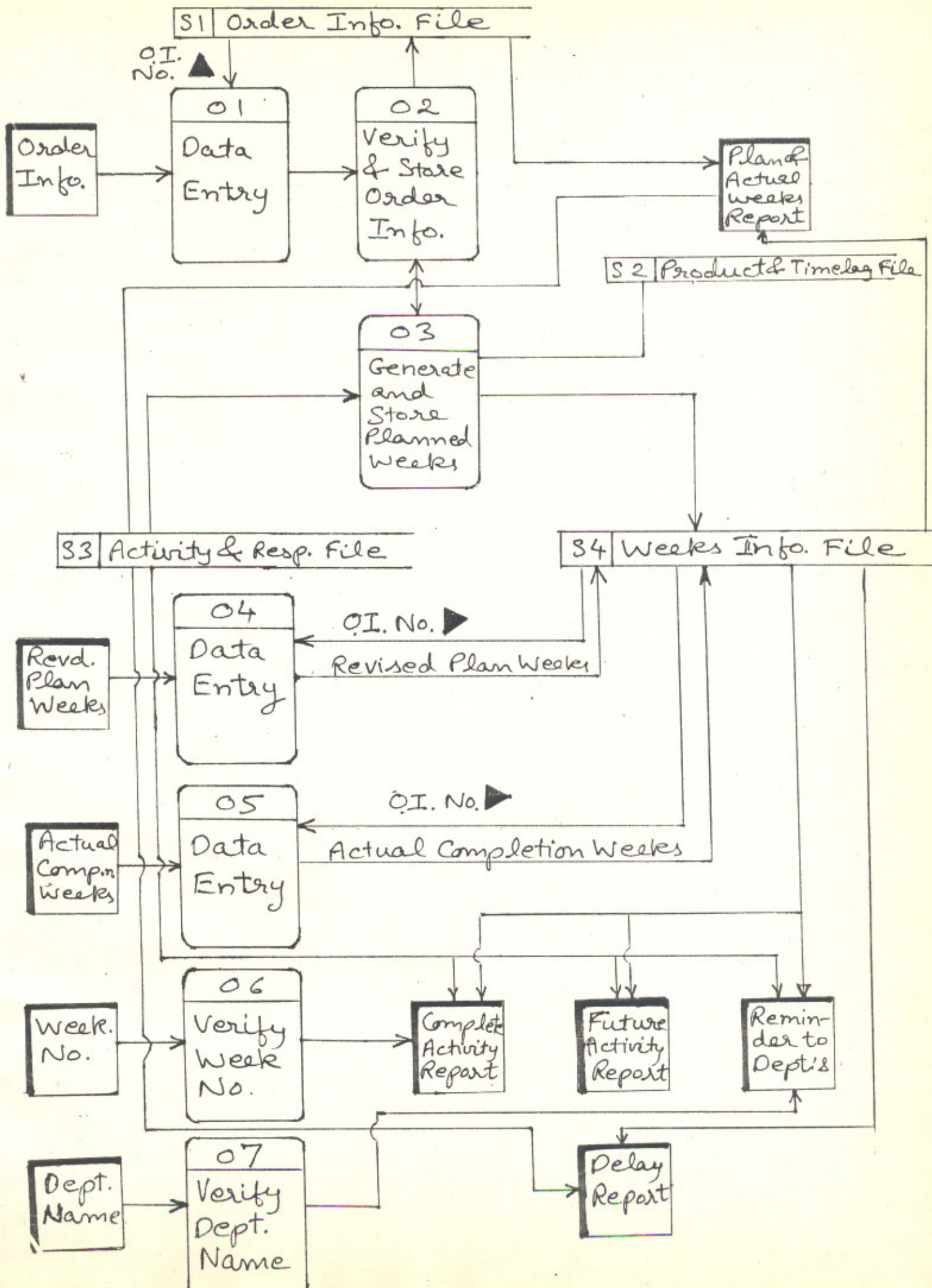
- d) Generate various types of reports giving completion weeks for activities to be completed in future and delay in activities.
- e) Send reminders to various departments giving details of activities they are to do in the coming weeks given in the report.
- f) For completed orders, generate a " Performance of Delivery Times" report and a report of loss suffered due to delay and a detailed reason for the delay.

Working on these lines a menu-driven system using relational database was made which could be easily operated by the employees in the order handling sections of various departments . The DFD and HIPO chart for the proposed system for order handling is given on the coming two pages.

# HIPO CHART (PROPOSED SYSTEM)



# DATA FLOW DIAGRAM (PROPOSED SYSTEM)



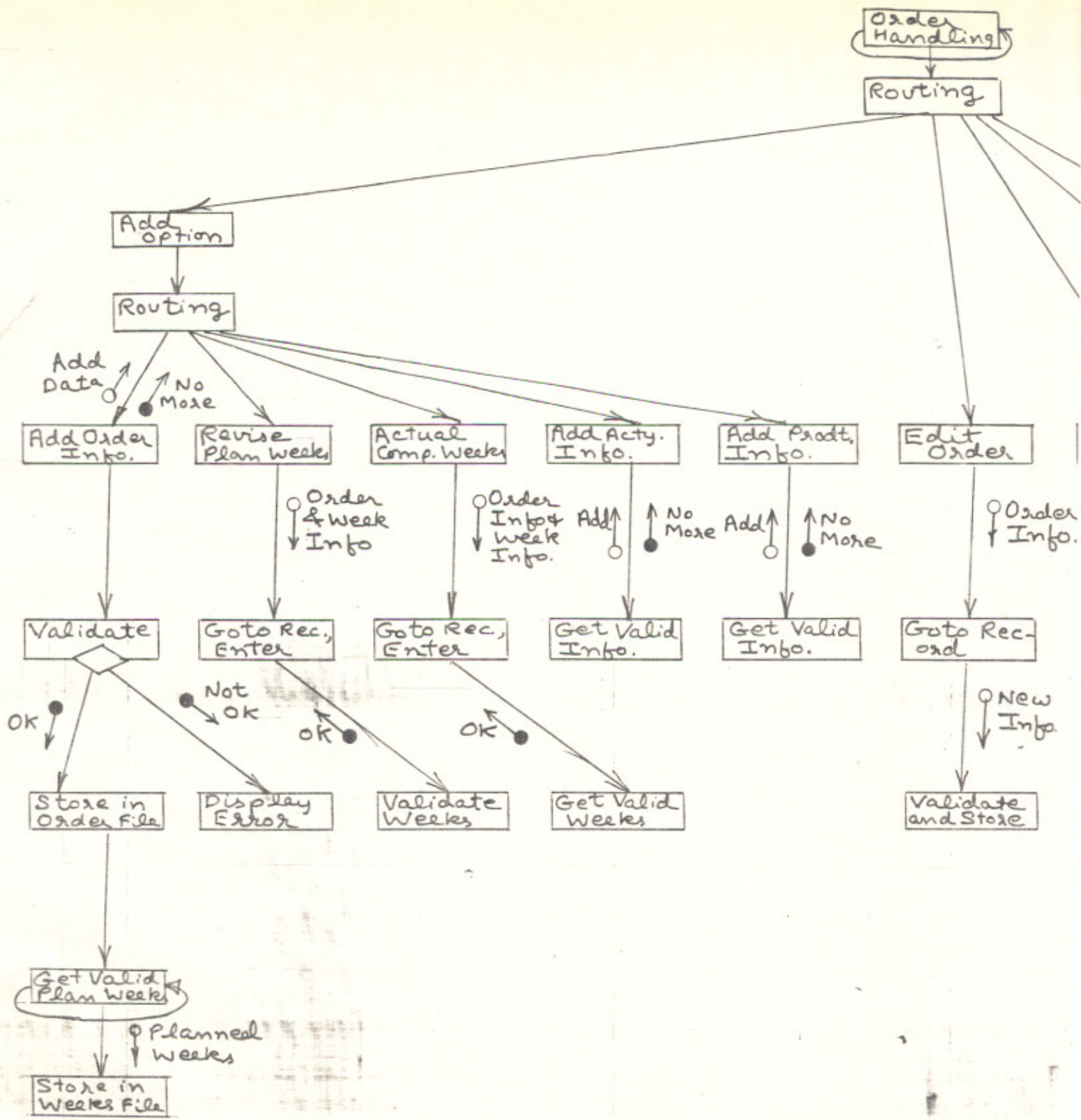
## 3.2 DESIGN

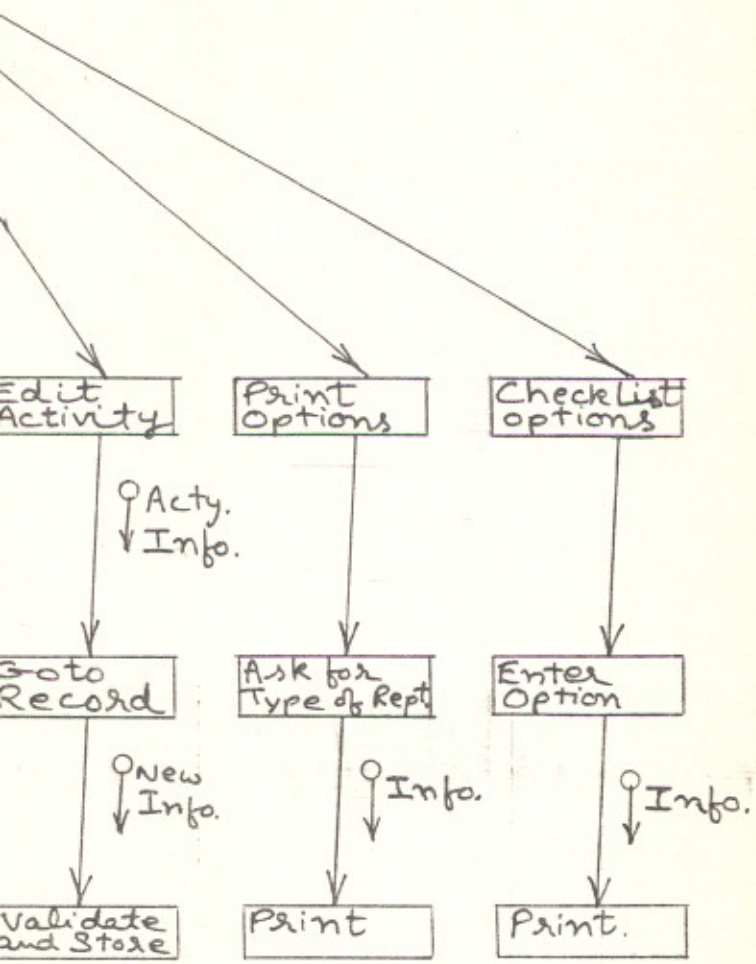
The design of OHS was done using structured Chart. This has been shown on the next page and is fully self-explanatory. But to make it more clear a description of this is given after the Chart. Later the input/output formats used and the databases made for the purpose are also given.

### 3.2.1 Structured Chart:

This design chart for OHS is self explanatory, giving details of running of the system. All the major building blocks of the system have been shown in the top down design and details have been omitted to avoid complexity. The routing here is showing the options available in the main menu.

The first option of the menu is an add menu used to input the data having five different modules. It is for entry of activity, product and order information. Moreover, planned, revised and actual weeks are entered here. The next two options of the main are for editing data in order and activity information file. The details of how the information flow takes place between the modules is not shown here and are can know more by going through processing logic. The other options are for printing. One for printing of check list i.e. dump of inputs. For generating reports there is a print menu giving six types to choose from. There are reports giving completion weeks for activities done, reminder for activities to be done, deviations from standards etc. The chart shows inter-connections between the modules with standard symbols.





### 3.2.2 Input/Output Formats:

The structures of inputs taken in by the system and the outputs printed are shown here. Actual output formats giving test data can be seen in Appendix 1.

a) The following are an example of input screen formats, used to take in the data from the user, for OHS.

i. A broad list of activities and departments responsible for each. This is to be entered once

Activity No. (ACT_NO)	Activity Name (ACT_NAME)	Resp. (Dept.) (DEPT_RESP)
-----------------------------	--------------------------------	---------------------------------

---

---

ii. To enter the name of the product, order indent no., quantity and value in K rupees for each order. To be entered once when the order is received i.e. Order Information

O.I. No.	Cust. Name	Product Name	Qty.	Value (K Rs)
-------------	---------------	-----------------	------	-----------------

---

---

- iii. The customer's name, O.I. No. and week no. in O.I. and the delivery date as given in the same

Cust. name	O.I. No	O.I. Week No	Delivery Week No
-----	-----	-----	-----
-----	-----	-----	-----

- iv. The actual week no.s when the activities are completed. To be entered at completion of every activity

Cust. name: _____	O.I. No: _____	
Activity Name	Actual week	Remarks
-----	-----	-----
-----	-----	-----

- v. If the planned week no.s are revised due to some reasons then enter those also

- b) Following are the structures of output formats available for printing reports on paper.

- i. A statement regarding order information

SNo	Cust. No.	O.I. Name	Product	Qty.	Value (K Rs)
-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----

- ii. A report to show the status of an order at the end of a certain week i.e. activities completed upto that week

Week no: \_\_\_\_\_

SNo	Cust.	Acty.			
	Name	1	2	3	.....

-----  
(acty's completed only)  
-----

- iii. A report to show the activities to be done in the future weeks

Week no: \_\_\_\_\_

SNo	Cust.	Acty.			
	Name	1	2	3	.....

-----  
(future acty's only)  
-----

- iv. A statement showing the deviations from actuals in the completion of an order i.e. Performance of Delivery Times schedule

SNo	Cust.	Product	Qty.	O.I.	Actual	Devi-	Remarks
	Name	Name		Comp.	Comp.	ation	
				wks	wks	+/-	

- v. A statement to show the activities delayed and department concerned with that

Delay: \_\_\_\_\_ weeks

SNo	O.I. No.	Cust. Name	Activity Name	Dept. resp.
-----	-------------	---------------	---------------	----------------

-----

-----

- vi. A statement giving the no. of weeks of delay and the loss suffered for the delay.

SNo	Cust. Name	Product Name	Value (K Rs)	Delay (weeks)	Loss (Rs)
-----	---------------	-----------------	-----------------	------------------	--------------

-----

-----

### 3.2.3. Database Structures:

Information to be stored in case of OHS was of different types but all were related together. So dBASE-III being a relational database language was used for the purpose.

The following four databases were created for successful operation of the order handling system. They are given alongwith structures below.

#### i. Activity and responsibility database - ACTDAT.DBF

Field	Description	Type	Width
1. ACTY_NO	Activity No.	C	5
2. SEQ	Sequence No.	N	2
3. ACT_NAME	Activity Name	C	40
4. DEP_RES1	Resp. for each	C	4
5. DEP_RES2	Resp. for each	C	4
6. DEP_RES3	Resp. for each	C	4

Total width of a record is 60 Characters

File is indexed on ACTY\_NO to ACTDAT.NDX

#### ii. Order information database - ORDINFO.DBF

1. OI_NO	O.I. No.	C	11
2. OI_DATE	O.I. Date	C	6
3. DEPT	Department Name	C	2
4. CNAME	Customer Name	C	25
5. PNAME	Product Name	C	10
6. ORD_TYPE	Order Type	C	4
7. QTY	Quantity	N	2
8. VALUE	Value (K Rs)	N	7 2
9. D_WEEK	No. of Weeks Delay	C	3
10. D_LOSS	Loss due to Delay	N	6 2
11. D_REASON	Reason for Delay	M	10
12. STATUS	Status of Order	C	1
13. WK_GEN_TYP	Type of Week Generation	C	1

Total width of a record is 87 Characters

File is indexed on OI\_NO+OI\_DATE to ORDINFO.NDX

iii. Week entry database- WEEKS.DBF

1. OI_NO	O.I. No.	C	11
2. ACTY_NO	Activity No.	C	5
3. PLAN_WK	Planned Week no	C	3
4. PLAN_DATE	Date of Planned Entry	C	6
5. REV_PL_WK	Revised Plan Week no	C	3
6. REVD_DATE	Date of Revised Entry	C	6
7. ACT_CMP_WK	Actual Completion Week	C	3
8. ACTL_DATE	Date of Actual Entry	C	6

Total width of a record is 44 Characters

File is indexed on OI\_NO+ACTY\_NO to WEEKS.NDX

iv. Activity times database- ACTTIME.DBF

1. PNAME	Product Name	C	10
2. ACTY_NO	Activity number	C	5
3. TIME_LAG	Time lag from start	N	2

Total width of a record is 18 Characters

File is indexed on PNAME+ACTY\_NO to PROD\_ACT.NDX

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### 3.3 IMPLEMENTATION AND TESTING

The system was tested using, test data given by the user's and accurate reports were generated from it. As regards implementation, the system was run on an IBM Compatible PC made available to me for the purpose of development of software packages. But this system could not be implemented in the users' departments till the end of my project since these departments could not get time available on the computer.

#### 3.3.1 Processing Logic:

The brief explanation of programs in OHS is given as under:

1. OHMENU .PRG Main Menu for Order Handling System giving five options to choose from.
2. PRGDATE .PRG To validate date for being today's date and putting date in format 'yymmdd'.
3. ADDMENU .PRG Menu giving options for entering data. It gives five options where data can be entered into various file.
4. CHKMENU .PRG Menu for printing dump of inputs made. The storage files are printed as such so as to check for data entry errors.
5. PRTMENU .PRG Menu for printing output reports. It allows six types of reports to be printed. The option no. can be pressed and printer made ready to start printing.
6. ADDORD .PRG To input the order information and the planned weeks. It validates the info. and allows for manually or automatically entering the planned week. It again confirms for any change and stores it permanently in weeks info. file.
7. ADREVPL .PRG To input the revision in the planned weeks. Enter the OI-no. for whom some of the planned weeks have changed. These are validated and stored after final confirmation.

8. ADACTLWK.PRG To input the actual weeks of completion of activities. On giving the OI-no., if found, planned and revised weeks along with activities are shown and actual weeks of completion can be entered.
9. ADDACT .PRG To input activity information and departments responsible for each of them.
10. ADDPROD .PRG To input product information and time lags. The names of standard products and time lag for each activity from the start is given here. So we know for a product what all activities are involved and time taken to do them.
11. VALIDORD.PRG Validate order information as OI-no., OI-date, Product name, Order type, Department, Week generation type.
12. EDORDER .PRG Edit order information in ORDINFO file. One can go to the particular record by command letter and edit. Edited data is updated to the file.
13. EDACTY .PRG Edit activity information in ACTDAT file. By pressing a command letter go to a particular record and edit the data.
14. PRICMPWK.PRG Print completion weeks for activities done. The department's name can be given and order info., planned, revised, actual weeks are printed for all activities completed for orders on this department.
15. PRIFTRWK.PRG Print week no.s for activities to be done. It gives planned and revised weeks along with activity information.
16. PRIREMDR.PRG Print reminder to departments for activities to be done. The department names can be entered for whom reminders can be sent showing week no's when activities are to be done.
17. PRIDVTN .PRG Print deviation for completed orders as a whole. It shows planned and actual weeks taken to execute on order and the +ve or -ve deviation from planned weeks.
18. PRILOSS .FRM Print statement of loss incurred. It is calculated @ 18% on the value of an order for no. of weeks of delay occurred in that order.
19. PRIDELAY.PRG Print statement of delay in activities. It gives the delay for each of the activities that got delayed in execution of an order.

- 20. LINEPRT .PRG Print a line of any length in print programs. The line type and length are given to print it.
- 21. NEXTYRWK.PRG To get the week in next year for planned weeks. It automatically changes the year if weeks exceed 53.
- 22. DIFFWK .PRG To calculate difference of weeks giving the delay.
- 23. DVTNWK .PRG For calculating +ve or -ve deviation for order. It is for completed orders after taking year changes into account.
- 24. DELAYWK .PRG To find delay in weeks for each activity delayed.
- 25. CHKWEEK .PRG Validate the week entered for being of correct type.
- 26. CHKDATE .PRG Validate the date entered in add order program for being in format 'yymmdd'.

The database file and format files are also explained as under:

- 29. ORDCKLST.FRM Print dump of order information entered
- 30. PRDCKLST.FRM Print dump of product information entered
- 31. ACTCKLST.FRM Print dump of activity information entered
- 32. ORDINFO .DBF Order information file
- 33. ORDINFO .DBT Memo file to store remarks
- 34. ACTDAT .DBF Activity and responsibility info. file
- 35. PROD\_ACT.DBF Product and time lag file
- 36. WEEKS .DBF Planned, Revised and Actual weeks file
- 37. ORDINFO .NDX Index file of Order information indexed on Oi\_no+Oi\_date
- 38. ACTDAT .NDX Index file of Activity information indexed on Acty\_no
- 39. PROD\_ACT.NDX Index file of Product information indexed on Pname+Acty\_no
- 40. WEEKS .NDX Index file of Weeks information indexed on Oi\_no+Acty\_no

### 3.3.2 Operational Procedures

The steps involved in using the system are listed in sequence as under:

- Switch on the P.C. and also the terminal. Once the system gets booted and the C> prompt is displayed you are ready to work with the system
- Insert the OHS floppy in A: drive and type a:OH and press return to go to the Main Menu.
- This will display the main menu which will appear as on the screen in the form shown below:

```
                OHS
            MAIN MENU                VERSION 0
```

1. Adding Menu
2. Edit Order Information
3. Edit Activity Information
4. Print Menu
5. Checklist Menu
- Q. Exit

Enter your choice :

The system prompts for your choice. To exit from OHS type 'Q' in this menu.

## Adding Menu

The first option '1', takes you to add menu which is shown as below :

### OHS Add Menu

1. Add Order Information and Planned Weeks
2. Add Revised Plan Weeks
3. Add Actual Weeks
4. Add Activity Information
5. Add Products and Time Lags
0. Exit to previous Menu

Enter your Choice :

All the options available here are for adding the information in order, weeks, activity and product information files. Option 1 is for adding basic data about an order along with the planned weeks for all the activities concerned. The system asks for the receipt week no. and delivery week no. as given in the order indent after the data about the order has been entered. The planned weeks can be generated automatically or can be entered manually on the user's choice of A or M week generation type respectively.

Then later on as the order gets processed, some of the planned weeks may have to be revised. This can be done in option 2 of above menu. The planned weeks as such can not be changed but the revisions will be stored separately. The 3rd option allows you to enter actual week numbers when the activities get completed.

The next two options are for entering the product names and fixed time lags for doing the activities from the starting activity and the activity information. From this the automatic planned week generation will be done. The activity information has to be entered once giving all the activities for a particular department with the departments i.e. the sections responsible for doing an activity for each of the activities.

Validations will be performed as indicated in the second last section. In case any error occurs, cursor returns to the current row and allows you to re-enter the fields correctly. This is done in all the options given here.

#### Editing Order Information

While keying in the order information some data might have been entered wrongly. Thus option 2 gives the choice of making changes in the data. The system asks for the department whose orders are to be corrected. On giving a correct department name the system displays the information regarding the first order for that department and prompts for a command. In case remarks have to be entered for an order, that can also be done here

To go to a particular order give N as your command and once there, you can press E to edit the data. On doing so the message 'Record Updated!' will be displayed after which you can give another command. To exit, this screen give X as your command.

#### Edit Activity Information

In option 3 of the main menu you can edit the information for the activities since while entering some of the grammatical errors may have occurred or some of the department responsibilities may have changed. The system asks you to enter the department whose activities you would like to change. If activities are found, it displays the first activity and prompts for a command. Go to a particular activity by typing in N and type E to edit the information there. To exit from the screen give X as your command letter.

## Print Menu

The option 4 takes you to the Print menu which is shown as below:

### OHS Print Menu

1. Completed Activities Report
2. Future Activities Report
3. Reminder for Pending Activities
4. Performance of Delivery Times
5. Report of Delay in Activities
6. Report of Loss Suffered
0. Exit

Enter your choice :

The first option gives for all orders in a said department the planned, revised and actual weeks for the activities completed. Option 2 is similar but it gives the planned and revised weeks for the activities to be done in future along with the departments responsible for each of them. On going through this report one can give the department names and in the 3rd option all reminders can be issued to all the departments for whom some of the activities are pending. It gives the planned and revised weeks for activities for that department.

Option 4 gives a cumulative statement of delivery times as regards to completed orders. The statement also gives the deviation of actuals from the planned weeks. This report is for all orders on one department. In case you want to know the delay in for each of the activities you can go to option 5 and print for all orders the delays. To print a statement of loss along with the remarks option 6 can be used for the purpose.

In all cases the system expects the printer to be ready. Press any key to start printing. When the printing is over a printing over message is displayed and by pressing any key you can return to the print menu

Check list menu:

Option 5 takes you to the Check list menu which is shown as below:

OHS  
Checklist Menu

1. Order Information
2. Activity Information
3. Product Information
0. Exit to Previous Menu

Enter your Choice :

Three options are available here:

- i. The first for printing the order information file
- ii. The second one for printing the activities entered in activities file giving departments responsible also for each of the activities
- iii. The final one is for printing the product data and the time lags for all products for all the activities required by that product.

In all cases, the printer is to be switched on.  
Press any key to start the printing.

## Validations

Here are listed the validations available in the various files used in this system:

Field Name	Description	Valid Data
ACTY_NO	Activity no.	First two chars., one out of 'RK', 'RE', 'YT' or 'YA' Duplicates are not allowed
OI_NO	Order Indent(OI) number	No duplicates are allowed eg. is BDY-7346-A1. '-A1' at end is optional.
SEQ	Sequence	Numeral starting from 1 upto 99. No duplicates.
ORD_TYPE	Order Type	One out of 'Ext' or 'IDTO' only
DIV	Division	'R' or 'Y' only.
DEPT	Department	One out of RK, RE, YT, YA
PNAME	Product Name	Same as in Products Master File
DATE	Date	Year field not less than 88 Format should be 'yymmdd'
WK_GEN_TYP	Week Gen. Type	'A'- Automatic 'M'- Manual
PLAN_WK	Planned Week no.	Last two digit not > 53. Format is 'yww'

## Error Messages

The error messages generated while running the programs and their remedies are listed as under:

Activity no. entered already present, enter a new no.

Activity no. cannot be in duplicate. Cursor returns to the field, enter a new no. which is unique.

End of file, no more records after this

This indicates that end of file has come in case of editing and type some other command letter to do some operation.

Error in Activity no., give first two letters only as 'RK', 'RE', 'YT' or 'YA'

When a wrong type of activity no. is entered this message is shown. Enter one with first two letters being one of the specified four and the message goes.

Error in dept. type, give only as 'RK', 'RE', 'YT' or 'YA'

The department name should be one of the specified types only. Type it in again

Error in division type, give only as 'R' or 'Y'

The division can only be either one of the two options said above. Control returns to the field, type R or Y.

Error in order type, enter as 'Ext' or 'IDTO' only

Error in order type, cursor returns to the field. Enter a new order type of the valid type.

Error in given date, enter date again

In case the date is not of a valid type, this error occurs. Type in a correct date in 'yymmdd' format

Error in week no., give last two digits <= 53

Do you want to continue?(Y/N):

This error is to show that a week no. cannot be more than 53, so type in Y to re-enter a new week no or N to come out of the program

Week field is blank, enter all the three digits

In case zeros are put or week no. is left blank then this error is shown. Thus a week no. of valid type has to be entered.

Given O.I. no. already present, enter new no.

When an attempt is made to type in an O.I. no. again, such an error occurs. Cursor returns to the field where a new no. can be entered.

Given O.I. no. not found, enter new no.

This indicates that there are no details for this order in the order information file. Control returns you to the field, where a new order indent no. can be entered

No week information found for this department

Do you want to continue?(Y/N):

The department name entered does not have any information lying in the weeks file. Type Y and enter a new department name as cursor returns to that field. Otherwise type N and exit from the program

No weeks found less than given week

In case of printing if there is no weeks are found less than given one in case of completed activities the above message appears and you can enter a new week no.

No completed orders found for this department

This error occurs in printing performance of delivery times schedule.

### 3.3.3 Environment:

Order handling is a somewhat complicated system occupying nearly 170 Kb for its executable version on the floppy. Only some more bytes are used by the order, activity and product information files leaving ample space to accommodate a large no. of orders in it.

The requirement of the system is a PC or PC XT and it will run on MS-DOS. But the presence of a 132 column printer during the time of printing reports is essential since all reports are large enough for them. Depending on the no. of orders and frequency of generation of reports the requirement of perforated 132 column continuous sheets may be large enough.

Page No. 1  
05/25/88

ORDER INFORMATION - CHECK LISTING

O.I. No.	Date	Cust's name	Prod. name	Order type	Qty.
ATY-3456A09	880405	MYSORE CEMENTS LTD.	T-8 II	EXT	5
BTY-1234B01	880406	NELCO LTD.	TYRAK-8	EXT	8

Value	Delay reason
00.00	The delay in this case was caused by the late delivery of certain essential material by our suppliers, Messrs Manjunathan and Sons Ltd. who were regularly reminded but inspite of this they delayed the whole product for us.
50.50	This product was delayed by our own design department who did not send the designs to production at the planned time since they had lot of work on hand as some of the design engineers had gone on leave. Thus this resulted in loss for us as the product as a whole got delayed.

ACTIVITY FILE - CHECKLISTING

Acty no.	Sequ- ence	Activity name	Dept 's Resp		
			1st	2nd	3rd
YT01	1	O.I. Receipt	REG	YTO	
YT02	2	O.I. Issued to YPP	YTO		
YT03	3	P.O. Received	REG		
YT04	4	Long Lead item list	YTO		
YT05	5	P.R. for long lead items	YTO		
YT06	6	Drgs. submitted for appl.	YTO		
YT07	7	Drgs. approved by cust.	REG	YTO	
YT08	8	Schemes submission to YTO	H		
YT09	9	Issue of OS/OD	YTO		
YT10	10	Check YS & YF matl. available	YPP		
YT11	11	P.R. for OS/OD	YPP		
YT12	12	Receipt of YS & YF mat.	RCP		
YT13	13	CDI, Road Permit Receipts	REG		
YT14	14	Excise filing	YTO	YCE	
YT15	15	Completion of Manu-facturing	YP		
YT16	16	Completion of test-ing	YPVT		
YT17	17	Customer inspection	YP	YTO	REG
YT18	18	Despatch and invoice	YPP	YCE	
YT19	19	Delivary as per PO / OI			
RKA11	20	Works order released by RF	RKD		
RKJ11	21	Questionnaire on unclear pts.	RKF		
RKJ20	22	Long delivary items list to RP	RKS		
RKJ21	23	Imported items of NonASEA make	RKD		
RKJ22	24	ASEA Protections	RKN		
RKJ23	25	Instruments and recorders	RKD	RKN	
RKJ24	26	Switches	RKF		
RKJ25	27	Cubls, Desks, Racks and Cases	RKS	RKF	
RKJ26	28	Local relays of other's make	RK		
RKJ27	29	Miscellaneous	RKE	RK	
RKC10	30	Balance items as per LA	RKR		
RKC11	31	Aux. CT's and PT's	RKH		
RKC12	32	ASEA Aux relays timers & bases	RKS		
RKC13	33	Other items	RK	RKE	
RKA32	34	GA,Sgl line diag & Trip logic	RKN		
RKA33	35	GA,LA,SCH. To Customer	RKD		
RKA40	36	Appl. of drgs. from Cust.	RK	RKE	
RKA50	37	Addition , deletion list to RF	RK	RKS	
RKJ32	38	Corrtns,Deltn list to RP	RK	RKE	RKD
RKC21	39	LA, OD & final GA to RP	RKF		
RKC22	40	Cut out drawings to RP	RKF		
RKC23	41	Label list to RP	RKS	RKD	
RKC31	42	Wiring table to RP	RKN		
RKC32	43	Inter panel wiring table to RP	RKN		
RKC40	44	Final drg to RF for the Cust.	RK	RKE	

PRODUCT AND TIME LAG - CHECK LISTING

Product name Acty. no. Time-lag

-----		
Product name	Acty. no.	Time-lag
T-8 II	YT01	0
T-8 II	YT02	1
T-8 II	YT03	3
T-8 II	YT04	8
T-8 II	YT05	10
T-8 II	YT07	20
T-8 II	YT08	25
T-8 II	YT09	22
T-8 II	YT10	20
T-8 II	YT11	18
T-8 II	YT12	17
T-8 II	YT13	15
T-8 II	YT14	20
T-8 II	YT15	28
T-8 II	YT16	30
T-8 II	YT17	34
T-8 II	YT18	35
T-8 II	YT19	40
TYRAK-8	YT01	0
TYRAK-8	YT02	1
TYRAK-8	YT03	1
TYRAK-8	YT04	2
TYRAK-8	YT06	2
TYRAK-8	YT10	5
TYRAK-8	YT11	5
TYRAK-8	YT12	8
TYRAK-8	YT13	10
TYRAK-8	YT14	15
TYRAK-8	YT15	12
TYRAK-8	YT16	12
TYRAK-8	YT17	12
TYRAK-8	YT18	16
TYRAK-8	YT19	20

## ACTIVITIES COMPLETED REPORT UPTO WEEK No: 8

Sno	O.I. no.	Customer's name	Acty no.	Activity name
1	ATY-3456A09	MYSORE CEMENTS LTD.	YT01	O.I. Receipt
			YT02	O.I. Issued to YPP
			YT03	P.O. Received
			YT04	Long Lead item list
			YT05	P.R. for long lead items
			YT07	Drgs. approved by cust.
			YT08	Schemes submission to YTO
			YT09	Issue of OS/OD
			YT10	Check YS & YF matl. available
			YT11	P.R. for OS/OD
			2	BTY-1234B01
YT02	O.I. Issued to YPP			
YT03	P.O. Received			
YT04	Long Lead item list			
YT06	Drgs. submitted for appl.			
YT10	Check YS & YF matl. available			

5 for YT DEPARTMENT

Dept's		Resp.	Plan	Revd	Actl
1st	2nd	3rd	wk	wk	wk

---

REG	YTO		812		812
YTO			813		813
REG			815		815
YTO			819		820
YTO			820	822	822
REG	YTO		830	832	833
H			835		835
YTO			832		833
YPP			830		835
YPP			828	833	835

REG	YTO		830		830
YTO			830		830
REG			830		831
YTO			830		832
YTO			832		832
YPP			835		835

---

FUTURE ACTIVITIES REPORT AS OF WEEK No: 84

Sno	O.I. no.	Customer's name	Acty no.	Activity name
1	ATY-3456A09	MYSORE CEMENTS LTD.	YT17	Customer inspection
			YT18	Despatch and invoice
			YT19	Delivery as per PO / OI
2	BTY-1234B01	NELCO LTD.	YT14	Excise filing
			YT15	Completion of Manu-facturing
			YT16	Completion of test-ing
			YT17	Customer inspection
			YT18	Despatch and invoice
			YT19	Delivery as per PO / OI

for YT DEPARTMENT

Dept's	Resp.	Plan	Revd	
1st	2nd	3rd	wk	wk

---

YP	YTO	REG	844	
YPP	YCE		845	
			853	

YTO	YCE		845	847
YP			842	846
YPVT			842	846
YP	YTO	REG	842	845
YPP	YCE		846	847
			905	910

---

PENDING ACTIVITIES FOR Y DIVISIO

REMINDER TO YTO DEPARTMENT AS ON

Sno	O.I. no.	Customer's name	Acty no.	Activity name
1	ATY-3456A09	MYSORE CEMENTS LTD.	YT05	P.R. for long lead items
			YT07	Drgs. approved by cust.
			YT09	Issue of OS/OD
			YT14	Excise filing
			YT17	Customer inspection
2	BTY-1234B01	NELCO LTD.	YT01	O.I. Receipt
			YT02	O.I. Issued to YPP
			YT04	Long Lead item list
			YT06	Drgs. submitted for appl.
			YT14	Excise filing
			YT17	Customer inspection

DATE: 880525

WEEK NO: 820

Dept's	Resp.	Plan	Revd	
1st	2nd	3rd	wk	wk

---

YTO		820	822
REG	YTO	830	832
YTO		832	
YTO	YCE	830	834
YP	YTO	REG	844

REG	YTO	830		
YTO		830		
YTO		830		
YTO		832		
YTO	YCE	845	847	
YP	YTO	REG	842	845

---

## ACTIVITIES DELAYED REPORT for YT DEPAR

Sno	O.I. no.	Customer's name	Acty no.	Activity name
1	ATY-3456A09	MYSORE CEMENTS LTD.	YT04	Long Lead item list
			YT07	Drgs. approved by cust.
			YT09	Issue of OS/OD
			YT10	Check YS & YF matl. available
			YT11	P.R. for OS/OD
			YT12	Receipt of YS & YF mat.
			YT13	CDI, Road Permit Receipts
			YT14	Excise filing
			YT15	Completion of Manu-facturing
			YT16	Completion of test-ing
			YT18	Despatch and invoice
			YT19	Delivery as per PO / OI
			2	BTY-1234B01
YT04	Long Lead item list			
YT11	P.R. for OS/OD			
YT12	Receipt of YS & YF mat.			
YT13	CDI, Road Permit Receipts			
YT14	Excise filing			
YT15	Completion of Manu-facturing			
YT16	Completion of test-ing			
YT17	Customer inspection			
YT18	Despatch and invoice			

NT

DATE: 880525

Dept's	Resp.	Plan	Revd	Actl	Delay
1st	2nd	3rd	wk	wk	wks

---

YTO			819	820	1
REG	YTO		830	832	833
YTO			832		833
YPP			830		835
YPP			828	833	835
RCP			827	830	837
REG			825		838
YTO	YCE		830	834	838
YP			838		840
YPVT			840		843
YPP	YCE		845		849
			853		904

REG			830		831
YTO			830		832
YPP			835		836
RCP			838		839
REG			840		842
YTO	YCE		845	847	848
YP			842	846	849
YPVT			842	846	849
YP	YTO	REG	842	845	846
YPP	YCE		846	847	852

---

## PERFORMANCE OF DELIVERY TIMES SCHE

Sno	O.I. no.	Customer's name	Product name	Qty	O.I. Comp wks	Actl Comp wks	Devia tion (+/-)
1	ATY-3456A09	MYSORE CEMENTS LTD.	T-8 II	5	41	45	+04
2	BTY-1234B01	NELCO LTD.	TYRAK-8	8	28	33	+05

---

RULE for YT DEPARTMENT

Remarks

---

The delay in this case was caused by the late delivery of certain essential material by our suppliers, Messrs Manjunathan and Sons Ltd. who were regularly reminded but inspite of this they delayed the whole product for us.

This product was delayed by our own design department who did not send the designs to production at the planned time since they had lot of work on hand as some of the design engineers had gone on leave. Thus this resulted in loss for us as the product as a whole got delayed.

---

LOSS SUFFERED REPORT

O.I. no.	Customer's name	Product name	Qty.	Value (Rs)	Delay (wks)	Loss (K Rs)
ATY-3456A09	MYSORE CEMENTS LTD.	T-8 II	5	200.00	+04	3
BTY-1234B01	NELCO LTD.	TYRAK-8	8	250.50	+05	4

## PROJECT III

### TIME RECORDING SYSTEM

#### 4.1 ANALYSIS

For time recording, mainly only two parts of problem and proposed system were involved since at present they did not have any running manual or computerised system of a similar type.

##### 4.1.1 Problem :

This part of the problem at ASEA was concerned with the personnel department. there was no proper way of knowing which employee were habitual late comers or on the other hand those doing hard work. They could not come to know which employees spent more time at office and those who spent less time there. When the employee's come in they record their in-coming time on punch cards by using the punching machine. Similarly, the card is punched while going out. Thus, the personnel department put forward this idea of developing a new system to do the following tasks.

- a) Take in the in-coming and out-going times for each day for all employees.
- b) Compute the late or early arrival to and late or early departure from office by comparing with the standard times.
- c) Report the total time an employee has put in extra work and/or the total time one worked short.
- d) Report the no. of occasions an employee came late to office and the no. of hours he came late in a month.
- e) Generate a report giving cumulative extra/short time put in by a department as a whole.

#### 4.1.2 Existing System:

As already mentioned, there was no proper manner by which punctuality of arrival/departure could be maintained. But, even still to calculate accurately or make a estimate of extra hours put in, late arrival and short hours was a very cumbersome and mind-boggling job. Couple of man-days can go waste doing such a work.

Looking at such fore-seeable problems, it was decided to make a computerised system for doing the job.

#### 4.1.3 Proposed System:

The proposed system had to be made on the conditions given by the users for doing the calculations and the way they wanted the data to be represented. Some of the conditions are:

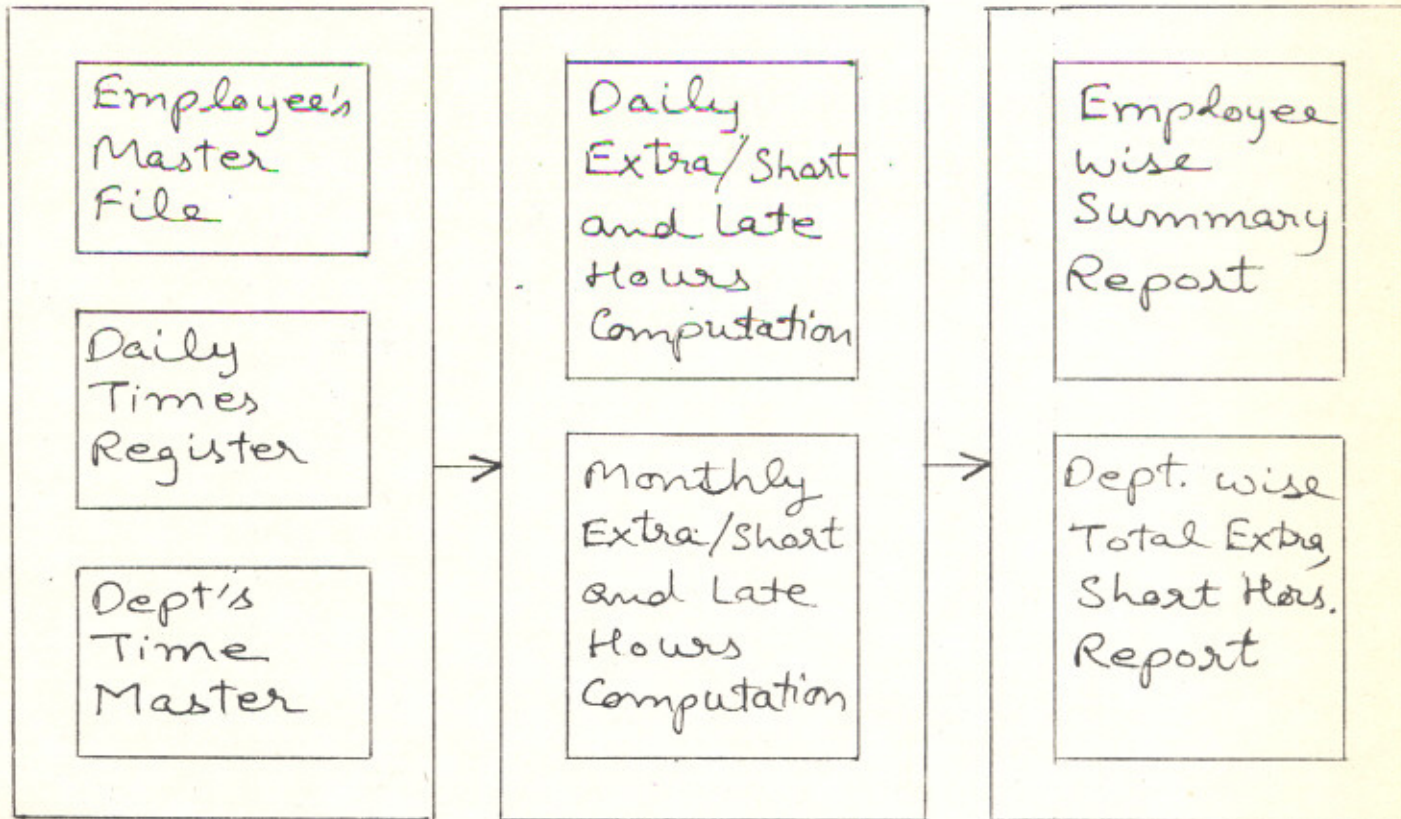
- a) Extra hours per day is the sum of early arrival minutes and late departure minutes.
- b) Short hours per day is the sum of late arrival to office and early departure from office.
- c) For late arrival to office a grace of 10 minutes is allowed, arrival within which is not late. But beyond that is late and considered from time of office opening. Grace is as  
7:45 to 7:55 for Shift A  
7:00 to 9:10 for Shift B
- d) In case of arriving late a grace of one hour or three occasions is allowed in a month, whichever is greater.
- e) Hours and minutes are to be printed in format given 10:35. This denotes 10 hours, 35 minutes.

The proposed system was able to do the following tasks:

- a) Takes in employee information and the daily in and out times for each employee.
- b) Calculates for an employee the no. of hours and no. of occasions arrived late in a month depending on one's shift.
- c) Calculates and stores the extra hours put in and hours remaining short for an employee in a month.
- d) Computes a single figure as nett, from extra and short hours, showing +ve or -ve deviation.
- e) Calculates for the whole department the extra and short and from the nett time.
- f) Generates a report on extra, short hours, nett, late arrivals for an employee and for a department as a whole.

The proposed has been represented in the form of a HIPO Chart and a DFD on the following two pages.

# HIPO CHART (PROPOSED SYSTEM)

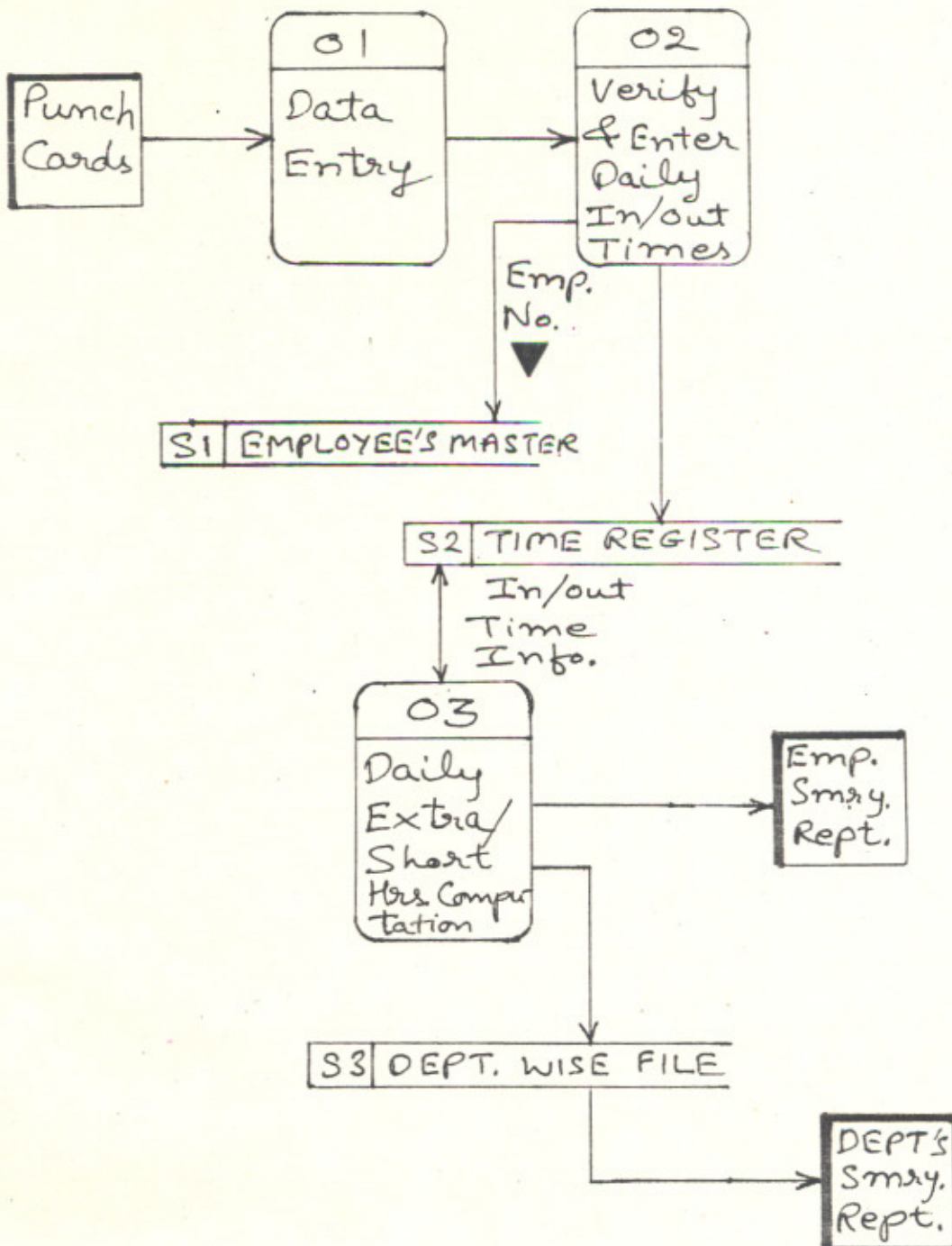


INPUT

PROCESS

OUTPUT

# DFD (PROPOSED SYSTEM)



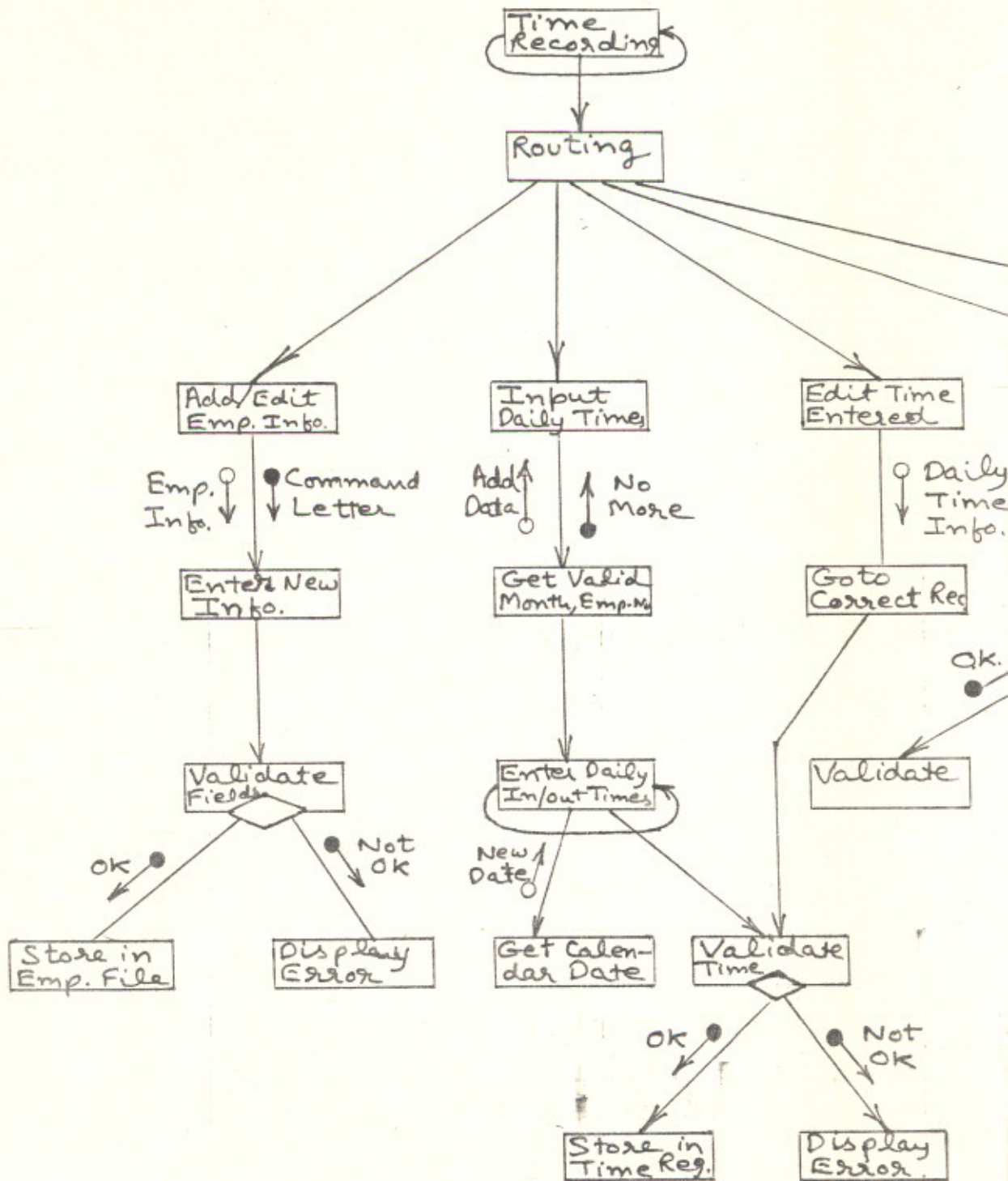
## 4.2 DESIGN

The design of Time Recording System (TRS) can be understood from the structured chart given on the next page. Its explanation is given here.

### 4.2.1 Structured Chart:

The design of TRS has been illustrated here in such a manner using standard symbols and arrows so as to make readers understand the functioning of this system. Here we show a routing below the looped main block showing that the whole is repeated for each employee.

From the routing are shown major blocks in TRS. The first one is for entry and editing of employee information. The next two for entry and editing of daily in and out times of an employee for all the working days in a month. A check-listing option has been provided to list the inputs and validate them. A separate option has been provided to do the computations since the process is quite complex, but not shown here to avoid over crowding of blocks. The other option left is of printing reports where two sub-options are provided to print short/extra hours for an employee and for the department as a whole for a month.



Time Calculation

Get month for Calc.

○ Time Info.

Compute Early/Late Time

○ Totals and Nett

Store in Time Reg.

Print Reports

Ask type of Report

○ Time Info.

Print Data

#### 4.2.2 Input/Output Formats:

Structures of Input and Output formats have been reported here. Actual outputs generated from the program are given in appendix 1.

a) Following are the input screens formats available for TRS.

i. To input data about the employees as Emp. no., Name, Category, Div, Dept and Shift.

Personnel Information - add screen

Emp-no	Name	Div. Dept.	Category	Shift
--------	------	------------	----------	-------

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---

ii. To input the in and out times for the employees for each date in a certain period

Time in and out - Adding screen

Month : (yy mm)

Emp\_no:            Name:

Date	Time
	IN            OUT

---

1

2

.

.

.

30

31

---

b) Following are the output report formats available for printing.

i. Total times for each employee in a period

Division:

Month:

Sl. no.	Emp. no.	Total hrs extra	Total hrs short	Nett (-/+)	Late Arrivals Occasions	Hrs
---------	----------	-----------------	-----------------	------------	-------------------------	-----

---

---

ii. For each department report the total no. of hours worked extra and/or short.

Div: No. of Days :

Month: No. of Working Days:

Dept. name	No. of Emps.	Total hrs extra	Total hrs short	Nett (-/+)
------------	--------------	-----------------	-----------------	------------

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#### 4.2.3 Database Structures:

##### i. Personal Information File for Employees - PERS.DBF

	Field	Description	Type	Width	
1	EMP_NO	Employee's No.	C	4	
2	ENAME	Employee's Name	C	30	
3	CARD_NO	Employee's Card No.	N	3	
4	BASIC	Basic Salary	N	7	2
5	SHIFT	Shift being A or B	C	1	
6	CATAGORY	Category	C	2	
7	DIV	Division	C	1	
8	DEPT	Department	C	3	

Total Width of a Record is 52 characters

This file is Indexed on EMP\_NO to PERS.NDX file

##### ii. Daily In/Out Times Register - TIMEREG.DBF

1	EMP_NO	Employee's No.	C	4	
2	PERIOD	Period for Calculation	C	4	
3	IN01	In Coming Time on 1st	N	5	2
4	OUT01	Out Going Time on 1st	N	5	2
5	IN02	In Coming Time on 2nd	N	5	2
6	OUT02	Out Going Time on 2nd	N	5	2
	.....				
	.....				
63	IN31	In Coming Time on 31st	N	5	2
64	OUT31	Out Going Time on 31st	N	5	2
65	TOT_XTRAHR	Total Extra Hrs. in Period	C	6	
66	TOT_SHRTHR	Total Short Hrs. in Period	C	6	
67	NETT	Nett Total of 65 & 66	C	7	
68	LATE_OCCNS	No. of Occasions Late	N	2	
69	LATE_HRS	No. of Hours Late	C	6	

Total Width of a Record is 346 characters

This file is Indexed on PERIOD+EMP\_NO to TIMEREG.NDX file

iii. Temporary File for Department Info. - TEMPDEPT.DBF

1	DIV	Division	C	1
2	DEPT	Department	C	3
3	NO_EMP	No. of Employees	N	2
4	TOT_XTRAHR	Total Extra Hrs. for Dept.	C	7
5	TOT_SHRTHR	Total Short Hrs. for Dept.	C	7
6	NETT	Nett of 4 & 5	C	7

Total Width of a Record is 28 characters

#### 4.3 IMPLEMENTATION AND TESTING

##### 4.3.1 Processing Logic:

Various programs and sub-programs used in TRS are briefly explained as under:

1. TIMEMENU.PRG Main Menu for Time Recording System giving six options to choose from.
2. PRGDATE .PRG Validate, today's date has been set and format it into 'yymmdd' form.
3. CKLSMENU.PRG Menu to print dump of inputs done
4. PRNTMENU.PRG Menu to print output reports
5. PERSEDIT.PRG To input and edit personnel information
6. TIMEIP .PRG To input the daily in and out times for all the employees for a month
7. EDITIME .PRG To edit times entered in time register
8. VLDTMPER.PRG Validate inputs for personnel information
9. CHKMONTH.PRG Validate month for being of correct type
10. GETDAYS .PRG Get the last day of months as in calendar
11. TMNEXTDT.PRG Get the next date according to calendar
12. TIMECHK .PRG Validate times inputted in time register for being of correct type
13. TIMEADIF.PRG Calculate difference of time for Shift A i.e. check time with 7:45 and 16:15
14. TIMEBDIF.PRG Calculate difference of time for Shift B i.e. check time with 9:00 and 17:30

- 15. TIMECALC.PRG Calculate total extra/short hours for a month for each employee using difference calculate programs for A and B shifts. It stores these along with late hours and late occasions in time register and department totals in temporary register.
- 16. TIMELST1.FRM Print dump of times entered in time register
- 17. TIMELST2.FRM Second part of the above time listing
- 18. PERSLIST.FRM Print dump of personnel information
- 19. PRIEMPTM.FRM Output report for extra/short hours for each of the employees
- 20. PRIDEPTM.FRM Output report for extra/short hours for departments
- 21. PERS .DBF Personnel Information file
- 21. TIMEREG .DBF Time register to store times
- 22. TEMPDEPT.DBF Temporary file for extra/short hours for departments
- 23. PERS .NDX Index file of personnel information index on Emp\_no
- 24. TIMEREG .NDX Index file of time register indexed on Period+Emp\_no

#### 4.3.2 Operational Procedures:

##### Start up

The steps involved in using the system are listed in sequence as under:

- Switch on the P.C. and also the terminal. Once the system gets booted and the C> prompt is displayed you are ready to work with the system
- Insert the TRS floppy and type a:TS and press return to go to the Main Menu.
- This will display the main menu which will appear as on the screen in the form shown below:

##### TRS MAIN MENU

1. Add/Edit Personal Information
2. Input Daily In/Out Times
3. Edit Times Entered
4. Month End Time Calculation
5. Print Menu
6. Checklist Menu
- Q. Exit

Enter your choice :

The system prompts for your choice. To exit from TRS type 'Q' in this menu.

## Add/Edit Personal Information

This file stores information about the employees. On pressing '1', you get an input screen where employees information can be entered or editing can also be done in the same screen.

The system displays the personal information as the employee no., name, division, department and shift for the first employee in the file and prompts for a command. To go a particular employees data give command N and on reaching there press E to edit the data. The message 'Record Updated!' will be displayed and a new command prompted for. You can also go to particular employee by giving S command and typing in the employee no.

To add a new employee no. and his personal data give the command letter as A, now you can enter data for a new employee. Validations will be performed as indicated in later sections. In case any error occurs, cursor returns to the current record and allows you to enter the fields corectly.

To exit this input and editing screen give X as your command. A message will confirm your intention and return to the this screen or the main menu.

## Input Daily In/Out Times

In option 3 of the main menu you can enter the daily in coming and out going times for the employees. The system asks the month for which data has to be entered and the employee no. It then displays the employee's name, if the employee no. is found in the Personnel database.

The dates starting from the beginning of the month entered are shown for which the times can be entered. The system validates the times and goes on to display the next date.

To exit this screen type a time more than 24 hours or type in an employee no. which is not in the personnel database.

#### Edit Times Entered

Option 3 is meant for correcting the times inputed. The system asks for the month and the employee no. whose times have to be corrected. The system displays the time for the first day in that month and prompts for a command as:

N for next, E for edit and X for exit

You can go to the particular record by giving N as your command and press E to change the time. The message 'Record Updated !' will be displayed after which you can go to another date or exit from this screen.

#### Month End Time Calculation

This option allows you to do the calculation part of the TRS. The system prompts for the month for which the extra/short hours are to be calculated. In case data is found for the said month, calculation of daily extra/short and late arrival to office begins. The system tells you to wait till it calculates and goes on displaying in serial order the no. of employees for whom the calculation is being done.

Upon storing the total hours of work done extra or short, the no. of hours of late arrival to office and the no. of hours late for that month, the system displays a message that calculations are complete. On pressing any key you can go to the main menu.

For extra hours of work put in the times are checked for both shift as

Shift A < 7.45 or > 16.15

Shift B < 9.00 or > 17.30

For short hours the times are checked for both the shifts as

Shift A > 7.55 or < 16.15

Shift B > 9.10 or < 17.30

But the late arrival time to office will be taken from the actual times of office opening.

No penalty is put in case employees come within the margins allowed i.e. For

Shift A 7.45 to 7.55

Shift B 9.00 to 9.10

For late arrival to office even after the margin allowed a grace of coming late for upto three occasions or one hour whichever is greater is given.

Print menu:

The option 5 takes you to the Print menu which is shown as below:

TRS  
Print menu

1. Employee Wise Time Summary Report
2. Department Wise Summary Report
0. Exit to previous Menu

Enter your choice:

The two options allow you to print summary reports for the employees. They ask for the division for which you want to print the report and also the month. In the second case the number of working days and the total no. of days in that month are also to be entered.

In all cases the system expects the printer to be ready. Press any key to start printing.

Check list menu:

The option 6 takes you to the Check list menu which is shown as below:

TRS  
Check list menu

1. Personnel Information
2. Daily Times Inputted
0. Exit to previous menu

Enter your choice:

Two options are available here:

- i. The first for printing the personnel information file
- ii. The second one for printing the daily in and out going times in time register.

In all cases, the printer is to be switched on.  
Press any key to start the printing.

## Validations

Here are listed the validations available in the various files used in this system:

Employee no. should start with 'R' or 'Y' and the numeral part must be greater than 300 in both the cases

Employee no. should not be repeated

Division should be same as first character of Employee no.

Department should start with first character of Employee no.

Shift should be 'A' or 'B' only

Category should have only the following types

For General staff GA, GB, GC, GD, GE, NG

For Workers W1, W2, W3, W4, W5, WT

For Manager level M1, M2, ... .. M8

Month entered should not have the year field less than the year 1988

The format for the month is 'yymm'

In/Out Times entered should not have minutes  $\geq 60$  and should be upto 24.00 hours.

## Error Messages

The error messages generated while running the programs and their remedies are listed as under:

Emp. no. entered already present, enter a new no.

Employee no. cannot be in duplicate. Cursor returns to the field, enter a new no. which is unique.

End of file, no more records after this

This indicates that end of file has come in case of editing and type some other command letter to do some operation.

Error in category type, give first letter only as 'G', 'W', 'M' or 'N'

When a wrong type of category is entered this message is shown. Enter one of a correct type and the message goes.

Error in dept. type, give first letter same as in Emp. no.

The department name should start with only R or Y. Type in the correct one and the error goes.

Error in division type, give only as 'R' or 'Y'

The division can only be either one of the two options said above. Control returns to the field, type R or Y.

Error in employee no., give only  $\geq$  R300 or  $\geq$  Y300

Error in Employee no., cursor returns to the field. Enter a new number of the valid type.

Error in given month

Do you want to give another month?(Y/N):

In case the month is not of a valid type, this error occurs. Type Y to enter a new month in the 'yymm' format. Type N to exit the program.

Given Emp. no. for the said period not found

This indicates that there are no details for an employee in this period. Control returns you to the period field, where a new period or same period and new employee no. can be given.

Given Emp. no. not found

Do you want to give new Emp. no ?(Y/N):

The Employee no. entered does not lie in the employees' file. Type Y and enter a new Employee no. as cursor returns to that field. Otherwise type N and exit from the program

No data available for the given month

In case of printing if there is no data in the files for the given month then the above message appears and you can enter a new month.

You are already at beginning of file

This shows the beginning of file condition.  
So another command letter can be entered.

#### 4.3.3 Environment:

For time recording there is only the need of a PC or PC XT with MS-DOS as its operating system. dBASE-III may or may not be required corresponding to the use of its simple version or the clipper compiled version. The second version is much faster to execute and just as accurate.

The system requires the services of a 80 column printer for its output reports but for its intermediate reports a 132 column printer is essential.

PERSONNEL INFORMATION - CHECKLISTING

Emp. no.	Name	Shift	Cate- gory	Divi- sion	Dept
R302	LAKSHMI KRISHNAMURTHY	A	GC	R	RFF
R303	VENKATARAMAN P	B	GA	R	RWZ
R305	BABU P N	A	GB	R	RKZ
R306	BABUDAYANANDA B S	B	GD	R	RMZ
R307	VENKATARAMAN P	B	GD	R	RMZ
R311	USHA M V	A	GC	R	RDZ
R312	SRINIVASAN D	B	GD	R	RKZ
R313	DAMODHAR M R	B	GD	R	RKZ
R314	NARENDRA K N	B	GB	R	RFZ
R315	SATHEESH S	B	GD	R	RKZ
R316	KUMAR G S	B	GD	R	RDZ
R320	MANGALA M P	A	GC	R	RCA
R321	SATHYANARAYANA RAO R K	B	GB	R	RCA
R323	GOVINDASWAMY S	A	GB	R	RCA
R324	RAMAKRISHNAN R	A	GC	R	RCA
R325	NARASHIMHA D B	A	GC	R	RMZ
R326	MEERA SESHACHALA	B	GC	R	RFF
R327	GANESH R	B	GC	R	RMZ
R328	PRAKASH S	A	GB	R	RKZ
R601	MICHEAL L	A	W3	R	RPR
R602	PAUL S	A	W4	R	RPR
R604	PRAKASH S	A	W2	R	RPR
R605	SHREENIVASA S R	A	W2	R	RPR

TIME RECORD - CHECK LIST

In and Out Times as on d

Emp. Month no.	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
R302 8804	7.40 16.15	7.40 16.15	7.45 16.15	7.45 16.15	7.45 16.15	7.45 16.15	7.45 16.15	7.45 16.15	7.45 16.15	7.50 16.15
R305 8804	7.45 16.15	7.45 16.15	7.45 16.15	7.48 16.15	7.48 16.15	7.55 16.15	8.00 16.20	8.00 16.20	8.00 16.20	8.00 16.20
R306 8804	9.10 17.30	9.10 17.30	9.10 17.30	9.10 17.30	9.00 17.30	9.00 17.30	9.00 17.30	9.00 17.30	9.05 17.30	8.55 17.30

NG1

as given below

11th	12th	13th	14th	15th	16th	17th
7.50 16.15	7.50 16.15	7.50 16.15	7.50 16.15	7.55 16.15	7.55 16.15	7.55 16.15
8.00 16.20	8.00 16.20	8.20 16.20	7.50 16.20	7.50 16.20	7.50 16.20	7.50 16.00
8.55 17.30	8.55 17.30	8.55 17.30	8.55 17.30	9.20 18.00	9.20 18.00	9.20 18.00





EMPLOYEE TIMES SUMMARY REPORT

Division: R

Month: 8804

Emp. no.	Total Hrs extra	Total Hrs short	Nett (+/-)	Late Arrivals Occns	Hrs
R302	2:40	4:36	- 1:55	10	3:36
R305	2:34	3:49	- 1:15	21	2: 4
R306	3:25	1:19	+ 2: 4	14	1:19

DEPARTMENTS SUMMARY REPORT

Division: R  
Month : 8804

No. of days in this month: 30  
No. of working days : 26

Dept	Total Hrs extra	Total Hrs short	Nett (+/-)
RFF	2:40	4:36	- 1:55
RKZ	2:34	3:49	- 1:15
RMZ	3:25	1:19	+ 2: 4

## CONCLUSIONS AND REMARKS

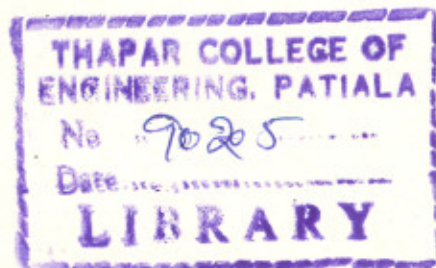
The report contains analysis, design and implementation parts for the three systems developed for ASEA, namely- OCS, OHS and TRS. The systems have been developed using a Microsense PC XT and a WIPRO PC XT both are IBM compatible.

The systems run on versions 3.00 and above MS-DOS eventhough they are developed in version 3.20. dBASE-III was used for the purpose but all have been compiled through dBASE add on - The Clipper Compiler, to make them execute with great speed and accuracy.

The systems have been developed according to the requirements made by the user's in the various departments of ASEA Ltd. and are not generally applicable in other environments. But this is possible through small changes in their code and they can be made adaptable to the needs of a new user or to the changing needs of ASEA.

In the later versions of OCS and TRS further additions can be done which will be highly beneficial to the personnel section. They are

- a) Store leave positions of employees.
- b) Store birth dates of employees to generate greeting cards.
- c) Combine OCS and TRS and other facilities into one system to take advantage of synergy.
- d) Incorporate other enhancements as and when they are thought of.



The order handling system was not implemented in the users' departments till the completion of this project work due to reasons best known to the organisation and also due to lack of availability of computer time. But this one will take ASEA a long way in advancing its range of customers and of course its turnover once the capacities and capabilities of the system are fully realised. Another major factor is the resistance to change and if change can be brought about in the input/output formats a lot can be accomplished by the system. Change is a vital factor, being an essential part of a reputed organisation like ASEA should be without resistance for ASEA has highly qualified and trained workforce.

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