



ISS  
M  
087

**BILLIN SYSTEM  
OF  
GREEN NUMBERS**

BY

JAN MUHAMMAD  
&  
KHALID PERVAIZ

Project Report Submitted to Quaid-i-Azam University, Islamabad, In Partial  
Fulfillment for the Post Graduate Diploma in Computer Science.

May, 1996.

**IN**  
**THE NAME OF**  
**ALLAH**  
**THE MOST GRACIOUS**  
**THE MOST MERCIFUL**

## PROJECT BRIEF

**Project Title** : Computerization of  
Billing System of Green  
Numbers

**Organization** : Pakistan Telecommunication  
Corporation

**Undertaken by** : Jan Muhammad & Khalid Pervaiz

**Supervised by** : Mr. Abdul Subhan Computer  
Centre, Q.A.U. Islamabad

**Starting Date** : September 1995

**Date of Completion:** May 1996

**Source Language** : INFORMIX

**Operating system** : SCO UNIX System V Release 3.2

**DEDICATED TO**

**THE**

**BELOVED PARENTS**

## Abstract

---

This report describes the computerization of Billing System of Green Numbers of Pakistan Telecommunication Corporation, Islamabad, which provides correct, liable and efficient information to the organization for decision making and forecasting. The system provides efficient means of data storage as well as retrieval.

The system deals with the billing of subscribers and their positions on monthly and yearly basis. It also deals with the defaulters in the form of reports. In addition to this, different types of on-line queries and printed

## Acknowledgment

First of all, we are grateful to Allah Almighty who gave us the ability and courage to undertake and complete this project successfully.

We cannot help wishing to express our heartiest thanks and profound gratitude to Mr. Abdul Subhan who supervised this project. His valuable suggestions, positive criticism and proper guidance in the system study, design and documentation phases of the project prove to be of great help.

Another very important acknowledgment is to Mr. Zaheer Ahmed Babar Senior Account Officer and for being extremely cooperative and helpful during the system study carried out at PTC office, Zero Point.

Our special and sincere thanks to Mr. Aslam System Analyst who provided a great help and guidance at every moment and encouraged us at problematic situations in the system's development.

We would like to avail this opportunity to pay our special thanks to Mr. Muhammad Siddique who always encouraged us to enhance our capabilities and potentials.

Finally, we are thankful to all our classmates and friends for their valuable suggestions, whole-hearted cooperation and company during our stay at PTC.

We would never forget the subtle loving, jovial and courteous attitude of Ch. Muhammad Sarwar Alvi, Altaf Hussain(Lala) and Irtiza Ahsan Naqvi.

A special tribute is paid to Amjad Farooq and Muhammad Shahid for their kind and continued cooperation in the preparation and compilation of this report.

## Preface

This report presents a detail of the system's study, design and implementation phases of the project carried out at the Account Branch of Pakistan Telecommunication of Pakistan Corporation. An attempt was made to organize this report according to the procedures recommended for the design and development of computer based information system.

The report starts with a brief introduction of the organization(PTC). The second chapter narrates the details of the existing system.

The third chapter presents requirement analysis of the existing system. a computer based system is proposed on the basis of the requirement analysis.

The chapter fourth describes the salient features of the Operating System used in the system development as well as the chapter fifth dives for a while into the unfathomable oceans of Database 'INFORMIX'.

Chapter sixth describes the system design process. The system design process consists of two parts i.e. logical design and physical design. The physical design of the system is performed after the selection of particular software for the development of the system. The selection of software has been done keeping in view the requirements of the system and considering all the available options. Finally, the chapter describes the details of tables for the system.

Chapter seventh relates the software development process and the implementation of the system.

Final chapter is the User's Guide that explains how to operate the system developed. Appendices given at the end consist of system reports and documents.



# Contents

	<u>Page</u>
<b>CHAPTER-1: INTRODUCTION OF THE ORGANIZATION</b>	
Brief History of PTC	1
Present Status of Services	3
Transmission	4
Customer Services Centres	5
SAOTR	6
<b>CHAPTER-2: EXISTING SYSTEM</b>	
Introduction of the System	7
Circuits	7
Green Numbers	8
Secro-Phone	8
Existing System	9
Present System	9
Management Structure of PTC	9

### **CHAPTER-3: PROPOSED SYSTEM**

Objectives of the System	11
New System	11
Statements/Reports	12
Phases of the Proposed System	13
Project Development Environment	14

### **CHAPTER-4:INTRODUCTION OF OPERATING SYSTEM(UNIX)**

Features and Benefits	15
-----------------------	----

### **CHAPTER-5:INTRODUCTION OF DATABASE(INFORMIX)**

Introduction to SQL	20
Introduction to INFORMIX-4GL	21
Advantages of 4GL	21
Procedural and Non-Procedural Languages	22
Features of INFORMIX-4GL	23

### **CHAPTER-6:SYSTEM DESIGN**

Introduction	27
Proposed System Design	27
Input Form Designing	27
Table Design	31

---

## **CHAPTER-7:SOFTWARE DEVELOPMENT AND IMPLEMENTATION**

Software Development	35
File Maintenance	35
System Implementation	36
System Testing	37
System Conversion	38
Proposed Method of Conversion	38
System Evaluation	39

## **CHAPTER-8:USER'S GUIDE**

Introduction	40
Logging into the System	40

## **APPENDICES**

Reports	
Documents	

---

# **CHAPTER-1**

## **Introduction of the Organization**

### Brief History of PTC:

Pakistan T&T Department inherited a small Telecommunication network consisting of only 12,000 telephone lines in 1974. Pakistan T&T department was separated from postal department in 1962. It remained as a Government department under Ministry of communication.

### Transformation from T&T into PTC:

Pakistan T&T department was converted into a statutory corporation on 15th Dec. 1990. December 15, 1990 was the day which ushered in a new era of dynamic changes, challenges and achievements in the field of communications in Pakistan. On this day, the Pakistan T&T department was transformed into Pakistan Telecommunication Corporation with a legal identity. Separate from the Government of Pakistan, enable PTC to move from an administrative to contractual relationship with its customers.

It provides the opportunity for the development of telecommunication facilities to unprecedented level or also for an increased customer satisfaction. Pakistan Telecommunication Corporation is a corporate body established under Pakistan Telecommunication Corporation Act(No.xviii) of 1991 is wholly owned by the Government of Pakistan.

The Corporation is required to:

- i. Provide Telegraph, Telex, Telefax, Telephone services for domestic as well as international stations in addition to this, Green Telephone and secro-phone and also some delicate link from defense point of view.
- i. Achieve performance standards which reasonably meet the social, industrial and commercial needs of the Pakistani community.

The corporation is run on commercial lines with the objective of achieving the level of services and profitability, comparable with private sector.

## Satellite System:

Pakistan became a member of intel sat in 1965. First satellite Earth Station started operation in 1972 with a cost of RS. 19 million. The first TV live telecast was a cricket test match between Pakistan and Australia at Sydney in 1972. A standard-B antenna of 13 meter dia was installed at Dehmandro in 1984 to provide a direct satellite link with USA. At present more than 475 circuits are working through it.

Another standard-A Earth Station at Malash, Islamabad started operation on 28th September, 1986 having 347 circuits at present.

First domestic satellite communications project started operation on 1st June, 1985 with 3 standard-B antenna having earth station at Gilgit, Skardu and Gwadar with capacity of 120 channels. Using these facilities, PTC operates International Telecast, and Bureaufax, Telefax, Telephone, Telex, Radiophone, Leased Telegraph and Telephone and Hot line services. Fully automatic ISD service is provide to 70 countries and there are 40 countries with which Pakistan work direct circuits.

## Customer Services Centers:

It is the endeavor of PTC to extend best possible public services to its valued customers.

The customer services centers have been designed to serve as a "ONE WINDOW OPERATION" for the general public. Some of the services which are being offered at these centers are as under:

1. Availability of national, international Telephone, Telex and Telefax facilities.
2. Facility of payment of telephone bills, demand notes, correction and issuance of duplicate telephone, telex bills.
3. Restoration of telephone on payment dues in case of disconnection for non-payment.

4. Rectification of telephone fault.
5. Provision of spares of telephone set in case of any fault.
6. Sale of registration form for new telephone directories.

**SAOTR(Senior Account Officer Telephone Revenue):**

The total assets of PTC as on 30th June, 1995 were more than 80 billions. The total revenue receipt for the financial year 30th June, 1995 were 20.5 billions.

The PTC employees are more than 50,000 full time staff.

**Function of SAOTR:**

- Facility of payment of Telephone bills.
- Facility of payment of demand notes.
- Facility of correction of bills.
- Facility of issuance of duplicate telephone, telex bills.
- Restoration of telephone on payment of dues in case of disconnection for non-payment.
- Recovery of bills.

## **CHAPTER-2**

### **Existing System**



### **Introduction of the System:**

The PTC is approximately in the process of computerization of all its work. But the computerization of the billing system of circuits and green numbers are not computerized. The aim of this study is to confer on the computerization of existing system.

### **Study of the System:**

- I. Analysis and understanding of the present system.
- ii. Design of the system.
- iii. Proposal for implementation of the package which includes detail of the new system, new techniques, program flow charts and instruction manual for users.

### **View of the System:**

The AOTR is already computerized of its ordering telephone billing system. But the billing system of the Circuits and Green numbers are not computerized. Now the computerization of the billing system of Circuits and Green numbers is going to process.

#### **i. Circuits:**

The Circuits are the type of telephone lines which are dedicated to the VIP's and Organizations like PIA, TV etc. On Circuits man to man communication is possible. There is no telephone number and no interruption in it. The telephone line is every time available for the dedicated persons and organizations.

### **Types of Circuits:**

- I. Ticker line circuit.
- II. Point-to-point circuit.
- III. Hot-Line circuit
- IV. Data-circuit(computer)

### **ii. Green Numbers:**

Green Numbers are allotted only to VIP's. There is only one exchange of green numbers in Pakistan present in Islamabad.

The green numbers are allotted only with the recommendation of cabinet Division. Communication is possible only from green number to another green number. It is absolutely impossible to communicate from an ordinary telephone number to green number. The ordinary telephone is called system numbers and Green numbers are called non-system numbers.

### **iii. Secro Phone:**

Secro phone is an equipment which is used for security purpose. The secro phone is attached with telephone set. so nobody can access the communication which is done with secro phone until the telephone operator also can not access the communication of secro phone.

It is an additional facility which is given to the subscriber on their demand. There is an additional charges of secro phone is taken from the subscriber at fixed rate. Now a days the secro phone charges are RS: 2080/annual. This is not special facility for VIP's any subscriber can get this facility.

### Existing System.

The demand of the increasing day by day while green numbers. So the billing very slow and complicated.

Our study is related to minimize the billing system of green numbers through

### Present System:

The billing system of Green numbers is annually. The charges on Green numbers are distance wise. There are different charges on Green numbers.

### Charges on Green Numbers:

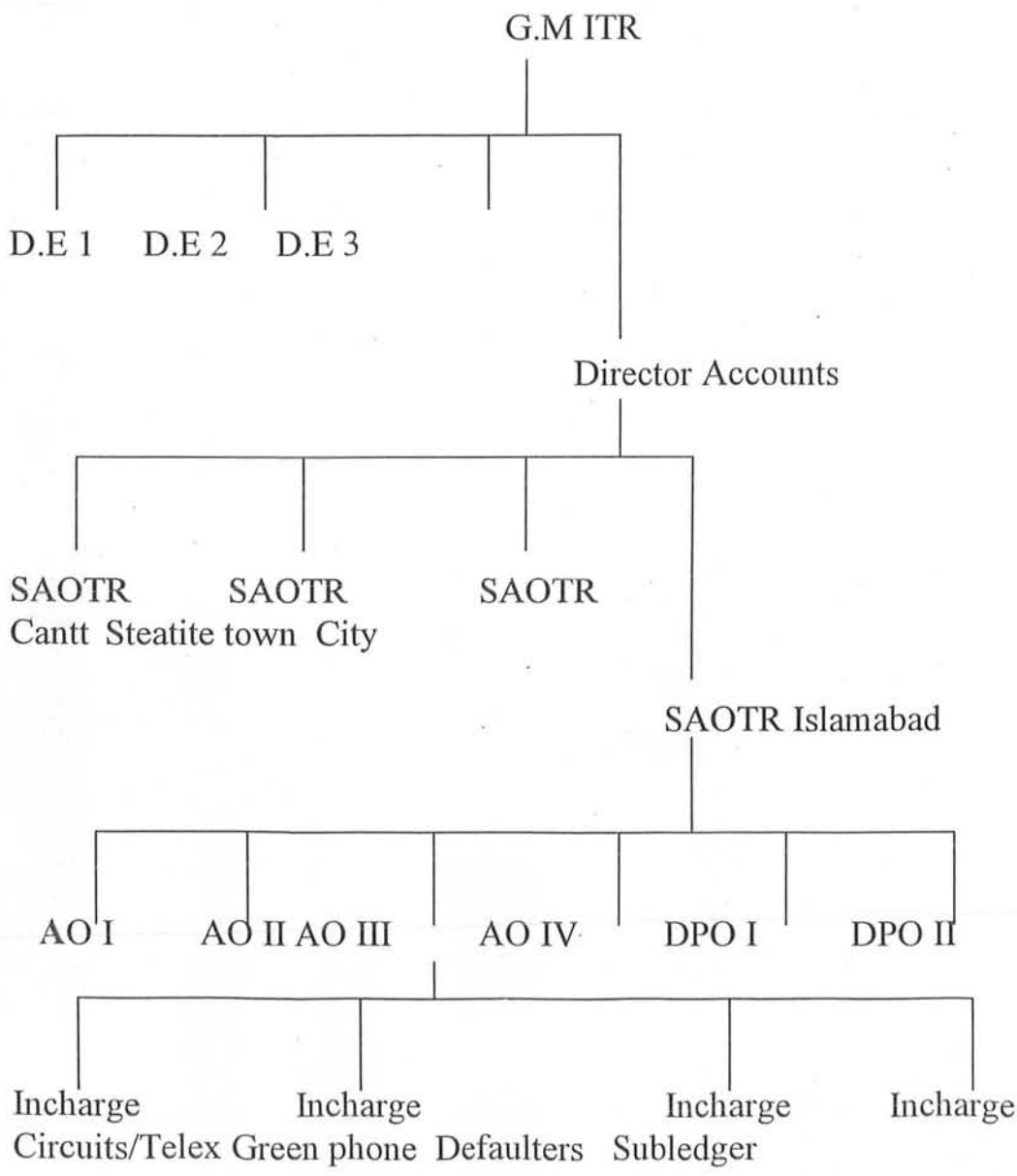
The charges on Green numbers are made annually basis. some times are made on quarterly basis. The charges on green numbers are fixed w.r.t distance.

The charges on green number are RS: 406/annual/5Km.

The charges on Secro phone are RS: 2080/annual.

### Management Structure of PTC:

The PTC is one of the biggest organization of Pakistan. So it is almost impossible to describe its all management set up. Here is the structure of (TR(Islamabad Telecommunication Region)). As because our study entails with this biggest office. The management structure is shown on next page.



## **CHAPTER-3**

### **Proposed system**

## **PROPOSED SYSTEM**

### **Objectives of the System:**

While designing the system proposed, it was kept in mind that it must meet the objectives of the computerization process of the organization.

At present, the system of green numbers is totally manual and the concerned staff has to carry out a lengthy and time consuming process.

Main objectives for designing of computerized are as follows:

- I) To obtain speedy work with minimum manpower.
- ii) To obtain maximum accuracy and reliability.
- iii) To generate reports of diversified nature as per requirement.

### **NEW SYSTEM:**

After study of existing system, we designed a new system which mainly related to a computerized production of different reports, files creation, maintenance of the files and different design approach.

It also includes redesigning the solution of problems and needs of organization were kept in mind and objective of the system was ascertained. The existing system had a number of drawbacks and limitations, whereas the proposed system has been designed in such a way that all the drawbacks could be minimized.

We tested the package developed thoroughly and improved or amended where it was necessary to make.

It is more user's friendly. we are of the opinion that the proposed package is quite comprehensive and meets all the requirements relating to Billing System of Green no's. Different programs have been developed to convert the manual system to a computer based system.

The proposed billing system if adopted will become an efficient tool for the foundation and if exercised to do routine work, It shall work more speedily and shall provide data timely for decision making.

#### **STATEMENTS/REPORTS:**

The normal output of the billing is required in the form of hard copy. The program proposed can provide hard copy of diversified nature and the user can manipulate it in a large variety of reports. Some of the forms of hard copy are as under:

#### **BILL:**

The computerized bill will bear the basic information about a Green no. It shall contain Green no code, name of subscriber, address of subscriber, period from, period to, bill, aerial, total bill.

#### **REPORTS:**

The program designed can also generate following reports, needed at different stages and time during a fiscal year.

- 1: BILL
- 2: LEDGER
- 3: LIST OF GREEN NUMBERS
- 4: LIST OF DEFAULTERS
- 5: LIST OF GREEN CODES

### **PHASES OF THE PROPOSED SYSTEM:**

The different stages relating to our study of the existing system to the development of the proposed system are as follow:

#### **i)Study Phase:**

This stage includes the following steps:

- a) Problem definition
- b) Objectives of the proposed system
- c) Recommendation of a feasible system

#### **ii)Design Phase:**

The design phase includes the following steps:

- a) Identification of process/procedure to be proposed.
- b) Time allocation for each procedure.
- c) Designing of input/output and data files.



### **iii)Development Phase:**

It includes the following steps:

- a) Development of the computer program
- b) Testing of computer program with actual data

### **Salient features of the proposed system:**

Some of the salient features of the proposed system are given below:

- i) As the main objective of the organization is to get efficient results in an economical way both in terms of manpower and money, we have tried to eliminate duplication. It has also been made sure that every possible contingencies could be eliminated. It is expected that the system proposed will also cost beneficial system as compared to the existing system.
- ii) The proposed system is flexible and with the changing environment it can be modified and fulfill all requirements as per new circumstances.
- iii) The proposed system though is in consistency of the existing system, but has better control in operations and is more reliable in incorporating good internal control.
- iv) The system designed provides more accurate and more error free information. It provides timely and accurate reports of management.

### **Project Development Environment:**

It is the requirement of the organization to develop this system on IBM compatible Pentium. The system will be used in multi-user environment by using any LAN software.

Due to vast feature of INFORMIX , it is selected for the development of the system.

## **CHAPTER-4**

### **Introduction of the Operating system (SCO UNIX)**

# UNIX

## **Features and Benefits:**

UNIX offers a dynamic blend of files and record locking, sophisticated user security, multitasking, advanced electronic mail and communications, networking, and remote file sharing. While other systems, such as OS/2, offer similar capabilities, UNIX is especially good at making all these features work together efficiently and smoothly on Intel-based systems. The sections that follow describe many of these important features and benefits in detail.

### **i) Inexpensive:**

The market for UNIX has grown in recent years, due to their availability on Intel 80286 and 80386 based system. The low cost and easy availability of these systems and the variety of peripherals available for The market for UNIX has grown in recent years, partly due to their them can mean substantial savings.

### **ii) Multi-user and Multitasking:**

UNIX's major advantages is that it was designed from the ground up as a multi-user operating system. In a additional UNIX system, a single computer with multiple users in a time-shared system does all work for a number of "dumb" terminals, that is, terminals that provide little or non of their own processing power but rely for processing on the computer to which they are linked. As a multi-user system, UNIX supports built-in protection scheme such as passwords and file permissions. This allows a group of users to have individual accounts, each with their own home directory for easy access.

As a multitasking operating system, UNIX can support many programs running at the same time on the same computer. It lets you run several programs simultaneously, not just keep them active. This means, for example, that in the midst of running an application program such as a

spreadsheet, you can launch another application such as a word processor to draft a letter, all the while receiving electronic mail without any interruption of your work.

### iii) Hierarchical file structure:

In a multi-user environment, the number of files can multiply quickly. UNIX's hierarchical file structure lets users group files in a coherent and accessible fashion. The file structure resembles an inverted tree whose trunk is root directory. Other directories branch from the root directory, with each directory containing one or more files. Grouping files in this way makes it easy to locate them and perform operations on them. UNIX's file structure has become the foundation for many other operating systems, including MS-DOS and OS/2 for IBM PCs.

### Utilities:

In addition to the operating system itself, SCO UNIX provides a host of built-in-commands, often called utilities, or tools. These tools are executable programs written with the idea that each tool should do one job well. In addition, the output from one utility is expected to be the input for another.

The advantage of the tools approach is its flexibility. It allows us to customize our environment by combining separate programs to do specific jobs.

### I/O Redirection and Pipes:

By default, SCO UNIX displays the output of most commands on the screen. For example, if we use the `ls` command, which lists the contents of a directory, UNIX displays those contents on the screen. We can have UNIX direct output file, however, by using I/O (input/output) redirection. I/O redirection simply means reassigning the source of a command or program's input and the destination of its output.

Piping is a special form of I/O redirection that lets you make the output from one command or program become the input to another. Like UNIX's hierarchical file structure, I/O redirection and piping have also become part of other operating systems.

### Shells: \_\_\_\_\_

A shell is a command interpreter that controls the interaction between the user and the kernel. (The kernel is the core UNIX program that serves as an interface between the hardware and the operating system).

In addition to interpreting commands that type from the keyboard, shells can also interpret commands that stored in a file. When we store commands in a file, that file is known as a *shell script*. The commands we can place in a shell script can be selected from among the many the utility programs UNIX provides. They can also be any of the special flow of control commands the shell offers for controlling the order in which commands are executed in the shells script. For example, the Bourne shell offers the **for** command, which lets us execute a group of commands a specified number of times. By using flow of control commands in a shell script, we can create a variety of sophisticated application programs.

### Text Processing: \_\_\_\_\_

SCO UNIX offers a comprehensive set of tools for creating, editing, and formatting documents. These are the same tools that are found in almost all UNIX systems.

### The vi Editor: \_\_\_\_\_

The original editor for UNIX was **ed**, a simple line-oriented editor that accepts the editing commands we enter and performs the requested operation on the contents of a line or group of lines within a text file. Although the **ed** utility is offered on all UNIX systems, it is rarely used today a as superior editor, **vi**, is widely available.

The vi (for visual) editor is an interactive, full-screen program that is the most popular editor among UNIX users today. (The vi editor is bundled with the SCO XENIX and UNIX operating systems). As a full-screen editor, vi provides a window onto your text file, which shows approximately 20 lines of a text time. To edit text in vi, you simply move the cursor around at a chosen spot within the text file, we use vi's, editing commands to insert, delete, and change text according to owe needs. We can also use other editing commands to effect groups of lines within the document or the documents as a whole.

### **The nroff Text Formatting Tool: \_\_\_\_\_**

After creating a document with vi, the next step is to format it for printing using the nroff text formatter. With nroff, you can control many different aspects of your document's action, and page headers and footers.

You format a document by using an editor to place formatting commands within the text. The nroff utility interprets any text that beings with a period in the first column of an input line as a command. For example, the command .ls 2 within your input file instructs nroff to double-space your document.

The nroff utility provides sets of macros for controlling your output macro is set of ready -made functions that let you perform with a few simple commands tasks that would otherwise take several nroff commands to accomplish.

### **MAIL:**

SCO UNIX includes powerful electronic mail capabilities. each user on a system has a mailbox to receive incoming mail. The MAIL utility enables you to send and receive electronic mail from different mailboxes.

To send mail to another user on the same SCO UNIX system, you just need to know the other user's account name. To send mail to a user on another UNIX system, you need to know that user's system or network address.

Either way, once you have an appropriate address, you can easily send a message to another user, even if that user is across the country or around the world.

### **The Development system:**

SCO UNIX offers a powerful software development environment that you can use to create your own c and assembly Language program. The required tools are part of the SCO XENIX or UNIX development system, which you must purchase separately from the base operation system. Microsoft and SCO have collaborated to make the development system particularly rich in features. It includes both the Microsoft and AT&T C compilers. Microsoft's code view debugger and MASM macro assembler are also part of the development system, as are SCO CGI and libraries for cross development of software for XENIX, DOS, and OS/2 programs. Because each tool in the development system could easily be the subject of a separate book, these tools are not covered here.

## **CHAPTER-5.**

### **Introduction of the Database (INFORMIX)**



# INFORMIX

INFORMIX has two main branches i.e.

1. informix-sql
2. informix-4gl

## Introduction to Structured Query Language(sql):

Structured Query Language entails following features:

- I. An English like Language
- ii. Allows us to create, manage, and use databases
- iii. Industry standard Developed by IBM
- iv. INFORMIX products provide enhanced version

## SQL Statements:

- I. Data Definition(DDL) i.e. used to create a database and define its structure.
- ii. Data Manipulation(DML)-- used to query, add, modify, or delete data in a database also include Select, Insert, Update, Load, Unload, Transaction processing, Concurrency.
- iii. Cursor Manipulation -- used to work with cursors.
- iv. Dynamic Management -- used to dynamically manage resources at runtime.
- v. Data Access(DCL) -- used to determine how data can be accessed.

- vi. Data Integrity --used to preserve data integrity.
- vii. Query Optimization Information --used to obtain information regarding the execution of a query.
- viii. Stored Procedure --used to execute and debug stored procedures

### **Introduction to INFORMIX-4GL:**

INFORMIX-4gl is a fourth-generation Language developed by INFORMIX software, Inc. and designed specifically for database applications.

Fourth-generation Languages such as INFORMIX-4GL represents the latest advancement in programming.

Fourth-generation programming Languages are designed for a particular class of applications. They are less complex than general-purpose languages like COBOL or C, and they more closely approximate “natural language”. Because they focus on a specific type of application, fourth-generation Languages can anticipate what you want to accomplish in your program. Also, fourth generation Languages are very powerful; one simple statement generates a great deal of machine code.

As a result, programs written in a fourth generation Language do not contain nearly as many statements as programs written in a general purpose Language.

### **Advantages of Fourth-Generation Languages:**

- I. They are simple, which speeds up the process of building and maintaining applications.
- ii. They are generally interactive, which simplifies the debugging process.

- iii. They appeal to a wide audience because they require no special training.
- iv. The resulting applications are easy to use and can solve problems efficiently.

### **Procedural and Non-Procedural Languages:**

Programming Languages are sometimes referred to as procedural or non-procedural. When we use a procedural language, we specify in our program how we want to accomplish something. This step-by-step approach makes a procedural language very flexible, so that we can use it for a variety of applications. For example, if we are designing a menu-driven program using a procedural language such as COBOL or C, we must specify, step by step, how to display the menu and handle input from the user such a program would include statements for displaying the menu title and menu options and for moving the cursor from one option to another. It would also include conditional statements like IF or CASE that perform a series of operations, depending on the user's input.

On the other, when we use a non-procedural language, we specify the desired result, and language supplies the procedure. Imagine that we wish to design a menu driven program using a non-procedural language. In this case, we would create a menu by using a statement such as the INFORMIX-4GL MENU statement. We would not need to use print statements to display the menu title and options because MENU has built-in procedures that display the menu for us. Likewise, we would not need to use conditional statements to handle requests from the user, because MENU in effect create a CASE like statement.

INFORMIX-4GL combines the features of procedural and non-procedural languages. We have seen how INFORMIX-4GL offers non-procedural statements like the MENU statement to make building applications simple. INFORMIX-4GL also provides procedural statements like IF, FOR, and WHILE so that we can do things that the designers of INFORMIX-4GL could not predict. Thus, INFORMIX-4GL combines the speed and simplicity of non-procedural language with the flexibility of procedural language.

## FEATURES OF INFORMIX-4GL:

INFORMIX-4GL is a very powerful fourth-generation language providing all the tools that we need to create relational database management systems.

INFORMIX-4GL is also

- A programming Language
- A screen building utility
- A menu building utility
- A report writer
- A window manager

## An Industry Standard Database Language:

INFORMIX-4GL is a development tool designed specifically for writing programs that create relational databases and that provide the user with facilities to manipulate the data stored in these databases.

INFORMIX-4GL is built on the INFORMIX software extension of the SQL developed by IBM and meets the Database Language Level 1 SQL standard(X3.135-1986) of the American National Standard Institute (ANSI) using INFORMIX-SE, INFORMIX-4GL also conforms to Level II of the ANSI standard for SQL. INFORMIX-4GL offers statements such as CREATE DATABASE, INSERT, SELECT, UPDATE, and DELETE, so that we can write programs that allow the user to add, retrieve, update, and delete information in database.

### **A Programming Language:**

INFORMIX-4GL still has many features of a programming language. In addition to database specific statements, INFORMIX-4GL supports statements similar to those found in general purpose languages, for basic tasks like assigning values, looping and conditional branching.

For example, we use the LET statement to assign values to INFORMIX-4GL program variables. Statements such as WHILE and FOR set up program loops that function like those third generation languages. The IF and CASE statements in INFORMIX-4GL perform in virtually the same fashion as the corresponding statements in C and Pascal. INFORMIX-4GL also provides data structures such as records and array that allow us to manipulate many values simultaneously. As our program become larger and complex, we can use the FUNCTION statement to create subroutines.

### **A Screen Building Utility:**

Many database management systems provide screen forms through which the user can enter or display information. INFORMIX-4GL includes a utility called FORM 4GL that enables us to create screen form with a minimum of effort. FORM 4GL can automatically generate a default screen form for any table(s) in a database. We can also use the FORM 4GL utility to design customized screen forms that are both complex and aesthetically pleasing.

### **Entering Data:**

After we have created a screen form, we can then use the INPUT statement to allow the user to enter data on the form and transfer it to program variables. Or, we can use the DISPLAY statement to display data in program variables on form. INFORMIX-4GL handles cursor movement automatically and provides built-in editing capabilities, including a multiline editor for multiple line fields.

### **Query by Example:**

With a powerful CONSTRUCT statement, we can let the user perform a query by example. A query by example allows the user to input data into one or more fields on a screen form. This data specifies the information that should be retrieved from the database. What makes this feature so powerful are the relational, range, alternation, and wildcard symbols that the user can include in a query.

### **A Menu-Building Utility:**

INFORMIX-4GL provides the powerful MENU statement that simplifies the process of creating menus. With the MENU statement, we can quickly build a menu. We can even nest menus within menus to create a menu interface for our application. By using the MENU statement, we can ensure that the menus in our applications are consistent.

### **A Report Writer:**

INFORMIX-4GL offers statements that allow us to create a variety of reports, from simple default reports to custom formatted reports. With INFORMIX-4GL, we can retrieve data from the database and then sort, group, and format the data to our exact specifications. INFORMIX-4GL also has built-in functions that allow us to determine minimum, maximum, and average values, as well as calculate percentages and totals for the data in our report. Advanced formatting capabilities such as adjustable page lengths and margins make it easy to produce columnar reports, payroll checks, invoices, and more.

### **Window Manager:**

With INFORMIX-4GL we can create applications that devote different rectangular parts of the screen to different activities. Each rectangular portion of the screen is called a window.

INFORMIX-4GL includes powerful window management statements that allow us to open, clear, close, and change windows within our programs.

### **A Creative Solution For Database Applications:**

INFORMIX-4GL represents a creative solution to the need for flexibility and simplicity in a fourth- generation language. Its basic statements are simple, and yet the optional extensions provide the flexibility we need for complex applications. the non-procedural statements are very compact and handle the bulk of the application. The procedural statements enable you to do things that the designers of INFORMIX-4GL could not predict.

# **CHAPTER-6**

## **System Design**



## **Introduction:**

System design is the most challenging of all the phases in the system's life cycle. After studying the existing system, analyst should plan and design a new system which meets the needs of the users. Systems design presents specific information for the designing of the output, input, processing, table structure and database.

Economy, reliability, responsiveness and modularity should be taken into account in the design. These four requirements may best be achieved with a modest start and testing each phase of information before processing to the next phase.

In this chapter we will discuss about the design of the system.

## **Proposed System Design:**

The system design process includes the following:

- Input Form designing
- Security
- i. Output Design
- v. Table Design

## **Input Form Designing**

Since an input form plays an important role in data entry, so input form should be easy and understandable to use. These forms provide for convenience for entering the data into the computers. Keeping all this in view, the input forms are designed for transaction processing:

The forms are given below:

- Inform\_tab form
- i. Stub\_tab form
- ii. Code\_tab form

the input screen for screen and other data have been designed while keeping in mind their ease of use and efficiency. These screens are depicted next:

**inform\_tab form:**

This form is used to enter data about all information in the inform\_tab table.

---



---

DATA ENTRY IN GREEN NUMBERS INFORMATION

---



---

```

green_no1      [          ] = =
Subscriber_nam [          ] = =
Address        [          ] = =
               [          ] = =
               [          ] = =
Advice_note_no [          ] = =
Advice_note_date [          ] ==
Open_date      [ ][ ][ ] = =
Instalation_fee[          ] Rate [          ] = =
Date_shift     [          ] Facilities[          ] = =
Part_of_connection [          ] Bank_branch[          ] = =
Billing_year[          ] Amount_billed[          ] = =
  
```

---



---

**Green code Form:**

This form is used to enter different codes of green numbers which are used in bill Report for security purpose.

---

---

DATA ENTRY FOR GREEN CODE

---

---

Code\_number [            ]

Code [            ]

---

---

**Stub Form:**

This form is used to enter data in stub using stub\_tab.

---

---

DATA ENTRY IN STUB FOR FORM

---

---

=				=
=	Green_no	[	]	=
=				=
=	Period_from	[	]	=
=				=
=	Period_to	[	]	=
=	Billed_amount	[	]	=
=				=
=	Paid_amount	[	]	=
=				=
=	Bank_branch	[	]	=

---

---

### Security:

The password system will be implemented for the security purpose. So that only authorized users would be able to do necessary actions.

### Output Designing:

The output design constitutes an important part of the system. The output may be queries or reports. Queries are the statements that retrieve data from system on the screen in any combination or order. So the table structure should be design while keeping in mind these queries. Reports is also a type of query but it is printed form.

### Table Design:

The following points should be kept in mind while designing tables:

1. Data redundancy should be minimized.
2. The table should provide the fast retrieval of information.
3. The record of the tables can easily be updated if necessary.
4. The system contains three tables. One of them are code table while other are transaction processing tables. An overview of each table (structure) is provided below:

### Tables Structure:

Table Name: Inform\_tab

### Purpose:

The purpose of this table is to store data of all information about green number.

**Record Structure:**

Field Name	Data type	Constraints	Description
Green_no1	Integer	Not Null	Green number
Subscriber am	char(40)	Not Null	Subscriber Name
Address	char(120)	Not null	Subscriber Address
Advice_note_no	char(20)	Null	Advice note number
Advice_note_ date	Date	Null	Advice note date
Open_date_dd	smallint	Null	Open date day
Open_date_mm	smallint	Null	Open date Month
Open_date_yy	smallint	Null	Open date year
Installation_fee	integer	Null	Instalation fee
Rate	integer	Null	Annual rate
Rate_shift	date	Null	Shift date
Facilities	char(1)	Null	Facilities
Part_of_ connection	char(8)	Null	Part of connection
Bank_branch	char(20)	Null	Bank branch
Billing_year	smallint	Null	Billing year
Amount_ billed	integer	Null	Total Billed amount

**Table Name:** Stub\_tab

**Purpose:**

The purpose of this table is to store data of all information about Stubs of green number.

**Record Structure:**

Field Name	Data type	Constraints	Description
Green_no	Integer	Not Null	Green number
Period_from	date	Not Null	period from
period_to	date	Not Null	period to
billed_amount	integer	Null	billed amount
paid_amount	integer	Null	paid amount
bank_branch	char(20)	Null	bank branch

**Table Name:** code\_tab

**Purpose:**

The purpose of this table is to store data of all information about Codes of green number.

**Record Structure:**

Field Name	Data type	Constraints	Description
code_no	Integer	Not Null	Code number
code	char(1)	Not Null	code



## **CHAPTER-7**

# **Software Development and Implementation**

## SOFTWARE DEVELOPMENT AND IMPLEMENTATION

### Software Development:

When the design phase is accomplished, the next task for the designer is to develop software using the selected software in accordance with the proposed system and the design specifications.

It was kept in mind that all possible care should be taken in writing different programs and then putting them together in one package. Steps necessary in program writing were fully observed and a convenient framework was developed. These steps were:

- 1) Defining the problem.
- 2) Planning a solution.
- 3) Maintenance of the programs.

The programming involved coding, testing and debugging various programs have been developed in this package. Programs have also been developed for data storage, amendment and deletion of data. In addition to this, programs have been formulated to get different reports as the requirement of PTC.

### File Maintenance:

In file maintenance, different steps have been observed which are as follows:

- i) Amendment in data
- ii) Insertion in data

### **I) Amendment in data:**

The amendment process involves when a record or field already residing in a file has been entered in an unacceptable format or is intended to be replaced by a fresh by a fresh and up-to-date information.

### **ii) Insertion of data:**

By insertion, we mean to add new record. This procedure is adopted when a new customer or subscriber is to be entertained or billing is to be adjusted.

### **Report generation programs:**

The purpose of these programs is to generate different reports related to the subscribers position of bills as well as for the requirement of the organization for various purposes and decision-making.

### **System Implementation:**

The aim of this phase is to ensure a smooth and efficient shifting from existing manual system to a computerized system of "Green Numbers" for which the main exercise is to convert manual data procession system into a new modified computer based system.

The following steps when adopted are involved in conversion from manual to computerized system:

I) System testing.

ii) System conversion.

## System Testing:

In testing phase, one has to ensure that the system designed for implementation leads to the destination in accordance with the requirement and objectives already defined.

The importance is given to the facts that the system designed is comprehensive in all respects keeping it under maximum limits. While writing each program, specific steps have been taken to ensure that the system is performing its functions correctly and it is tested on sample data of optimum nature.

In the testing phase following steps were taken:

- i) Each phase of the system has been checked carefully.
- ii) With input of test data, it was ensured that each type of the defined data was acceptable to various programs.
- iii) Comparison between the manual reports and the computerized was made.
- iv) Creation and retrieval of data meets the objectives specified.
- v) All processing and tabulations were upto the required standard.
- vi) All the documents produced by the package were complete, accurate and properly interfaced with manual procedures.
- vii) All parts of the package proposed were well interlinked with each other.

In short through testing of the system, we ensured that all modules were performing their functions correctly and the new developed system was ready to use.

### **System Conversion:**

The system conversion involves the switching over from the existing manual system to the new proposed computer based system. This could be achieved by adopting one of the following methods.

- a) Direct conversion.
- b) Parallel conversion.
- c) Pilot conversion.

In direct conversion, the old system can be completely abandoned and new system adopted whereas in case of parallel conversion the old and new system run together simultaneously for a few months and when the desired results or satisfaction is achieved, the old system is replaced by the new one. In case of pilot conversion, a sub-system of proposed system is replaced with a part of the old system and all sub-systems are replaced one after the other.

### **Proposed Method of Conversion:**

After a careful examination of the merits and demerits of the system conversion methods, we recommend the parallel conversion for adoption of the package proposed. Though the arrangements against the parallel conversion system are cost and additional work load, but the advantage in our case is that the related office of PTC is affluent with highly trained personnel in computer. They can handle the proposed system in an exquisite manner in parallel to the already existing manual work.

The another advantage of the parallel system involves the continuation of the existing system with new proposed system for a few months shall provide an opportunity of training and testing of the package on actual data.

### System Evaluation:

The evaluation involves an accurate and impartial judgment, whether the objectives defined for the system have been achieved or not. we are confident that the package proposed has the following salient features:

- i) The new system is efficient and suitable for each retrieval of information.
- ii) The system has been designed in such a way that user does not face any difficult during insertion, deletion, or modification of data.
- iii) The output i.e. in the form of reports are accurate and reliable.
- iv) The system designed provides the user facilities of updating data when required.
- v) The system designed is flexible and additions can be incorporated in it very easily in future.

## User's Guide

### Introduction:

This guide has been organized to provide a basic understanding of Green Numbers Billing System developed for the SAOTR department of PTC. This guide focuses on the features provided by the system.

### Logging into the System:

As has already been mentioned that the system operates in a multi-user environment, thus requiring the services of a Database Administrator to perform several administrative tasks of the system such as creating new users keeping backup of data as well as to confirm the efficient working of the system.

A pre-requisite for starting the system is that when the system is switched on, the UNIX operating system runs and asks for a 'login name' to access the software. Only the users having a login name can access the system. The passwords are enforced to prevent the unauthorized usage of the system. After correct user name and password is provided by the user, the main menu is displayed as shown:

<p style="text-align: center;"><b>Pakistan Telecommunication Corporation</b> <b>Billing System</b> <b>for</b> <b>Green Numbers</b></p>
--

<p style="text-align: center;"><b>Main Menu</b></p>
---

- |   |
|---|
| <ul style="list-style-type: none"><li>1. Data Entry</li><li>2. Reports</li><li>99. Exit</li></ul> |
|---|

<p>Please Enter your choice.....</p>
--------------------------------------

If user enters choice '1' for data entry from the above main menu, then there will be appeared another menu as below:

**Pakistan Telecommunication Corporation  
Billing System  
for  
Green Numbers  
Data Entry Menu**

- 1. Data Entry in Master File**
- 2. Data Entry in Stubs**
- 3. Data entry for Green Codes**
- 99. Exit**

**Please Enter your choice.....**

If the user enters choice '1' for data entry in master file, the master file will be opened for data entry like updating(inserting, deleting etc.). Master file actually holds all the information about the green numbers.

Similarly, if the choice '2' is entered, the user can enter the whole information about the bill paid by the subscriber.

If the option '3' is entered, the user can view all the green number codes already existed and enter new codes as well.

If the option '99' is given, the user can go back the main menu.

In the main menu if the choice '2' is entered, another menu for different reports is displayed as shown on the next page:



**Pakistan Telecommunication Corporation**  
**Billing System**  
**for**  
**Green Numbers**  
**Reports Menu**

1. Reports of Bills
2. Reports of Ledger
3. Reports of Defaulters
4. List of Green Numbers
5. List of Green Codes
99. Exit

Please Enter your choice.....

On the basis of these choices, the above mentioned reports can be generated.

## Reports

## Report of Green Code:

Code Numbers	Code
23	G
27	K
31	F
32	E
33	H
34	A
35	B
36	D
56	M
76	N

**Report of Green Numbers:**

Green Numbers

-----  
3149

2785

3153

3184

3119

3148

**Bill Report:**

Bill For Green Number F 49

---

---

Subscriber's Name

Subscriber's Address

-----  
Mr. Muhammad Siddique

-----  
Planning Division

H.no 24 Sector F-6-3

Islamabad

Period From

Period To

Total Bill

-----  
10/01/96

-----  
30/06/96

-----  
168

**Report of Ledger:**

Ledger For Green Number 3149

---

---

Subscriber's Name

Subscriber's Address

-----  
Mr.Muhammad Siddique

-----  
Planning Division

H.No 24 Sector F-6-4

Islamabad

Advice Note Number

-----  
FSH-81

Open Date

-----  
10/01/96

Period From

Period To

Total Bill

-----  
10/01/96

-----  
30/06/96

-----  
168

01/07/96

30/06/97

336

**Documents**