PERSONNEL INFORMATION SYSTEM
FOR
PNS HAFEEZ HOSPITAL
NAVAL COMPLEX ISLAMABAD

BY

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IN THE NAME OF

ALMIGHTY ALLAH

WHOSE BLESSINGS ARE

UNLIMITED

DEPARTMENT OF COMPUTER SCIENCE
QUAID-I-AZAM UNIVERSITY
ISLAMABAD

Dated: Sept. 30, 1998

FINAL APPROVAL

This is to certify that we have read the project report submitted by Mr. Farhan Asim Naseem and it is our judgment that this report is of sufficient standard to warrant its acceptance by the Quaid-i-Azam University, Islamabad for the degree of Master of Science in Computer Science.

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Project Brief

Project Title	:	Personnel Information System
Organization	:	PNS Hafeez Hospital Naval Complex Islamabad
Undertaken By	:	Farhan Asim Naseem
Supervised By	:	Mr. Iftikhar Azim Niaz Lecturer, Department of Computer Sciences Quaid-i-Azam University Islamabad
Starting Date	:	December, 1997
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Software Used	:	Oracle 7.0 & Developer/2000
Operating System	:	Windows 95
System Used	:	IBM Compatible Pentium 166 MMX

Dedicated To:

My Respected Father

Ch. Noor Ahamd Naseem (Late),

My Sweet Mother &

My Loving Sister

Acknowledgement

First and the foremost, I am grateful to Almighty Allah Whose blessings enabled me to accomplish this hard task successfully.

For getting the ball rolling, I am greatly indebted to Lt.Comm.Muhammad Shafique and Commander Hafeez from NHQ Islamabad. I am also thankful to Executive Officer of PNS Hafeez Ghulam Mehdi for his excellent co-operation during my visits to the hospital.

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At the end, I pray for my sweet father that may Allah keep his soul in peace. I am really proud of him.

Farhan Asim Naseem

July, 1998

Islamabad.

Abstract

This project report aims at the computerization of Personnel Information System of PNS Hafeez Islamabad. The developed system stores the information of three categories of employees working in the hospital. Queries and reports from the main menu of the system can retrieve the concerned information regarding to an employee. The information stored in the database can be manipulated wit the help of various forms developed for the system.

Chapter1 is an introductory chapter. It describes the introduction to the hospital and also includes the problem definition.

Chapter2 describes the detailed working of the existing system. The draw backs of the existing system have also been discussed.

Chapter3 describes he proposed system and its futures. The proposed system design is also discussed in this chapter

Chapter4 puts light on the development and the implementation of the new system. Different testing strategies have also been discussed in this chapter.

Chapter5 evaluates the developed system and also includes future enhancements.

Chapter6 provides the guidelines for the users to operate the new system.

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Chapter No. 1

Introduction

1.1 Introduction to the Hospital:

In order to provide medical facilities to entitled category of armed forces personnel and civilians, Pakistan Navy has many hospitals working in different regions of the country. PNS Hafeez is one of them functioning in the capital city Islamabad. It started functioning on March 4, 1974 as a sick bay in a rented house in sector F-6. Since it was not fully accomplishing the requirements of the armed forces, it was upgraded to twenty-four bedded Naval Medical Center on June 29, 1976 which is presently the outdoor block of PNS Hafeez. It worked as a Naval Medical Center for about ten years. Then it was commissioned as PNS Hafeez on March 24, 1986 in the honor of Late Vice Admiral Hasan Hafeez TQA, Ex-CNS Pakistan Navy.

Later on, it was realized that PNS Hafeez is not fully meeting the requirements of the patients. To overcome this problem, the construction of new hundred-bedded hospital started in 1989. On July 21,1990 a new admission block was added to the hospital. PNS Hafeez started functioning as a hundred bedded hospital on June 20, 1993.

Now the hospital has advanced facilities for the armed forces and their family patients. About 300 patients daily visit for the cure of different diseases. Currently nine specialists including Medical, Surgical, Skin, Gynecology, Children, Pathology, Radiology, Eye and ENT specialties are working in the hospital. It also has the advanced facilities of laboratory tests, X-rays, ECG and operation theaters.

Two types of patients visit the hospital namely outdoor and indoor patients. Outdoor patients are dealt immediately while serious patients are admitted which are called indoor patients.

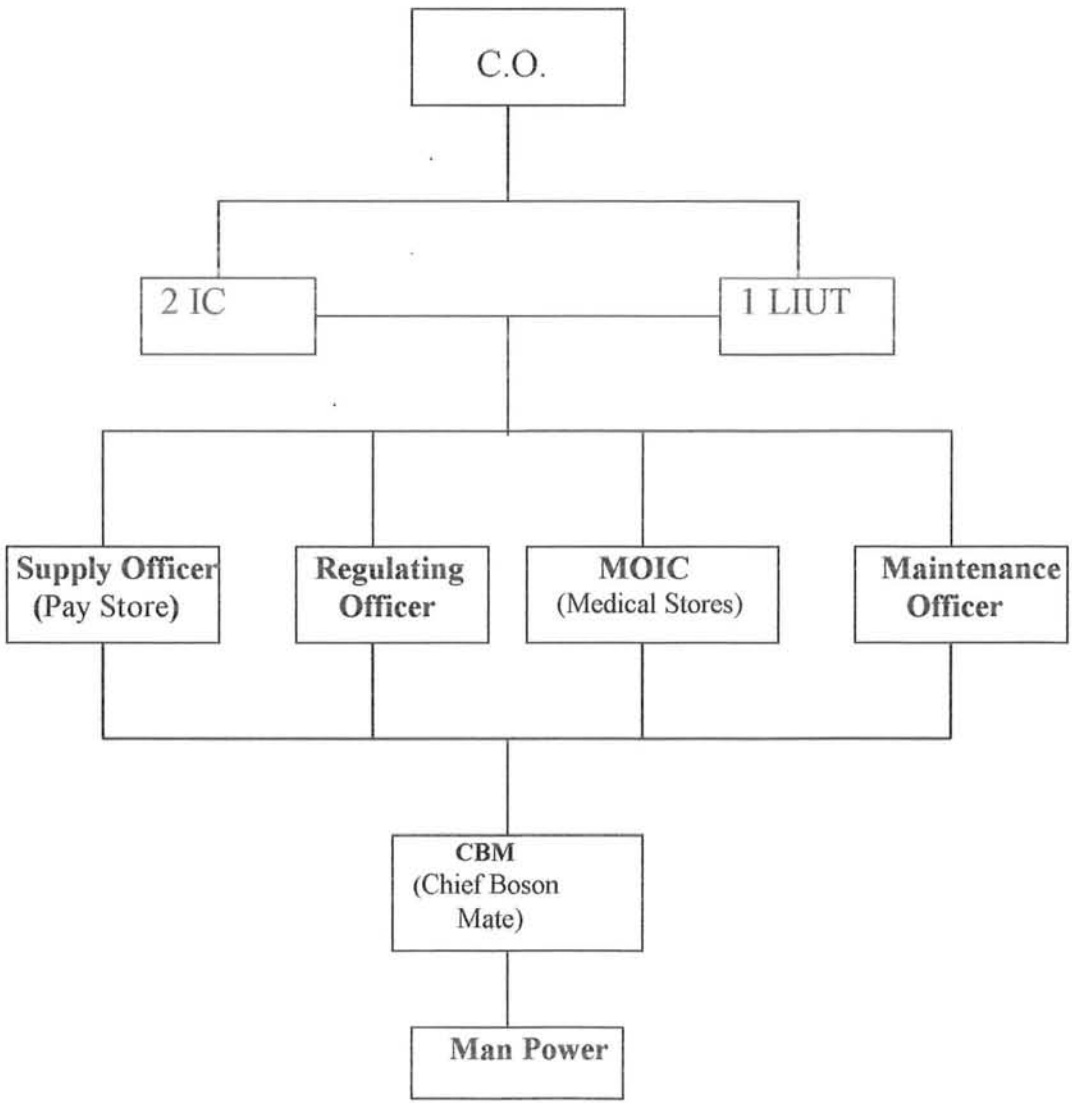
There are three wards for indoor patients, namely, General Male Ward (GMW), General Female Ward (GFW) and Gynea Ward. Out of hundred, forty beds are

reserved for GMW and thirty beds are reserved for GFW and Gynea Ward each. Female ward also includes children. Ten beds are reserved for female officers, ten for male officers and six beds are allotted to Intensive Care Unit (ICU).

In addition to armed forces personnel, PNS Hafeez Hospital also provides services to civilians but they have to pay for their treatment.

1.2 Organization Chart:

PNS Hafeez management works under the following format:



1.3 Missions and Capabilities:

PNS Hafeez management has the following major missions:

- To provide medical/surgical treatment and hospitalization facilities to the entitled categories of the armed forces personnel, civilians and their families.
- To receive patients from PNS Shifa for specialized treatment.
- To hold invalidment, categorization and re-survey medical board for officers, CPOs, sailors and civilians in defense services.
- To conduct medical examinations for entrance to the armed forces.
- To provide VVIP/VIP medical cover at Islamabad.
- To act as SHO for Naval Installations at Islamabad.

1.4 Problem Definition:

Every organization, institution and firm is concerned with some data processing activities. Today most of the organizations are willing to have efficient and reliable data processing systems by using the latest technology available. So everyone is looking towards the computerization of the manual system.

PNS Hafeez is also looking for a computer based "***Personnel Information System***" to make their tedious job of handling the employee information, easy and reliable. Also they want to design a personnel information system, which would provide them with an efficient and fast access to their queries and reports required for decision making.

Chapter No. 2

The Existing System

2.1 Introduction:

The primary aim to study the existing system is to have a close view of the current working of the system and to evaluate the system requirements. To design, develop and implement the new system, a comprehensive understanding of the existing system is necessary. Incorrect or incomplete understanding of the existing system may lead to erroneous design of the new system. Hence a detailed study of the existing working is of paramount importance for the design and development of an efficient and reliable system.

2.2 The Existing System:

A detailed description of the existing personnel system of PNS Hafeez is mentioned below:

2.2.1 Employee Information:

The personnel system of PNS Hafeez comprises of three categories of employees namely civilians, officers and sailors. Sailors are non-officers uniformed persons. Although the consulting departments have some other jobs also like payroll system, accountings etc. but this project is concerned with personnel information only. Although some information is different according to employee category but most of the information is same for each employee. Following are those entries:

- Personal no/Official no.
- Name
- Father's name
- Sex
- Marital Status
- Date of posting at PNS Hafeez

- Date of joining in Armed Forces
- Permanent address
- Present address
- National id card no.
- Date of birth
- Phone no (if any)

Some information is specific according to each employee category.

Officers:

When an officer is appointed or transferred to PNS Hafeez,he/she is referred by Medical Directorate NHQ Islamabad. Medical Directorate then demands for his/her performa, which is sent by PNS Hafeez after consulting the officer. Each officer has a personal file that moves along with him/her during the service. Following is the information that is specific for an officer:

- Rank
- Date of commission
- Anti-date seniority
- Officer Category
- Medical Category
- Accommodation (in/out)
- Command /Special pay

An officer may also opt to engage in private practice in conformity with the existing rules or may opt to draw non-practicing allowance, which is Rs.500 per month.

Sailors:

Any uniformed person but not an officer will be called a sailor.

Two types of sailors perform their duties in PNS Hafeez:

- ***MLR*** (Money in lieu of ration)
- ***Vitl*** (Victual)

MLRs are those who are not availing the mess facility but are receiving money for that while ***Vitl*** category is availing the mess facility.

The following additional information is stored for the sailors:

- Rate
- State *(MLR or Vitl)*
- Department

For each transaction they are keeping daily moments record, also called rough moments.

From those rough moments two sheets are prepared, one for MLRs and other for Vitl category. Both incoming and outgoing daily moments have the following format:

Incoming	**Outgoing**
---	---
Born	Official. No
Leave	Name
Temporary duty	Rate

Run Absent	Date of moment
Admit	Moment to
MLR	
Vitl	
Present (MLR + Vitl)	

Civilians:

In order to run its official and medical working properly, civilian personnel is also appointed in the hospital. Each civilian has an individual Service Book that moves along with him during the service. Each civilian has a corresponding unique personal number. Following information is stored specifically for a civilian employee:

- Designation
- Pay Scale
- Department

2.2.2 Leave Procedure:

Although the official formality and the number of granted leaves per year for officers, sailors and civilians are different but for each one the leave form contains the following entries:

- Personal No
- Name
- Rank/Rate/Designation
- Type of leave
- Amount Due

- Amount granted
- Date of moment
- Date of reporting
- Reason
- Leave address

The granted leave may be one of the following types:

- **P/L** (Privilege leave)
- **C/L** (Casual leave)

Casual leave is fixed for all categories of employees, which is twenty days/year.

Privilege leave for each category is shown below:

Category	**P/L granted per year (in days)**
Officers	30
Sailors	60
Civilians	48

A sailor can also avail the leaves of the previous year in his credit while an officer can avail the leaves of current year only.

Casual leaves are for the current year only.

Medical leave may also be granted that depends upon the type and seriousness of disease.

2.2.3 Next Of kin:

In case of death of an employee, they have the kin information for each employee, containing the following entries:

- Personal no
- Name of kin
- Occupation
- Relation
- Phone no
- Address

2.2.4 Temporary Duty:

An employee may also be sent for a short-term temporary duty to some other unit of Pakistan Navy. He/she is sent by concerned authorities due to the temporary lack of working personnel in the particular unit. Following information is stored for that:

- Personal No.
- Date of moment
- Date of reporting
- Duty Unit
- Authority

2.2.5 Admit:

An employee is also provided the facility of admission in the hospital if he/she is in such condition. If his/her condition is not serious then he/she may be granted medical leaves instead of being admitted to the hospital. Following information is needed for an employee to when he/she is admitted to the hospital:

- Personal No.
- Date of Admission
- Date of Discharge
- Medical Unit
- Disease

2.2.6 Codes:

They are also using the codes for some entries. Following are those:

1) Medical Category:

According to the medical state of each officer, he/she is assigned different codes ranging from A to E.

2) Leave Code:

They are using the following codes for the privilege and casual leaves respectively:

- **P/L**
- **C/L**

2.3 Draw backs of the existing system:

Presently the personal system of PNS Hafeez is handled manually. Being an armed forces hospital although the current working of personnel system is systematic but still there are few limitations in the existing system.

Secrecy

PNS Hafeez is an armed forces hospital, which is the most sensitive and confidential department of the country. In the present manual system, a number of personnel is involved in the compilation of results and for most of the time sensitive information are exposed on the reports or forms. So it is very likely that some unauthorized person might get access to secret information.

Time Factor

With the passage of time, the number of transaction are reasonably increasing, so evaluation and record keeping data is becoming difficult to handle. In many cases, such as report generation etc. a lot of time is consumed to handle search and to maintain the data, which is quite tedious and cumbersome. Also the registers are maintained again and again which again requires a lot of time.

Leave Balance

Currently, they do not have any proper record of balance for leave, whether it is P/L or C/L. They have to search it from some other sources, each times a person applies for leave.

Slowness

Due to its manual nature, the existing system is slow and laborious. Since all information are store into papers, files and registers, so in order to access a particular information they have to go through a tired some and tedious exercise.

Redundancy:

Same information is being stored at different places in the manual system, which is quite a tedious job. For example exactly the same entries are made on leave form and leave register. In addition to that, the same information is stored in another register, called the general information register.

Chapter No. 3

The Proposed System & Its Design

3.1 Introduction

After a detailed study of the existing system, it is essential to develop a logical model for the proposed system. Keeping all the requirements and the problems faced by the existing system in mind, a computerized system is proposed.

3.2 Features of the Proposed System

It is important to establish the objectives that a proposed system should meet. The proposed personnel information system will possess the following capabilities.

Authorized Access:

Only the authorized persons will have the access to the desired information about the application. It will be out of access of any unauthorized person.

Efficiency:

Due to its computerized nature, the proposed system will be more efficient and reliable as compared to the existing system.

Time Reduction:

The proposed system will produce faster responses to the queries and to generate reports, which will cause reasonable reduction in time.

Ease of Use:

The system will provide a user-friendly interface, so that the user will quickly become familiar with the working of the application software.

Acceptable to the Management:

System design will be acceptable to the hospital management and will ensure the objectives of the hospital to meet.

Reduced Redundancy:

Same information is stored and maintained at different places in the existing system. The proposed system will greatly reduce the redundancy of data occurring in the existing system.

Codes:

To eliminate any keying error and to reduce the storage and the number of typing strokes, codes will be designed which will be small and easy to use. Codes will be assigned keeping in mind the maximum range of values. The numeric and alphabetic codes may be used in the proposed system.

Data Checks:

Data checks are of paramount importance in the developed system since they prevent the user to enter invalid data. So in order to make the proposed system efficient and consistent and to ensure the validity of data several data checks will be implemented. For example when the data is entered other than the specified format. A message will appear to enter the data in correct format.

User Interface:

Finally, the system will be designed in such a way so that the users become familiar with it very soon. The interface of the input screens will be simple and easy to interact.

3.3 The Proposed System:

The characteristics of the intended system are discussed in this section. It specifies various types of input that are required to be input and also discusses the desired outputs.

3.3.1 Proposed System Inputs:

The inputs of the system determine the data that will be used for the processing of the output. The generation of either correct or erroneous information is also determined by it. Thus it is very necessary to carefully plan the proposed system inputs.

3.3.1.1 Specification of Inputs:

The inputs can be of various types classified according to their mode of entry in the database. These are discussed below:

1) Constant Inputs:

Some inputs remain constant during the working of the system. These will be provided once in the system and the users will not have to make their entry again and again. For example, privilege leaves (P/L) are fixed for each employee category. All such entries will be stored once.

2) Variable Inputs:

Some inputs keep on changing with the passage of time. For example, the number of leaves taken by an employee will be different each time. Such information must be entered each time.

3) Conditional Inputs:

There are some conditional inputs also which depend upon some predicates. For example the private practice facility is available for the specialists only. All such inputs are conditional.

3.3.1.2 Inputs Forms:

The inputs of the proposed system are mentioned below. The layout of these inputs is given in the appendix.

1) Input Data Forms:

Following different input data forms are devised in the new system:

- **Employee Information Form**
- **Officers Data Entry Form**
- **Sailors Data Entry Form**
- **Civilians Data Entry Form**
- **Next of Kin Form.**
- **Leave Form**
- **Temporary Duty Form**
- **Admit Form**
- **Specialist Form**

2) Code Forms:

To speed up the processing and to ensure the correct data entry, following code forms have been designed:

- **Designation Code Form**
- **Department Code Form**
- **Rank Code Form**
- **Rate Code Form**
- **Medical Unit Code Form**
- **Temporary Duty Unit Code Form**
- **Specialist Code Form**
- **Leave Code Form**

3.3.2 Proposed System Outputs:

One of the major functions of any computerized system is to produce relevant timely information, whenever needed. The outputs of the system are in the form of queries to be displayed on the screen and different reports to be printed on the paper. All this should be finalized before the file structure is considered. The system developed for PNS Hafeez Hospital is capable of generating both the required queries and reports.

1) Queries:

One of the major objectives of developing a database system is to retrieve information quickly and efficiently. The users are not concerned with the internal working of the system. They are only concerned with the output produced by the system.

Queries are the statements that retrieve date on the screen in any combination or format. Different fields of different tables may be combined to display data on the screen. Queries in the system are provided keeping in mind the questions that may arise in user's mind regarding the retrieval of desired information from the system. Following different queries will be produced by the new system:

- **Employees on temporary duty on a particular date**
- **Employees on leave on a particular date**
- **Next of kin information of a particular employee**
- **Employees admitted in the hospital on a particular date**

2) Reports:

Report, in fact, is also a form of query but in printed form. Well-formatted reports will be produced by the system according to the requirements of the management. Following different reports will be produced by the new system:

- **Daily report of sailors transactions**
- **Civilians quarterly sanctioned borne return**
- **Nominal roll report for civilians**
- **Daily State report of PNS Hafeez employees**
- **Officers quarterly return**

The layout of these reports is given in the appendix.

3.4 File Design:

Design is the only way that can accurately translate the user's requirements into a finished software product. The quality of the software design is reflected in the development of the system. So the quality of design is of paramount importance for the development of efficient and reliable software. The system designer must keep in mind the structure of the system that helps users making decisions effecting future as well as current events.

File design is concerned with the actual physical storage of data in the form of database tables. Here, the particular storage structures and access paths for the database files are selected to achieve efficient performance.

Table Description:

Different tables used in the database design are as follow:

1. **Table Name** : Employee
   Primary Key : P_No
   Purpose : This table is used to keep the general information of the employees.

Table Layout :

Field Name	Description	Data Type	Length	Status
P_No	Personal No	Varchar2	7	Not Null
Name	Employee Name	Varchar2	25	Not Null
F_Name	Father's Name	Varchar2	25	Not Null
Sex	Sex	Char	1	Not Null
M_Status	Marital Status	Char	1	Not Null
D_O_Birth	Date of birth	Date	11	
N_I_D	National ID No	Varchar2	13	
Domicile	Domicile	Char	1	Not Null
D_O_Join	Date of joining Hafeez	Date	11	Not Null
D_O_Post	Date of Posting in Forces	Date	11	Not Null
Pre_addr	Present Address	Varchar2	50	
Per_addr	Permanent Address	Varchar2	50	
Ph1	Phone1	Varchar2	15	
Ph2	Phone2	Varchar2	15	

2. **Table Name :** Sailors

Purpose : This table is used to store the information specific to sailors.

Table Layout:

Field Name	Description	Data Type	Length	Status
P_No	Personal No	Varchar2	7	Not Null
Rate	Navy Rate	Char	3	Not Null
State	Mess State	Char	1	Not Null
Dept	Department	Char	3	Not Null

3. **Table Name** : Officers

Purpose : This table is used to store the information that is specific to officers.

Table Layout:

Field Name	Description	Data Type	Length	Status
P_No	Personal No	Varchar2	7	Not Null
Rank	Navy Rank	Char	3	Not Null
D_O_Com	Date of Commission	Date	11	Not Null
A_D_Sen	Anti Date Seniority	Date	11	
Accomm	Accommodation	Char	1	Not Null
O_Cat	Officer Category	Char	3	Not Null
M_Cat	Medical Category	Char	1	Not Null
P_Type	Pay Type	Char	1	Not Null

4. **Table Name :** Civilians

Purpose : This table is used to store the information that is specifically for the civilians.

Table Layout:

Field Name	Description	Data Type	Length	Status
P_No	Personal No	Varchar2	7	Not Null
Desig	Designation	Char	3	Not Null
Dept	Department	Char	3	

5. **Table Name** : Leave

Primary Key : (P_No,D_O_M)

Purpose : This table is used to keep the leave record of employees.

Table Layout :

Field Name	Description	Data Type	Length	Status
P_No	Personal No	Varchar2	7	Not Null
D_O_M	Date of moment	Date	11	Not Null
D_O_R	Date of reporting	Date	11	Not Null
Type	Type of leave	Char	3	Not Null
Reason	Reason of leave	Varchar2	50	
L_addr	Leave Address	Varchar2	50	

6. **Table Name** : TY_Duty

Primary Key : (P_No,F_Date)

Purpose : This table is used to store the information about temporary duties of employees performed at different units of Pakistan Navy.

Table Layout :

Field Name	Description	Data Type	Length	Status
P_No	Personal No	Varchar2	7	Not Null
F_Date	From Date	Date	11	Not Null
T_Date	To Date	Date	11	Not Null
D_Unit	Duty Unit	Char	3	Not Null
Auth	Authority	Varchar2	50	

7. **Table Name :** Admit

Primary Key: (P_No, D_O_A)

Purpose : This table is used to keep the record of those employees who remained admit to hospital.

Table Layout :

Field Name	Description	Data Type	Length	Status
P_No	Personal No	Number	6	Not Null
D_O_A	Date of admission	Date	11	Not Null
D_O_D	Date of discharge	Date	11	Not Null
Disease	Disease	Varchar2	30	
M_Unit	Medical Unit	Char	3	

8. **Table Name :** N_O_Kin

Primary Key: P_No

Purpose : This table is used to store the information about the next of kin of each employee.

Table Layout :

Field Name	Description	Data Type	Length	Status
P_No	Personal No	Varchar2	7	Not Null
Kin_Name	Name of kin	Varchar2	25	Not Null
Relation	Relation with Kin	Char	1	
Occupation	Occupation of Kin	Varchar2	25	
Kin_addr	Address of Kin	Varchar2	50	Not Null
K_Ph	Phone No. of Kin	Varchar2	15	

9. **Table Name :** Specialist

Primary Key: (P_No,D_O_A)

Purpose : This table stores the information of specialists who are doing their private practice in the hospital.

Table Layout :

Field Name	Description	Data Type	Length	Status
P_No	Personal No	Varchar2	7	Not Null
D_O_A	Applying Date	Date	11	Not Null
Speciality	Medical Specialty	Char	3	Not Null
Opt	Practice Option	Char	1	Not Null
D_O_S	Starting Date	Date	11	

10. **Table Name :** Rank

Primary Key: Rk_Code

Purpose : This table is used to store the codes for different ranks of officers.

Table Layout:

Field Name	Description	Data Type	Length	Status
Rk_Code	Rank Code	Char	3	Not Null
Rank	Navy Rank	Varchar2	25	

11. **Table Name :** Rate

Primary Key: Rt_Code

Purpose : This table is used to store the codes for different rates of sailors.

Table Layout:

Field Name	Description	Data Type	Length	Status
Rt_Code	Rate Code	Char	3	Not Null
Rate	Navy Rate	Varchar2	25	

12. **Table Name :** Designation

Primary Key: D_Code

Purpose : This table is used to store the codes, scale and the no. of personnel sanctioned for each designation.

Table Layout :

Field Name	Description	Data Type	Length	Status
D_Code	Designation Code	Char	3	Not Null
Desig	Designation	Varchar2	25	
Sanc	Sanctioned	Number	2	Not Null
Scale	Scale	Number	2	Not Null
S_Auth	Snactioned Authority	Varchar2	50	

13. Table Name : Specialist_Code

Primary Key : S_Code

Purpose : This table is used to store the codes for different specialties of officers.

Table Layout:

Field Name	Description	Data Type	Length	Status
S_Code	Specialist Code	Char	3	Not Null
Speciality	Medical Speciality	Varchar2	25	

14. Table Name : Med_Unit

Primary Key : Unit_Code

Purpose : This table is used to store the codes for different medical units working in the hospital.

Table Layout:

Field Name	Description	Data Type	Length	Status
Unit_Code	Medical Unit Code	Char	3	Not Null
Med_Unit	Medical Unit	Varchar2	25	

15. **Table Name** : Duty_Unit

Primary Key : D_Unit_Code

Purpose : This table is used to store the codes for different medical units working in the hospital.

Table Layout:

Field Name	Description	Data Type	Length	Status
D_Unit_Code	Duty Unit Code	Char	3	Not Null
D_Unit	Duty Unit	Varchar2	25	

16. **Table Name :** Dept

Primary Key: Dept_Code

Purpose : This table is used to store the codes for different departments of the hospital.

Table Layout :

Field Name	Description	Data Type	Length	Status
Dept_Code	Department Code	Char	3	Not Null
Depart	Department	Varchar2	25	

17. **Table** : Leave_Code

Primary Key : (L_Code,Cat)

Purpose : This table is used to store the codes and the corresponding leaves of that code according to each employee category.

Table layout:

Field Name	Description	Data Type	Length	Status
L_code	Leave Code	Char	1	Not Null
Cat	Emp Category	Char	1	Not Null
L_Sanc	Sanctioned Leave	Number	3	Not Null

18. **Table** : Transfer

Primary Key : (P_NO, D_O_T)

Purpose : This table is used to store the information about those employees who have been transferred from PNS Hafeez.

Table Layout :

Field Name	Description	Data Type	Length	Status
P_No	Personal No	Varchar2	7	Not Null
D_O_T	Date of transfer	Date	11	Not Null
Desc	Description	Varchar2	50	

Chapter No. 4

System Development & Its Implementation

4.1 Introduction:

After the completion of the proposed system and the software design phase, the designer moves towards the development phase of the software in accordance with the proposed system and design specifications. Since phase is more practical since it involves the transformation of design into executable computer software.
Before developing the software one should identify the functional requirements of the system. The hardware and the software selection for the development phase plays a vital role for the success of the system.

4.2 Software Selection:

The choice of software tool is of paramount importance and depends upon the problem. Since "***Personnel Information System***" needs a *DBMS*, so the selection had to be made among different database management systems available. Database management systems are of three types, namely:

- **Hierarchical**
- **Network**
- **Relational**

The first two are accessed through pointers, while the last one is accessed by value. Impressed by the type of user interface and the type of highlevel query language available, it was decided to use the RDBMS for the designed system. Furthermore, there were number of options available for RDBMS like Oracle, Informix, Sybase, Access etc. but after considering all mentioned above, Oracle was considered to be most appropriate having developer/2000 as its front end.

4.2.1 Why used Oracle/Developer 2000?

The major features that resulted in the selection of Oracle for the development of the system are as follow:

Client-Server Model:

Oracle provides a powerful Client/Server model between the server and its terminals. In such a model, some of the processing is performed at the server and part of it is performed at the user's terminals, causing a reasonable increase in the speed of processing.

Security:

A very strict security is provided by Oracle package. Before log in, you must have to show your identification by entering the user name and password which is very favorable for such a sensitive application that holds Pakistan Navy personnel information. With out the correct password, no one can access the data. It is also possible to grant different types of privileges to different users according to their status. For example the rights of deletion and updation may be granted only to the authorized personnel.

Multi-user Support:

Oracle is designed to allow users to share frequently used programs and data. Which causes to increase efficiency and decrease the memory and I/O cost.

Portability:

Oracle RDBMS can run various applications on an impressive range of hardware and operating systems including VMS, MVS, Unix, MS-DOS and OS/2.

Oracle/Developer 2000 Tools:

Oracle/Developer 2000 supports the following powerful tools:

1) Standard Query Language (SQL):

Oracle has introduced SQL, which is standard relational database language. In addition to that it provides a powerful procedural language extension to SQL, which is called PL/SQL. PL/SQL uses programming language constructs, which increases the functionality and performance of the application.

It is also possible to embed SQL in programs written in C, ADA, Pascal, Fortran and other programming languages by using the Oracle pre-compilers.

2) Forms:

Oracle forms are used to design forms. Data entry, deletion, updation and queries can be performed very easily through these forms.

3) Menus:

User friendly menus can be constructed through Oracle Menu application.

4) Oracle Report Writer:

Different reports can be generated through Oracle Report Writer in any desired format by an interactive manner.

4.3 System Development:

Before discussing the development of the system, it is essential to explain some of the terms used by the tool.

Block:

A block is a container for interface items. All items whether they come from a base table or not must be in a block. Blocks are the links between the form and the database. Each block can relate to one table in the database or may be non-base table. A form may contain one or more blocks.

Base Table:

The database table on which a block is based will be called as a base table. When an operator executes a query in a block, each record displayed corresponds to one row in the underlying base table.

Item:

An item is an interface object that displays data from a column in the database to operators. Most items in a form are text items such as employee name but items also include buttons, check boxes etc.

Triggers:

Trigger is a sequence of code that executes in response to a particular *event. An event* is an action that occurs when a control is activated. All triggers are written in PL/SQL.

Master/Detail Relationship:

Master-detail relationship exists between the blocks in case of presence of more than one block in a form. A master-detail relationship exists when there are multiple records in the detail block corresponding to each record of master block or there is a primary to foreign key relationship between the two.

4.4 Input Form Designing:

Different data and code forms used in the system are as follow:

4.4.1 Input Data Forms:

Various input forms used in the system development are described below. The layout of these forms is given in the appendix.

1. **Form Name** : Emp_form
   Purpose : This form is used to keep the information about all employees working in the hospital

Detail :

Block Name	Master Block	Table Involved
Emp		Emp

2. **Form Name** : Sailors_form
   Purpose : This form is used to keep the information specific to sailors.

Detail :

Block Name	Master Block	Table Involved
Sailors		Sailors

3. **Form Name** : Civilians_form

Purpose : This form is used to keep the information about the civilians

Detail :

Block Name	Master Block	Table Involved
Civilians		Civilians

4. **Form Name** : Officers_form

Purpose : This form is used to keep the information about the officers

Detail :

Block Name	Master Block	Table Involved
Officers		Officers

5. **Form Name** : Leave_form

Purpose : This form is used to keep the leave record of all the employees of the hospital.

Detail :

Block Name	Master Block	Table Involved
Leave		Leave

6. **Form Name** : Ty_duty_form

Purpose : This form is used to keep the information about those employees who are sent on temporary duty in other Navy Units.

Detail :

Block Name	Master Block	Table Involved
Ty_duty		Ty_duty

7. **Form Name** : Admit_form

   Purpose : This form is used to keep the information about the employees who are or remained admit in the hospital.

Detail:

Block Name	Master Block	Table Involved
Admit		Admit

8. **Form Name** : Specialist__form

   Purpose : This form is used for the specialists, whether or not they are doing their private practice in the hospital.

Detail :

Block Name	Master Block	Table Involved
Specialist		Specialist

9. **Form Name** : Kin_form

   Purpose : This form is devised for the next_of_kin information of all the employees performing their duties in the hospital.

Detail :

Block Name	Master Block	Table Involved
Next_of_Kin		Next_of_kin

4.4.2 Code Forms:

Following different code forms have been devised to alleviate the typing errors and to make the system efficient:

1. **Form Name** : Rank_code_form

   Purpose : The purpose of this form is to store different rank codes for Navy officers.

Detail :

Block Name	Description	Table Involved
Rank	Specifies different rank codes for Navy officers.	Rank

2. **Form Name** : Rate_code_form

   Purpose : The purpose of this form is to store different rate codes for Navy sailors.

Detail :

Block Name	Description	Table Involved
Rate	Specifies different rate codes for Navy sailors.	Rate

3. **Form Name** : Desig_code_form

   Purpose : The purpose of this form is to store different designations for the civilians.

Detail :

Block Name	Description	Table Involved
Designation	Specifies designation codes used for civilians.	Designation

4. **Form Name** : Dept_code_form

Purpose : This form is used to store the codes for different departments of the hospital.

Detail :

Block Name	Description	Table Involved
Dept	Specifies department codes of the hospital.	Dept

5. **Form Name** : Specialist_code_form

Purpose : This form is used to store the codes for specialists.

Detail :

Block Name	Description	Table Involved
Specialist_blk	Specifies codes for the specialists.	Specialist_code

6. **Form Name** : Medical_unit_code_form

Purpose : This form is used to store the codes for different medical units functioning in the hospital.

Detail :

Block Name	Description	Table Involved
Med_unit_blk	Specifies codes for different medical units	Med_unit_code

7. **Form Name** : Ty_duty_code_form

Purpose : This form is used to store the codes for different duty units of Navy in the country.

Detail :

Block Name	Description	Table Involved
Ty_duty_blk	Specifies codes of different duty units of Pakistan Navy	Ty_duty_code

8. **Form Name** : Leave_code_form

Purpose : This form is used to store the codes for each type of leave according to each employee category..

Detail :

Block Name	Description	Table Involved
Leave_code_blk	Specifies leave codes & leaves assigned for them.	L_code

4.5 Testing:

Testing is the process of executing a program with the explicit intention of finding errors. The data is created with the intent of determining whether the system will process it correctly or not. There are three levels of testing that are used to ensure that the developed system is operating correctly.

- **Unit Testing**
- **Integrated Testing**
- **System Testing**

a) Unit Testing:

Different modules of the developed system are tested independently in this testing. Thus each module can be checked separately to locate and correct errors.

b) Integrated Testing:

In this approach the combined testing of all modules of the system is performed to ensure that all modules are interacting correctly with each other.

c) System Testing:

Validation of results is very important to make the system acceptable, so system testing is performed to ensure that the system is operating according to desired requirements and specifications

4.6 System Implementation:

To bring the developed system in operational use is called implementation. This is the final phase of system development life cycle and starts at the beginning of the development phase with an implementation plan. After the implementation the system is evaluated for further enhancements and suggestions

4.6.1 Conversion:

Conversion is the process of changing from old system to a new system. Following three approaches are used for the system conversion:

- **Pilot approach**
- **Parallel System Conversion**
- **Direct Cut Over**

a) Pilot Approach:

In this method a working volume of the new system is implemented on specific area of the existing system. The remaining departments continue to work with the old system. This approach provides substantial grounds for the whole developed system to implement.

b) Parallel System Conversion:

Both the old and the new systems run side by side in this approach. The users begin to operate the new system but they also continue to work with the old system. If the new system produces errors in processing or unable to handle certain types of transactions, the user can immediately fall back to the old system with out any loss of time and information, which is a plus point of this approach.

c) Direct Cut Over:

In direct cut over conversion, the old system is converted to new system abruptly. This method requires careful advance planning, because there are no parallel activities. The failure of new system will totally collapse the old one.

Proposed System Conversion:

The management of PNS Hafeez does not want to immediately discard the old system and implement the new one. First they want to use the new system for some duration and compare it with the old system, so that they are satisfied with the working of the developed system. So keeping in mind the management requirements, the parallel conversion approach is recommended for the implementation of developed system. In this case the old system will be available as a back up in case of failure of the new system.

Chapter No. 5

System Evaluation & Future Enhancements

5.1 Introduction:

There is always room for improvement. Hence no human effort is ever complete and perfect. When the system is implemented successfully, the designer evaluates the system to see whether the objectives of the system are accomplished or not. The user of the new system is in the best position to determine the effectiveness of the system. So the major factor during system evaluation is to evaluate the system with the perspective of the user because he/she will eventually be the one to use it. This is also termed as the "User Interface".

5.2 Merits of the System:

Some of the merits of the developed system are:

- **Security**
- **Accuracy**
- **Efficiency**
- **List Of Values**
- **Device Independence**
- **User Friendly**

1) Security:

The system will be completely isolated from an unauthorized person. Only registered users will be allowed to log on to the system.

2) Accuracy:

The new system is designed by keeping in mind the format of the inputs. Data validation checks have been provided, where necessary, for the storage of correct information. If some body gives input other than the specified format, he/she will get an appropriate message to correct it.

3) Efficiency:

Time consumption in information searching was one of the major problems for the PNS Hafeez personnel department. Such problems have been removed with the development of computerized system.

4) List of Values:

Keeping the user flexibility in mind, a list of fixed values is provided, where needed, so that the users need not to make those entries that are fixed. He/she can select the desired entry by simply clicking on it.

5) Device Independancy:

The system can be run on different machines even with different operating systems with minor changes in parameter setting.

6) User Friendly:

The system has to be operated by the users finally. Thus efforts have been made to make the system user oriented.

5.3.2 Future Enhancements:

The main objective of the new system is to meet all good qualities of the system and to accumulate them into the system by meeting all possible present and future requirements. The new system meets all present requirements. However in future, improvements can be made according to the requirements. For example new reports and queries could be designed. Currently the developed system is PC based but in future it can be extended to operate in a multi user environment. The users working on the client machines can access the data from a server.

Chapter No. 6

User's Guide

6.1 Introduction:

The user guide is provided to become familiar with the new system more easily and quickly. This chapter will provide a comprehensive understanding of how to operate the "***Computerized Personnel Information System***" developed for PNS Hafeez Islamabad.

Since the system operates in a multi user environment so it requires the services of D.B.A to perform certain tasks such as creating new users, giving them privileges, keeping back up of data etc.

The first and the foremost step towards the system implementation is Windows/95 or a higher version. The next step is the installation of Oracle 7 and Developer/2000. Oracle is the database engine functioning at the back end where as developer/2000 is its front end development tool which consists of Developer/2000 Forms 4.5, Reports 2.5 and Graphics 2.5.

After the installation of Oracle 7 and Developer/2000, the database administrator will create users identified by their respected passwords.

6.2 Getting Started:

Before starting working with the front end, the user should start Oracle 7 database engine. The database engine is mounted by selecting:

Start -->Programs -->Personal Oracle 7 for Windows 95 -->Start Database

On clicking this option, following messages will appear one by one:

Starting up database...

Checking security...

Oracle7 instance started

Database mounted

Finally a message box will appear displaying:

Oracle7 database started successfully.

Press *OK* to clear this message box.

Now in order to logon to Developer/2000 Forms 4.5, click on:

Start -->Programs -->Developer/2000 for Windows 95 -->Form Designer

6.3 Pull Down Menu:

To logon to main menu of "*Personnel Information System*" of PNS Hafeez select:

C:\PNS\PIS

Now the user will be on main menu. The main menu will appear as:

Action	Data Forms	Code Forms	Reports	Queries	Window

1) Action Menu:

In action menu different menu items such as Save, Clear and Exit are available and any one can be selected to execute the corresponding function.

2) Data Forms Menu:

Data forms menu consists of the following menu items:

Employees Information Form

Officers Data

Civilians Data Entry Form

Sailors Data Entry Form

Admit Form

Temporary Duty Form

Leave Entry Form

Next Of Kin Form

Officers Data is a sub menu having two menu items:

Officers Data Entry Form

Specialist Form

Any data form can be selected from above options and the related data can be manipulated.

3) Code Forms Menu:

Different code forms designed in the system will appear in the code forms menu as:

Rank Code Form

Rate Code Form

Designation Code Form

Department Code Form

Duty Unit Code Form

Medical Unit Code Form

Specialist Code Form

Leave Code Form

The user can enter codes and description for different entries by selecting any of the above.

4) Reports Menu:

In reports menu following options are available:

Civilians Sanctioned Borne Report

Daily State of PNS Hafeez

Officers Quarterly Report

Civilians Nominal Roll Report

Sailors Daily Transaction Report

By moving the cursor, click on the desired report. The collected results will be displayed on the screen, which can be printed on the screen by selecting the print option.

6.4 Important Considerations:

The user must know following terminology and their function:

1) Console:

Console is the general name for the standard features that provide essential user information at run time. It appears at the bottom of the screen. The console includes the *Status Line* and the *Message Line.*

Status Line:

The status is a console component that displays a variety of indicators to reflect the current state of the form module. These indicators along with their meaning are described below:

Indicator	Meaning
Count	The number of records retrieved and displayed by a query.
*	The last record has been retrieved.
^	There are records above the current ones.
V	There are records below the current ones.
Enter query	The current record is in enter query mode and no record has been retrieved.
<List>	A list of values (LOV) is associated with the current item

Message Line:

The message is a console component that displays both Oracle Forms and application specific messages. For example, different error messages and additional help may be displayed, whenever needed.

2) Default Menu:

The default menu is the menu that is automatically used by all Oracle Forms applications. It provides an alternative method of use to that of keystroke operations. The default menu can be customized to introduce your own functionality. In the developed system, the main menu has been customized.

3) Alerts:

An alert is displayed as a model window. It gives information to the user that requires a response before processing can continue; either an acknowledgement or an answer to a question.

When more than one message is waiting to show on the message line, the current message also displays as an alert. In addition to the system alerts, different self-designed alerts will appear on the screen to take response from the user before processing.

6.5 Record Manipulation:

Four general operations can be performed on a record, namely, Insertion, Retrieval, Modification and Deletion. The basic condition for these operations to perform is that the form on which the operation is to be performed must be displayed on the screen.

a) Insertion:

A record can be inserted into the database tables by the following procedure:

- From <Record> menu, click on <Insert>. The form will appear blank. This can also be done by clicking the <Clear> button on the form.
- Enter the data in the form.
- Press <Save> button to save it in the workspace.
- To insert more records, repeat the above steps.
- Click on <Exit> button to return to main menu.

b) Retrieval:

To retrieve a record:

- Click on <Query> button.
- If the key value for that record is entered then the particular record will be displayed, otherwise the first record will be displayed. Keep on pressing <Next> key to scroll the records until the desired record is retrieved.
- Click on <Exit> button to go back to main menu.

c) Modification:

- Repeat first two steps of retrieval operation.
- Enter new data in the displayed editing fields, where values are needed to be modified.
- Press <Save> button to save the changes in the database.

- Press <Exit> to go to main menu.

d) **Deletion/Removal:**

- Repeat 1st & 2nd steps of retrieval operation.
- Click on <Remove> in the <record> menu. The desired record will be deleted.
- Click on <Save> button to save the deleted record.
- Repeat the same process to delete more records.
- Click on <Exit> button to return to main menu.

6.6 Implementing the Security:

Any computerized database system should be secure enough to be accessed by unauthorized persons. Database administrator (DBA) implements such securities. One of the duties of DBA is to provide access of the computer system to the users to use an Oracle database. For that, one must have an access to the computer and the operating system through an identification name and password to ensure valid access to the system. After that, one must have an Oracle username and password to gain access to the Oracle database that are valid for the underlying database.

Oracle DBA can create new users with different privileges assigned to them according to their status. Each user has its own domain of privileges and operations that he/she can perform. All this is handled by DBA. Hence the security is promptly implemented by DBA.

6.7 Precaution:

Before switching off the computer, the Oracle database engine, working at the back end, should be properly shutdown i.e. the Oracle database should be dismounted first by selecting

Start -->Programs -->Personal Oracle 7 for Windows 95 -->Stop Database

Following messages will appear one by one on clicking this option:

Checking security...

Shutting down database...

Database dismounted

Oracle7 instance closed.

Finally, a message box will appear displaying:

Oracle7 database is shutdown.

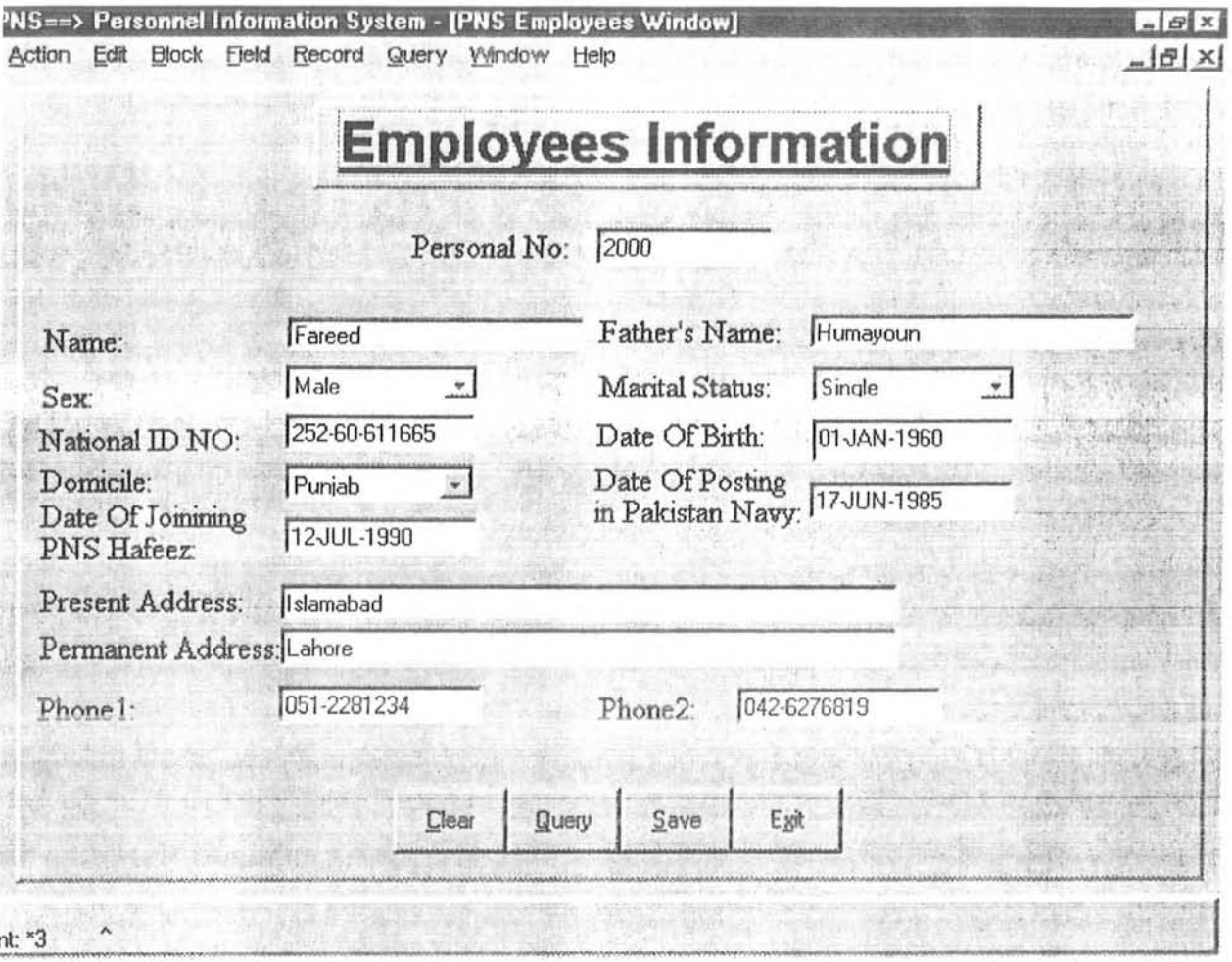
To clear this message box, press *OK*.

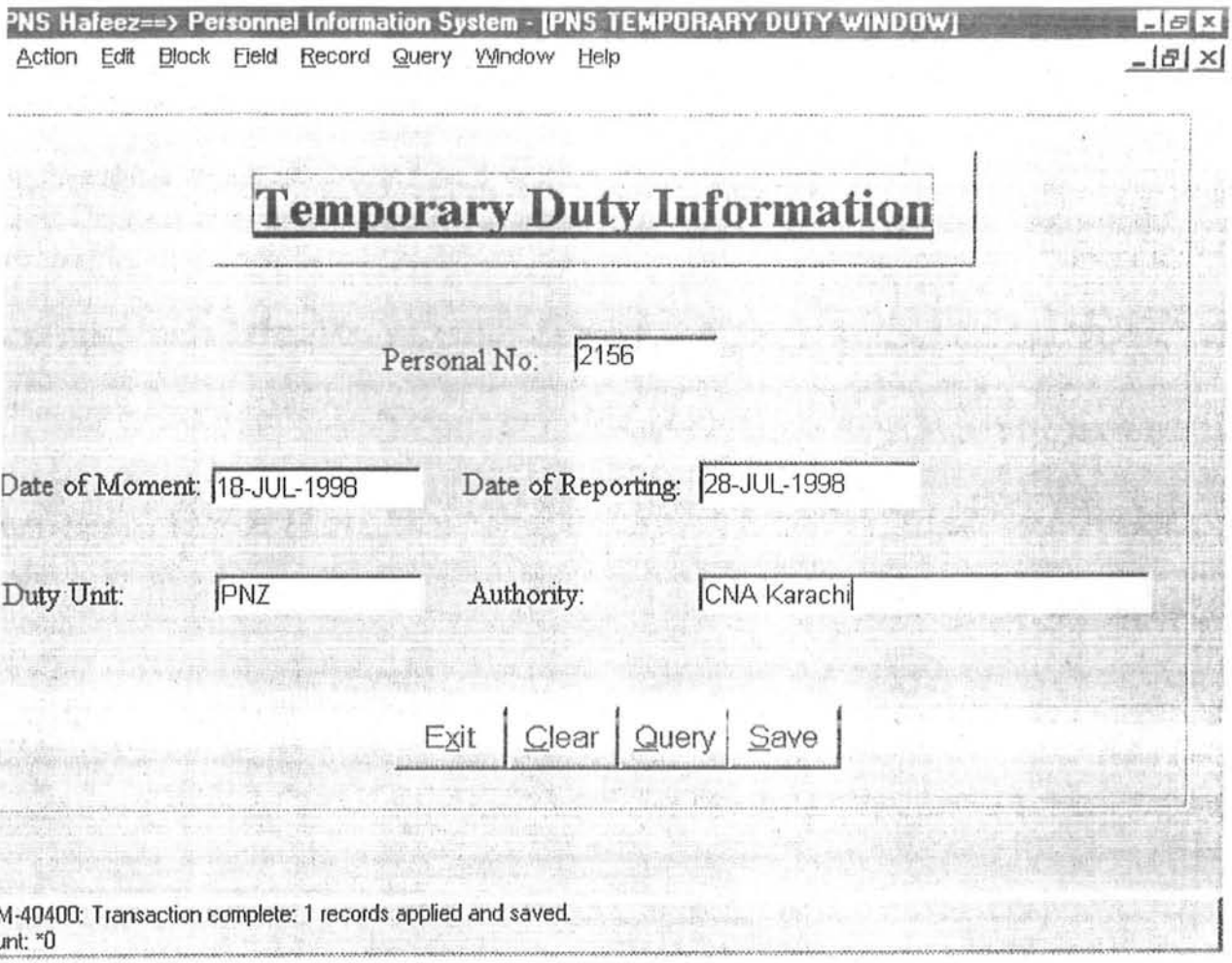
If the Oracle database engine is not properly shutdown down, the system may get corrupt, which may result in the loss or inconsistency of data.

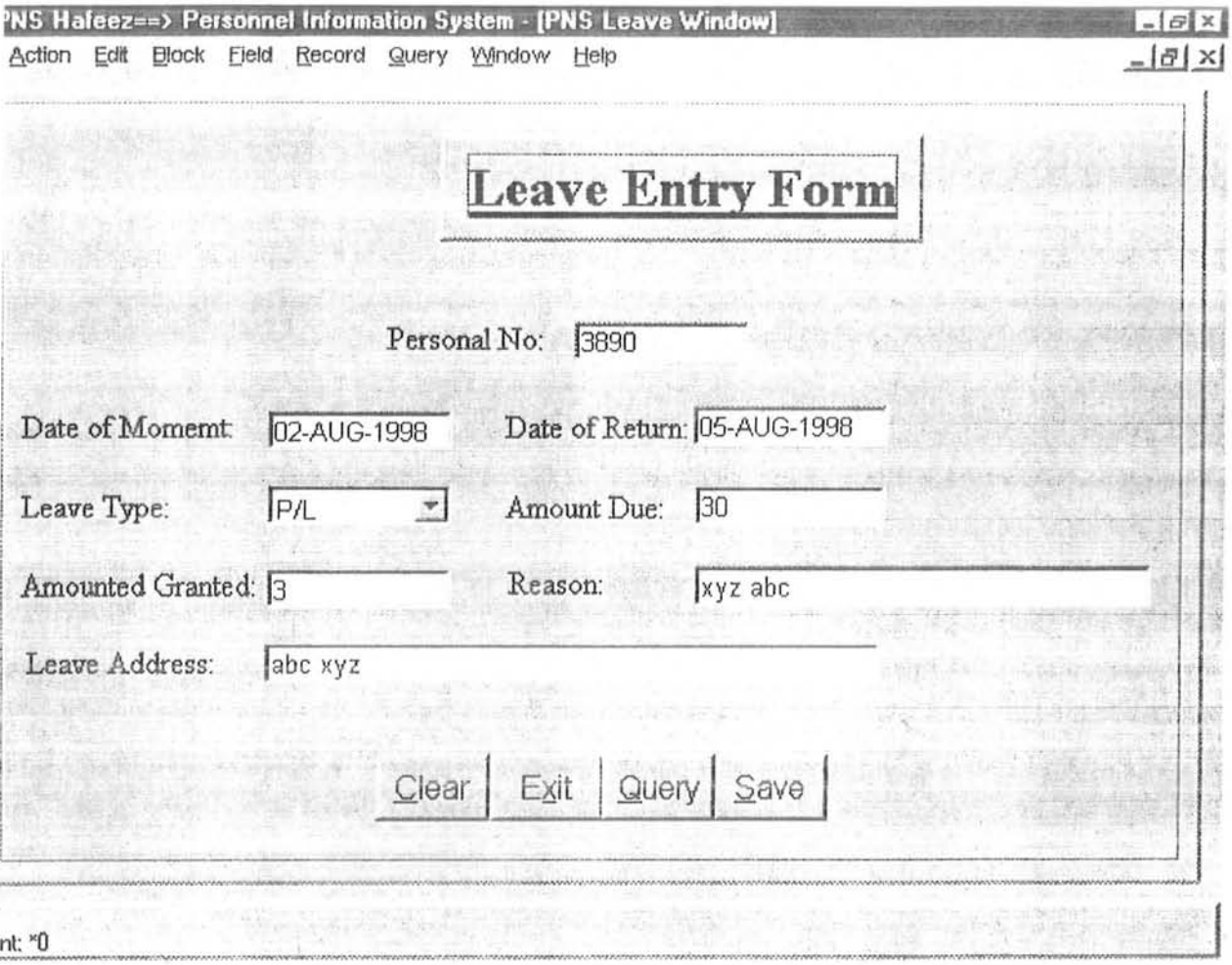
Appendices

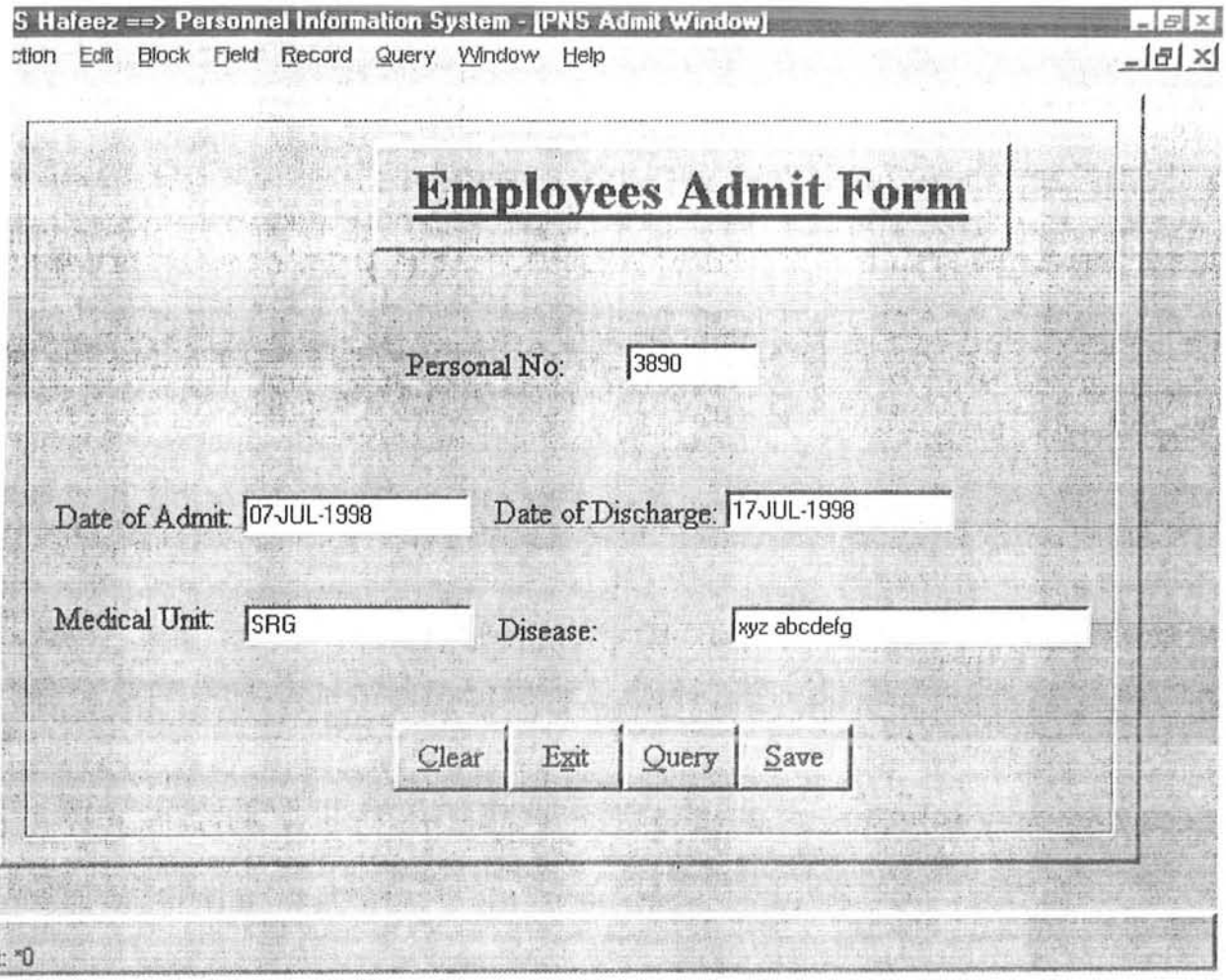
Appendix (A)

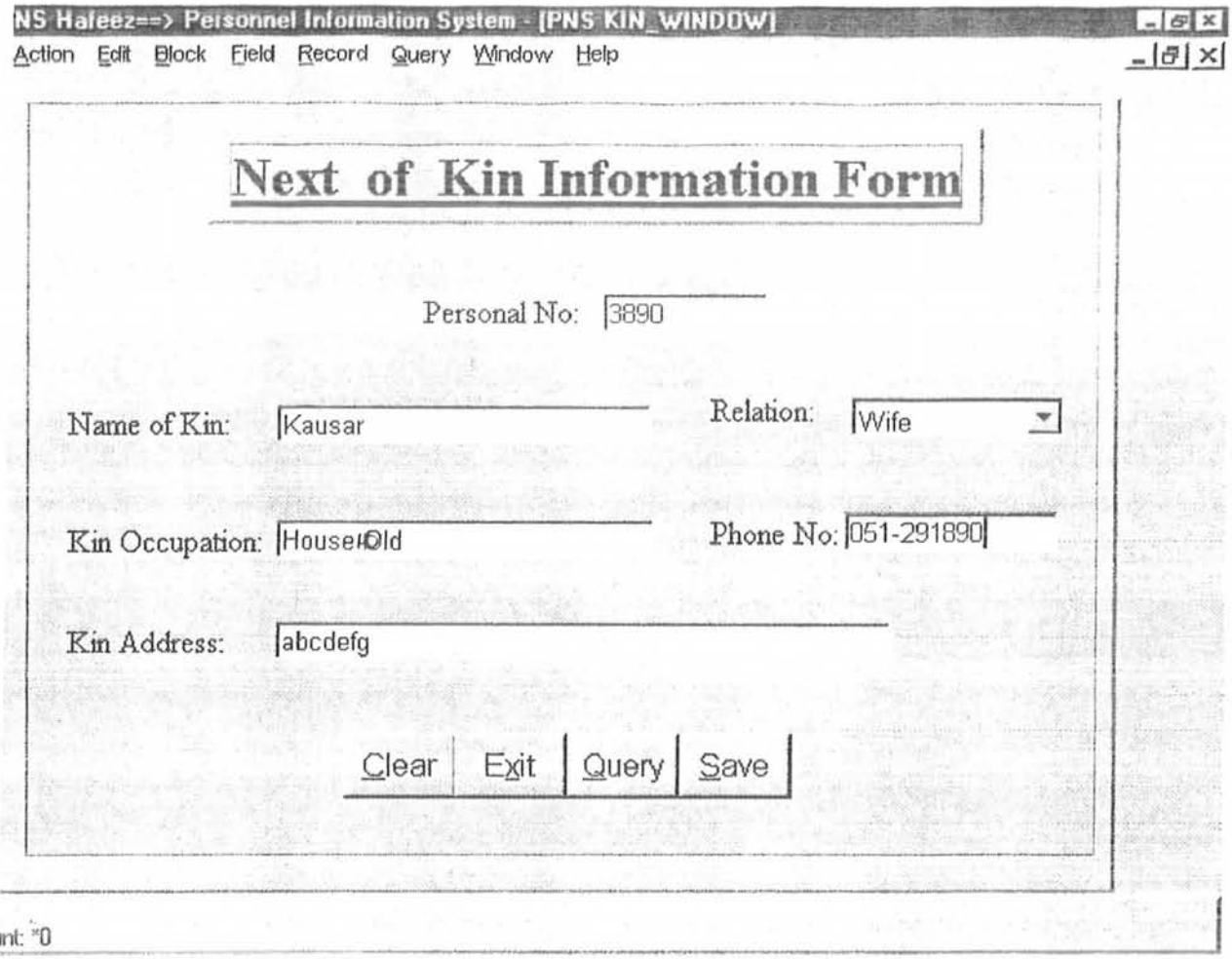
Input Forms

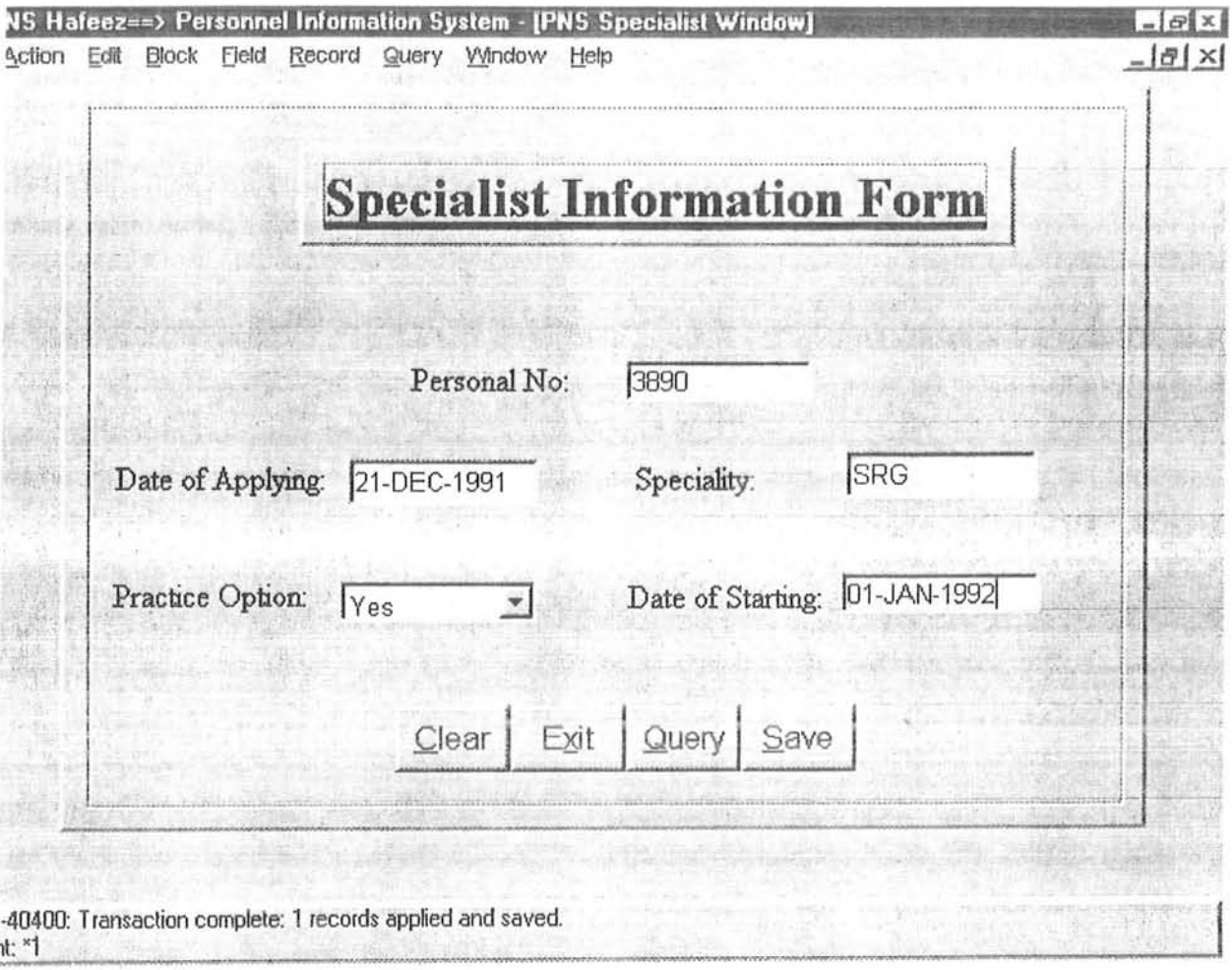

PNS==> Personnel Information System - [PNS Employees Window]
Action Edit Block Field Record Query Window Help
Employees Information
Personal No: 2000
Name: Fareed
Father's Name: Humayoun
Sex: Male
Marital Status: Single
National ID NO: 252-60-611665
Date Of Birth: 01-JAN-1960
Domicile: Punjab
Date Of Posting in Pakistan Navy: 17-JUN-1985
Date Of Joinining PNS Hafeez: 12-JUL-1990
Present Address: Islamabad
Permanent Address: Lahore
Phone1: 051-2281234
Phone2: 042-6276819
Clear
Query
Save
Exit

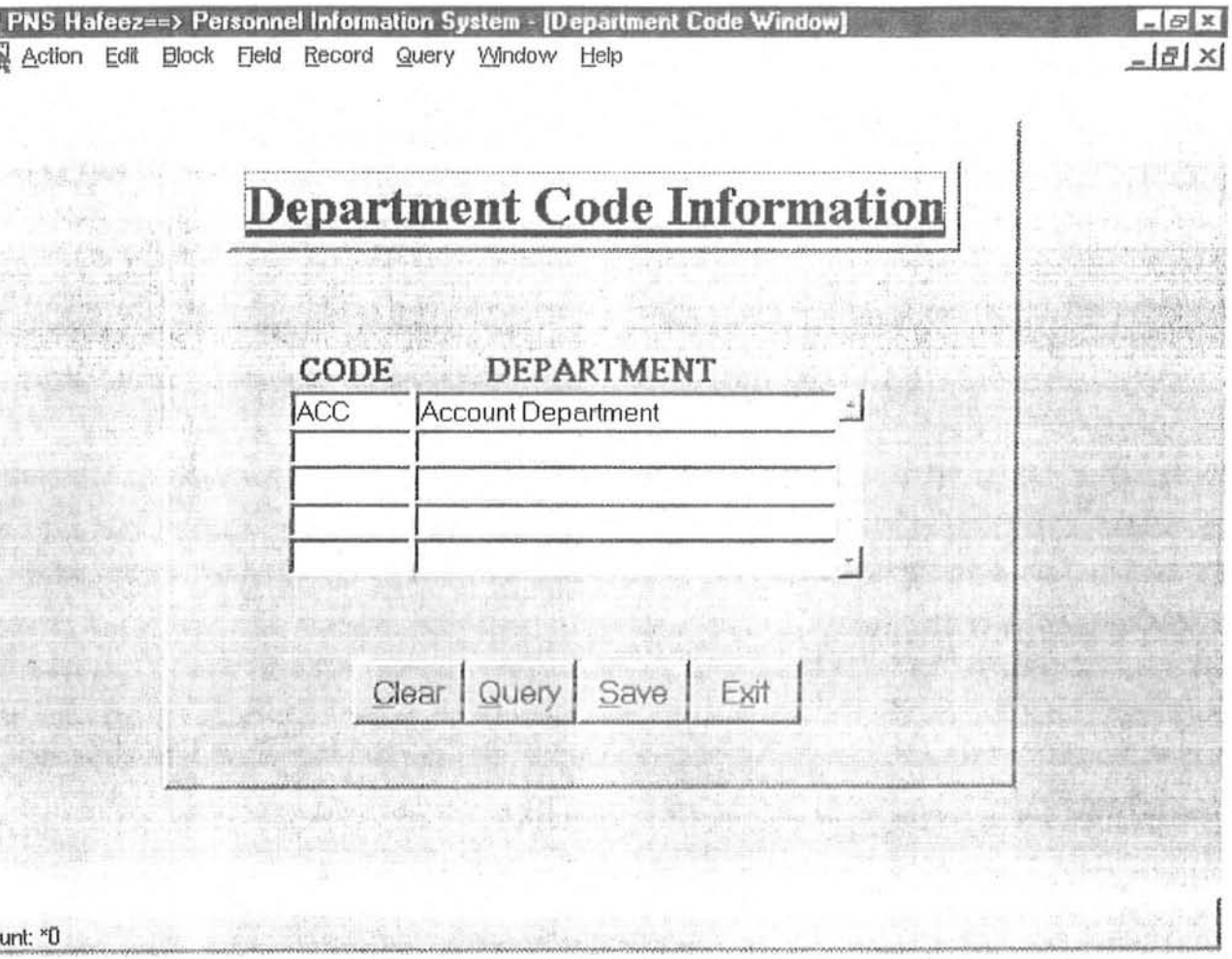

PNS Hafeez==> Personnel Information System - [PNS TEMPORARY DUTY WINDOW]
Action Edit Block Field Record Query Window Help
Temporary Duty Information
Personal No: 2156
Date of Moment: 18-JUL-1998
Date of Reporting: 28-JUL-1998
Duty Unit: PNZ
Authority: CNA Karachi
Exit Clear Query Save
M-40400: Transaction complete: 1 records applied and saved.
unt: *0

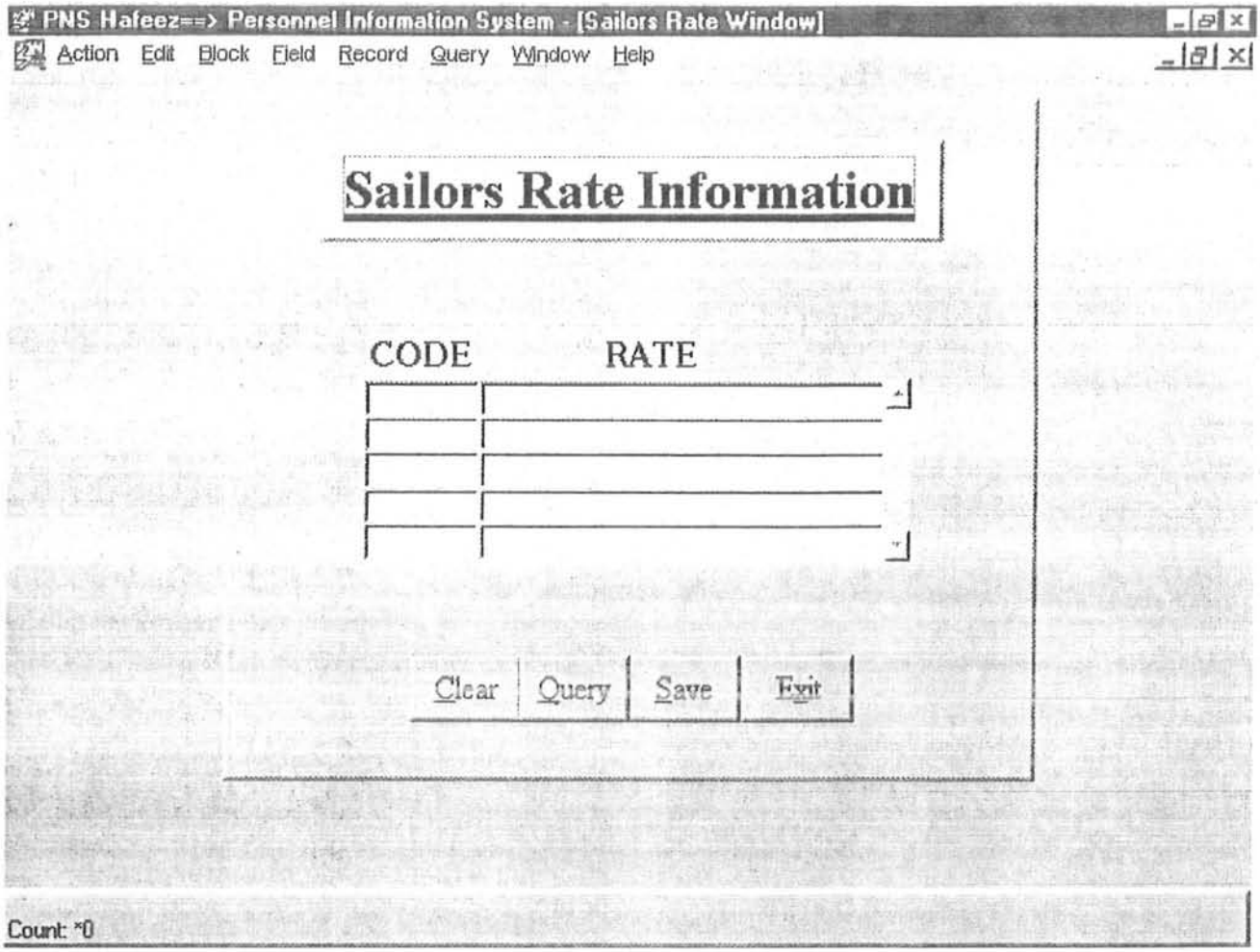

PNS Hafeez==> Personnel Information System - [PNS Leave Window]
Action Edit Block Field Record Query Window Help
Leave Entry Form
Personal No: 3890
Date of Momemt: 02-AUG-1998
Date of Return: 05-AUG-1998
Leave Type: P/L
Amount Due: 30
Amounted Granted: 3
Reason: xyz abc
Leave Address: abc xyz
Clear
Exit
Query
Save
nt: *0

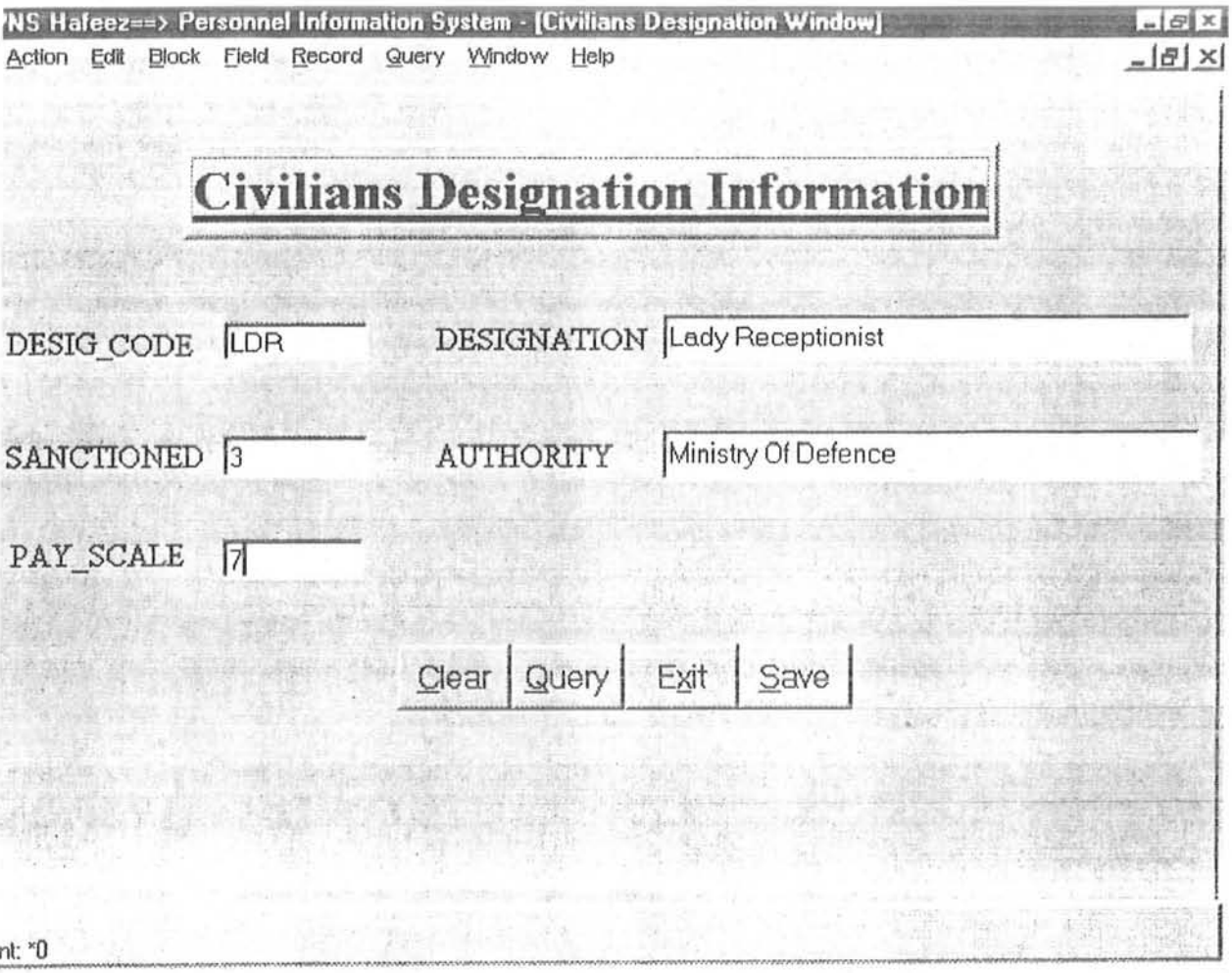

S Hafeez ==> Personnel Information System - [PNS Admit Window]
ction Edit Block Field Record Query Window Help
Employees Admit Form
Personal No: 3890
Date of Admit: 07-JUL-1998
Date of Discharge: 17-JUL-1998
Medical Unit: SRG
Disease: xyz abcdefg
Clear
Exit
Query
Save

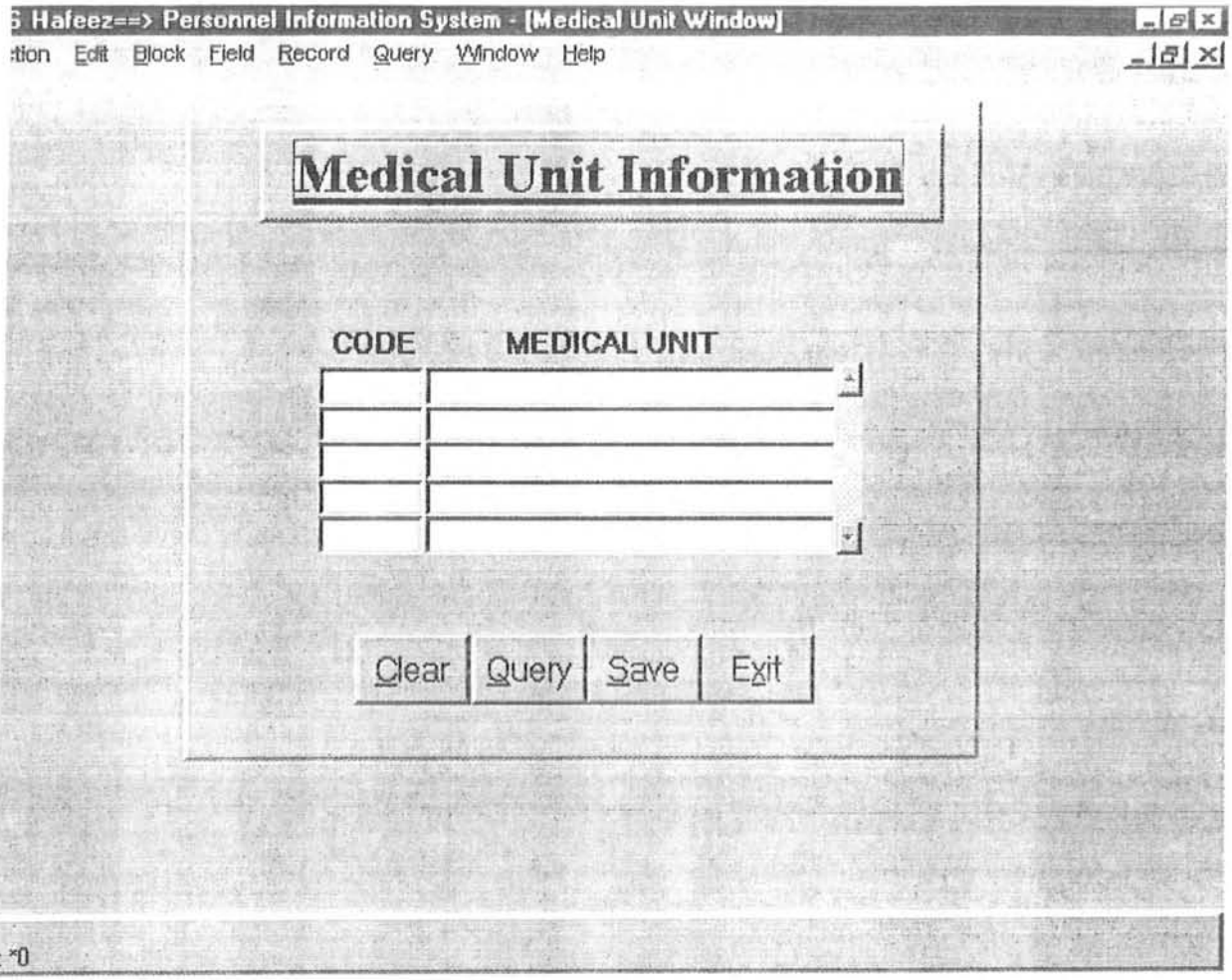

NS Haleez==> Personnel Information System - [PNS KIN_WINDOW]
Action Edit Block Field Record Query Window Help
Next of Kin Information Form
Personal No: 3890
Name of Kin: Kausar
Relation: Wife
Kin Occupation: HouseHOld
Phone No: 051-291890
Kin Address: abcdefg
Clear Exit Query Save
nt: *0

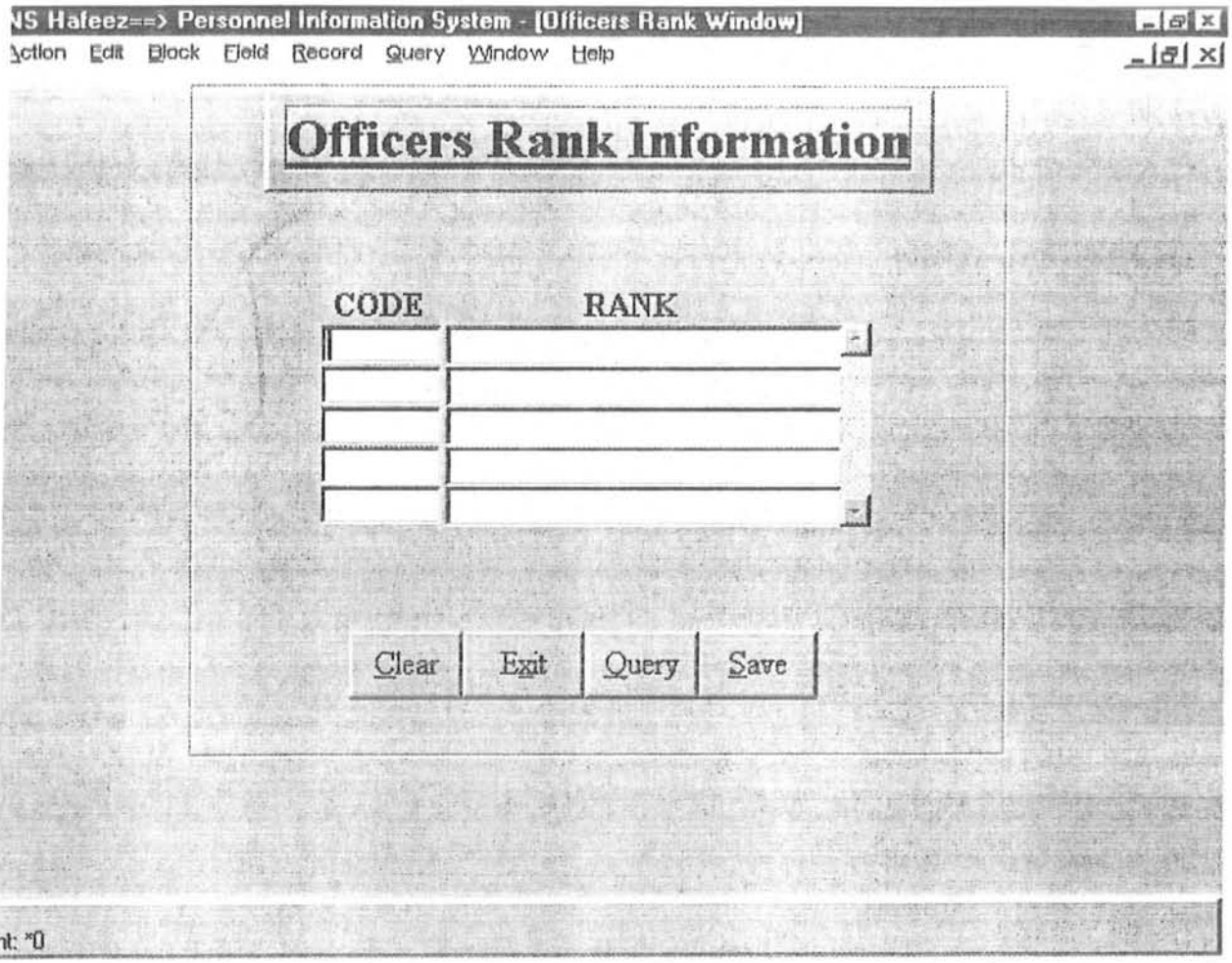

NS Hafeez==> Personnel Information System - [PNS Specialist Window]
Action Edit Block Field Record Query Window Help
Specialist Information Form
Personal No: 3890
Date of Applying: 21-DEC-1991
Speciality: SRG
Practice Option: Yes
Date of Starting: 01-JAN-1992
Clear Exit Query Save
-40400: Transaction complete: 1 records applied and saved.
t: *1


PNS Hafeez==> Personnel Information System - [Department Code Window]
Action Edit Block Field Record Query Window Help
Department Code Information
CODE
DEPARTMENT
ACC
Account Department
Clear
Query
Save
Exit
unt: *0


PNS Hafeez==> Personnel Information System - [Sailors Rate Window]
Action Edit Block Field Record Query Window Help
Sailors Rate Information
CODE
RATE
Clear
Query
Save
Exit
Count: *0


NS Hafeez==> Personnel Information System - [Civilians Designation Window]
Action Edit Block Field Record Query Window Help
Civilians Designation Information
DESIG_CODE
LDR
DESIGNATION
Lady Receptionist
SANCTIONED
3
AUTHORITY
Ministry Of Defence
PAY_SCALE
7
Clear
Query
Exit
Save
nt: *0


Hafeez==> Personnel Information System - [Medical Unit Window]
tion Edit Block Field Record Query Window Help
Medical Unit Information
CODE
MEDICAL UNIT
Clear
Query
Save
Exit
*0


NS Hafeez==> Personnel Information System - [Officers Rank Window]
Action Edit Block Field Record Query Window Help
Officers Rank Information
CODE
RANK
Clear
Exit
Query
Save

Appendix (B)

Reports

SAILORS DAILY TRANSACTION STATE

PNS HAFEEZ ISLAMABAD

Date: 20-JUL-1998

Born	Leave	TY Duty	Admit	Present	MLR	Victual
20	3	2	2	13	5	8

Executive Officer

_____

Commanding Officer

_____

Officers Nominal Roll Return

PNS Hafeez Islamabad

From 30-MAY-1998 **To** 30-JUL-1998

'. No	Officer's Name	Marital Status	Medical Category	Command/ Special Pay	Accomm-odation	Present Address
1023	Muhammad Shafique	Single	A	Special	In	Islamabad
2045	IftikharAhmad	Married	A	Special	Out	Islamabad
1167	Arslan Munir	Single	B	Command	In	Rawalpindi
5123	Atif Bashir	Married	A	Special	In	Islamabad
2318	Muhammad Akram	Married	A	None	In	Rawalpindi
3410	Adnan Asif	Married	B	Command	Out	Rawalpindi
6689	Waseem Anwar	Single	A	Special	In	Islamabad

Executive Officer

Commanding Officer

Civilians Sanctioned-Borne Return

PNS Hafeez Islamabad

Date : 18-JUL-1998

Designation	BPS	No. of Sanctioned	Sanctioned Authority	No of Borne
Head Clerk	10	1	Govt. of Pak Ministry of Defense	1
Lady Receptionist	7	1	Govt. of Pak Ministry of Defense.	1
M T D	5	10	Govt. of Pak Ministry of Defense	7
Naib Qasid	1	4	Govt. of Pak Ministry of Defense	4

Executive Officer

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Commanding Officer

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NOMINAL ROLL OF CIVILIANS EMPLOYEES

PNS HAFEEZ ISLAMABAD

Date:18-JUL-1998

ne	Father's Name	P.No.	Designation	Date of joining Hafeez	Date of joining PN	Pay Scale	Domocile	Permanent Address
ed Iqbal	Bashir Ahmad	63145	M.T.D	18-FEB-1996	12-APR-1980	5	Punjab	Faisalabad
at Khan	Muhammad. Khan	63176	M.T.D	28-FEB-1995	18-NOV-1987	5	N.W.F.P	Karachi
iaz Hussain	Noor Muhammad	39015	Head Clerk	11-JUN-1996	19-APR-1984	10	Kashmir	Bagh
sher	Aziz Khan	66320	Naib Qasid	17-JAN-1997	20-JUL-1990	1	N.W.F.P	Peshawar
da	Bashir Ahmad	12780	Lady Receptionist	13-SEP-1996	12-APR-1980	7	Punjab	Rawalpindi

Executive Officer

Commanding Officer

- C. J. Date

  An Introduction to Database Systems

  Addison-Wesley Publishing Company.

  Fifth Edition

- Scott Urman

  Oracle PL/SQL Programming

  Osborne McGram-Hill.

- Getting Started With Developer/2000 Forms 4.5

- Oracle Forms Reference Manual

  Release 4.5 Vol. I & II.

- Oracle Building Report Manual

  Release 2.5

- Oracle Developer's Manual Guide

  Second Generation

  Client/Server Development