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APPENDIX

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Appendix A

The Overview of ORACLE

The ORACLE is a Relational Database Management System, developed by the ORACLE Corporation (6). It is compatible with SQL/DS and DB2, The IBM database systems. The ORACLE is designed into two different configurations as described below:

1. Professional ORACLE : it is designed to run on a stand-alone computer. It is the ORACLE version used to implement this thesis and it will be referred in more details later. Professional ORACLE includes the following products:
   - ORACLE RDBMS and Utilities
   - SQL*Plus
   - SQL*Forms
   - SQL*Calc
   - SQL*Report
   - Programming Interfaces to the ORACLE RDBMS
2. Networkstation ORACLE : it is designed to run on computer that is attached to computer network. There is a feature that allows data manipulation of the remote ORACLE database within the network. This ORACLE configuration includes the following products:
   - SQL*Net
   - ORACLE Utilities
   - SQL*Calc
   - SQL*Plus
   - SQL*Forms
   - SQL*Report

The system's design of ORACLE is to make use of two-dimentional tables to store data, and it allows the definition of relationships between information items in different tables. The accessing of the information items from ORACLE database is via a high-level query language called Structured Query Language, or SQL. It allows retrieving, inserting, updating and deleting of data; adding new tables to the database; protect the data and more. SQL can be used either through an interactive interface or by embedding statements in some programming languages that can make use of the provided programming interfaces.

ORACLE RDBMS is the kernel of the package. It includes the database manager and several utilities for maintaining the database and performing the administrative tasks; such as backing up and restoring data including the space allocation and more. The utilities are:

- CCF : creates files used to store database information.
- CRT : processes the CRT files, which control the aspects of how ORACLE uses the computer's keyboard and display.
- EXP : exports data from database to an ordinary file.
- IMP : imports the exported data by EXP.
- IOR : start, stop, and initialize the database.
- ODL : loads data from ordinary files into ORACLE database.
- ODS : monitors the user and ORACLE processes.

SQL*Plus is the interactive SQL interface that lets the user to use SQL statements in accessing the database interactively. In addition, it provides the commands for editing , formatting and printing the reports, and also for storing and retrieving the pre-defined queries.

SQL*Forms is an interactive program for designing and using form-based applications. It is the user-friendly interface to access the database. A designer creates the forms to serve as an application's front end , and the user fills out the designed forms

to enter and retrieve database information. The details about the form which is used in the thesis's design stage are already described in the chapter of user-friendly interfaces design.

SQL*Calc is an electronic spreadsheet, similar to Lotus 1-2-3, that is integrated with ORACLE. It can be used to create tables from data in the spreadsheet and retrieve data into the spreadsheet easily.

SQL*Report is a program that allows reporting of the database information and formatting the complex reports.

Programming interfaces to ORACLE RDBMS are the interfaces which allow some procedural programming languages; such as C and COBOL, to refer to the contents of the ORACLE database by embedding the SQL statements within the programs. The examples of the interfaces are PRO*C and PRO*COBOL.

The Advantages of ORACLE (7)

ORACLE is always chosen to implement the database system for several reasons. First, it is a popular relational database management system, used by many applications. Second, it utilizes the SQL interface language that has become the standard for the relational database accesss. Third, the ORACLE package was developed utilizing the C language which ensure the maximum portability; that is it can run on different ranges of computers, so the created database in one type of computer can be comfortably tranferred to another one, if needed.

Appendix B

Definitions of ORACLE Table Structures

Definitions of Table Structures of Engineering Instructor Information

```
CREATE TABLE INSTRUCTORS
       (PERSONAL_ID              NUMBER(7) NOT NULL,
        POSITION_ACCT            NUMBER(4),
        DEPT_NAME                CHAR(4),
        PREFIX                   CHAR(4),
        NAME                     CHAR(30),
        SEX                      CHAR(1),
        DATE_OF_BIRTH            DATE,
        ADDRESS                  CHAR(40),
        MARITAL_STAT             CHAR(10),
        HIGH_DEGREE              CHAR(20))
CREATE TABLE EXPERT_FLD
       (PERSONAL_ID              NUMBER(7) NOT NULL,
        SEQUENCE                 NUMBER(3) NOT NULL,
        FLD_OF_EXPERT            CHAR(20))
CREATE TABLE OFFICIALDOM
       (PERSONAL_ID              NUMBER(7) NOT NULL,
        POSITION_ACCT            NUMBER(4),
        SALARY_LEVEL             NUMBER(7),
        STEP                     NUMBER(2),
        FACULTY_RANK             CHAR(3),
        DATE_OF_EMPLOY           DATE,
        DATE_TOBE_LECTURER       DATE,
        DATE_TOBE_ASST_PROF      DATE,
```

```
        DATE_TOBE_ASSO_PROF         DATE,
        DATE_TOBE_PROF              DATE)
CREATE TABLE SAL_PROMOTION
       (PERSONAL_ID                 NUMBER(7) NOT NULL,
        SEQUENCE                    NUMBER(3) NOT NULL,
        YEAR_OF_SAL_PROMOTE         NUMBER(4))
CREATE TABLE SPECIAL_RANK
       (PERSONAL_ID                 NUMBER(7) NOT NULL,
        SPC_RANK                    CHAR(20) NOT NULL,
        ORG_NAME                    CHAR(30),
        DATE_OF_START               DATE,
        DATE_OF_STOP                DATE)
CREATE TABLE RESEARCH
       (PERSONAL_ID                 NUMBER(7) NOT NULL,
        POSITION_ACCT               NUMBER(4),
        PROJ_NAME                   CHAR(30),
        DATE_OF_COMMENCE            DATE,
        DATE_OF_COMPLETE            DATE,
        DATE_OF_ACTUAL_COMPLETE     DATE,
        DATE_OF_ABANDON             DATE,
        PARTICIPATE_RATIO           NUMBER(3),
        POSITION                    CHAR(10),
        FINANCE_SOURCE              CHAR(20))
CREATE TABLE ACADEMIC_CONTRIBUTE
       (PERSONAL_ID                 NUMBER(7) NOT NULL,
        POSITION_ACCT               NUMBER(4),
        DESCR                       CHAR(30),
        TYPE                        CHAR(20),
        PUBLISH_YEAR                NUMBER(4),
        NUM_OF_PAGE                 NUMBER(4),
        NUM_OF_WHOLE_PAGE           NUMBER(5),
        CREATING_RATIO              NUMBER(3))
```

Definitions of Table Structures of Planning and Development Division Information

```
CREATE TABLE PERSONNEL
       (YEAR                        NUMBER(4) NOT NULL,
        DEPT_NAME                   CHAR(4) NOT NULL,
        NUM_OF_TYPEA                NUMBER(3),
        NUM_OF_TYPEB                NUMBER(3),
        NUM_OF_TYPEC                NUMBER(3))
CREATE TABLE INSTRUCTOR
       (YEAR                        NUMBER(4) NOT NULL,
        DEPT_NAME                   CHAR(4) NOT NULL,
        NUM_OF_PROF                 NUMBER(3),
        NUM_OF_ASSO_PROF            NUMBER(3),
        NUM_OF_ASST_PROF            NUMBER(3),
        NUM_OF_LECTURER             NUMBER(3),
        NUM_OF_DOCTORATE            NUMBER(3),
        NUM_OF_MASTER               NUMBER(3),
        NUM_OF_BACHELOR             NUMBER(3),
        NUM_OF_AGE_NOT_OVER_30      NUMBER(3),
        NUM_OF_AGE_BET_31_40        NUMBER(3),
        NUM_OF_AGE_BET_41_50        NUMBER(3),
        NUM_OF_AGE_BET_51_60        NUMBER(3))
CREATE TABLE STUDENT
       (YEAR                        NUMBER(4) NOT NULL,
        DEPT_NAME                   CHAR(4) NOT NULL,
        NUM_OF_1ST_YR_BACHELOR      NUMBER(3),
        NUM_OF_2ND_YR_BACHELOR      NUMBER(3),
        NUM_OF_3RD_YR_BACHELOR      NUMBER(3),
        NUM_OF_4TH_YR_BACHELOR      NUMBER(3),
        NUM_OF_TRAINEE              NUMBER(3),
        NUM_OF_MASTER               NUMBER(3),
        NUM_OF_HIGH_CERT            NUMBER(3),
        NUM_OF_DOCTORATE            NUMBER(3))
```

```
CREATE TABLE GRADUATE
       (YEAR                    NUMBER(4) NOT NULL,
        DEPT_NAME               CHAR(4) NOT NULL,
        NUM_OF_1ST_HONOUR       NUMBER(3),
        NUM_OF_2ND_HONOUR       NUMBER(3),
        NUM_OF_NML_GRAD         NUMBER(4))
CREATE TABLE GOVMNT_BUDGET
       (YEAR                    NUMBER(4) NOT NULL,
        DEPT_NAME               CHAR(4) NOT NULL,
        G_SALARY                NUMBER(10),
        G_WAGES                 NUMBER(10),
        G_TEMP_WAGES            NUMBER(10),
        G_REMUNERATION          NUMBER(10),
        G_SUPPLIES              NUMBER(10),
        G_EQUIPMENT             NUMBER(10),
        G_PROP_AND_CONST        NUMBER(10),
        G_SUBSIDIES             NUMBER(10),
        G_COMP_EQUIPMENT        NUMBER(10))
CREATE TABLE DEPT_BUDGET
       (YEAR                    NUMBER(4) NOT NULL,
        DEPT_NAME               CHAR(4) NOT NULL,
        D_SALARY                NUMBER(10),
        D_WAGES                 NUMBER(10),
        D_TEMP_WAGES            NUMBER(10),
        D_REMUNERATION          NUMBER(10),
        D_SUPPLIES              NUMBER(10),
        D_EQUIPMENT             NUMBER(10),
        D_PROP_AND_CONST        NUMBER(10),
        D_SUBSIDIES             NUMBER(10),
        D_COMP_EQUIPMENT        NUMBER(10))
CREATE TABLE POST_GRAD_BUD
       (YEAR                    NUMBER(4) NOT NULL,
        DEPT_NAME               CHAR(4) NOT NULL,
```

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```
        BUDGET_60                NUMBER(10),
        BUDGET_40                NUMBER(10),
        BUDGET_FR_DEDUC          NUMBER(10))
CREATE TABLE LIB_STAT
       (YEAR                     NUMBER(4) NOT NULL,
        MONTH                    CHAR(2) NOT NULL,
        NUM_OF_USER              NUMBER(5),
        NUM_OF_BORROWED_BOOK     NUMBER(5))
CREATE TABLE LIB_MEMBER
       (YEAR                     NUMBER(4) NOT NULL,
        DEPT_NAME                CHAR(4) NOT NULL,
        NUM_OF_BACHELOR_MEM      NUMBER(4),
        NUM_OF_MASTER_MEM        NUMBER(4),
        NUM_OF_DOCTORATE_MEM     NUMBER(4),
        NUM_OF_LECTURER_MEM      NUMBER(4),
        NUM_OF_ALUMNI_MEM        NUMBER(4),
        NUM_OF_GOVMNT_OFF_MEM    NUMBER(4))
CREATE TABLE INST_DOCUMENT
       (YEAR                     NUMBER(4) NOT NULL,
        DEPT_NAME                CHAR(4) NOT NULL,
        TOPIC                    CHAR(40) NOT NULL,
        TYPE                     CHAR(20),
        WRITER                   CHAR(30),
        PUBLISHER_NAME           CHAR(30),
        PUBLISHED_YEAR           NUMBER(4),
        NUM_OF_PAGE              NUMBER(4))
CREATE TABLE SCHOLARSHIP
       (YEAR                     NUMBER(4) NOT NULL,
        TYPE                     CHAR(15) NOT NULL,
        NAME                     CHAR(15) NOT NULL,
        QUANTITY                 NUMBER(3),
        STUDENT_NAME             CHAR(20))
```

```
CREATE TABLE SERVICE
       (YEAR                    NUMBER(4) NOT NULL,
        DEPT_NAME               CHAR(4) NOT NULL,
        DESCR                   CHAR(40) NOT NULL,
        PERSON_OF_AUTH          CHAR(20),
        FREQUENCY               NUMBER(3),
        INCOME                  NUMBER(10),
        NUM_OF_REQUESTER        NUMBER(3),
        KIND_OF_REQUESTER       CHAR(20),
        NOTE                    CHAR(60))
CREATE TABLE CONT_ED
       (YEAR                    NUMBER(4) NOT NULL,
        DEPT_NAME               CHAR(4) NOT NULL,
        TOPIC                   CHAR(40) NOT NULL,
        TYPE                    CHAR(20),
        PERSON_OF_AUTH          CHAR(20),
        KIND_OF_PARTICIPANT     CHAR(30),
        NUM_OF_PARTICIPANT      CHAR(5),
        DATE_OF_PRESENT         DATE,
        PLACE                   CHAR(20),
        FEE                     NUMBER(10))
CREATE TABLE RES_OUTCOME
       (YEAR                    NUMBER(4) NOT NULL,
        DEPT_NAME               CHAR(4) NOT NULL,
        TOPIC                   CHAR(40) NOT NULL,
        RESEARCHER              CHAR(20),
        SUPPORT_BUDGET          NUMBER(10),
        FINANCE_SOURCE          CHAR(20),
        PERCENT_OF_PROGRESS     NUMBER(3))
```

```
CREATE TABLE RES_UNIT
      (YEAR                    NUMBER(4) NOT NULL,
       DEPT_NAME               CHAR(4) NOT NULL,
       LEADER_NAME             CHAR(20),
       SUPPORT_DEV_BUDGET      NUMBER(10),
       SPECIFIC_DEV_BUDGET     NUMBER(10))
```

Additional Definitions of Table Structures of Planning and Development Division Information (used in step of SQL*Forms design)

```
CREATE TABLE SUM_PERSONNEL
      (YEAR                    NUMBER(4) NOT NULL,
       S_NUM_OF_TYPEA          NUMBER(5),
       S_NUM_OF_TYPEB          NUMBER(5),
       S_NUM_OF_TYPEC          NUMBER(5))
CREATE TABLE SUM_INSTRUCTOR
      (YEAR                    NUMBER(4) NOT NULL,
       S_NUM_OF_PROF           NUMBER(3),
       S_NUM_OF_ASSO_PROF      NUMBER(4),
       S_NUM_OF_ASSO_PROF      NUMBER(4),
       S_NUM_OF_LECTURER       NUMBER(4),
       S_NUM_OF_DOCTORATE      NUMBER(3),
       S_NUM_OF_MASTER         NUMBER(4),
       S_NUM_OF_BACHELOR       NUMBER(3),
       S_NUM_OF_AGE_NOT_OVER_30 NUMBER(3),
       S_NUM_OF_AGE_BET_31_40  NUMBER(4),
       S_NUM_OF_AGE_BET_41_50  NUMBER(4),
       S_NUM_OF_AGE_BET_51_60  NUMBER(4))
CREATE TABLE SUM_STUDENT
      (YEAR                    NUMBER(4) NOT NULL,
       S_NUM_OF_1ST_YR_BACHELOR NUMBER(5),
       S_NUM_OF_2ND_YR_BACHELOR NUMBER(5),
       S_NUM_OF_3RD_YR_BACHELOR NUMBER(5),
```

```
        S_NUM_OF_4TH_YR_BACHELOR  NUMBER(5),
        S_NUM_OF_TRAINEE          NUMBER(5),
        S_NUM_OF_MASTER           NUMBER(5),
        S_NUM_OF_HIGH_CERT        NUMBER(5),
        S_NUM_OF_DOCTORATE        NUMBER(5))
CREATE TABLE SUM_GRADUATE
       (YEAR                      NUMBER(4) NOT NULL,
        S_NUM_OF_1ST_HONOUR       NUMBER(5),
        S_NUM_OF_2ND_HONOUR       NUMBER(5),
        S_NUM_OF_NML_GRAD         NUMBER(6))
CREATE TABLE SUM_INST_DOCUMENT
       (YEAR                      NUMBER(4) NOT NULL,
        DEPT_NAME                 CHAR(4) NOT NULL,
        NUM_OF_PAPER              NUMBER(4),
        NUM_OF_RESEARCH           NUMBER(4),
        NUM_OF_BOOK               NUMBER(4),
        NUM_OF_HANDOUT            NUMBER(4))
CREATE TABLE SUM_SERVICE
       (YEAR                      NUMBER(4) NOT NULL,
        DEPT_NAME                 CHAR(4) NOT NULL,
        TOT_FREQUENCY             NUMBER(5),
        TOT_INCOME                NUMBER(12),
        TOT_REQUESTER             NUMBER(5))
CREATE TABLE SUM_INC_CONT_ED
       (YEAR                      NUMBER(4) NOT NULL,
        DEPT_NAME                 CHAR(4) NOT NULL,
        TOT_ED                    NUMBER(3),
        TOT_ED_INC                NUMBER(12),
        TOT_SEM                   NUMBER(3),
        TOT_SEM_INC               NUMBER(12))
```

```
CREATE TABLE SUM_EXP_CONT_ED
       (YEAR                    NUMBER(4) NOT NULL,
        DEPT_NAME               CHAR(4) NOT NULL,
        TOT_PRESENT             NUMBER(3),
        TOT_PRESENT_EXP         NUMBER(12))
```


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Biography

Mr.Komain Parpaeng was born on 7th October 1963, graduated in 1984 with the Bachelor Degree in General Science from Department of General Science, Faculty of Science, Chulalongkorn University.

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