

**CS/DSA 4513 – 001- Fall 2017 - Dr. Le Gruenwald**  
**INDIVIDUAL PROJECT: A CLIENT AND DONOR DATABASE SYSTEM**  
**Assigned: 10/9/2017; Due: 1:30 PM 11/20/2017 (on the class website)**

(Late submission will be accepted until 11:59 PM on 11/21/2017 with 5% penalty; late submission after this time will NOT be graded)

## **I. PROJECT DESCRIPTION**

### **Overview**

The Patient Assistance Network (PAN) is a non-profit organization that provides support and care for patients. PAN needs to implement a database system to keep track of the personnel necessary to support the organization. In this project, your task will be to design and implement this database system. The information that needs to be stored in the database is described in the next section.

### **System Requirements**

There are many categories of people that need to be tracked in the PAN database. Each person may fall into more than one of the following categories: clients, volunteers, employees, and donors. PAN tracks the name, social security number, birth date, race, gender, and profession of each person. In addition, PAN stores the contact information for each person consisting of a mailing address, email address, and home, work, and cell phone number. PAN also sends a monthly newsletter to people on its mailing list, so the database should indicate whether or not each person in the database is on that list. Finally, the system should have the ability to store a list of emergency contacts for the people in the database. This information should record the name and contact information for each of the emergency contacts along with their respective relationship to the person in the database.

PAN tracks its list of clients in the database. For each client, PAN tracks the name and phone number of his or her doctor and attorney. PAN also tracks the date the client was first assigned to the organization. Each client has a list of needs. Examples of these needs include visiting, shopping, housekeeping, transportation, yard work, and food. Each of these needs is also associated with a value indicating its importance to the client (1-10). PAN also tracks the list of insurance policies that each client has. Each insurance policy has a unique policy id, a provider id, provider address, and a type such as life, health, home, or auto.

PAN provides care for each client using teams that contain many volunteers. Each team cares for several clients, and more than one team may care for a client. Each team is identified by its name, and each team also has a type and a date it was formed. A volunteer may serve on multiple teams. For each volunteer, the database should store the date he or she first joined PAN and the date and location of his or her most recent training course. In addition, PAN should record the number of hours a volunteer worked each month for a particular team. Note that the volunteers do not work the same number of hours each month. One of the volunteers on a team serves as the team leader. This information should be tracked in the database as well. In addition, volunteers and clients may switch teams; so, the database system should provide the ability to mark whether or not each volunteer and client is active or inactive on a specific team.

Every team reports periodically to one PAN employee to discuss its current status, and more than one team may report to the same employee. The database should record the date of each report as well as a description of its content. For each employee, the database should store the employee's salary, marital status, and hire date. An employee may charge several expenses each month. The database should track the date of the expense, along with the amount and its description.

PAN depends on support from its donors. The database should track these people as well as record each of their donations. This information should include the date, amount, and type of donation along with the name of the fund raising campaign that generated the donation if it is applicable. If the donation was made by check, the database should record the check number. If the donation was made by credit card, the database should record the card number, card type, and expiration date. In addition, each donor may wish to remain anonymous, so the database should record that information as well.

Each person in the database may be affiliated with an external organization. The database should track this information as well. Each organization should have a unique name, mailing address, phone number, and contact person. In addition, each organization may sponsor one or more PAN teams, and a team may have more than one sponsor. If the organization is a business, the database should record the business type, size, and company web site. If the organization is a church, the database should record its religious affiliation. Each organization may also make several donations to PAN, and the database should track the same donation information as it does for individual donors. This includes the ability for the organization to make anonymous donations.

### **Queries and Their Frequencies for the PAN Client and Donor Database System**

1. Enter a new team into the database (1/month).
2. Enter a new client into the database and associate him or her with one or more teams (1/week).
3. Enter a new volunteer into the database and associate him or her with one or more teams (2/month).
4. Enter the number of hours a volunteer worked this month for a particular team (30/month).
5. Enter a new employee into the database and associate him or her with one or more teams (1/year).
6. Enter an expense charged by an employee (1/day).
7. Enter a new organization and associate it to one or more PAN teams (2/week).
8. Enter a new donor and associate him or her with several donations (1/day).
9. Enter a new organization and associate it with several donations (1/day).
10. Retrieve the name and phone number of the doctor of a particular client (1/week).
11. Retrieve the total amount of expenses charged by each employee for a particular period of time. The list should be sorted by the total amount of expenses (1/month).
12. Retrieve the list of volunteers that are members of teams that support a particular client (4/year).
13. Retrieve the names and contact information of the clients that are supported by teams sponsored by an organization whose name starts with a letter between B and K. The client list should be sorted by name (1/week).
14. Retrieve the name and total amount donated by donors that are also employees. The list should be sorted by the total amount of the donations, and indicate if each donor wishes to remain anonymous (1/week).
15. For each team, retrieve the name and associated contact information of the volunteer that has worked the most total hours between March and June (1/month).
16. Increase the salary by 10% of all employees to whom more than one team must report. (1/year)
17. Delete all clients who do not have health insurance and whose value of importance for transportation is less than 5 (4/year).

## II. TASKS TO BE PERFORMED

There are six tasks:

**Task 1.** Design an ER diagram and a relational database to represent the PAN client and donor system defined in part I.

**Task 2.** Provide a Data Dictionary that lists the names, types, and sizes (in bytes) of all attributes and associated constraints for each table.

**Task 3.**

- 3.1. Discuss choices of appropriate storage structures **for each relational table** in Task 1 assuming that all types of storage structures discussed in class are available.
- 3.2. Discuss choices of storage structures **for each relational table** in Task 1 when implementing it in Oracle 12c (if different from the previous choices specified in 3.1).

**Task 4.** Construct SQL statements to create tables and implement them on SQL Developer and Oracle 12c. All Create statements must include appropriate constraints as defined in Task 2. For each table, you must include SQL statements that create the same storage structure as the one you selected for Oracle implementation in Task 3.2 (e.g., if you have decided that a table X must have an index on attribute Y, then you must include an SQL statement to create an index on attribute Y for table X).

**Task 5.** Write SQL statements for all queries (1-17) defined in Section I. Write a Java application program that uses JDBC and Oracle 12c to implement all SQL queries (options 1-17), two additional queries for import and export (options 18-19), and the “Quit” option (option 20) as specified in the menu given below. The program will stop execution only when the user chooses the “Quit” option; otherwise all options must be available for the user to choose at all times. Remember to observe good user-interface design principles when designing your menu. Your program must be commented properly.

### WELCOME TO THE PAN CLIENT AND DONOR DATABASE SYSTEM

(1) Description of query 1

(2) Description of query 2

.

.

(17) Description of query 17

(18) Import: Enter new teams from a data file until the file is empty (the user should be asked to enter the input file name)

(19) Export: Retrieve names and mailing addresses of all people on the mailing list and output them to a data file instead of screen (the user should be asked to enter the output file name)

(20) Quit

**Task 6.** Run the program created for Tasks 5 to test its correctness. To populate the database, perform 5 queries for each type (1-9) and show the contents of the affected tables after those queries are completed. To show database access is possible, perform 2 queries of each type (10-12) and 1 query for each type (13-17). To show the import and export facilities are available, run each option (18-19) once. To demonstrate that Oracle can detect errors, you also need to perform 3 queries of different types that contain some errors.

### Important Notes for the Java+JDBC+Oracle 12c Part (Tasks 5 and 6):

Data manipulation and error checking **must be done** by ORACLE. Your program is only to create the menu, accept choices, form queries, submit them to ORACLE for execution, and display results or error messages.

### III. SUBMISSION

1. The project must be typed (diagrams must be computer-generated).
2. The project must be paginated.
3. The project must include a cover page, which contains the following information: course name and number, semester and year, instructor's name, author's name, id, and email address, and title of the project.
4. The project must include a table of contents using the format specified in Section IV.
5. Appropriate section headings must be included to show your solutions for the corresponding tasks/subtasks.
6. In-line comments must be provided for the Java programs.
7. Soft copy submission: Submit one ZIP file (with the file name as IP\_your last name\_your first name) that contains three files: 1) one single PDF file containing the entire project report with the contents as specified in Section IV (with the file name as IP\_REPORT\_your last name\_your first name); 2) one SQL file (extension .sql) containing the SQL statements to create tables as explained in Task 4 in Section II (with the file name as IP\_SQL\_your last name\_your first name); and 3) one Java file (extension .java) containing the Java source program (with the file name as IP\_JAVA\_your last name\_your first name).
8. The soft copy of the project (submitted to the class website) is due at 1:30 PM Monday, November 20, 2017. Late projects will be accepted until 11:59 PM Tuesday, November 21, 2017 with 5% penalty.
9. The overall project is worth 250 points (25% of your course grade); the late submission penalty is 12.5 points.

### IV. REQUIRED FORMAT FOR THE TABLE OF CONTENTS

For each task, indicate the pages in which it appears. For each subtask, indicate its start and end page numbers. Below is an example of the table of contents.

Tasks Performed	Page Number
Task 1.	1-10
1.1. ER Diagram	1-1
1.2. Relational Database Schema	2-10
Task 2. Data Dictionary	11-11
Task 3.	12-20
3.1. Discussion of storage structures for tables	12-14
3.2. Discussion of storage structures for tables (Oracle 12c)	15-20
Task 4. SQL and text files showing the creation of tables in Oracle 12c	21-50
Task 5. Script file showing the entire Java program and its successful compilation	51-60
Task 6. Java program Execution	61-100
6.1. Scrip file showing the testing of query 1	61-63
6.2. Scrip file showing the testing of query 2	63-65
.	
.	
.	
6.17. Script file showing the testing of query 17	90-91
6.18. Script file showing the testing of the import and export options	92-94
6.19. Script file showing the testing of three types of errors	95-98
6.20. Script file showing the testing of the quit option	99-100

## **V. PLAGIARISM**

This is an INDIVIDUAL PROJECT. You must do this project by yourself. You must not collaborate with your classmates or anyone else. A violation of this rule will be considered plagiarism and will result in action as specified in the Academic Integrity Code at OU: [http://integrity.ou.edu/files/Academic\\_Misconduct\\_Code.pdf](http://integrity.ou.edu/files/Academic_Misconduct_Code.pdf). Review the Fall 2017 CS/DSA 4515-001 course syllabus for more information concerning plagiarism. If you have questions about this project, please come to see your TAs or me. If you have questions concerning your Oracle account, contact Mr. James M. Cassidy ([jmcassidy@ou.edu](mailto:jmcassidy@ou.edu)).