Project, Phase 4

CS 4347

Spring 2017

Assigned: April 7, 2017

Due: April 28th, 11:59 pm

Demonstrations: Week of April 24

**Instructions:**

This assignment is a Cohort Assignment. Each cohort will be doing the assignment, and turn in the assignment in a group turn in.

**Objective:**

To continue through to the design aspect of construction a database for the Database Class. The goal of the project is to build the database, not the database application. To that end, certain phases must be completed. This phase consists of

* Bookwork
* Final Design
* Data Generation
* Data Examples
* Query Examples

**Bookwork:**

Answer the following problems from the textbook….

Chapter 17. Page 647, Problems 1

Query Processing: Chapter 18, Problem 4

Concurrency Chapter 21, Problem 1, 2, 3

**Phase 2 Final Design:**

By this stage, the ER diagram, ER Dictionary, Schema Diagram, and Schema Dictionary should be complete and have no further revisions. This version has no strike-through or other colors. A flat, ready-to read copy of your cohort’s final document.

**Data Generation**

In order for a database to function, it must be populated. And the population must adequately large explain the nature and complexity of the database structure. To that end, all the tables in the database must have values entered. For this section, the cohort has to do ***two particular tasks***

## Task 1: How Big?

Estimate the size of each population of each relational table in your design, that is, how may tuples should your table contain?

A doctor is an important person, and he works with a nurse and a technician on a patient. An entire hospital does not exist for one doctor, one technician, one nurse, and one patient. A doctor might work with two or three technicians, a dozen nurses, and might see a hundred patients over the course of a years. Each nurse watches over a ward, with some number of rooms. Visit a hospital, even a small one, and the system is able to handle many, many, people.

A hospital group might have five doctors, supported by 10 technicians. Most hospitals are four to five stories high, with basements and subbasements and adjoining office buildings. Perhaps 40 rooms on a ward, and each ward one floor of the hospital above ground level, with the top floor being the intensive care unit. So, five nurses in charge of 40 rooms each, but working 8 hour shifts…and two technicians for every doctor...24 hours in a day… 5 doctors, 10 technicians, 15 nurses, and 200 patients. 200 hospital rooms, 5 wards. Let each doctor have one operating room. And let each operating room have one recovery room. That’s 5 and 5.And let each doctor be a specialist in some condition (cardiac, osteopath, cancer, gastro-intestinal, neurological, obstetrics, etc)

Break it down into a relevant population:

* 200 patients, 200 rooms
* 15 nurses, 10 technicians, 5 doctors
* 5 key diseases, 5 operating theaters. 5 recovery rooms

That’s 445 tuples…not including all the details!

Perhaps there is a different estimation. Perhaps the hospital has only 10 patients per ward, and 3 wards, reducing the problem to 30 patients. Include a table that includes the name of each relational table, and the number of entries planned for each table. That reduces the problem to 103 tuples.

## Task 2: Scripting

How is your cohort entering the data?

* By hand-In theory, the database could be on a server, and each cohort member would enter part of the information. Usually, the database would be on one laptop as a local host
* An SQL script-A set of SQL commands would be used to load the information. Each cohort member could write a script for their data section, and use each script to load the database.
* A program-A program can be written, using random number generators to fill in the various attributes of each tuple. Some databases would then allow direct access for the insertion, or more likely, string concatenation can be used to create the INSERT SQL statements and save them to a file. Then that file can be loaded into the DBMS as an SQL script.

## Turn In:

1. A table that lists out all the relational tables, and the planned size of each.
2. Turn in a copy of the script or program used to generate the population. If a script or program was not used, describe how the data was entered, even if it was an all-nighter pizza party with four laptops.

**Data Examples**

For each table in the database, show one valid tuple. Usually these are in the form of

|  |  |  |
| --- | --- | --- |
| TABLE NAME |  |  |
| ATTRIBUTE | VALUE | PRIMARY KEY TRUE/FALSE |

**Example:**

|  |  |  |
| --- | --- | --- |
| PATIENT |  |  |
| PATIENT ID | 10110113341 | PRIMARY KEY |
| LAST NAME | Merrick |  |
| FIRST NAME | Joseph |  |
| CONDITION | Proteus Syndrome |  |

**Query Examples**

For each of the following, show the SQL query that was written, and the result.

1. Show a count of the largest population

Example: How many patients are in the hospital?

1. Show a listing of a key entity in the database.

Example: Who are the doctors in the hospital?

1. Show what group of objects must function together.

For example, show all the doctors and technicians who work together (a join)

1. Show the cost of an occurrence, which should be derived using aggregate functions

Example: How much will a hospital stay cost a patient, if the doctor, nurse, technician, and all the rooms and insurance are considered?

1. Show a schedule for multiple occurrences, sorted by date and time

What is the schedule for one of the doctors over the course of a week? Or the usage of an operating theatre over the course of a day?

**Time for the Bonus**

The week of April 24th is scheduled for review of topics for the final exam. At the beginning of each class, Dr. Becker will ask if anyone would like to demo. The cohort would present their system to the class, and this application needs to have a wow factor. A simple dialog system of black, grey, and white will not do. The class then will ask the cohort questions. To get full points, the system must not crash, and the class has to be engaged.

**Naming Conventions for Turn In**

Turn in each of the five sections with appropriate names. Each file should be a Portable Document File (.PDF) These files should be turned in as separate files (Which can be done during one session on Blackboard)

Note: The word *Cohort* in the table below should be replaced by the name of your cohort.

|  |  |
| --- | --- |
| Bookwork Problems | *Cohort*.Bookwork.pdf |
| Final Design | *Cohort*.FinalDesign.pdf |
| Data Generation | *Cohort*.DataGeneration.pdf |
| Data Examples | *Cohort*.DataExamples.pdf |
| Query Examples | *Cohort*.QueryExamples.pdf |

**Additional:**

The assignment may be turned in multiple times before the deadline.

The assignment will be based on Blackboard groups for a single turn in location per cohort.

The assignment should not be a zip file, the files should be independent for online grading.

The last submission only will be counted.