AUBURN
UNIVERSITY

CPSC 5133 Project

Overview

A new hospital is being constructed to service the needs of a rapidly growing retirement community. You have been contracted to develop the database system that will manage the primary care operation of the hospital, but not the financial operation.

Deliverables

There are four checkpoints for this project before the final project is due.

IMPORTANT. When submitting your files, you **must** group the paths of your source files together and tell me where they are in your code. This is to help me execute your program and grade it properly. My test files will have different names and different paths than the files you test with.

Alternatively, use relative paths in your code. Either way, I need to easily alter your code to test with my test files.

Checkpoint 1 is the ER diagram for this project. This will be an image file you submit through Canvas. You may draw this diagram on paper and scan the paper or use a piece of software and save your diagram as an image.

Checkpoint 2 is the text file containing all the CREATE TABLE statements for the database. You are to translate your ER diagram from checkpoint 1 into the tables necessary for your application to provide everything detailed in the specifications.

Checkpoint 3 is the source .java files for the working “Data Importer” program. This program will take two properly formatted text files (examples at the end of this document) and import this data into the database using INSERT statements. This program will be written in Java. You are free to use whatever tools in Java you see fit. I will not specify any methods, variables, classes, etc. You can build this application as you like. Meaning, you may use any libraries included with Java. You may not use any third-party libraries other than the libraries needed for SQLite.

This program must be robust and handle exceptions. I will purposefully provide invalid data to the data importer. This invalid data will test to make sure you have proper Foreign Key constraints in your database. E.g. I might try to assign a non-existent doctor to a patient. The importer should ignore any row (line in the text file) of data in the source file that contains invalid data and continue to process the text file. This is to simulate the real world where users will accidentally attempt to put invalid data into your system. This data importer is the guard at the gate to make sure that invalid data never enters your database.

Checkpoint 4 is the text file containing the SQL statements needed to query the data from the database. See the “SQL Queries” section below. NOTE: These queries must be written 100% in SQL.

If your database has changed since checkpoint 2 (and I assume it might) please also include a new copy of the CREATE TABLE statements. Likewise, for the data importer. If there is a new version, please include the .java files.

Final Project is the final version of all above, plus a **simple menu** written in Java to select and execute the queries (noted below) and print the result of those queries to the screen. This project must be robust and handle exceptions.

An example of a simple menu:

```
Please enter the query number to execute that query:

1.1

1.2

1.3

2.1

2.2

…

4.5

Which query would you like to execute? {USER INPUT HERE}
```

Specifications

- The hospital is staffed by many types of workers. Some are volunteers, while others are employees of the hospital. Employees include doctors, nurses, technicians, and administrators.
- When a patient is admitted to the hospital by a doctor, he or she is given a unique patient identification number and assigned to a room by an administrative employee.
- Each patient must provide an emergency contact and insurance policy information at the time of admission.
- The hospital rooms are all private rooms; that is, each room accommodates no more than one patient.
- The hospital has 20 rooms, the room numbers will be 1-20.
- The doctor assigned to a patient can order and perform treatments for that patient.
- Treatments include both procedures and medication.
- All treatments must be ordered and administered by a doctor.
- Treatments may be ordered for all patients. A date is associated with the order and all administrations.
- At the time of admission, a patient's primary doctor provides an initial diagnosis.
- When an admitted patient's primary doctor decides that the necessary course of treatment has ended, that patient is discharged from the hospital by an administrative employee.
- For the sake of simplicity, there will be two non-real-world constraints:
    - All people have a different last name, i.e. last names in this system will be unique.
    - Employees of the hospital will never be patients.

SQL Queries

1. Room Utilization

   1.1. List the rooms that are occupied, along with the associated patient names and the date the patient was admitted.

   1.2. List the rooms that are currently unoccupied.

   1.3. List all rooms in the hospital along with patient names and admission dates for those that are occupied.

2. Patient Information

   2.1. List all patients in the database, with full personal information.

   2.2. List all patients currently admitted to the hospital. List only patient identification number and name.

   2.3. List all patients who were discharged in a given date range. List only patient identification number and name.

   2.4. List all patients who have been admitted within a given date range. List only patient identification number and name.

   2.5. For a given patient, list all admissions to the hospital along with the diagnosis for each admission.

   2.6. For a given patient, list all treatments that were administered. Group treatments by admissions. List admissions in descending chronological order, and list treatments in ascending chronological order within each admission.

   2.7. List patients who were admitted to the hospital within 30 days of their last discharge date. For each patient list their patient identification number, name, diagnosis, and admitting doctor.

   2.8. For each patient that has ever been admitted to the hospital, list their total number of admissions, average duration of each admission, longest span between admissions, shortest span between admissions, and average span between admissions.

3. Diagnosis and Treatment Information

3.1. List the diagnoses given to admitted patients, in descending order of occurrences. List diagnosis identification number, name, and total occurrences of each diagnosis.

3.2. List the diagnoses given to all (admitted and discharged) patients, in descending order of occurrences. List diagnosis identification number, name, and total occurrences of each diagnosis.

3.3. List the treatments performed at the hospital, in descending order of occurrences. List treatment identification number, name, and total number of occurrences of each treatment.

3.4. List the treatments performed on admitted patients, in descending order of occurrences. List treatment identification number, name, and total number of occurrences of each treatment.

3.5. List the top 5 most administered medications.

3.6. List the most common procedure administered at the hospital. Also, list all doctors that performed that procedure.

3.7. List the most recent procedure administered at the hospital. Also, list all doctors that performed that procedure.

3.8. List the diagnoses associated with the top 5 patients who have the highest occurrences of admissions to the hospital, in ascending order or correlation.

4. Employee Information

4.1. List all workers at the hospital, in ascending last name, first name order. For each worker, list their, name, and job category.

4.2. List the primary doctors of patients with a high admission rate (at least 4 admissions within a one-year time frame).

4.3. For a given doctor, list all associated diagnoses in descending order of occurrence. For each diagnosis, list the total number of occurrences for the given doctor.

4.4. For a given doctor, list all treatments that they ordered in descending order of occurrence. For each treatment, list the total number of occurrences for the given doctor.

4.5. List doctors who have been involved in the treatment of every admitted patient.

Layout of Person Data File

The person data file will be a comma delimited text file. This file will contain data about people in the system. Not all data is required for all people. E.g. Workers at the hospital will not need data for attributes like a patient ID, room number, etc. The following list will detail each element.

1. The type of person. Legal types are
    a. “V” – Volunteer
    b. “D” – Doctor
    c. “A” – Administrator
    d. “N” – Nurse
    e. “T” – Technician
    f. “P” – Patient
2. First Name of Person
3. Last Name of Person (**for the sake of the project, this value will be unique**)
4. Room Number
5. Emergency Contact Name (first and last name)
6. Emergency Contact Phone Number
7. Insurance Policy Number
8. Insurance Policy Company
9. Last Name of Patient’s Primary Doctor
10. Initial Diagnosis
11. Admission Date
12. Discharge Date

Sample lines from the file:

D,John,Smith,,,,,,,,,

P,Sam,Jones,1,Liz Jones,334-555-1234,INS123,INS Company, Smith, Broken Arm,3-19-2019, 3-20-2020

Layout of Treatment Data File

The treatment data file will be a comma delimited text file. This file will contain data about treatments administered in the system.

1. Patient Last Name
2. Doctor Last Name
3. Treatment Type
    a. "P" – Procedure
    b. "M" – Medication
4. Date of treatment

Sample lines from the file (assume that all the patient names and doctor names are valid in the database):

Jackson, Smith, M, Aspirin, 1-1-2019

Jackson, Smith, M, Aspirin, 1-2-2019

Jackson, Smith, M, Aspirin, 1-3-2019

Jones, Smith, P, Set Arm, 3-20-2020