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Database Design Document

PIMS Database Design

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## Abstract

This document was written for the purpose of designing and describing a database that will fulfill the project requirements as set forth in the contract statement of work. This database will serve as the primary source and storage location of data for the Patient Information Management System (PIMS). The database will be implemented using Microsoft SQL Server in the SQL Server Management Studio (SSMS).

## Required Software

* SQL Server Management Studio (SSMS)
* SQL Server Configuration Manager

## Make/Buy/Reuse Justification

We chose to make use of the SQL Server software to implement our database for several reasons. Firstly, the software in its express version is available for non-commercial use at no cost. Secondly, prior team member experience with the software confirms that the software is dependable, fast, and easy to use. Furthermore, this experience can be leveraged to help bring the rest of the team up to speed on the software, implement the database, and finally develop a database abstraction layer that will aid in rapid development. It was for these reasons that we chose Microsoft SQL Server for our database service.

## System Overview

The database for the PIMS software project must be a fast and reliable service that will allow for the team to develop rapidly with a test-driven approach. To meet this goal, an efficient Database Interface (DBI) is needed to keep team learning curve and database to business logic coupling low. To make this DBI efficient, tables need to remain small, efficient, and easy to modify. For this reason, several smaller tables will be used to represent the PIMS dataset.

At the core of the database design are two primary types of tables. The first of these types is the patient table. The patient table tracks a patient’s personal information (name, address, contact information) and associates each patient with a unique identification number that will allow for easy database queries regarding patient information. The patients table is supplemented by several other tables that allow us to maintain a patient’s emergency contact information, admittance information (datetime for check-in/checkout, reason for visit, location on campus, preferred doctor), treatment history, prescriptions, procedures, insurance, billing, and individual charges.

The second type of table is the user tables that track each PIMS user and all their associated properties. The primary tables here are the user tables that represent the various users of PIMS. Users are broken into 4 distinct types (doctors, nurses, office staff, volunteers) represented by four unique tables. Breaking users into separate tables allows for us to track things like notes on a more granular level and also eases in future expansion for new user types. Each user type has an associated notes table where all of a user’s notes are stored.

## Tables

1. patientPersonal
   * nameLast
   * nameFirst
   * nameMiddle
   * street
   * city
   * state
   * zip
   * phoneHome
   * phoneWork
   * phoneMobile
   * id
2. iCE
   * nameLast
   * nameFirst
   * nameMiddle
   * phone
   * patientId
   * id
3. admittanceLog
   * datetimeAdmittance
   * datetimeDischarge
   * reason
   * facility
   * floor
   * roomNumber
   * bedNumber
   * familyDoctor
   * patientId
   * id
4. caseHistory
   * prescriptionId
   * procedureId
   * patientId
   * id
5. prescriptions
   * name
   * amount
   * prescriptionDate
   * duration
   * patientId
   * caseId
   * id
6. procedures
   * datetime
   * type
   * duration
   * responsibleUserId
   * procedureNotes
   * patientId
   * caseId
   * id
7. insurance
   * insuranceCarrier
   * accountNumber
   * groupNumber
   * patientId
   * id
8. billing
   * amountTotal
   * amountPaidByPatient
   * amountOwed
   * amountPaidByInsurance
   * datetimeCharged
   * datetimeDue
   * patientId
   * caseId
   * id
9. charges
   * description
   * amount
   * datetimeCharged
   * datetimeDue
   * procedureId
   * officeStaffId
   * patientId
   * caseId
   * id
10. usersDoctor
    * name
    * title
    * accessLevel
    * id
11. usersNurse
    * name
    * title
    * accessLevel
    * id
12. usersOfficeStaff
    * name
    * title
    * accessLevel
    * id
13. usersVolunteers
    * name
    * title
    * accessLevel
    * id
14. notesDoctor
    * notes
    * doctorId
    * patientId
    * caseId
    * id
15. notesNurse
    * notes
    * nurseId
    * patientId
    * caseId
    * id
16. notesOfficeStaff
    * notes
    * officeStaffId
    * patientId
    * caseId
    * id
17. notesVolunteers
    * notes
    * volunteerId
    * patientId
    * caseId
    * id

## Detailed Table Descriptions

1. patientPersonal – This table shall keep up with each patient that has been checked into the hospital in the last 5 years. The patient’s personal information is stored here and each patient is assigned a unique id that will be used to query other tables that contain the rest of the patient’s data.
2. iCE – This table shall maintain each patient’s in case of emergency (ICE) information. This data will be referenced by patientId.
3. admittanceLog – This table shall maintain a log of each patient admitted to the hospital. Each log shall contain details on why they were admitted, where they are/were located, as well as whether or not they have been discharged.
4. caseHistory – This table shall maintain a log of all cases handled by the hospital. This table will reference other tables such as prescriptions, procedures, and patient tables.
5. prescriptions – This table shall serve as reference for each case handled by the hospital. Here the prescriptions for each case will be stored and will be referenced by unique ids.
6. procedures – This table shall maintain a log of all procedures performed by hospital staff. This will be referenced primarily by patientId.
7. insurance – This table shall maintain a log of insurance information for each patient. This table shall be referenced primarily by patientId.
8. billing – This table shall maintain a log of all bills issued to patients. Each item will represent a whole bill and itemization will be handled in another table (charges).
9. charges – This table shall maintain a log of each individual charge assessed by the hospital. This will contain a billingId to associate each charge to the bill it belongs to.
10. usersDoctor – This table shall maintain a list of all doctors currently employed by the hospital as well as their access level in the PIMS.
11. usersNurse - This table shall maintain a list of all nurses currently employed by the hospital as well as their access level in the PIMS.
12. usersOfficeStaff - This table shall maintain a list of all office staff currently employed by the hospital as well as their access level in the PIMS.
13. usersVolunteer - This table shall maintain a list of all volunteers currently in service of the hospital as well as their access level in the PIMS.
14. notesDoctor – This table shall maintain a list of all notes entered by doctors. These shall be associated with a caseId.
15. notesNurse – This table shall maintain a list of all notes entered by nurses. These shall be associated with a caseId.
16. notesOfficeStaff – This table shall maintain a list of all notes entered by office staff. These shall be associated with a caseId.
17. notesVolunteer – This table shall maintain a list of all notes entered by volunteers. These shall be associated with a caseId.