Overview

Disclaimer: This document is in no way directly affiliated with Our Lady of The Lake Regional Medical Center. It is a sample document created under fictitious circumstances by an independent student. Any material contained within shall be considered an act of parody protected by fair use exception.

1. Project Statement:

The following report and accompanying database are a mock response to a hypothetical need for a modernized and overhauled database system at Our Lady of The Lake Regional Medical Center. Originally this idea was proposed and executed by Team Yellow in ISDS 3110 as part of coursework at LSU. However, this document and the accompanying database were created independently of this course to allow me to develop a more involved solution. There is no significant carryover from one project to the other.

1. Project Background:

Our Lady of The Lake (OLL) is a Regional Medical Center is a medical and surgery facility in Baton Rouge, Louisiana. It contains 1,020 beds and serves nearly 25,000 patients annually, it is the largest medical center in Louisiana. This project fulfills the hypothetical need for a new relational database to support the medical center's day-to-day operations and logistical needs.

1. Project Scope:

Contained within this document is an architectural layout of the logical database design, as well as source code for generating this database. Various other forms of documentation for compliance and enterprise alignment are included.

1. High-level Requirements:

Business Requirements:

* Must track patients and their billing.
* Must organize employees and supervise duties.
* Must track treatments and facilities (rooms).
* Treatments must be tied to staff for ethical reasons.
* Must be resistant to fraud, tampering, and malicious activity.
* Database solutions must be able to scale to meet large increases in patient traffic.

Architecture Requirements:

* Tables must be efficient, enforce data integrity, and be scalable.
* Pre-defined queries should be meaningful, easy to interpret, and accessible.

1. Deliverables:

* Source Code:
* MySQL 8.0.31(MySQL Community Server GDL)
* File: OLLDatabase\_Final.sql
* ERD Diagram:
* LucidChart modeler is utilized to generate a graphical model of the logical topology of operations at OLL.
* File: ERD\_OLL.jpg
* Load Testing and Function Validation:
* Python’s ‘Faker’ is utilized in tandem with Pandas to generate large amounts of sample data at a quick rate. This tests the database for efficiency under load and for general logical integrity.

1. In Scope:

Business Requirements:

* Billing Accuracy:
* To ensure accurate billing quantities, sample data was used in reference to:
* <https://data.texas.gov/dataset/Institutional-Medical-Billing-Services-SV2-Detail-/tuuc-49gz>
* Salary Accuracy:
* To ensure accurate salary estimates for staff, sample data was used in reference to:
* <https://www.bls.gov/oes/current/oes291229.htm>

Architectural Requirements:

* Scalability:
* Whatever deployment solution is chosen, must be able to scale to several thousand requests a second.
* Seeing as OLLBR is a member of the “Our Lady” health system, any necessary connection must be formed between the parent system and the Baton Rouge regional facilities’ system and this database.
* This may be considered out of scope, as it would require an in-depth knowledge of the facilities networking solution.
* Indexing:
* Depending on the nuance of the operations at the hospital, different indexes may be created. Whatever application is utilized as a front end for this database, should specify the ability to create indexes dynamically.

1. Out of Scope:

Business Requirements:

* Business logic has not been decided concerning billing. This is an architectural and logical proof of concept for a viable databasing solution. There is no security design, no triggers, no predefined procedures, file streaming, or application integration.

Architectural Requirements:

* It is not explicitly decided what the front end of this database would be, and how it would integrate, and the means of data intake is not considered in the scope of this project.

1. Data Model

* The following model represents the logical ordering of this database’s entities and attributes.
* *Departments (****departmentID****, departmentName, staffCount,/staffID)*
* *Rooms(****roomID****, floorNo, status, /departmentID/ )*
* *Staff(****staffID****, staffName, jobTitle,supervisorName, /departmentID/)*
* *Patients(****patientID****, firstName, lastName, gender, age, /roomID/, /staffID/)*
* *Treatment(****treatmentID****,treatmentName, endDate, /staffID/, /patientID/)*
* *Bill(****billID****, inDate, outDate, billAmount, billAddress,billCity,billState, /patientID/)*

1. Data Dictionary:

|  |  |  |  |
| --- | --- | --- | --- |
| Name of Attributes | Defintion | Data Type | Possible Values |
| ***departmentID*** | Department’s number | VARCHAR(5) | D001, D002, D003 |
| *departmentName* | Department’s name | NCHAR(20) | Radiology, Cardiology, Neurology |
| *staffCount* | Number of staff to each department | VARCHAR(3) | 87, 49, 102 |

|  |  |  |  |
| --- | --- | --- | --- |
| Name of Attributes | Definition | Data Type | Possible Values |
| ***roomID*** | Room’s number | VARCHAR(10) | A101, B097, C002 |
| *floorNo* | Floor’s Number | NUMERIC(5) | 1,2,3 |
| status | Room is filled or room is empty | NCHAR(10) | Filled, Empty |
| */departmentID/* | Department’s number | VARCHAR(5) | D001, D002, D003 |

|  |  |  |  |
| --- | --- | --- | --- |
| Name of Attributes | Definition | Data Type | Possible Values |
| ***patient ID*** | Patient’s number | VARCHAR(20) | P001, P002, P003 |
| *firstName* | Patient’s first name | VARCHAR(30) | Jane, Mark, Liam |
| *lastName* | Patient’s last name | VARCHAR(30) | Smith, Johnson, Miller |
| *gender* | Patient’s gender | VARCHARCTER(4) | M, F |
| *age* | Patient’s age | VARCHAR(3) | 35, 46, 18 |
| */roomID/* | Room’s number | NCHAR(4) | A101, B097, C002 |
| */staffID/* | Staff’s number | NCHAR(5) | S001, S005, S007 |

|  |  |  |  |
| --- | --- | --- | --- |
| Name of Attributes | Defintion | Data Type | Possible Values |
| ***staffID*** | Staff’s number | NCHAR(20) | S001, S002, S003 |
| *staffFname* | Staff’s first name | VARCHAR(250) | John, Ann, David |
| *staffLname* | Staff’s last name | VARCHAR(250) | White, Beech, Ford |
| *jobTitle* | Staff’s job title | VARCHAR(250) | Doctor, Nurse, Receptionist |
| */departmentID/* | Department’s number | NCHAR(20) | D001, D002, D003 |

|  |  |  |  |
| --- | --- | --- | --- |
| Name of Attributes | Defintion | Data Type | Possible Values |
| ***treatmentID*** | Treatment number | VARCHAR(20) | T001, T008 |
| *endDate* | Date treatment ended | DATE | 2020-01-01, 2029-01-01 |
| */staffID/* | Staff’s number | VARCHAR(250) | S001, S005, S007 |
| */patientID/* | Patient’s number | VARCHAR(250) | P001, P002, P003 |

|  |  |  |  |
| --- | --- | --- | --- |
| Name of Attributes | Defintion | Data Type | Possible Values |
| ***billID*** | Billing number | VARCHAR(20) | b101, b102, b103 |
| *inDate* | Date patient came into hospital | DATE | 8/17/2021, 8/23/2021, 12/24/2021 |
| *outDate* | Date patient left hospital | DATE | 8/24/2021, 8/27/2021, 8/25/2021, |
| *billingAmount* | Amount patient owes | VARCHAR(30) | 7593.67, 5000, 2182.73 |
| *billAddress* | Address to send bill | VARCHAR(250), | 5445 Moss Side Ln Baton Rouge LA 70808, 308 Cornell Ave Baton Rouge LA 70808, 160 Chatsworth St, Baton Rouge, LA 70802 |
| */patientID/* | Patient’s number | VARCHAR(30) | P001, P002, P003 |

1. Visual Data Model:

A diagram of patient care

Description automatically generated