Logo

Description automatically generated with medium confidence

**Project: - Lake Ridge Community Hospital**

**Professor: Stephen Forbes**

**Group Members:**

Vishwa Patel (100851337)

Yuqi Zhou (100854558)

Bei Jia (100834162)

Chiao-yun Chung (100841247)

Table of Contents

**Introduction3**

**Mission Statement4**

**Data Flow Diagram5**

**Contextual Diagram6**

**Functional Requirements7**

**Non- Functional Requirements8**

**Entity Relationship Diagram9**

**3NF Relational Normalized Schema10**

**Data Dictionary11,12,13,14**

**Overall Occupancy by room dashboard15**

**Physician-Patient dashboard16,17**

**LRCH Database System:**

-The Durham Region as well as people from Oshawa are treated at Lake Ridge City Hospital, an Oshawa hospital. In the hospital, there are 200 total beds. Currently, they are using a batch-oriented system, which means all the various dashboards, such as Patient Accounts, Billing, Financial Accounting, and Accounts Receivable, are divided separately and not connected, meaning if any patients come and want to make changes frequently, it will take more than 1 day to do that change, preventing them from performing instant registration of the patients.

Additionally, because all prescriptions are written on paper, there is a potential that they might go misplaced. Furthermore, the system is unable to report and record the information of the staff members, which might lead to future disagreements. Our team has decided to create a system that is entirely separated into two components: the physician-patient Dashboard and the dashboard for room use. The room usage Dashboard displays all relevant information on each room, including the kind, location, and number of unoccupied rooms, as well as the date on which patients were discharged from each room.

The physician can see all the patient's details in our system when the patient arrives at the doctor's office for treatment, and he or she can also provide the patient with any necessary notes. On the other hand, the physician-patient dashboard will show all the necessary patient details, physician details, report bill details, and transaction details for the entire day. Further, the system has a storage capacity of 3 years after a patient is discharged, after which time the records are automatically erased if the patient does not return within that time. The creation of this system may make things simpler for the patient and the hospital because everything would be done manually in the system, and there may be no possibility of any information loss.

**Mission Statement**

Provides secure and efficient database solutions to support hospital data management by improving system efficiency and tracking capabilities.

**Data- Flow Diagram:**

A screenshot of a computer

Description automatically generated with medium confidence

**Contextual Diagram:**

Diagram

Description automatically generated

**Functional requirements:**

**Group 1: Creates**

1. User creates new patient record.

2. User creates new physician record.

3. User creates calculated costs by cost centre.

4. Medical staff creates records of test results.

5. Physician creates records of prescriptions.

**Group 2: Retrieves**

6. User retrieves existing records of patients.

7. User retrieves existing records of physicians.

8. User retrieves the usage of rooms.

9. User retrieves the usage of beds.

10. User retrieves status of bills.

11. Physician retrieves the patient list.

12. Physician retrieves patients’ detailed information.

13. User retrieves currently admitted patients.

14. User retrieves referred patients by physician.

**Group 3: Updates**

15. User updates existing records of patients.

16. User updates existing records of physician.

17. User updates the usage of rooms.

18. User updates the usage of beds.

**Non-Functional requirements**  
Non-functional requirements cover a system's Availability, performance, and other attributes. The following are the non-functional needs of the LRCH Hospital Information System based on the provided case:

**Availability:**   
The newly designed database system should always be available (24/7/365) according to the Hospital’s needs.

**Performance:**  
1) Response Times – It should take less than 3 seconds to load each page.   
2) Processing Times - Any changes should be instantly update in the database system. The system ought to offer instant system-wide access to data.

**Capacity:**  
The database system can store more than 400 beds and related information.

**Recovery:**  
Backup Time– The system will take approximately 30 minutes to back up the data.

**Entity Relationship Diagram:**



**3NF Normalized Relational Schema:**

**PATIENT** (PATIENT\_NO, PHYSICIAN \_NO, PATIENT\_FIRST\_NAME, PATIENT\_LAST\_NAME, ADDRESS, PHONE, CITY\_PROV\_PC, SEX, HCN, EXTENSION, LAST\_DISCHARGE\_DATE)

\*Constraint: if today's date minus LAST\_DISCHARGE\_DATE> 3\*365, then delete the patient record

**FINANCIAL\_STATUS** (FINANCIAL\_ID, FINANCIAL\_TYPE)

**PHYSICIAN** (PHYSICIAN \_NO, PHYSICIAN\_FIRST\_NAME, PHYSICIAN\_LAST\_NAME, SPECIALTY, PHYSICIAN\_PHONE,)

**PRESCRIPTION** (PRES\_ID, PHYSICIAN\_ID, PATIENT\_ID, PRES\_DATE, PRES\_MEDICATION, PRES\_DOSAGE)

**ADMISSION** (ADMISSION\_ID, PATIENT\_ID, BED\_ID, ADMISSION\_DATE, DISCHARGE\_DATE)

**ITEM** (ITEM\_CODE, COST\_CENTRE\_ID)

**BILL** (BILL\_ID, ADMISSION\_ID, BILL\_DATE)

**CHARGE\_ITEM** (ITEM\_ID, ITEM\_CODE ,BILL\_ID, ADMISSION\_ID, FINANCIAL\_ID, DESCRIPTION, QUANTITY, UNIT\_PRICE)

**PAYMENT** (PAYMENT\_ID, BILL\_ID, PAYMENT\_DATE, PAID\_AMOUNT)

**COST\_CENTRE**(COST\_CENTRE\_ID，DESCRIPTION)

**ROOM** (ROOM\_NUMBER, ROOM\_TYPE, ROOM\_ EXTENESION)

**BED** (BED\_ID, ROOM\_NUMBER, BED\_NUMBER)

**TEST** (TEST\_ID PATIENT\_ID, PHYSICIAN \_ID, TEST\_DATE, TEST\_TYPE, RESULT)

Top of Form

Bottom of Form

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **LRCH DATABASE SYSTEM- DATA DICTIONARY** | | | | | | | | |
| **TABLE NAME** | **ATTRIBUTE NAME** | **CONTENTS** | **TYPE** | **FORMAT** | **RANGE** | **REQ’D** | **PK/FK** | **REFERENCING TABLE** |
| **FINANCIAL\_STATUS** | FINANCIAL\_ID | Financial id | INT | 999999 |  | Y | PK |  |
|  | FINANCIAL\_TYPE | Financial type | VARCHAR(50) | Xxxxxxxx |  | Y |  |  |
| **PHYSICIAN** | PHYSICIAN \_NO | Physician number | INT | 9999 |  | Y | PK |  |
|  | PHYSICIAN\_FIRST\_NAME | Physician first name | VARCHAR(50) | Xxxxxxxx |  | Y |  |  |
| PHYSICIAN\_LAST\_NAME | Physician last name | VARCHAR(50) | Xxxxxxxx |  | Y |  |  |
| SPECIALTY | Physician specialty | VARCHAR(50) | Xxxxxxxx |  | Y |  |  |
| PHYSICIAN\_PHONE | Physician phone | VARCHAR(15) | XXX-XXX-XXXX |  | Y |  |  |
| **PATIENT** | PATIENT\_NO | Patient number | INT | 99999 |  | Y | PK |  |
|  | PATIENT\_FIRST\_NAME | Patient last name. | VARCHAR (50) | Xxxxxxxx |  | Y |  |  |
| PATIENT\_LAST\_NAME | Patient first name. | VARCHAR (50) | Xxxxxxxx |  | Y |  |  |
| ADDRESS | Patient address | VARCHAR(50) | Xxxxxxxx |  | Y |  |  |
| PHONE | Patient phone number | VARCHAR (15) | XXX-XXX-XXXX |  | Y |  |  |
| CITY\_PROV\_PC | City Province Postal Code | VARCHAR(100) | Xxxxxxxx |  | Y |  |  |
| SEX | Patient gender | CHAR(1) | “M” or “F” |  | Y |  |  |
| HCN | Health Card Number | VARCHAR(15) | XXX XXX XXX |  | Y |  |  |
| EXTENSION | Extension of the phone | VARCHAR(10) | Xxxxxxxx |  | N |  |  |
| LAST\_DISCHARGE\_DATE | Patient | DATE | YYYY-MM-DD |  | N |  |  |
| **PRESCRIPTION** | PRES\_ID | Prescription id | INT | 999999 |  | Y | PK |  |
|  | PHYSICIAN\_ NO | Physician id | INT | 999999 |  | Y | FK | PHYSICIAN |
| PATIENT\_ID | Patient id | INT | 999999 |  | Y | FK | PATIENT |
| PRES\_DATE | Prescription date | DATE | YYYY-MM-DD |  | Y |  |  |
| PRES\_MEDICATION | Prescription medication | VARCHAR(50) | Xxxxxxxx |  | Y |  |  |
| PRES\_DOSAGE | Prescription dosage | VARCHAR(50) | Xxxxxxxx |  | Y |  |  |
| **ROOM** | ROOM\_NUMBER | Room number | INT | 999999 |  | Y | PK |  |
|  | ROOM\_TYPE | Room type | VARCHAR(50) | Xxxxxxxx |  | Y |  |  |
| ROOM\_ EXTENESION | Room | VARCHAR(10) | Xxxxxxxx |  | Y |  |  |
| **BED** | BED\_ID | Bed | INT | 999999 |  | Y | PK |  |
|  | ROOM\_NUMBER | Room | INT | 999999 |  | Y | FK | ROOM |
| BED\_NUMBER | Bed | CHAR (1) | A, B, C, or D |  | Y |  |  |
| **COST\_CENTRE** | COST\_CENTRE\_ID | Cost centre id | INT | 999999 |  | Y | PK |  |
|  | DESCRIPTION | Description | VARCHAR (50) | Xxxxxxxx |  | Y |  |  |
| **ADMISSION** | ADMISSION\_ID | Admission id | INT | 999999 |  | Y | PK |  |
|  | PATIENT\_NO | Patient id | INT | 999999 |  | Y | FK | PATIENT |
| BED\_ID | Bed id | INT | 99999 |  | Y | FK | BED |
| ADMISSION\_DATE | Admission date | DATE | YYYY-MM-DD |  | Y |  |  |
| DISCHARGE\_DATE | Discharge date | DATE | YYYY-MM-DD |  | Y |  |  |
| APPOINTMENT | Appointment | BIT | 0 or 1 |  |  |  |  |
| NOTE | Note from doctor | VARCHAR(200) |  |  |  |  |  |
| **ITEM** | ITEM\_CODE | Item code | INT | 999999 |  | Y | PK |  |
|  | COST\_CENTRE\_ID | Const centre id | INT | 999999 |  | Y | FK | COST\_CENTRE |
| COST | Item cost | SMALLMONEY | 99999.99 |  | Y |  |  |
| **BILL** | BILL\_ID | Bill id | INT | 999999 |  | Y | PK |  |
|  | ADMISSION\_ID | Admission id | INT | 999999 |  | Y | FK | ADMISSION |
| BILL\_DATE | Bill date | DATE | YYYY-MM-DD |  | Y |  |  |
| **CHARGE\_ITEM** | ITEM\_ID | Item id | INT | 999999 |  | Y | PK |  |
|  | ITEM\_CODE | Item code | INT | 999999 |  | Y | FK | ITEM |
| BILL\_ID | Bill id | INT | 999999 |  | Y | FK | BILL |
| FINANCIAL\_ID | Financial id | INT | 999999 |  | Y | FK | FINANCIAL |
| ADMISSION\_ID | Admission id | INT | 999999 |  | Y | FK | ADMISSION |
| DESCRIPTION | Description | VARCHAR(50) | Xxxxxxxx |  | Y |  |  |
| QUANTITY | Item quantity | INT | 999999 |  | Y |  |  |
| UNIT\_PRICE | Unit price | SMALLMONEY | 99999.99 |  | Y |  |  |
|  | DATE | Charge item use date | DATE | YYYY-MM-DD |  | Y |  |  |
| **PAYMENT** | PAYMENT\_ID | Payment id | INT | 999999 |  | Y | PK |  |
|  | BILL\_ID | Bill id | INT | 999999 |  | Y | FK | BILL |
| PAYMENT\_DATE | Payment date | DATE | YYYY-MM-DD |  | Y |  |  |
| PAID\_AMOUNT | Amount paid | SMALLMONEY | 99999.99 |  | Y |  |  |
| **TEST** | TEST\_ID | Test id | INT | 999999 |  | Y | PK |  |
|  | PATIENT\_NO | Patient id | INT | 999999 |  | Y | FK | PATIENT |
| PHYSICIAN \_ NO | Physician id | INT | 999999 |  | Y | FK | PHYSICIAN |
| TEST\_DATE | Test date | DATE | YYYY-MM-DD |  | Y |  |  |
| TEST\_TYPE | Test type | VARCHAR(50) | Xxxxxxxx |  | Y |  |  |
| RESULT | Test result | VARCHAR(50) | Xxxxxxxx |  | Y |  |  |

**Table

Description automatically generatedOverall Occupancy by Rooms Dashboard:**

**Graphical user interface, application

Description automatically generatedPhysician- Patient Dashboard:**