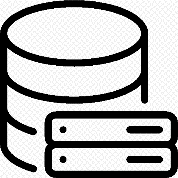
Text

Description automatically generated with low confidence



DATABASE PROJECT

OVERALL VIEW:

* Hospital Business description.
* Er diagram of the database.
* Relation schema of the database.
* Explanation of entities/attributes/relationships.

SQL code:

* Creating tables.
* Populating the tables with data.
* Statements for data retrieving.

Kostandin hila

**BUSSINES DESCRIPTION:**

The hospital is a modern healthcare facility that provides a range of medical services to patients. It employs a team of highly skilled healthcare professionals including doctors, nurses, and specialized personnel, who work together to provide comprehensive care to patients.

Patients receive care in private or shared rooms, depending on their needs and preferences. The rooms are equipped with modern medical equipment and technology to ensure optimal care delivery. The hospital offers a variety of medical treatments, including medication and physical therapy, to help patients recover from various illnesses and diseases.

Patients are assigned to doctors and nurses who are responsible for managing their care. Doctors specialize in different areas, such as cardiology and oncology, and work closely with patients to develop treatment plans tailored to their specific needs. Nurses assist with daily care tasks, such as administering medications and monitoring vital signs.

The hospital has an on-site pharmacy where patients can obtain prescriptions for medications prescribed by their doctors. Medications are selected from a list of available medicines, which are stored in the hospital's inventory.

The hospital also has a lab where medical tests are conducted to diagnose diseases and monitor patient health. The lab is staffed by skilled technicians who perform tests, record results, and communicate findings to the treating physician.

Overall, the hospital's mission is to provide high-quality medical care in a safe and welcoming environment. The hospital is committed to treating patients with dignity and respect, and to supporting them through their healing journey.

**Some of the data we want to retrieve from the database:**

* Retrieve the list of nurses and doctors with their patient count.
* Retrieve the medications prescribed for each patient.
* Retrieve the exams and results for each patient that participated in lab activities.
* Retrieve the treatment history of each patient, including the date, disease, treatment type, and prescription.

**Diagram

Description automatically generatedER Diagram of the Database:**

**Explenation of the Entities/Atributes/Relationships:**

1. Patient: represents a person who is admitted to the hospital.

Attributes:

* Patient\_id: a unique identifier for each patient.
* First\_Name: the first name of the patient.
* Last\_Name: the last name of the patient.
* Gender: the gender of the patient.
* Age: the age of the patient.
* Contact: the contact information of the patient.
* Notes: any notes or comments regarding the patient.
* Room\_ID: the ID of the room assigned to the patient.

**Cardinality and Participation Explained:**

Relationships:

* A patient can be assigned to only one room, but a room can have multiple patients. (1:M) ***mandatory***
* A patient can receive multiple treatments from different doctors. (M:M) ***mandatory***
* A patient can take multiple medications. (M:M) ***optional***

(and so it goes on for the other attributes aswell)

**Relational Schema of the Database:**

*Table created by using reverse engieneering feature in MySQL Workbench*

**Diagram

Description automatically generated**

**How could a StarSchema would look like for a DataWarehouse implementation:**

**Diagram

Description automatically generated**

**DataWarehouse from star schema into tables:**

1. **CREATE** **TABLE** Medicine\_Dimension
2. (
3. Med\_Desc **CHAR**(50) NOT NULL,
4. Med\_ID **INT** NOT NULL,
5. Med\_Type **INT** NOT NULL,
6. **PRIMARY** **KEY** (Med\_ID)
7. );
9. **CREATE** **TABLE** Room\_Dimension
10. (
11. Type **CHAR**(50) NOT NULL,
12. Max\_occupancy **INT** NOT NULL,
13. Room\_ID **INT** NOT NULL,
14. Occupied **CHAR**(50) NOT NULL,
15. **PRIMARY** **KEY** (Room\_ID)
16. );
18. **CREATE** **TABLE** Employee\_Dimension
19. (
20. First\_Name **CHAR**(50) NOT NULL,
21. Last\_Name **CHAR**(50) NOT NULL,
22. Employee\_id **INT** NOT NULL,
23. Contact **CHAR**(50) NOT NULL,
24. Hire\_date **DATE** NOT NULL,
25. **PRIMARY** **KEY** (Employee\_id)
26. );
28. **CREATE** **TABLE** Calendar\_Dimension
29. (
30. Full\_Date **DATE** NOT NULL,
31. Day\_of\_week **INT** NOT NULL,
32. Day\_of\_month **INT** NOT NULL,
33. Month **INT** NOT NULL,
34. Quarter **INT** NOT NULL,
35. Year **INT** NOT NULL,
36. Calendar\_Key **INT** NOT NULL,
37. **PRIMARY** **KEY** (Calendar\_Key)
38. );
40. **CREATE** **TABLE** Patient
41. (
42. First\_Name **CHAR**(50) NOT NULL,
43. Last\_Name **CHAR**(50) NOT NULL,
44. Notes **CHAR** NOT NULL,
45. Gender **CHAR** NOT NULL,
46. Patient\_id **INT** NOT NULL,
47. Age\_ **INT** NOT NULL,
48. Contact **CHAR**(50) NOT NULL,
49. Calendar\_Key **INT** NOT NULL,
50. Med\_ID **INT** NOT NULL,
51. Employee\_id **INT** NOT NULL,
52. Room\_ID **INT** NOT NULL,
53. **PRIMARY** **KEY** (Patient\_id),
54. **FOREIGN** **KEY** (Calendar\_Key) **REFERENCES** Calendar\_Dimension(Calendar\_Key),
55. **FOREIGN** **KEY** (Med\_ID) **REFERENCES** Medicine\_Dimension(Med\_ID),
56. **FOREIGN** **KEY** (Employee\_id) **REFERENCES** Employee\_Dimension(Employee\_id),
57. **FOREIGN** **KEY** (Room\_ID) **REFERENCES** Room\_Dimension(Room\_ID)
58. );

**Database Implementation:**

**CREATE** **DATABASE** HOSPITAL**;**

USE HOSPITAL**;**

**CREATE** **TABLE** EMPLOYEE

**(**

First\_Name CHAR**(50)** **NOT** **NULL,**

Last\_Name CHAR**(50)** **NOT** **NULL,**

Emloyee\_id CHAR**(50)** **NOT** **NULL,**

Contact CHAR**(50)** **NOT** **NULL,**

Hire\_date DATE **NOT** **NULL,**

**PRIMARY** **KEY** **(**Emloyee\_id**)**

**);**

**CREATE** **TABLE** NURSE

**(**

Emloyee\_id CHAR**(50)** **NOT** **NULL,**

**PRIMARY** **KEY** **(**Emloyee\_id**),**

**FOREIGN** **KEY** **(**Emloyee\_id**)** **REFERENCES** EMPLOYEE**(**Emloyee\_id**)**

**);**

**CREATE** **TABLE** DOCTOR

**(**

Emloyee\_id CHAR**(50)** **NOT** **NULL,**

**PRIMARY** **KEY** **(**Emloyee\_id**),**

**FOREIGN** **KEY** **(**Emloyee\_id**)** **REFERENCES** EMPLOYEE**(**Emloyee\_id**)**

**);**

**CREATE** **TABLE** MEDICINE

**(**

Med\_Type CHAR**(50)** **NOT** **NULL,**

Med\_ID CHAR**(50)** **NOT** **NULL,**

Med\_Desc CHAR**(50)** **NOT** **NULL,**

**PRIMARY** **KEY** **(**Med\_ID**)**

**);**

**CREATE** **TABLE** DOCTOR\_Specialization

**(**

Specialization INT **NOT** **NULL,**

Emloyee\_id CHAR**(50)** **NOT** **NULL,**

**PRIMARY** **KEY** **(**Specialization**,** Emloyee\_id**),**

**FOREIGN** **KEY** **(**Emloyee\_id**)** **REFERENCES** DOCTOR**(**Emloyee\_id**)**

**);**

**CREATE** **TABLE** ROOM

**(**

Room\_ID CHAR**(50)** **NOT** **NULL,**

**Type** CHAR**(50)** **NOT** **NULL,**

Max\_occupancy INT **NOT** **NULL,**

Occupied CHAR**(50)** **NOT** **NULL,**

Emloyee\_id CHAR**(50),**

**PRIMARY** **KEY** **(**Room\_ID**),**

**FOREIGN** **KEY** **(**Emloyee\_id**)** **REFERENCES** NURSE**(**Emloyee\_id**)**

**);**

**CREATE** **TABLE** PATIENT

**(**

First\_Name CHAR**(50)** **NOT** **NULL,**

Last\_Name CHAR**(50)** **NOT** **NULL,**

Contact CHAR**(50)** **NOT** **NULL,**

Patient\_id CHAR**(50)** **NOT** **NULL,**

Gender CHAR**(50)** **NOT** **NULL,**

Notes CHAR**(50)** **NOT** **NULL,**

Age INT **NOT** **NULL,**

Room\_ID CHAR**(50)** **NOT** **NULL,**

**PRIMARY** **KEY** **(**Patient\_id**),**

**FOREIGN** **KEY** **(**Room\_ID**)** **REFERENCES** ROOM**(**Room\_ID**)**

**);**

**CREATE** **TABLE** Treats

**(**

Date DATE **NOT** **NULL,**

Disease CHAR**(50)** **NOT** **NULL,**

Treatment\_Type CHAR**(50)** **NOT** **NULL,**

Med\_Prescription CHAR**(50)** **NOT** **NULL,**

Patient\_id CHAR**(50)** **NOT** **NULL,**

Emloyee\_id CHAR**(50)** **NOT** **NULL,**

**PRIMARY** **KEY** **(**Patient\_id**,** Emloyee\_id**),**

**FOREIGN** **KEY** **(**Patient\_id**)** **REFERENCES** PATIENT**(**Patient\_id**),**

**FOREIGN** **KEY** **(**Emloyee\_id**)** **REFERENCES** DOCTOR**(**Emloyee\_id**)**

**);**

**CREATE** **TABLE** Take

**(**

Patient\_id CHAR**(50)** **NOT** **NULL,**

Med\_ID CHAR**(50)** **NOT** **NULL,**

**PRIMARY** **KEY** **(**Patient\_id**,** Med\_ID**),**

**FOREIGN** **KEY** **(**Patient\_id**)** **REFERENCES** PATIENT**(**Patient\_id**),**

**FOREIGN** **KEY** **(**Med\_ID**)** **REFERENCES** MEDICINE**(**Med\_ID**)**

**);**

**CREATE** **TABLE** Participate

**(**

Patient\_id CHAR**(50)** **NOT** **NULL,**

**PRIMARY** **KEY** **(**Patient\_id**),**

**FOREIGN** **KEY** **(**Patient\_id**)** **REFERENCES** PATIENT**(**Patient\_id**)**

**);**

**CREATE** **TABLE** LAB

**(**

Exams CHAR**(50)** **NOT** **NULL,**

Results CHAR**(50)** **NOT** **NULL,**

Date DATE **NOT** **NULL,**

Patient\_id CHAR**(50)** **NOT** **NULL,**

**FOREIGN** **KEY** **(**Patient\_id**)** **REFERENCES** Participate**(**Patient\_id**)**

**);**

**ALTER** **TABLE** Treats

**MODIFY** **COLUMN** Med\_Prescription CHAR**(50)** **NULL;**

**Population of the database:**

**INSERT** **INTO** EMPLOYEE **(**First\_Name**,** Last\_Name**,** Emloyee\_id**,** Contact**,** Hire\_date**)**

**VALUES**

**(**'John'**,** 'Doe'**,** '1001'**,** '555-1234'**,** '2021-01-01'**),**

**(**'Jane'**,** 'Doe'**,** '1002'**,** '555-5678'**,** '2021-01-02'**),**

**(**'Mary'**,** 'Smith'**,** '1003'**,** '555-2468'**,** '2021-01-03'**),**

**(**'Bob'**,** 'Johnson'**,** '1004'**,** '555-7890'**,** '2021-01-04'**);**

*-- Populate NURSE table*

**INSERT** **INTO** NURSE **(**Emloyee\_id**)**

**VALUES**

**(**'1001'**),**

**(**'1002'**);**

*-- Populate DOCTOR table*

**INSERT** **INTO** DOCTOR **(**Emloyee\_id**)**

**VALUES**

**(**'1003'**),**

**(**'1004'**);**

*-- Populate MEDICINE table*

**INSERT** **INTO** MEDICINE **(**Med\_Type**,** Med\_ID**,** Med\_Desc**)**

**VALUES**

**(**'Antibiotic'**,** 'M1001'**,** 'Used to treat bacterial infections'**),**

**(**'Analgesic'**,** 'M1002'**,** 'Used to relieve pain'**),**

**(**'Antihistamine'**,** 'M1003'**,** 'Used to treat allergies'**),**

**(**'Antidepressant'**,** 'M1004'**,** 'Used to treat depression'**);**

*-- Populate DOCTOR\_SPECIALIZATION table*

**INSERT** **INTO** DOCTOR\_SPECIALIZATION **(**Specialization**,** Emloyee\_id**)**

**VALUES**

**(1,** '1003'**),** *-- Cardiologist*

**(2,** '1004'**);** *-- Oncologist*

*-- Populate ROOM table*

**INSERT** **INTO** ROOM **(**Room\_ID**,** **Type,** Max\_occupancy**,** Occupied**,** Emloyee\_id**)**

**VALUES**

**(**'101'**,** 'Private'**,** **2,** 'Y'**,** '1001'**),**

**(**'102'**,** 'Private'**,** **2,** 'N'**,** **NULL),**

**(**'103'**,** 'Ward'**,** **4,** 'Y'**,** '1002'**);**

*-- Populate PATIENT table*

**INSERT** **INTO** PATIENT **(**First\_Name**,** Last\_Name**,** Contact**,** Patient\_id**,** Gender**,** Notes**,** Age**,** Room\_ID**)**

**VALUES**

**(**'David'**,** 'Smith'**,** '555-1111'**,** '2001'**,** 'Male'**,** 'History of heart disease'**,** **40,** '101'**),**

**(**'Sara'**,** 'Johnson'**,** '555-2222'**,** '2002'**,** 'Female'**,** 'Severe allergies'**,** **28,** '102'**),**

**(**'Tom'**,** 'Williams'**,** '555-3333'**,** '2003'**,** 'Male'**,** 'Recovering from surgery'**,** **65,** '103'**);**

*-- Populate TREATS table*

**INSERT** **INTO** TREATS **(**Date**,** Disease**,** Treatment\_Type**,** Med\_Prescription**,** Patient\_id**,** Emloyee\_id**)**

**VALUES**

**(**'2022-01-01'**,** 'Heart disease'**,** 'Medication'**,** 'M1001'**,** '2001'**,** '1003'**),**

**(**'2022-01-02'**,** 'Allergies'**,** 'Medication'**,** 'M1003'**,** '2002'**,** '1004'**),**

**(**'2022-01-03'**,** 'Recovering from surgery'**,** 'Physical therapy'**,** **NULL,** '2003'**,** '1003'**);**

*-- Populate TAKE table*

**INSERT** **INTO** TAKE **(**Patient\_id**,** Med\_ID**)**

**VALUES**

**(**'2001'**,** 'M1001'**),**

**(**'2002'**,** 'M1003'**);**

*-- Populate PARTICIPATE table*

**INSERT** **INTO** PARTICIPATE **(**Patient\_id**)**

**VALUES**

**(**'2001'**),**

**(**'2002'**),**

**(**'2003'**);**

**INSERT** **INTO** LAB **(**Exams**,** Results**,** Date**,** Patient\_id**)**

**VALUES**

**(**'Blood test'**,** 'Normal'**,** '2022-01-04'**,** '2001'**),**

**(**'X-ray'**,** 'Abnormal'**,** '2022-01-05'**,** '2002'**),**

**(**'MRI'**,** 'Normal'**,** '2022-01-06'**,** '2003'**);**

**SELECT SQL statements:**

**#**Retrieve the treatment history **of** **each** patient**,** **including** the date**,** disease**,** treatment **type,** **and** prescription**:**

**SELECT** p**.**Patient\_id**,** t**.**Date**,** t**.**Disease**,** t**.**Treatment\_Type**,** t**.**Med\_Prescription

**FROM** PATIENT p

**JOIN** Treats t **ON** p**.**Patient\_id **=** t**.**Patient\_id**;**

**#**Retrieve the exams **and** results **for** **each** patient that participated **in** lab activities**:**

**SELECT** p**.**Patient\_id**,** l**.**Exams**,** l**.**Results

**FROM** Participate p

**JOIN** LAB l **ON** p**.**Patient\_id **=** l**.**Patient\_id**;**

**#**Retrieve the medications prescribed **for** **each** patient**:**

**SELECT** p**.**Patient\_id**,** m**.**Med\_ID**,** m**.**Med\_Type

**FROM** PATIENT p

**JOIN** Take t **ON** p**.**Patient\_id **=** t**.**Patient\_id

**JOIN** MEDICINE m **ON** t**.**Med\_ID **=** m**.**Med\_ID**;**

**#**Retrieve the list **of** nurses **and** doctors **with** their patient **count:**

**SELECT** e**.**First\_Name**,** e**.**Last\_Name**,**

**COUNT(CASE** **WHEN** p**.**Patient\_id **IS** **NOT** **NULL** **THEN** **1** **ELSE** **NULL** **END)** **AS** Patient\_Count

**FROM** EMPLOYEE e

**LEFT** **JOIN** DOCTOR d **ON** e**.**Emloyee\_id **=** d**.**Emloyee\_id

**LEFT** **JOIN** NURSE n **ON** e**.**Emloyee\_id **=** n**.**Emloyee\_id

**LEFT** **JOIN** ROOM r **ON** n**.**Emloyee\_id **=** r**.**Emloyee\_id **OR** d**.**Emloyee\_id **=** r**.**Emloyee\_id

**LEFT** **JOIN** PATIENT p **ON** r**.**Room\_ID **=** p**.**Room\_ID

**GROUP** **BY** e**.**Emloyee\_id**;**

**#**Retrieve the list **of** nurses **and** doctors **with** their specialization **and** the room they **are** **in** charge **of:**

**SELECT** e**.**First\_Name**,** e**.**Last\_Name**,**

**CASE** **WHEN** d**.**Emloyee\_id **IS** **NOT** **NULL** **THEN** ds**.**Specialization **ELSE** **NULL** **END** **AS** Specialization**,**

**CASE** **WHEN** n**.**Emloyee\_id **IS** **NOT** **NULL** **THEN** r**.**Room\_ID **ELSE** **NULL** **END** **AS** Room\_ID

**FROM** EMPLOYEE e

**LEFT** **JOIN** DOCTOR d **ON** e**.**Emloyee\_id **=** d**.**Emloyee\_id

**LEFT** **JOIN** DOCTOR\_Specialization ds **ON** d**.**Emloyee\_id **=** ds**.**Emloyee\_id

**LEFT** **JOIN** NURSE n **ON** e**.**Emloyee\_id **=** n**.**Emloyee\_id

**LEFT** **JOIN** ROOM r **ON** n**.**Emloyee\_id **=** r**.**Emloyee\_id **OR** d**.**Emloyee\_id **=** r**.**Emloyee\_id**;**