The Vitals Crew

Prof. Xinda Wang

CS 4347.005: Database Systems

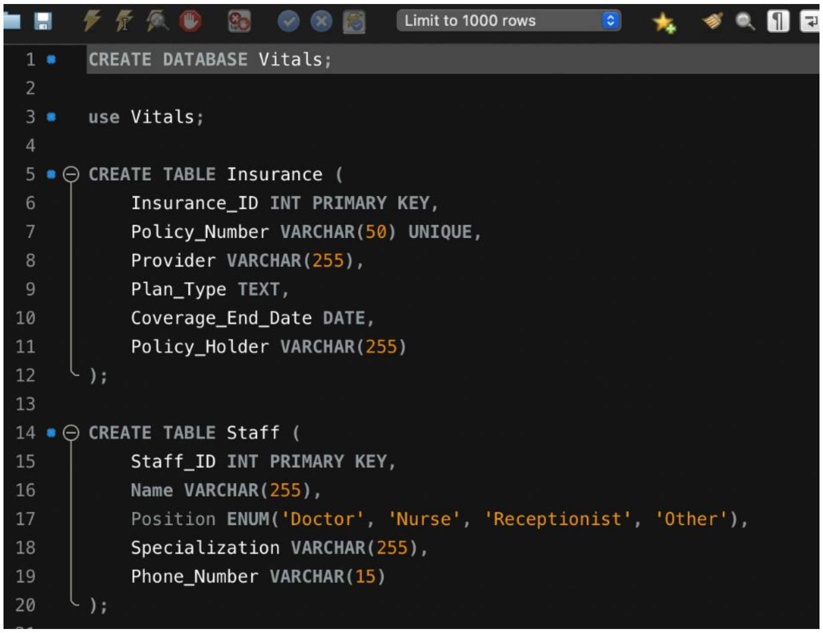
April 13, 2025

Phase 3 Project Report

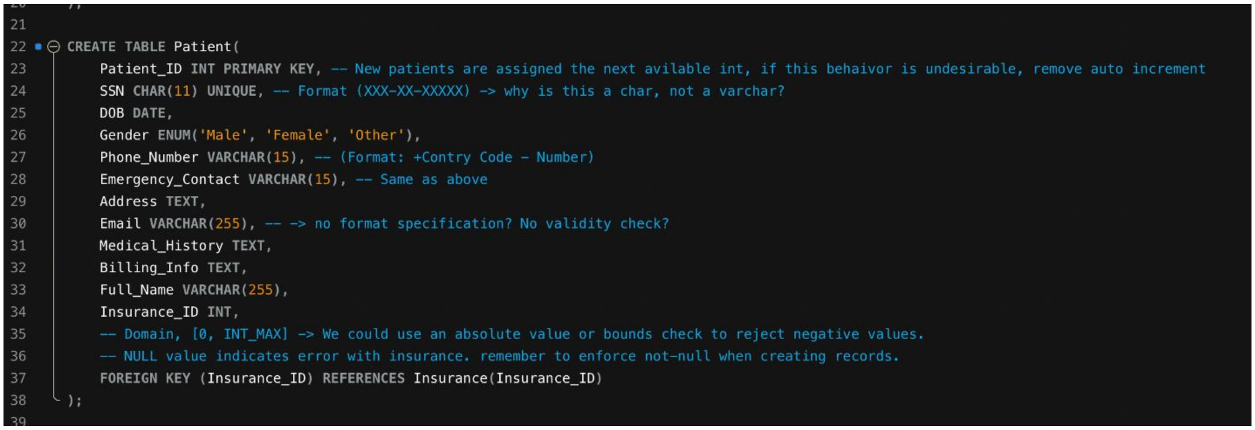
Task C:

Create.sql

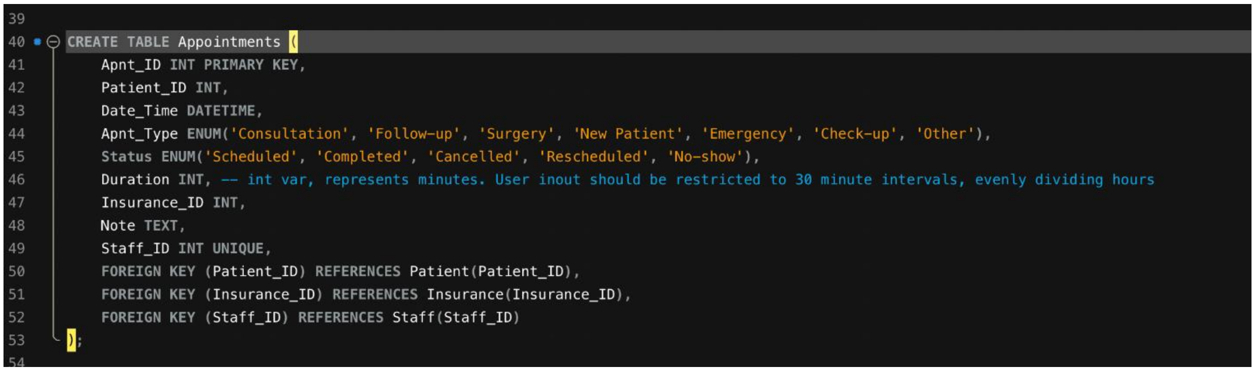
The focus of this was to establish the actual relationships between entitles by constructing the database schema and loading sample data. This was accomplished using create.sql and load.sql. The create.sql file defines the structure of the database by creating all necessary tables. The four tables are Insurance, Staff, Patient, and Appointments. Each table was designed with appropriate data types and constraints to ensure data integrity. Primary keys were assigned to uniquely identifying records. ENUMs were used to restrict specific fields like staff position and appointment type. Also, foreign keys were implemented to define meaningful relationships between tables. The Appointments table acts as a central hub, linking all the tables together through foreign key.



```sql
CREATE DATABASE Vitals;

use Vitals;

CREATE TABLE Insurance (
    Insurance_ID INT PRIMARY KEY,
    Policy_Number VARCHAR(50) UNIQUE,
    Provider VARCHAR(255),
    Plan_Type TEXT,
    Coverage_End_Date DATE,
    Policy_Holder VARCHAR(255)
);

CREATE TABLE Staff (
    Staff_ID INT PRIMARY KEY,
    Name VARCHAR(255),
    Position ENUM('Doctor', 'Nurse', 'Receptionist', 'Other'),
    Specialization VARCHAR(255),
    Phone_Number VARCHAR(15)
);
```



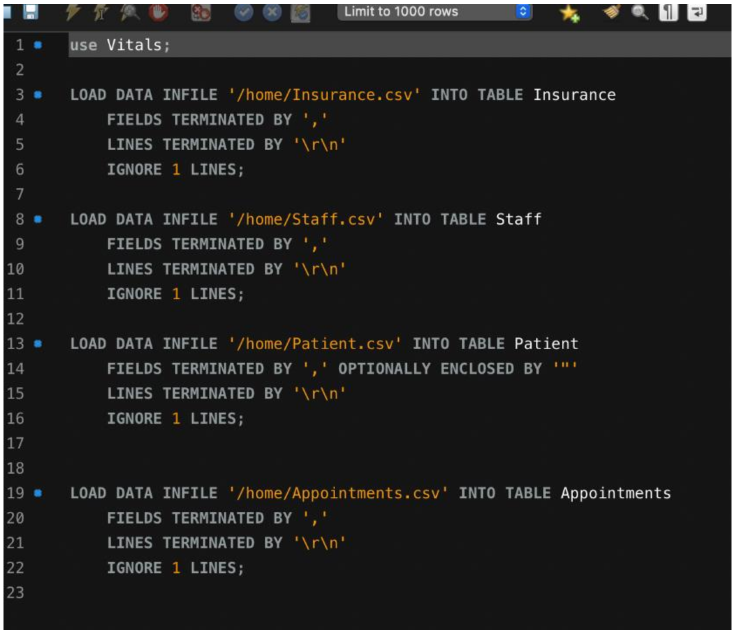
```sql
CREATE TABLE Patient(
    Patient_ID INT PRIMARY KEY, -- New patients are assigned the next avilable int, if this behaivor is undesirable, remove auto increment
    SSN CHAR(11) UNIQUE, -- Format (XXX-XX-XXXXX) -> why is this a char, not a varchar?
    DOB DATE,
    Gender ENUM('Male', 'Female', 'Other'),
    Phone_Number VARCHAR(15), -- (Format: +Contry Code - Number)
    Emergency_Contact VARCHAR(15), -- Same as above
    Address TEXT,
    Email VARCHAR(255), -- -> no format specification? No validity check?
    Medical_History TEXT,
    Billing_Info TEXT,
    Full_Name VARCHAR(255),
    Insurance_ID INT,
    -- Domain, [0, INT_MAX] -> We could use an absolute value or bounds check to reject negative values.
    -- NULL value indicates error with insurance. remember to enforce not-null when creating records.
    FOREIGN KEY (Insurance_ID) REFERENCES Insurance(Insurance_ID)
);
```



```sql
CREATE TABLE Appointments (
    Apnt_ID INT PRIMARY KEY,
    Patient_ID INT,
    Date_Time DATETIME,
    Apnt_Type ENUM('Consultation', 'Follow-up', 'Surgery', 'New Patient', 'Emergency', 'Check-up', 'Other'),
    Status ENUM('Scheduled', 'Completed', 'Cancelled', 'Rescheduled', 'No-show'),
    Duration INT, -- int var, represents minutes. User inout should be restricted to 30 minute intervals, evenly dividing hours
    Insurance_ID INT,
    Note TEXT,
    Staff_ID INT UNIQUE,
    FOREIGN KEY (Patient_ID) REFERENCES Patient(Patient_ID),
    FOREIGN KEY (Insurance_ID) REFERENCES Insurance(Insurance_ID),
    FOREIGN KEY (Staff_ID) REFERENCES Staff(Staff_ID)
);
```

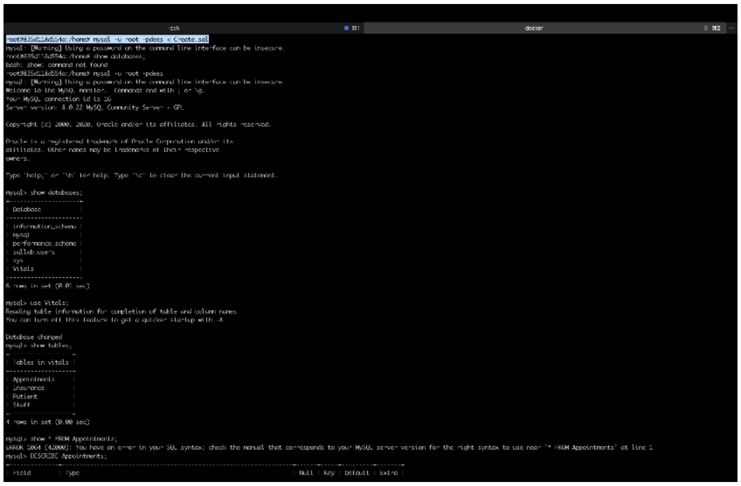
Load.sql

To populate the tables with data, a file called load.sql was created to handle bulk data loading from CSV files. This file utilizes the load data in file command to read comma separated values in each table. It skips the header and handles multiple answers in Medical History column enclosed in quotes. This ensures the large datasets can be imported quickly and consistently. This is very effective and functional for development.



```
use Vitals;

LOAD DATA INFILE '/home/Insurance.csv' INTO TABLE Insurance
    FIELDS TERMINATED BY ','
    LINES TERMINATED BY '\r\n'
    IGNORE 1 LINES;

LOAD DATA INFILE '/home/Staff.csv' INTO TABLE Staff
    FIELDS TERMINATED BY ','
    LINES TERMINATED BY '\r\n'
    IGNORE 1 LINES;

LOAD DATA INFILE '/home/Patient.csv' INTO TABLE Patient
    FIELDS TERMINATED BY ',' OPTIONALLY ENCLOSED BY '"'
    LINES TERMINATED BY '\r\n'
    IGNORE 1 LINES;


LOAD DATA INFILE '/home/Appointments.csv' INTO TABLE Appointments
    FIELDS TERMINATED BY ','
    LINES TERMINATED BY '\r\n'
    IGNORE 1 LINES;

```

The following are a series of images executed in the /home directory of the same Docker container + MySQL server used in HW4. If, for the purposes of grading, you execute create.sql and load.sql, you ought to either remove the /home if you are creating the database in the same directory as the .csv files, or create a /home/ directory.



```
root@635d118d554a:/home# mysql -u root -pdees < Create.sql
mysql: [Warning] Using a password on the command line interface can be insecure.
root@635d118d554a:/home# show databases;
bash: show: command not found
root@635d118d554a:/home# mysql -u root -pdees
mysql: [Warning] Using a password on the command line interface can be insecure.
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 16
Server version: 8.0.22 MySQL Community Server - GPL

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
| sqllab_users       |
| sys                |
| Vitals             |
+--------------------+
6 rows in set (0.01 sec)

mysql> use Vitals;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> show tables;
+------------------+
| Tables in vitals |
+------------------+
| Appointments     |
| Insurance        |
| Patient          |
| Staff            |
+------------------+
4 rows in set (0.00 sec)

mysql> show * FROM Appointments;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near '* FROM Appointments' at line 1
mysql> DESCRIBE Appointments;
+--------------+------------------------------------------------------------------+------+-----+---------+-------+
| Field        | Type                                                             | Null | Key | Default | Extra |
```
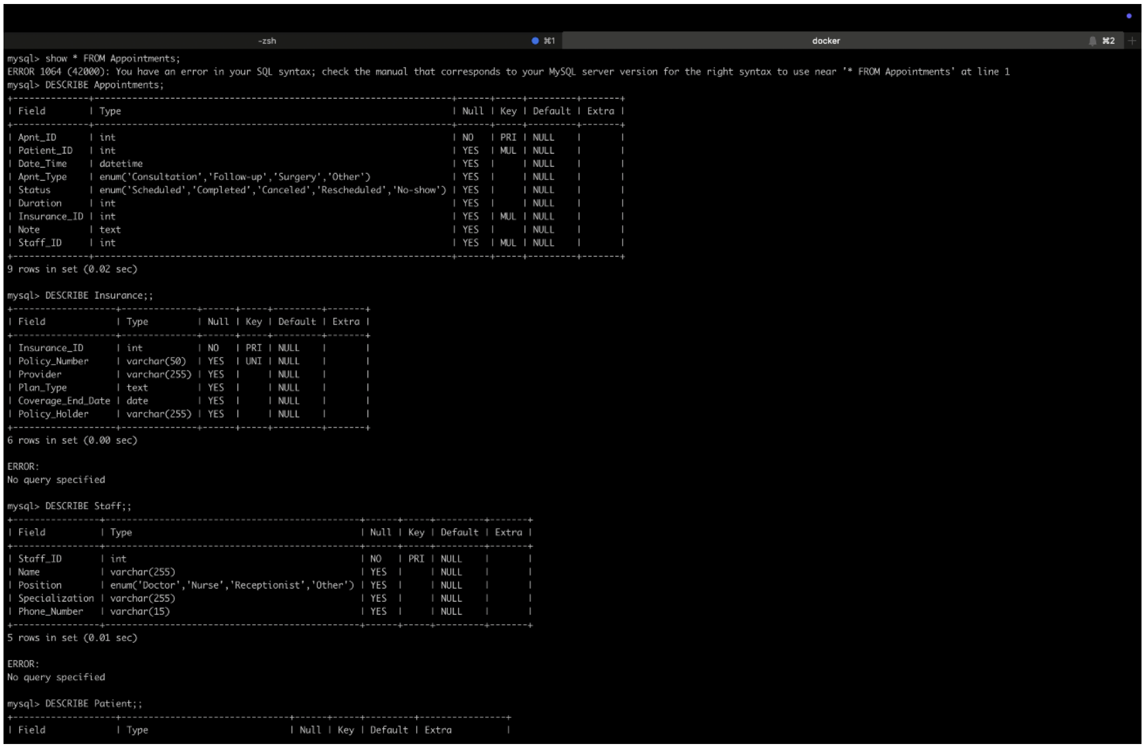
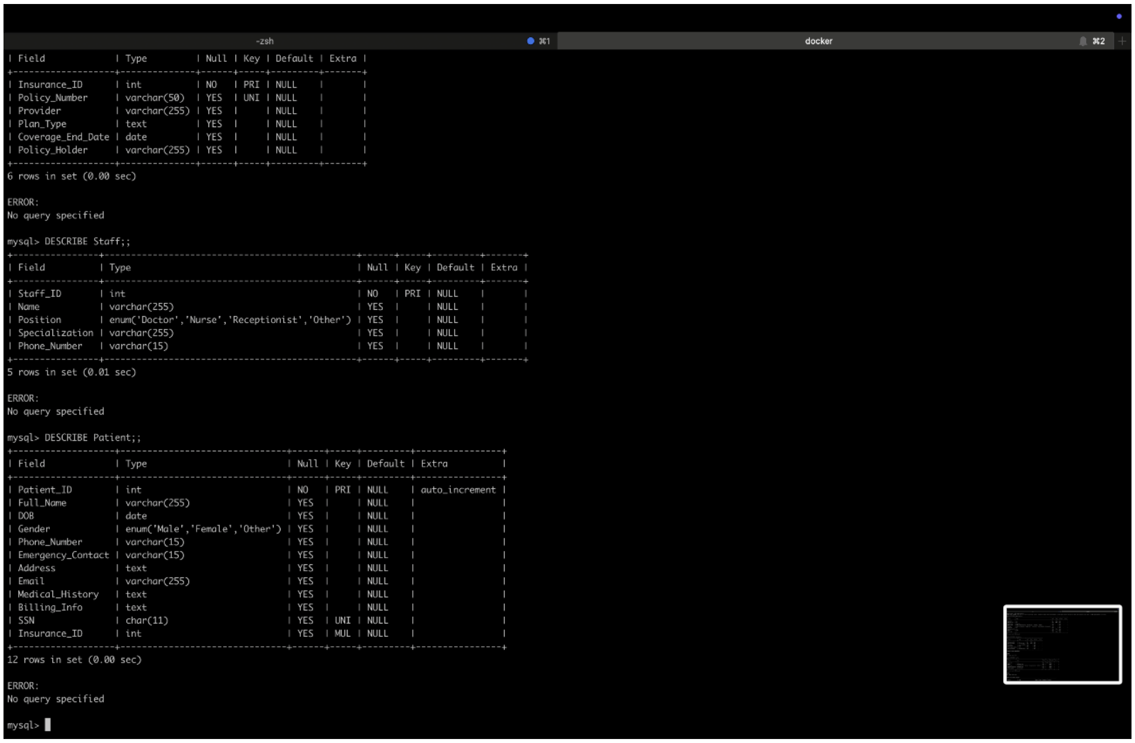

Note, if you already created a database and wish only to create the tables within this database, please remove the first two lines of create.sql, which, when piped into a mysql shell, creates a new database. For the purposes of repeatedly creating and destroying tables, without affecting the whole database, these lines should be removed.

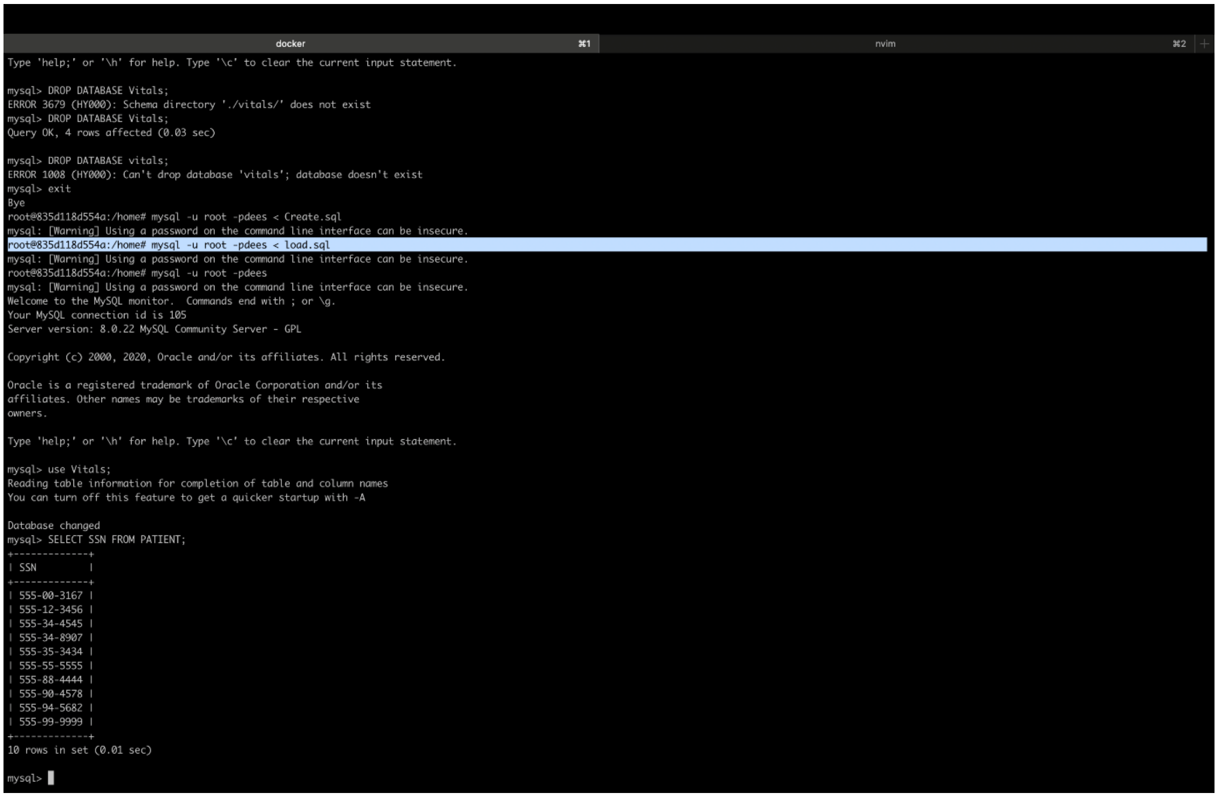


```
mysql> show * FROM Appointments;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near '* FROM Appointments' at line 1
mysql> DESCRIBE Appointments;
+--------------+------------------------------------------------------------------+------+-----+---------+-------+
| Field        | Type                                                             | Null | Key | Default | Extra |
+--------------+------------------------------------------------------------------+------+-----+---------+-------+
| Apnt_ID      | int                                                              | NO   | PRI | NULL    |       |
| Patient_ID   | int                                                              | YES  | MUL | NULL    |       |
| Date_Time    | datetime                                                         | YES  |     | NULL    |       |
| Apnt_Type    | enum('Consultation','Follow-up','Surgery','Other')               | YES  |     | NULL    |       |
| Status       | enum('Scheduled','Completed','Canceled','Rescheduled','No-show') | YES  |     | NULL    |       |
| Duration     | int                                                              | YES  |     | NULL    |       |
| Insurance_ID | int                                                              | YES  | MUL | NULL    |       |
| Note         | text                                                             | YES  |     | NULL    |       |
| Staff_ID     | int                                                              | YES  | MUL | NULL    |       |
+--------------+------------------------------------------------------------------+------+-----+---------+-------+
9 rows in set (0.02 sec)

mysql> DESCRIBE Insurance;;
+-------------------+--------------+------+-----+---------+-------+
| Field             | Type         | Null | Key | Default | Extra |
+-------------------+--------------+------+-----+---------+-------+
| Insurance_ID      | int          | NO   | PRI | NULL    |       |
| Policy_Number     | varchar(50)  | YES  | UNI | NULL    |       |
| Provider          | varchar(255) | YES  |     | NULL    |       |
| Plan_Type         | text         | YES  |     | NULL    |       |
| Coverage_End_Date | date         | YES  |     | NULL    |       |
| Policy_Holder     | varchar(255) | YES  |     | NULL    |       |
+-------------------+--------------+------+-----+---------+-------+
6 rows in set (0.00 sec)

ERROR:
No query specified

mysql> DESCRIBE Staff;;
+----------------+-----------------------------------------------+------+-----+---------+-------+
| Field          | Type                                          | Null | Key | Default | Extra |
+----------------+-----------------------------------------------+------+-----+---------+-------+
| Staff_ID       | int                                           | NO   | PRI | NULL    |       |
| Name           | varchar(255)                                  | YES  |     | NULL    |       |
| Position       | enum('Doctor','Nurse','Receptionist','Other') | YES  |     | NULL    |       |
| Specialization | varchar(255)                                  | YES  |     | NULL    |       |
| Phone_Number   | varchar(15)                                   | YES  |     | NULL    |       |
+----------------+-----------------------------------------------+------+-----+---------+-------+
5 rows in set (0.01 sec)

ERROR:
No query specified

mysql> DESCRIBE Patient;;
+-------------------+-------------------------------+------+-----+---------+----------------+
| Field             | Type                          | Null | Key | Default | Extra          |
```



```
| Field             | Type         | Null | Key | Default | Extra |
+-------------------+--------------+------+-----+---------+-------+
| Insurance_ID      | int          | NO   | PRI | NULL    |       |
| Policy_Number     | varchar(50)  | YES  | UNI | NULL    |       |
| Provider          | varchar(255) | YES  |     | NULL    |       |
| Plan_Type         | text         | YES  |     | NULL    |       |
| Coverage_End_Date | date         | YES  |     | NULL    |       |
| Policy_Holder     | varchar(255) | YES  |     | NULL    |       |
+-------------------+--------------+------+-----+---------+-------+
6 rows in set (0.00 sec)

ERROR:
No query specified

mysql> DESCRIBE Staff;;
+----------------+-----------------------------------------------+------+-----+---------+-------+
| Field          | Type                                          | Null | Key | Default | Extra |
+----------------+-----------------------------------------------+------+-----+---------+-------+
| Staff_ID       | int                                           | NO   | PRI | NULL    |       |
| Name           | varchar(255)                                  | YES  |     | NULL    |       |
| Position       | enum('Doctor','Nurse','Receptionist','Other') | YES  |     | NULL    |       |
| Specialization | varchar(255)                                  | YES  |     | NULL    |       |
| Phone_Number   | varchar(15)                                   | YES  |     | NULL    |       |
+----------------+-----------------------------------------------+------+-----+---------+-------+
5 rows in set (0.01 sec)

ERROR:
No query specified

mysql> DESCRIBE Patient;;
+-------------------+-------------------------------+------+-----+---------+----------------+
| Field             | Type                          | Null | Key | Default | Extra          |
+-------------------+-------------------------------+------+-----+---------+----------------+
| Patient_ID        | int                           | NO   | PRI | NULL    | auto_increment |
| Full_Name         | varchar(255)                  | YES  |     | NULL    |                |
| DOB               | date                          | YES  |     | NULL    |                |
| Gender            | enum('Male','Female','Other') | YES  |     | NULL    |                |
| Phone_Number      | varchar(15)                   | YES  |     | NULL    |                |
| Emergency_Contact | varchar(15)                   | YES  |     | NULL    |                |
| Address           | text                          | YES  |     | NULL    |                |
| Email             | varchar(255)                  | YES  |     | NULL    |                |
| Medical_History   | text                          | YES  |     | NULL    |                |
| Billing_Info      | text                          | YES  |     | NULL    |                |
| SSN               | char(11)                      | YES  | UNI | NULL    |                |
| Insurance_ID      | int                           | YES  | MUL | NULL    |                |
+-------------------+-------------------------------+------+-----+---------+----------------+
12 rows in set (0.00 sec)

ERROR:
No query specified

mysql> 
```

The previous images were the result of the create.sql file executing SQL commands in a MySQL shell. The following is the result of piping load.sql into the same shell:



```
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> DROP DATABASE Vitals;
ERROR 3679 (HY000): Schema directory './vitals/' does not exist
mysql> DROP DATABASE Vitals;
Query OK, 4 rows affected (0.03 sec)

mysql> DROP DATABASE vitals;
ERROR 1008 (HY000): Can't drop database 'vitals'; database doesn't exist
mysql> exit
Bye
root@835d118d554a:/home# mysql -u root -pdees < Create.sql
mysql: [Warning] Using a password on the command line interface can be insecure.
root@835d118d554a:/home# mysql -u root -pdees < load.sql
mysql: [Warning] Using a password on the command line interface can be insecure.
root@835d118d554a:/home# mysql -u root -pdees
mysql: [Warning] Using a password on the command line interface can be insecure.
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 105
Server version: 8.0.22 MySQL Community Server - GPL

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> use Vitals;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> SELECT SSN FROM PATIENT;
+-------------+
| SSN         |
+-------------+
| 555-00-3167 |
| 555-12-3456 |
| 555-34-4545 |
| 555-34-8907 |
| 555-35-3434 |
| 555-55-5555 |
| 555-88-4444 |
| 555-90-4578 |
| 555-94-5682 |
| 555-99-9999 |
+-------------+
10 rows in set (0.01 sec)

mysql> 
```
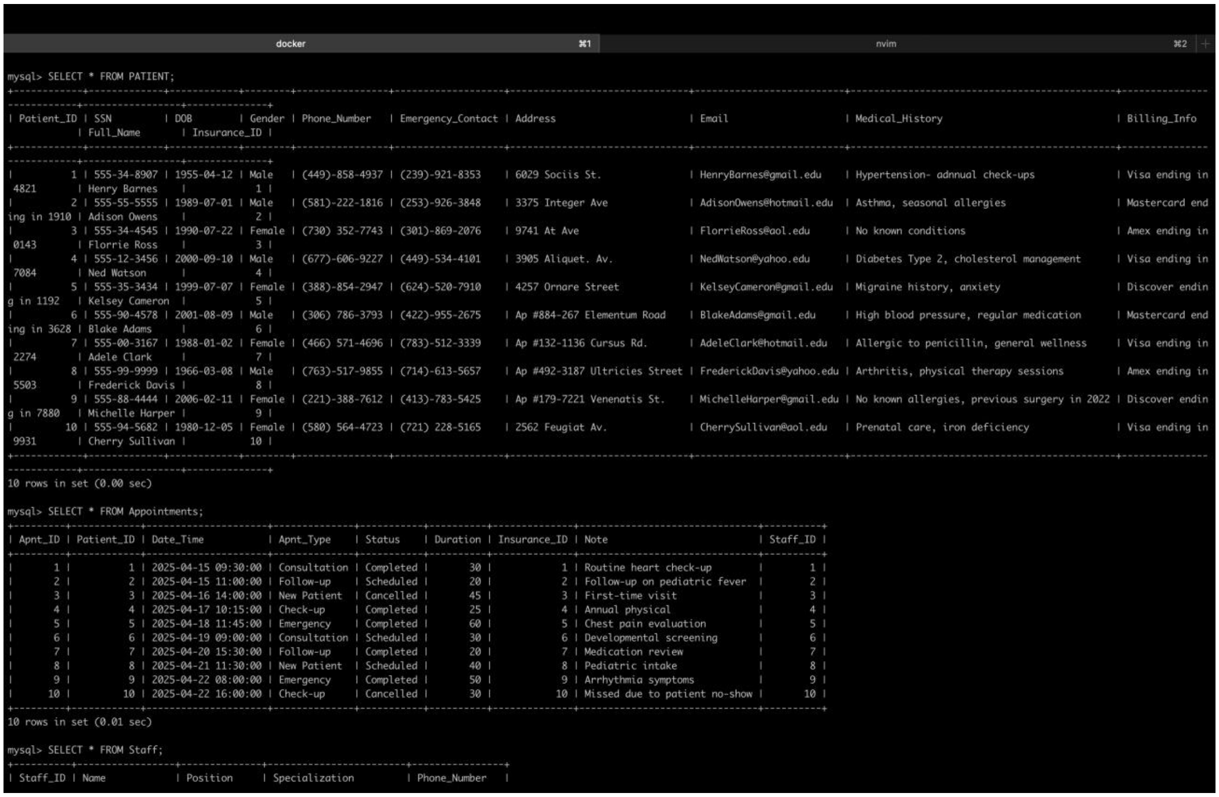
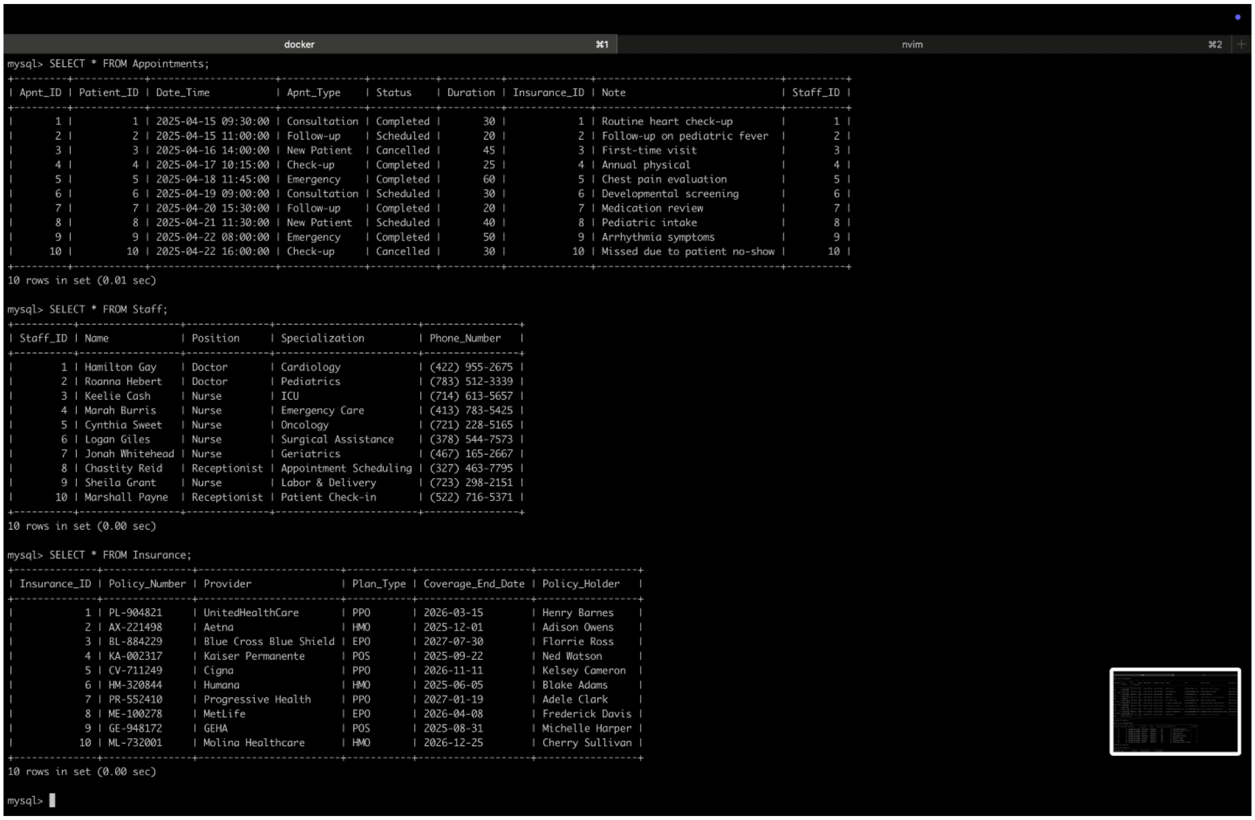



```
mysql> SELECT * FROM PATIENT;
+------------+-------------+------------+--------+----------------+-------------------+--------------------------------+---------------------------+----------------------------------------------+-------------
-----------+------------------+--------------+
| Patient_ID | SSN         | DOB        | Gender | Phone_Number   | Emergency_Contact | Address                        | Email                     | Medical_History                              | Billing_Info
           | Full_Name        | Insurance_ID |
+------------+-------------+------------+--------+----------------+-------------------+--------------------------------+---------------------------+----------------------------------------------+-------------
-----------+------------------+--------------+
|          1 | 555-34-8907 | 1955-04-12 | Male   | (449)-858-4937 | (239)-921-8353    | 6029 Sociis St.                | HenryBarnes@gmail.edu     | Hypertension- adnnual check-ups              | Visa ending in
 4821      | Henry Barnes     |            1 |
|          2 | 555-55-5555 | 1989-07-01 | Male   | (581)-222-1816 | (253)-926-3848    | 3375 Integer Ave               | AdisonOwens@hotmail.edu   | Asthma, seasonal allergies                   | Mastercard end
ing in 1910 | Adison Owens     |            2 |
|          3 | 555-34-4545 | 1990-07-22 | Female | (730) 352-7743 | (301)-869-2076    | 9741 At Ave                    | FlorrieRoss@aol.edu       | No known conditions                          | Amex ending in
 0143      | Florrie Ross     |            3 |
|          4 | 555-12-3456 | 2000-09-10 | Male   | (677)-606-9227 | (449)-534-4101    | 3905 Aliquet. Av.              | NedWatson@yahoo.edu       | Diabetes Type 2, cholesterol management      | Visa ending in
 7084      | Ned Watson       |            4 |
|          5 | 555-35-3434 | 1999-07-07 | Female | (388)-854-2947 | (624)-520-7910    | 4257 Ornare Street             | KelseyCameron@gmail.edu   | Migraine history, anxiety                    | Discover endin
g in 1192  | Kelsey Cameron   |            5 |
|          6 | 555-90-4578 | 2001-08-09 | Male   | (306) 786-3793 | (422)-955-2675    | Ap #884-267 Elementum Road     | BlakeAdams@gmail.edu      | High blood pressure, regular medication      | Mastercard end
ing in 3628 | Blake Adams      |            6 |
|          7 | 555-00-3167 | 1988-01-02 | Female | (466) 571-4696 | (783)-512-3339    | Ap #132-1136 Cursus Rd.        | AdeleClark@hotmail.edu    | Allergic to penicillin, general wellness     | Visa ending in
 2274      | Adele Clark      |            7 |
|          8 | 555-99-9999 | 1966-03-08 | Male   | (763)-517-9855 | (714)-613-5657    | Ap #492-3187 Ultricies Street  | FrederickDavis@yahoo.edu  | Arthritis, physical therapy sessions         | Amex ending in
 5503      | Frederick Davis  |            8 |
|          9 | 555-88-4444 | 2006-02-11 | Female | (221)-388-7612 | (413)-783-5425    | Ap #179-7221 Venenatis St.     | MichelleHarper@gmail.edu  | No known allergies, previous surgery in 2022 | Discover endin
g in 7880  | Michelle Harper  |            9 |
|         10 | 555-94-5682 | 1980-12-05 | Female | (580) 564-4723 | (721) 228-5165    | 2562 Feugiat Av.               | CherrySullivan@aol.edu    | Prenatal care, iron deficiency               | Visa ending in
 9931      | Cherry Sullivan  |           10 |
+------------+-------------+------------+--------+----------------+-------------------+--------------------------------+---------------------------+----------------------------------------------+-------------
-----------+------------------+--------------+
10 rows in set (0.00 sec)

mysql> SELECT * FROM Appointments;
+---------+------------+---------------------+--------------+-----------+----------+--------------+------------------------------+----------+
| Apnt_ID | Patient_ID | Date_Time           | Apnt_Type    | Status    | Duration | Insurance_ID | Note                         | Staff_ID |
+---------+------------+---------------------+--------------+-----------+----------+--------------+------------------------------+----------+
|       1 |          1 | 2025-04-15 09:30:00 | Consultation | Completed |       30 |            1 | Routine heart check-up       |        1 |
|       2 |          2 | 2025-04-15 11:00:00 | Follow-up    | Scheduled |       20 |            2 | Follow-up on pediatric fever |        2 |
|       3 |          3 | 2025-04-16 14:00:00 | New Patient  | Cancelled |       45 |            3 | First-time visit             |        3 |
|       4 |          4 | 2025-04-17 10:15:00 | Check-up     | Completed |       25 |            4 | Annual physical              |        4 |
|       5 |          5 | 2025-04-18 11:45:00 | Emergency    | Completed |       60 |            5 | Chest pain evaluation        |        5 |
|       6 |          6 | 2025-04-19 09:00:00 | Consultation | Scheduled |       30 |            6 | Developmental screening      |        6 |
|       7 |          7 | 2025-04-20 15:30:00 | Follow-up    | Completed |       20 |            7 | Medication review            |        7 |
|       8 |          8 | 2025-04-21 11:30:00 | New Patient  | Scheduled |       40 |            8 | Pediatric intake             |        8 |
|       9 |          9 | 2025-04-22 08:00:00 | Emergency    | Completed |       50 |            9 | Arrhythmia symptoms          |        9 |
|      10 |         10 | 2025-04-22 16:00:00 | Check-up     | Cancelled |       30 |           10 | Missed due to patient no-show |       10 |
+---------+------------+---------------------+--------------+-----------+----------+--------------+------------------------------+----------+
10 rows in set (0.01 sec)

mysql> SELECT * FROM Staff;
+----------+-----------------+--------------+------------------------+----------------+
| Staff_ID | Name            | Position     | Specialization         | Phone_Number   |
```



```
mysql> SELECT * FROM Appointments;
+---------+------------+---------------------+--------------+-----------+----------+--------------+-------------------------------+----------+
| Apnt_ID | Patient_ID | Date_Time           | Apnt_Type    | Status    | Duration | Insurance_ID | Note                          | Staff_ID |
+---------+------------+---------------------+--------------+-----------+----------+--------------+-------------------------------+----------+
|       1 |          1 | 2025-04-15 09:30:00 | Consultation | Completed |       30 |            1 | Routine heart check-up        |        1 |
|       2 |          2 | 2025-04-15 11:00:00 | Follow-up    | Scheduled |       20 |            2 | Follow-up on pediatric fever  |        2 |
|       3 |          3 | 2025-04-16 14:00:00 | New Patient  | Cancelled |       45 |            3 | First-time visit              |        3 |
|       4 |          4 | 2025-04-17 10:15:00 | Check-up     | Completed |       25 |            4 | Annual physical               |        4 |
|       5 |          5 | 2025-04-18 11:45:00 | Emergency    | Completed |       60 |            5 | Chest pain evaluation         |        5 |
|       6 |          6 | 2025-04-19 09:00:00 | Consultation | Scheduled |       30 |            6 | Developmental screening       |        6 |
|       7 |          7 | 2025-04-20 15:30:00 | Follow-up    | Completed |       20 |            7 | Medication review             |        7 |
|       8 |          8 | 2025-04-21 11:30:00 | New Patient  | Scheduled |       40 |            8 | Pediatric intake              |        8 |
|       9 |          9 | 2025-04-22 08:00:00 | Emergency    | Completed |       50 |            9 | Arrhythmia symptoms           |        9 |
|      10 |         10 | 2025-04-22 16:00:00 | Check-up     | Cancelled |       30 |           10 | Missed due to patient no-show |       10 |
+---------+------------+---------------------+--------------+-----------+----------+--------------+-------------------------------+----------+
10 rows in set (0.01 sec)

mysql> SELECT * FROM Staff;
+----------+-----------------+--------------+------------------------+----------------+
| Staff_ID | Name            | Position     | Specialization         | Phone_Number   |
+----------+-----------------+--------------+------------------------+----------------+
|        1 | Hamilton Gay    | Doctor       | Cardiology             | (422) 955-2675 |
|        2 | Roanna Hebert   | Doctor       | Pediatrics             | (783) 512-3339 |
|        3 | Keelie Cash     | Nurse        | ICU                    | (714) 613-5657 |
|        4 | Marah Burris    | Nurse        | Emergency Care         | (413) 783-5425 |
|        5 | Cynthia Sweet   | Nurse        | Oncology               | (721) 228-5165 |
|        6 | Logan Giles     | Nurse        | Surgical Assistance    | (378) 544-7573 |
|        7 | Jonah Whitehead | Nurse        | Geriatrics             | (467) 165-2667 |
|        8 | Chastity Reid   | Receptionist | Appointment Scheduling | (327) 463-7795 |
|        9 | Sheila Grant    | Nurse        | Labor & Delivery       | (723) 298-2151 |
|       10 | Marshall Payne  | Receptionist | Patient Check-in       | (522) 716-5371 |
+----------+-----------------+--------------+------------------------+----------------+
10 rows in set (0.00 sec)

mysql> SELECT * FROM Insurance;
+--------------+---------------+-------------------------+-----------+-------------------+-----------------+
| Insurance_ID | Policy_Number | Provider                | Plan_Type | Coverage_End_Date | Policy_Holder   |
+--------------+---------------+-------------------------+-----------+-------------------+-----------------+
|            1 | PL-904821     | UnitedHealthCare        | PPO       | 2026-03-15        | Henry Barnes    |
|            2 | AX-221498     | Aetna                   | HMO       | 2025-12-01        | Adison Owens    |
|            3 | BL-884229     | Blue Cross Blue Shield  | EPO       | 2027-07-30        | Florrie Ross    |
|            4 | KA-002317     | Kaiser Permanente       | POS       | 2025-09-22        | Ned Watson      |
|            5 | CV-711249     | Cigna                   | PPO       | 2026-11-11        | Kelsey Cameron  |
|            6 | HM-320844     | Humana                  | HMO       | 2025-06-05        | Blake Adams     |
|            7 | PR-552410     | Progressive Health      | PPO       | 2027-01-19        | Adele Clark     |
|            8 | ME-100278     | MetLife                 | EPO       | 2026-04-08        | Frederick Davis |
|            9 | GE-948172     | GEHA                    | POS       | 2025-08-31        | Michelle Harper |
|           10 | ML-732001     | Molina Healthcare       | HMO       | 2026-12-25        | Cherry Sullivan |
+--------------+---------------+-------------------------+-----------+-------------------+-----------------+
10 rows in set (0.00 sec)

mysql> █
```

These images prove that create.sql and load.sql function on a mysql server environment to load the tables with data obtained from .csv files located in the /home/ directory. All files, .sql and .csv, must were located in the same directory when they were executed.

While the syntax for MySQL was quite straightforward for our little app, I did have some trouble sanitizing input. Because our .csv files were generated by hand, there were a few inconsistencies and mistakes in comma separation or datatyping that had to be resolved. As my (Eva B) comments show in create.sql, we need to be mindful when accepting user input to ensure that data which is valid for our chosen typing, but which is not in the correct format, is prevented. As of now this is not handled at the database layer, but I (Eva B) propose it will handled be at the API layer. CRUD operations should deny valid typed input if it does not conform to our chosen representational formatting. The simplest example is not allowing scheduled appointments to be in increments unevenly divisible by 15-minute increments. We use an int type, so it is possible to schedule appointments in odd minute intervals smaller that 15 minutes, but that is both not useful, and messy.