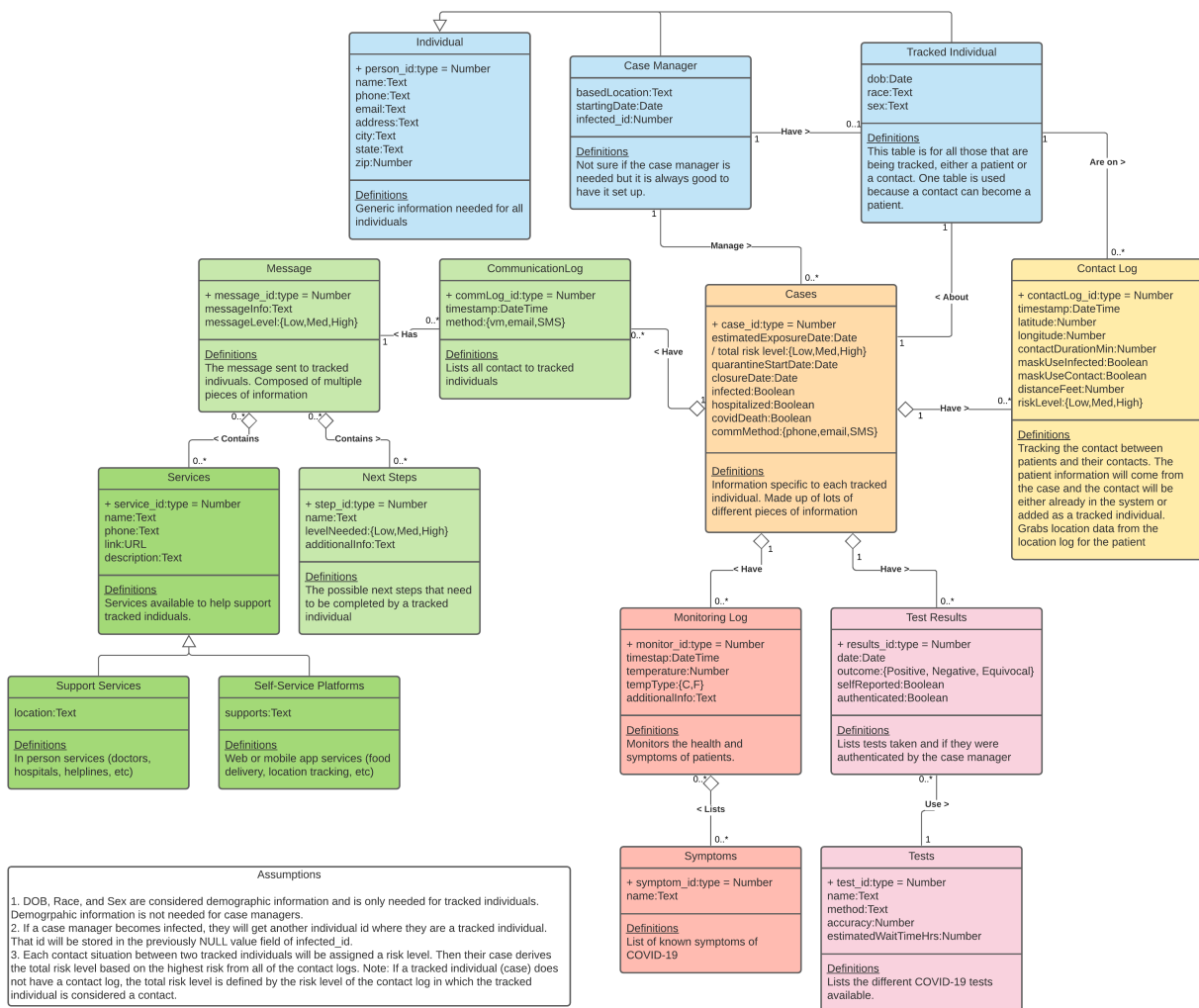# CS5200 Fall 2020: Practicum 1

## Chandra Davis, Evan Douglass

The steps we completed for Practicum 1 are detailed below. Please note that there are links to each image that requires it in each section. We decided to focus our attention on the case management aspect of the contract tracing problem.

## Conceptual Model: UML

View the conceptual model in Lucid Chart here:
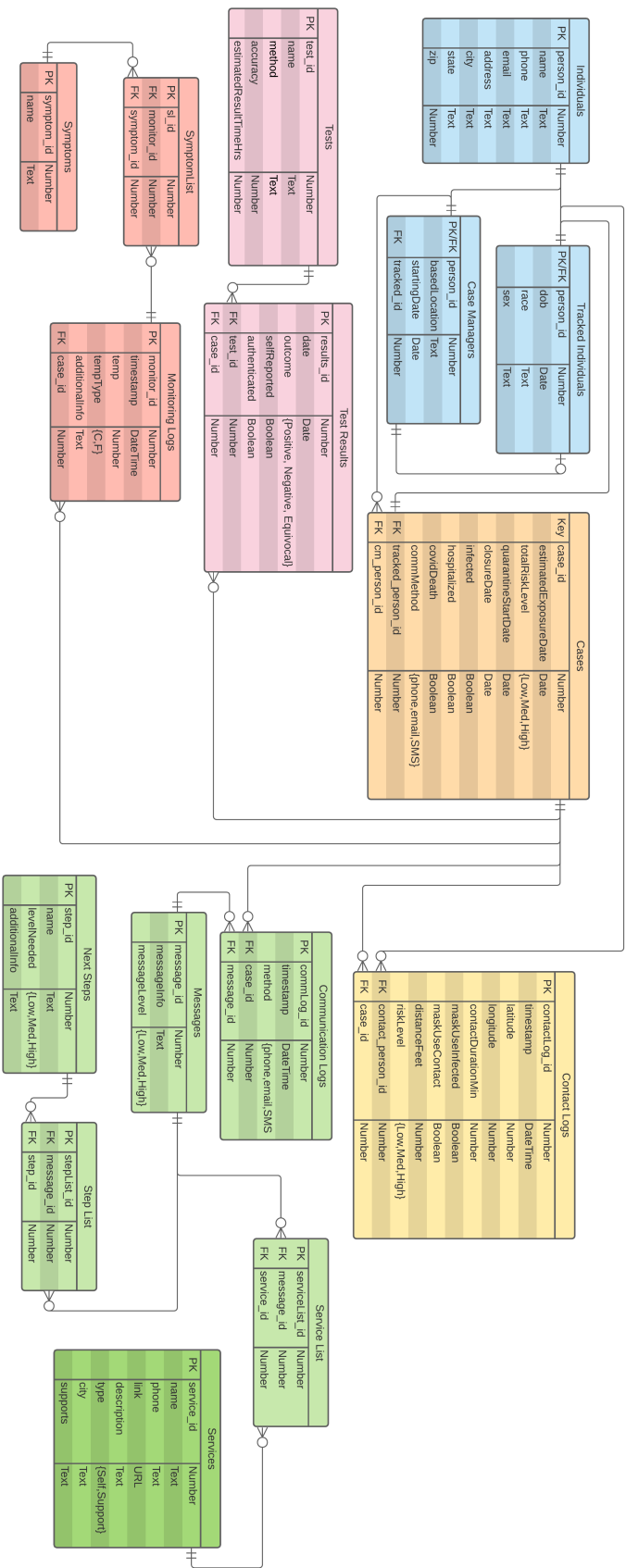
https://app.lucidchart.com/invitations/accept/5602312e-dfc3-4423-975c-47190ce6022e

## Logical Model: ERD

View the logical model in Lucid Chart here:

https://app.lucidchart.com/invitations/accept/7b497cbf-268d-4a03-b1a7-822b5a844fea

**Entity-Relationship Diagram**

**Individuals**
| PK | person_id | Number |
|---|---|---|
| | name | Text |
| | phone | Text |
| | email | Text |
| | address | Text |
| | city | Text |
| | state | Text |
| | zip | Number |

**Tracked Individuals**
| PK/FK | person_id | Number |
|---|---|---|
| | dob | Date |
| | race | Text |
| | sex | Text |

**Case Managers**
| PK/FK | person_id | Number |
|---|---|---|
| | basedLocation | Text |
| | startingDate | Date |
| FK | tracked_id | Number |

**Tests**
| PK | test_id | Number |
|---|---|---|
| | name | Text |
| | method | Text |
| | accuracy | Number |
| | estimatedResultTimeHrs | Number |

**SymptomList**
| PK | sl_id | Number |
|---|---|---|
| FK | monitor_id | Number |
| FK | symptom_id | Number |

**Symptoms**
| PK | symptom_id | Number |
|---|---|---|
| | name | Text |

**Test Results**
| PK | results_id | Number |
|---|---|---|
| | date | Date |
| | outcome | {Positive, Negative, Equivocal} |
| | selfReported | Boolean |
| | authenticated | Boolean |
| FK | test_id | Number |
| FK | case_id | Number |

**Monitoring Logs**
| PK | monitor_id | Number |
|---|---|---|
| | timestamp | DateTime |
| | temp | Number |
| | tempType | (C,F) |
| | additionalInfo | Text |
| FK | case_id | Number |

**Cases**
| Key | case_id | Number |
|---|---|---|
| | estimatedExposureDate | Date |
| | totalRiskLevel | {Low,Med,High} |
| | quarantineStartDate | Date |
| | closureDate | Date |
| | infected | Boolean |
| | hospitalized | Boolean |
| | covidDeath | Boolean |
| | commMethod | {phone,email,SMS} |
| FK | tracked_person_id | Number |
| FK | cm_person_id | Number |

**Contact Logs**
| PK | contactLog_id | Number |
|---|---|---|
| | timestamp | DateTime |
| | latitude | Number |
| | longitude | Number |
| | contactDurationMin | Number |
| | maskUseInfected | Boolean |
| | maskUseContact | Boolean |
| | distanceFeet | Number |
| | riskLevel | {Low,Med,High} |
| FK | contact_person_id | Number |
| FK | case_id | Number |

**Communication Logs**
| PK | commLog_id | Number |
|---|---|---|
| | timestamp | DateTime |
| | method | {phone,email,SMS} |
| FK | case_id | Number |
| FK | message_id | Number |

**Messages**
| PK | message_id | Number |
|---|---|---|
| | messageInfo | Text |
| | messageLevel | {Low,Med,High} |

**Next Steps**
| PK | step_id | Number |
|---|---|---|
| | name | Text |
| | levelNeeded | {Low,Med,High} |
| | additionalInfo | Text |

**Step List**
| PK | stepList_id | Number |
|---|---|---|
| FK | message_id | Number |
| FK | step_id | Number |

**Service List**
| PK | serviceList_id | Number |
|---|---|---|
| FK | message_id | Number |
| FK | service_id | Number |

**Services**
| PK | service_id | Number |
|---|---|---|
| | name | Text |
| | phone | Text |
| | link | URL |
| | description | Text |
| | type | Text |
| | city | Text |
| | supports | {Self,Support} |

## Schema

View the schema in Google Docs here:

https://docs.google.com/document/d/1o8pk51aed3BJSaBcwO2EMbT8I3ru_wpGTcTN4W-DbIM/edit?usp=sharing

Individuals(person_id: Number, name: Text, phone: Text, email: Text, address: Text, city: Text, state: Text, zip: Number)

TrackedIndividuals(person_id: Number, dob: Date, race: Text, sex: Text)

CaseManagers(person_id: Number, basedCity: Text, basedState: Text, startingDate: Date, infected_id: Number)

Tests(test_id: Number, name: Text, method: Text, accuracy: Number, estimatedResultTimeHrs: Number)

TestResults(results_id: Number, date: Date, outcome: {Positive, Negative, Equivocal}, selfReported: Boolean, authenticated: Boolean, test_id: Number, case_id: Number)

MonitoringLogs(monitor_id: Number, timestamp: DateTime, temp: Number, tempType: {C, F}, additionalInfo: Text, case_id: Number)

SymptomList(sl_id: Number, monitor_id: Number, symptom_id: Number)

Symptoms(symptom_id: Number, name: Text)

Cases(case_id: Number, estimatedExposureDate: Date, totalRiskLevel: {Low, Med, High}, quarantineStartDate: Date, closureDate: Date, infected: Boolean, hospitalized: Boolean, covidDeath: Boolean, commMethod: {phone, email, SMS}, cm_person_id: Number, infected_person_id: Number)

ContactLogs(contactLog_id: Number, timestamp: DateTime, latitude: Number, longitude: Number, contactDurationMin: Number, maskUseInfected: Boolean, maskUseContact: Boolean, distanceFeet: Number, riskLevel: {Low, Med, High}, contact_person_id: Number, case_id: Number)

CommunicationLogs(commLog_id: Number, timestamp: DateTime, method: {phone, email, SMS}, case_id: Number, message_id: Number)

Messages(message_id: Number, messageLevel: {Low, Med, High}, messageInfo: Text)

StepList(stepList_id: Number, message_id: Number, step_id: Number)

NextSteps(step_id: Number, name: Text, levelNeeded: {Low, Med, High}, additionalInfo: Text)

ServiceList(serviceList_id: Number, message_id: Number, service_id: Number)

Services(service_id: Number, name: Text, phone: Text, link: Text, description: Text, type: {Self, Support}, city: Text, supports: Text)
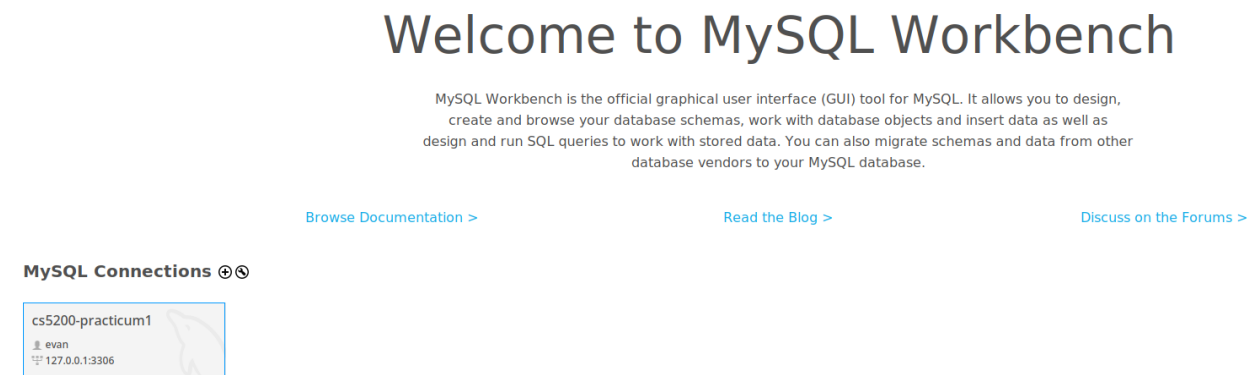
## Creating Database Tables

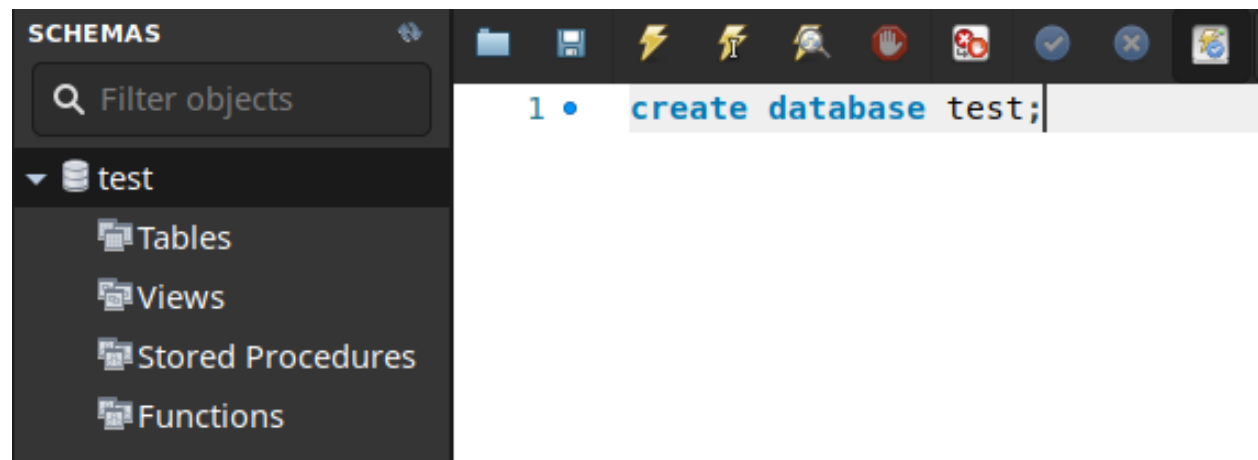Should you wish to inspect the scripts that create the database and populate data, they can be found at:

https://github.com/eldss-classwork/databases-practicum1-scripts

The following images will show a progression from an empty database through table creation in MySQL Workbench.

The MySQL Workbench start screen.
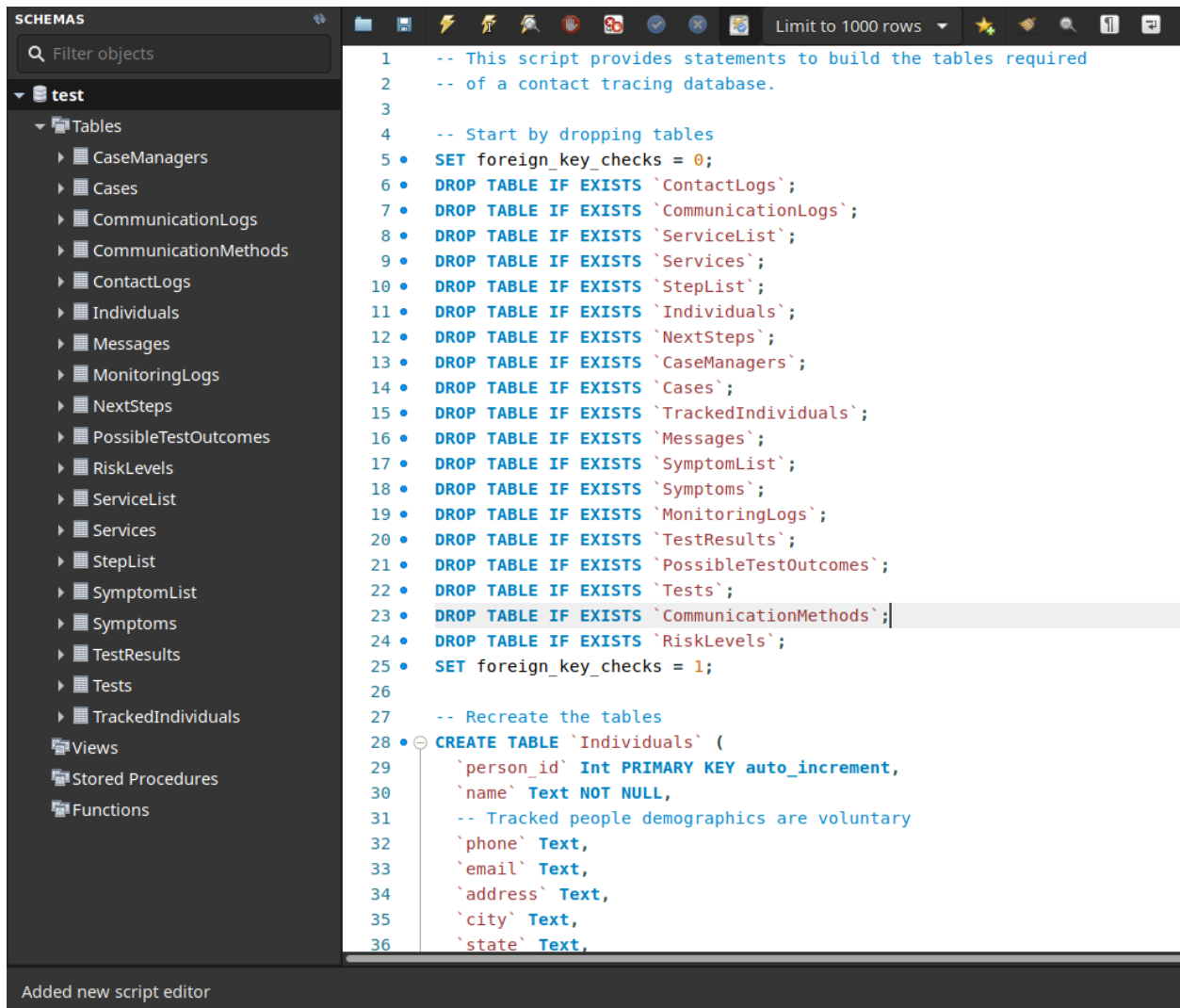
# Welcome to MySQL Workbench

MySQL Workbench is the official graphical user interface (GUI) tool for MySQL. It allows you to design, create and browse your database schemas, work with database objects and insert data as well as design and run SQL queries to work with stored data. You can also migrate schemas and data from other database vendors to your MySQL database.

Browse Documentation >                Read the Blog >                Discuss on the Forums >

**MySQL Connections** ⊕ ⊘

cs5200-practicum1
👤 evan
📶 127.0.0.1:3306

The newly created, empty `test` database.

**SCHEMAS**

Q Filter objects

▼ 🗐 test
  📊 Tables
  📊 Views
  📊 Stored Procedures
  📊 Functions

1 ● create database test;

The `test` database after table creation.

```
1    -- This script provides statements to build the tables required
2    -- of a contact tracing database.
3
4    -- Start by dropping tables
5  • SET foreign_key_checks = 0;
6  • DROP TABLE IF EXISTS `ContactLogs`;
7  • DROP TABLE IF EXISTS `CommunicationLogs`;
8  • DROP TABLE IF EXISTS `ServiceList`;
9  • DROP TABLE IF EXISTS `Services`;
10 • DROP TABLE IF EXISTS `StepList`;
11 • DROP TABLE IF EXISTS `Individuals`;
12 • DROP TABLE IF EXISTS `NextSteps`;
13 • DROP TABLE IF EXISTS `CaseManagers`;
14 • DROP TABLE IF EXISTS `Cases`;
15 • DROP TABLE IF EXISTS `TrackedIndividuals`;
16 • DROP TABLE IF EXISTS `Messages`;
17 • DROP TABLE IF EXISTS `SymptomList`;
18 • DROP TABLE IF EXISTS `Symptoms`;
19 • DROP TABLE IF EXISTS `MonitoringLogs`;
20 • DROP TABLE IF EXISTS `TestResults`;
21 • DROP TABLE IF EXISTS `PossibleTestOutcomes`;
22 • DROP TABLE IF EXISTS `Tests`;
23 • DROP TABLE IF EXISTS `CommunicationMethods`;
24 • DROP TABLE IF EXISTS `RiskLevels`;
25 • SET foreign_key_checks = 1;
26
27   -- Recreate the tables
28 •⊖ CREATE TABLE `Individuals` (
29     `person_id` Int PRIMARY KEY auto_increment,
30     `name` Text NOT NULL,
31     -- Tracked people demographics are voluntary
32     `phone` Text,
33     `email` Text,
34     `address` Text,
35     `city` Text,
36     `state` Text,
```

The following photos provide a detailed look at the schema of each table as it was created in MySQL.

```
1       DESCRIBE CaseManagers;
```



| # | Field | Type | Null | Key | Default | Extra |
|---|---|---|---|---|---|---|
| 1 | person_id | int(11) | NO | PRI | NULL | |
| 2 | basedCity | text | NO | | NULL | |
| 3 | basedState | text | NO | | NULL | |
| 4 | startingDate | date | NO | | NULL | |
| 5 | infected_id | int(11) | YES | UNI | NULL | |

```
1    DESCRIBE Cases;
```

| # | Field | Type | Null | Key | Default | Extra |
|---|-------|------|------|-----|---------|-------|
| 1 | estimatedExposureDate | date | NO | | NULL | |
| 2 | quarantineStartDate | date | YES | | NULL | |
| 3 | closureDate | date | YES | | NULL | |
| 4 | case_id | int(11) | NO | PRI | NULL | auto_increment |
| 5 | totalRiskLevel_id | int(11) | NO | MUL | NULL | |
| 6 | commMethod_id | int(11) | NO | MUL | NULL | |
| 7 | cm_person_id | int(11) | NO | MUL | NULL | |
| 8 | tracked_person_id | int(11) | NO | UNI | NULL | |
| 9 | infected | tinyint(1) | YES | | 0 | |
| 10 | hospitalized | tinyint(1) | YES | | 0 | |
| 11 | covidDeath | tinyint(1) | YES | | 0 | |

```
1    DESCRIBE CommunicationLogs;
```

| # | Field | Type | Null | Key | Default | Extra |
|---|-------|------|------|-----|---------|-------|
| 1 | commLog_id | int(11) | NO | PRI | NULL | auto_increment |
| 2 | timestamp | datetime | NO | | NULL | |
| 3 | method_id | int(11) | NO | MUL | NULL | |
| 4 | case_id | int(11) | NO | MUL | NULL | |
| 5 | message_id | int(11) | NO | MUL | NULL | |

```
1    DESCRIBE CommunicationMethods;
```

| # | Field | Type | Null | Key | Default | Extra |
|---|-------|------|------|-----|---------|-------|
| 1 | commMethod_id | int(11) | NO | PRI | NULL | auto_increment |
| 2 | commMethod | text | NO | UNI | NULL | |

```
1     DESCRIBE ContactLogs;
```

| # | Field | Type | Null | Key | Default | Extra |
|---|-------|------|------|-----|---------|-------|
| 1 | contactLog_id | int(11) | NO | PRI | NULL | auto_increment |
| 2 | timestamp | datetime | NO | | NULL | |
| 3 | latitude | decimal... | NO | | NULL | |
| 4 | longitude | decimal... | NO | | NULL | |
| 5 | contactDurationMin | int(11) | NO | | NULL | |
| 6 | maskUseInfected | tinyint(1) | NO | | NULL | |
| 7 | maskUseContact | tinyint(1) | NO | | NULL | |
| 8 | distanceFeet | int(11) | NO | | NULL | |
| 9 | risk_id | int(11) | NO | MUL | NULL | |
| 10 | contact_person_id | int(11) | NO | MUL | NULL | |
| 11 | case_id | int(11) | NO | MUL | NULL | |

```
1     DESCRIBE Individuals;
```

| # | Field | Type | Null | Key | Default | Extra |
|---|-------|------|------|-----|---------|-------|
| 1 | person_id | int(11) | NO | PRI | NULL | auto_increment |
| 2 | name | text | NO | | NULL | |
| 3 | phone | text | YES | | NULL | |
| 4 | email | text | YES | | NULL | |
| 5 | address | text | YES | | NULL | |
| 6 | city | text | YES | | NULL | |
| 7 | state | text | YES | | NULL | |
| 8 | zip | int(11) | YES | | NULL | |

```
1    DESCRIBE Messages;
```

| # | Field | Type | Null | Key | Default | Extra |
|---|-------|------|------|-----|---------|-------|
| 1 | message_id | int(11) | NO | PRI | NULL | auto_increment |
| 2 | messageLevel_id | int(11) | NO | MUL | NULL | |
| 3 | messageInfo | text | NO | | NULL | |

```
1    DESCRIBE MonitoringLogs;
```

| # | Field | Type | Null | Key | Default | Extra |
|---|-------|------|------|-----|---------|-------|
| 1 | monitor_id | int(11) | NO | PRI | NULL | auto_increment |
| 2 | timestamp | datetime | NO | | NULL | |
| 3 | temp | decimal... | NO | | NULL | |
| 4 | tempType | text | NO | | NULL | |
| 5 | additionalInfo | text | YES | | NULL | |
| 6 | case_id | int(11) | NO | MUL | NULL | |

```
1    DESCRIBE NextSteps;
```

| # | Field | Type | Null | Key | Default | Extra |
|---|-------|------|------|-----|---------|-------|
| 1 | step_id | int(11) | NO | PRI | NULL | auto_increment |
| 2 | name | text | NO | | NULL | |
| 3 | levelNeeded_id | int(11) | NO | MUL | NULL | |
| 4 | additionalInfo | text | NO | | NULL | |

```
1    DESCRIBE PossibleTestOutcomes;
```

| # | Field | Type | Null | Key | Default | Extra |
|---|-------|------|------|-----|---------|-------|
| 1 | outcome_id | int(11) | NO | PRI | NULL | auto_increment |
| 2 | outcome | text | NO | | NULL | |

9

```
1    DESCRIBE RiskLevels;
```

| # | Field | Type | Null | Key | Default | Extra |
|---|-------|------|------|-----|---------|-------|
| 1 | risk_id | int(11) | NO | PRI | NULL | auto_increment |
| 2 | risk | text | NO | UNI | NULL | |

```
1    DESCRIBE ServiceList;
```

| # | Field | Type | Null | Key | Default | Extra |
|---|-------|------|------|-----|---------|-------|
| 1 | serviceList_id | int(11) | NO | PRI | NULL | auto_increment |
| 2 | message_id | int(11) | NO | MUL | NULL | |
| 3 | service_id | int(11) | NO | MUL | NULL | |

```
1    DESCRIBE Services;
```

| # | Field | Type | Null | Key | Default | Extra |
|---|-------|------|------|-----|---------|-------|
| 1 | service_id | int(11) | NO | PRI | NULL | auto_increment |
| 2 | name | text | NO | | NULL | |
| 3 | phone | text | NO | | NULL | |
| 4 | link | text | NO | | NULL | |
| 5 | description | text | NO | | NULL | |
| 6 | type | text | NO | | NULL | |
| 7 | city | text | NO | | NULL | |
| 8 | supports | text | NO | | NULL | |

```
1    DESCRIBE StepList;
```

| # | Field | Type | Null | Key | Default | Extra |
|---|-------|------|------|-----|---------|-------|
| 1 | stepList_id | int(11) | NO | PRI | NULL | auto_increment |
| 2 | message_id | int(11) | NO | MUL | NULL | |
| 3 | step_id | int(11) | NO | MUL | NULL | |

```
1    DESCRIBE SymptomList;
```

| # | Field | Type | Null | Key | Default | Extra |
|---|---|---|---|---|---|---|
| 1 | sl_id | int(11) | NO | PRI | NULL | auto_increment |
| 2 | monitor_id | int(11) | NO | MUL | NULL | |
| 3 | symptom_id | int(11) | NO | MUL | NULL | |

```
1    DESCRIBE Symptoms;
```

| # | Field | Type | Null | Key | Default | Extra |
|---|---|---|---|---|---|---|
| 1 | symptom_id | int(11) | NO | PRI | NULL | auto_increment |
| 2 | name | text | NO | | NULL | |

```
1    DESCRIBE TestResults;
```

| # | Field | Type | Null | Key | Default | Extra |
|---|---|---|---|---|---|---|
| 1 | results_id | int(11) | NO | PRI | NULL | auto_increment |
| 2 | date | date | NO | | NULL | |
| 3 | outcome_id | int(11) | NO | MUL | NULL | |
| 4 | selfReported | tinyint(1) | NO | | NULL | |
| 5 | authenticated | tinyint(1) | NO | | 0 | |
| 6 | test_id | int(11) | NO | MUL | NULL | |
| 7 | case_id | int(11) | NO | MUL | NULL | |

```
1    DESCRIBE Tests;
```

| # | Field | Type | Null | Key | Default | Extra |
|---|---|---|---|---|---|---|
| 1 | test_id | int(11) | NO | PRI | NULL | auto_increment |
| 2 | name | text | NO | UNI | NULL | |
| 3 | method | text | NO | | NULL | |
| 4 | accuracy | decimal... | NO | | NULL | |
| 5 | estimatedResultTimeHrs | int(11) | NO | | NULL | |

```
1    DESCRIBE TrackedIndividuals;
```

| # | Field | Type | Null | Key | Default | Extra |
|---|-------|------|------|-----|---------|-------|
| 1 | person_id | int(11) | NO | PRI | NULL | |
| 2 | dob | date | YES | | NULL | |
| 3 | race | text | YES | | NULL | |
| 4 | sex | text | YES | | NULL | |

**Populating The Database**

**Queries**