


Course Title:	Fundamentals of Data Engineering
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<i>Assignment/Lab Number:</i>	4
<i>Assignment/Lab Title:</i>	Database Design

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*By signing above you attest that you have contributed to this written lab report and confirm that all work you have contributed to this lab report

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Entity Relationship Diagram

SQLite Dump

```
PRAGMA foreign_keys=OFF;
BEGIN TRANSACTION;
CREATE TABLE Hotel (
    HotelCode INTEGER PRIMARY KEY,
    Name TEXT,
    Address TEXT,
    Postcode TEXT,
    City TEXT,
    Country TEXT,
    NumRooms INTEGER,
    DeskPhone TEXT,
    ManagementPhone TEXT,
    StaffCount INTEGER,
    EstablishmentDate DATE
);
INSERT INTO Hotel VALUES(1,'Germantown Hotel','4944 Germantown Ave, Philadelphia, Pennsylvania, United States','PA 19144','Philadelphia','USA',345,'+12673686167',NULL,NULL,NULL);
INSERT INTO Hotel VALUES(2,'Weston Hotel','874-A Weston Rd, York, ON','M6N 3R6','York','Canada',455,'+14162435320',NULL,NULL,NULL);
INSERT INTO Hotel VALUES(3,'Scarborough Hotel','41 Lebovic Ave Unit A110, Scarborough, ON','M1L 0H2','Scarborough','Canada',277,'+14162859973',NULL,NULL,NULL);
INSERT INTO Hotel VALUES(4,'Ottawa Hotel','1172 Walkley Rd, Ottawa, ON','K1V 2P7','Ottawa','Canada',510,'+16135239600',NULL,NULL,NULL);
INSERT INTO Hotel VALUES(5,'London Hotel','2 Whitehall Ct, London, United Kingdom','SW1A 2EJ','London','United Kingdom',332,'+442075235062',NULL,NULL,NULL);
INSERT INTO Hotel VALUES(6,'Birmingham Hotel','4 Woodcock St, Birmingham, United Kingdom','B7 4BL','Birmingham','United Kingdom',510,'+441218206000',NULL,NULL,NULL);
INSERT INTO Hotel VALUES(7,'Leicester Hotel','19 Loughborough Rd, Leicester, United Kingdom','LE4 5LJ','Leicester','United Kingdom',82,'+441162682626',NULL,NULL,NULL);
INSERT INTO Hotel VALUES(8,'Makkah Hotel','4289, Al Hajlah, Makkah, Saudi Arabia','24231','Makkah','Saudi Arabia',602,'+966125768888',NULL,NULL,NULL);
```

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INSERT INTO Hotel VALUES(9,'Riyadh Hotel','JPRC+PF3, Omar Almukhtar St, Al
Amal, Riyadh, Saudi Arabia','11561','Riyadh','Saudi
Arabia',188,'+966114024121',NULL,NULL,NULL);
INSERT INTO Hotel VALUES(10,'Kuwait City Hotel','Mutlaq Abbas Munawir St,
Kuwait City, Kuwait','','Kuwait
City','Kuwait',734,'+96522262000',NULL,NULL,NULL);
INSERT INTO Hotel VALUES(11,'Sharjah Hotel','Al Mahatta - Al Qasimia -
Sharjah - United Arab Emirates','89XR+V9XA1','Sharjah','United Arab
Emirates',221,'+97165066222',NULL,NULL,NULL);
CREATE TABLE Staff (
    StaffID INTEGER PRIMARY KEY,
    HotelCode INTEGER,
    FirstName TEXT,
    LastName TEXT,
    DOB DATE,
    Gender TEXT,
    Email TEXT,
    Phone TEXT,
    Password TEXT,
    Position TEXT,
    Salary REAL,
    FOREIGN KEY (HotelCode) REFERENCES Hotel (HotelCode)
);
INSERT INTO Staff
VALUES(1,1,'Bethan','Ramirez',NULL,'M','bramirez@hotel.com',NULL,'$2b$12$r
7b.2pj7WfBm3JiHGQsQr.J96CRNoLUafwtCXdLiBW/diI64fCI.C',NULL,NULL);
INSERT INTO Staff
VALUES(2,1,'Eoin','Colon',NULL,'M','eoin.colon@hotel.com',NULL,'$2b$12$DnL
wxMa21nv5tIl/dldz7uUpLfWzPqYN4fk3ZmGTfU23yXTzOMVP6',NULL,NULL);
INSERT INTO Staff
VALUES(3,1,'Pablo','Rivers',NULL,'M','pablo.rivers@hotel.com',NULL,'$2b$12
$nyrSDwO1cSMd8VEt4tRhSe71ulmi7zSkFQMMTg/u4gILCFupDwYF6',NULL,NULL);
INSERT INTO Staff
VALUES(4,1,'Richard','Gilmore',NULL,'M','richard.gilmore@hotel.com',NULL,'
$2b$12$iMtAxDvhkThUugFNAs1erunaBi4l6zrb0IajY0tBp4e2VinNN3g1S',NULL,NULL);
INSERT INTO Staff
VALUES(5,1,'Zahraa','Woodward',NULL,'F','zwoodward@hotel.com',NULL,'$2b$12
$hQCcjv31Gantt.i4DzGLGOOkIMhEf8mo.SkLBjV3PFb4KSi9J2euu',NULL,NULL);
INSERT INTO Staff
VALUES(6,1,'Abigail','Rivera',NULL,'F','abigail.rivera@hotel.com',NULL,'$2
b$12$QnAMdbcx5YBotDfOcXZj8ujhVLwN4KTezSAmphfHTBuGLOZYnrLXG',NULL,NULL);

```

```

INSERT INTO Staff
VALUES(7,2,'Marco','Clements',NULL,'M','mclements@hotel.com',NULL,'$2b$12$
Drs/KX6XP/WIHTBfgazkeO5nqvKIbb/QzwS6IdZnKKydpCHRO9VSq',NULL,NULL);

INSERT INTO Staff
VALUES(8,2,'Teresa','Zamora',NULL,'F','tzamora@hotel.com',NULL,'$2b$12$z1O
BIUpcXbq.Y3Gs3j1oS0lwaquX1iAvbWf5koa4wjLEyRudRDJxK',NULL,NULL);

INSERT INTO Staff
VALUES(9,2,'Leanne','Davies',NULL,'F','ldavies@hotel.com',NULL,'$2b$12$7N8
.hEbaVha8da/lKOld6uLpPkal9biNjlUgent8.1LwrTr345v1W',NULL,NULL);

INSERT INTO Staff
VALUES(10,3,'Shakira','Luna',NULL,'F','shakira.luna@hotel.com',NULL,'$2b$1
2$iigjxuH.sGRfrtEI5xO3iepEYEk3r0gk1DtGtlSmeCMx3dcmZrWI.',NULL,NULL);

CREATE TABLE Room (
    RoomNo INT NOT NULL,
    HotelCode INTEGER NOT NULL,
    RoomType TEXT, PricePerNight REAL, NumBeds INTEGER,
    PRIMARY KEY (HotelCode, RoomNo)
    FOREIGN KEY (HotelCode) REFERENCES Hotel (HotelCode)
);

INSERT INTO Room VALUES(1,1,'Guest',81.9999999999999998,1);
INSERT INTO Room VALUES(2,1,'Guest',145.0,2);
INSERT INTO Room VALUES(3,1,'Guest',81.9999999999999998,1);
INSERT INTO Room VALUES(4,1,'Office',81.9999999999999998,1);
INSERT INTO Room VALUES(5,1,'Public',81.9999999999999998,1);
INSERT INTO Room VALUES(1,2,'Guest',81.9999999999999998,1);
INSERT INTO Room VALUES(2,2,'Guest',145.0,2);
INSERT INTO Room VALUES(3,2,'Guest',81.9999999999999998,1);
INSERT INTO Room VALUES(4,2,'Office',81.9999999999999998,1);
INSERT INTO Room VALUES(5,2,'Public',81.9999999999999998,1);

CREATE TABLE Guest (
    GuestID INTEGER PRIMARY KEY,
    FirstName TEXT NOT NULL,
    LastName TEXT NOT NULL,
    DOB DATE,
    Gender TEXT,
    Email TEXT NOT NULL,
    Password TEXT NOT NULL,
    Address TEXT,
    Phone TEXT
);

```

```

INSERT INTO Guest
VALUES(1,'Irene','Miles',NULL,'F','irene.miles@gmail.com','irenemiles',NULL,NULL);

INSERT INTO Guest
VALUES(2,'Phoebe','Mayer',NULL,'F','phoebe.mayer@gmail.com','phoebemayer',NULL,NULL);

INSERT INTO Guest
VALUES(3,'Cara','Leblanc',NULL,'F','cara.leblanc@gmail.com','caraleblanc',NULL,NULL);

INSERT INTO Guest
VALUES(4,'Bonnie','Webb',NULL,'F','bonnie.webb@gmail.com','bonniewebb',NULL,NULL);

INSERT INTO Guest
VALUES(5,'Earle','Khan',NULL,'M','earle.khan@gmail.com','earlekhan',NULL,NULL);

INSERT INTO Guest
VALUES(6,'Ruben','Reeves',NULL,'M','ruben.reeves@gmail.com','rubenreeves',NULL,NULL);

INSERT INTO Guest
VALUES(7,'Brian','Black',NULL,'M','brian.black@gmail.com','brianblack',NULL,NULL);

INSERT INTO Guest
VALUES(8,'Antoinette','Trujillo',NULL,'F','antoinette.trujillo@gmail.com','antoinettetrujillo',NULL,NULL);

INSERT INTO Guest
VALUES(9,'Kristina','Clements',NULL,'F','kristina.clements@gmail.com','kristinaclements',NULL,NULL);

INSERT INTO Guest
VALUES(10,'David','Oconner',NULL,'M','david.oconner@gmail.com','davidocconner',NULL,NULL);

CREATE TABLE Resource (
    ResourceID INTEGER PRIMARY KEY,
    HotelCode INTEGER NOT NULL,
    Name TEXT NOT NULL,
    Quantity TEXT,
    FOREIGN KEY (HotelCode) REFERENCES Hotel (HotelCode)
);

INSERT INTO Resource VALUES(1,1,'Bread','4');
INSERT INTO Resource VALUES(2,1,'Coffee','20');
INSERT INTO Resource VALUES(3,1,'Egg','120');
INSERT INTO Resource VALUES(4,1,'Lettuce','50');

```

```

INSERT INTO Resource VALUES (5,1,'Hand-soap','34');
INSERT INTO Resource VALUES (6,1,'Dish-soap','22');
INSERT INTO Resource VALUES (7,2,'Vacuum','12');
INSERT INTO Resource VALUES (8,2,'Pillow','40');
INSERT INTO Resource VALUES (9,3,'Bed-sheet','14');
INSERT INTO Resource VALUES (10,3,'Walkie-Talkie','15');
CREATE TABLE Expense (
    ExpenseID INTEGER PRIMARY KEY,
    HotelCode INTEGER NOT NULL,
    Name TEXT NOT NULL,
    Amount REAL NOT NULL,
    FOREIGN KEY (HotelCode) REFERENCES Hotel (HotelCode)
);
INSERT INTO Expense VALUES (1,1,'Resupply bread',50.0);
INSERT INTO Expense VALUES (2,1,'Resupply coffee',60.0);
INSERT INTO Expense VALUES (3,1,'Guest speaker event',150.0);
INSERT INTO Expense VALUES (4,2,'Resupply broom',24.0);
INSERT INTO Expense VALUES (5,2,'Resupply towel',70.0);
INSERT INTO Expense VALUES (6,2,'Resupply carrot',45.0);
INSERT INTO Expense VALUES (7,3,'Resupply bed
sheet',76.99999999999999);
INSERT INTO Expense VALUES (8,3,'Resupply back-up keys',12.0);
INSERT INTO Expense VALUES (9,3,'Resupply back-up monitors',400.0);
INSERT INTO Expense VALUES (10,3,'Cisco network testing service',120.0);
CREATE TABLE Booking (
    BookingID INTEGER PRIMARY KEY,
    HotelCode INTEGER NOT NULL,
    RoomNo INTEGER NOT NULL,
    GuestID INTEGER NOT NULL,
    BookingDateTime DATETIME NOT NULL,
    CheckinDateTime DATETIME NOT NULL,
    CheckoutDateTime DATETIME NOT NULL,
    NumAdults INTEGER NOT NULL,
    FOREIGN KEY (HotelCode) REFERENCES Hotel (HotelCode),
    FOREIGN KEY (RoomNo) REFERENCES Room (RoomNo),
    FOREIGN KEY (GuestID) REFERENCES Guest (GuestID)
);
INSERT INTO Booking VALUES (1,1,2,3,'2024-04-10 12:00:00','2024-05-01
14:00:00','2024-05-05 10:00:00',2);
INSERT INTO Booking VALUES (2,1,1,1,'2024-03-06 16:30:22','2024-03-06
16:30:22','2024-03-08 16:30:22',1);

```

```

INSERT INTO Booking VALUES(3,1,2,2,'2024-03-06 16:30:22','2024-03-06
16:30:22','2024-03-09 16:30:22',2);
INSERT INTO Booking VALUES(4,1,3,3,'2024-03-06 16:30:22','2024-03-06
16:30:22','2024-03-10 16:30:22',1);
INSERT INTO Booking VALUES(5,1,4,4,'2024-03-06 16:30:22','2024-03-06
16:30:22','2024-03-11 16:30:22',1);
INSERT INTO Booking VALUES(6,1,5,5,'2024-03-06 16:30:22','2024-03-06
16:30:22','2024-03-12 16:30:22',1);
INSERT INTO Booking VALUES(7,2,1,6,'2024-03-06 16:30:22','2024-03-06
16:30:22','2024-03-13 16:30:22',2);
INSERT INTO Booking VALUES(8,2,2,7,'2024-03-06 16:30:22','2024-03-06
16:30:22','2024-03-14 16:30:22',1);
INSERT INTO Booking VALUES(9,2,3,8,'2024-03-06 16:30:22','2024-03-06
16:30:22','2024-03-15 16:30:22',1);
INSERT INTO Booking VALUES(10,2,4,9,'2024-03-06 16:30:22','2024-03-06
16:30:22','2024-03-16 16:30:22',2);
INSERT INTO Booking VALUES(11,2,5,10,'2024-03-06 16:30:22','2024-03-06
16:30:22','2024-03-17 16:30:22',1);
CREATE TABLE Bill (
    InvoiceNum INTEGER PRIMARY KEY,
    BookingID INTEGER NOT NULL,
    Amount REAL NOT NULL,
    PaidDate DATE,
    PaymentMode TEXT,
    ExpireDate DATE NOT NULL,
    FOREIGN KEY (BookingID) REFERENCES Booking (BookingID)
);
INSERT INTO Bill VALUES(1,1,100.0,'2024-04-10','Debit','2024-04-15');
INSERT INTO Bill VALUES(2,2,150.0,'2024-04-10','Debit','2024-04-15');
INSERT INTO Bill VALUES(3,3,120.0,'2024-04-12','Debit','2024-04-17');
INSERT INTO Bill VALUES(4,4,80.0,'2024-04-10','Debit','2024-04-15');
INSERT INTO Bill VALUES(5,5,200.0,'2024-04-10','Debit','2024-04-15');
INSERT INTO Bill
VALUES(6,6,179.99999999999999,'2024-04-12','Debit','2024-04-17');
INSERT INTO Bill VALUES(7,7,90.0,'2024-04-10','Debit','2024-04-15');
INSERT INTO Bill VALUES(8,8,110.0,'2024-04-10','Debit','2024-04-15');
INSERT INTO Bill
VALUES(9,9,129.99999999999999,'2024-04-12','Debit','2024-04-17');
INSERT INTO Bill VALUES(10,10,95.0,'2024-04-12','Debit','2024-04-17');
CREATE TABLE Service (
    ID INTEGER PRIMARY KEY,

```

```

        BillNum INTEGER NOT NULL,
        Name TEXT NOT NULL,
        Cost REAL,
        Description TEXT,
        FOREIGN KEY (BillNum) REFERENCES Bill (InvoiceNum)
    );

INSERT INTO Service VALUES(1,1,'Room Service',25.0,'Food and drinks
delivered to the room');
INSERT INTO Service VALUES(2,1,'WiFi Access',10.0,'High-speed internet
access');
INSERT INTO Service VALUES(3,2,'Room Service',20.0,'Food and drinks
delivered to the room');
INSERT INTO Service VALUES(4,3,'Laundry',15.0,'Cleaning and ironing of
clothes');
INSERT INTO Service VALUES(5,3,'Room Service',30.0,'Food and drinks
delivered to the room');
INSERT INTO Service VALUES(6,4,'WiFi Access',12.0,'High-speed internet
access');
INSERT INTO Service VALUES(7,5,'Laundry',17.9999999999999999,'Cleaning
and ironing of clothes');
INSERT INTO Service VALUES(8,6,'Room Service',22.0,'Food and drinks
delivered to the room');
INSERT INTO Service VALUES(9,7,'WiFi Access',8.0,'High-speed internet
access');
INSERT INTO Service VALUES(10,8,'Laundry',20.0,'Cleaning and ironing of
clothes');
COMMIT;

```

Queries

1. Return all guest who made a booking at a given hotel

```

SELECT DISTINCT G.FirstName, G.LastName
    FROM Guest G
    JOIN Booking B ON G.GuestID = B.GuestID
    JOIN Hotel H ON B.HotelCode = H.HotelCode
    WHERE H.Name = ?;

```

2. Return all RoomNo given a upper price limit for a given hotel.

```

SELECT R.RoomNo, R.PricePerNight
    FROM Room R
    JOIN Hotel H ON R.HotelCode = H.HotelCode
    WHERE H.Name = ? AND R.PricePerNight < ?;

```


3. Return all hotels ordered by most occupants to least.

```
SELECT H.HotelCode, H.Name, SUM(B.NumAdults) as TotalOccupants
FROM Hotel H
LEFT JOIN Booking B ON H.HotelCode = B.HotelCode
GROUP BY H.HotelCode, H.Name
ORDER BY TotalOccupants DESC;
```

4. Return all resources for a given hotel in descending order of quantity.

```
SELECT R.ResourceID, R.Name, R.Quantity
FROM Resource R
ORDER BY R.Quantity DESC;
```

5. Return all guests currently checked in at the hotel.

```
SELECT DISTINCT G.FirstName, G.LastName, B.CheckinDateTime,
B.CheckoutDateTime
FROM Guest G
JOIN Booking B ON G.GuestID = B.GuestID
JOIN Hotel H ON B.HotelCode = H.HotelCode
WHERE H.Name = ? AND B.CheckinDateTime <= ? AND
B.CheckoutDateTime > ?;
```

6. Return all guests checking out on a given day at a hotel.

```
SELECT DISTINCT G.FirstName, G.LastName, B.CheckoutDateTime
FROM Guest G
JOIN Booking B ON G.GuestID = B.GuestID
JOIN Hotel H ON B.HotelCode = H.HotelCode
WHERE H.Name = ? AND DATE(B.CheckoutDateTime) = ?;
```

7. Return all guests checking in on a given day at a hotel.

```
SELECT DISTINCT G.FirstName, G.LastName, B.CheckinDateTime
FROM Guest G
JOIN Booking B ON G.GuestID = B.GuestID
JOIN Hotel H ON B.HotelCode = H.HotelCode
WHERE H.Name = ? AND DATE(B.CheckinDateTime) = ?;
```

8. Return all guests by booking date for a given hotel.

```
SELECT DISTINCT G.FirstName, G.LastName, B.BookingDateTime
FROM Guest G
JOIN Booking B ON G.GuestID = B.GuestID
JOIN Hotel H ON B.HotelCode = H.HotelCode
WHERE H.Name = ? AND DATE(B.BookingDateTime) = ?;
```

9. Return staff whose first name starts with a given string of characters for a hotel.

```
SELECT FirstName, LastName
      FROM Staff
      JOIN Hotel ON Staff.HotelCode = Hotel.HotelCode
      WHERE Hotel.Name = ? AND Staff.FirstName LIKE ?;
```

10. Return the most popular service in a given hotel.

```
SELECT
      S.Name AS ServiceName,
      COUNT(*) AS NumberOfTimesOrdered
      FROM
      Service S
      JOIN Bill B ON S.BillNum = B.InvoiceNum
      JOIN Booking BK ON B.BookingID = BK.BookingID
      JOIN Hotel H ON BK.HotelCode = H.HotelCode
      WHERE
      H.Name = ?
      GROUP BY
      S.Name
      ORDER BY
      NumberOfTimesOrdered DESC
      LIMIT 1;
```