Department of Electrical & Computer Engineering
Faculty of Engineering & Architectural Science

Course Title:	Fundamentals of Data Engineering
Course Number:	COE 848
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Instructor:	Faezeh Ensan

Assignment/Lab Number:	5
Assignment/Lab Title:	Database Programming

Submission Date:	Mar 25, 2024
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Setup and Installation

Environment Requirements

- Windows 10/11
- 4GB RAM
- VSCode version 1.87.2
  - If not installed on the system, then install the latest version for Windows using the following guide https://code.visualstudio.com/download.
- java version "21.0.2" 2024-01-16 LTS
  - If not installed on the system, then install the latest version for Windows using the following guide https://code.visualstudio.com/docs/java/java-tutorial.
  - Ensure that the *Coding Pack for Java* is installed.
- Java(TM) SE Runtime Environment (build 21.0.2+13-LTS-58)

Steps

1. Open Visual Studio Code
2. Open the HotelDatabase folder by going to *File→Open Folder*.
3. Open the *HotelDatabase.java* file in the *src* folder.
4. On the top right corner of the VSCode window, click *Run Java*, to run the program.

Running the Program

Startup

Upon running the *HotelDatabase.java* file, the following message should appear.

```
What query would you like to execute?
(Type h to see list of available queires...)

You> h
```

Typing 'h' should display the list of commands available.

```
You> h
1 - get guest by hotel name
2 - get rooms below price
3 - get resources
4 - get guests at a given hotel by datetime
5 - get guests by check-out date
6 - get guests by check-in date
7 - book room
8 - get guests by booking date
9 - get staff by firstname
10 - get most popular service
```

Queries

To execute the queries simply type in the number corresponding to the query of choice and press enter. The first time a query is executed you should see a warning message like the one below.

```
SLF4J: Failed to load class "org.slf4j.impl.StaticLoggerBinder".
SLF4J: Defaulting to no-operation (NOP) logger implementation
SLF4J: See http://www.slf4j.org/codes.html#StaticLoggerBinder for further details.
```

1. Display list of guests for whom a booking was created at a particular hotel.
   a. get guest by hotel name
   b. You will be prompted for the hotel name. Once you have entered it, the list of guest should be displayed.

```
You> 1

Hotel name: Germantown Hotel
Cara Leblanc
Irene Miles
Phoebe Mayer
Bonnie Webb
Earle Khan
You>
```

2. Display rooms that are at a price lower than the given maximum at a particular hotel.
   a. get rooms below price
   b. You will be prompted to enter the hotel name and then the maximum price. Once both are entered correctly, the list of RoomNo's with the price shall be displayed.

```
You> 2
Hotel name: Germantown Hotel
Max price: 150
Rooms below the specified price:
RoomNo: 1, PricePerNight: 82.0
RoomNo: 2, PricePerNight: 145.0
RoomNo: 3, PricePerNight: 82.0
RoomNo: 4, PricePerNight: 82.0
RoomNo: 5, PricePerNight: 82.0
You>
```

3. Display list of resources in the database.
   a. get resources
   b. List of resources found in the database shall be displayed.

```
You> 3
Resources ordered by quantity (descending):
ResourceID: 4, Name: Lettuce, Quantity: 50
ResourceID: 8, Name: Pillow, Quantity: 40
ResourceID: 1, Name: Bread, Quantity: 4
ResourceID: 5, Name: Hand-soap, Quantity: 34
ResourceID: 6, Name: Dish-soap, Quantity: 22
ResourceID: 2, Name: Coffee, Quantity: 20
ResourceID: 10, Name: Walkie-Talkie, Quantity: 15
ResourceID: 9, Name: Bed-sheet, Quantity: 14
ResourceID: 3, Name: Egg, Quantity: 120
ResourceID: 7, Name: Vacuum, Quantity: 12
You>
```

4. Display the guests with bookings in a hotel at a given time.
   a. get guests at a given hotel by datetime
   b. Prompts user for hotel name and specific datetime before displaying the list of guests.

```
You> 4
Hotel name: Weston Hotel
Date and Time (yy-MM-dd HH:mm:ss): 2024-03-07 16:30:22
Guests currently checked in at Weston Hotel:
Name: Ruben Reeves, CheckinDateTime: 2024-03-06 16:30:22, CheckoutDateTime: 2024-03-13 16:30:22
Name: Brian Black, CheckinDateTime: 2024-03-06 16:30:22, CheckoutDateTime: 2024-03-14 16:30:22
Name: Antoinette Trujillo, CheckinDateTime: 2024-03-06 16:30:22, CheckoutDateTime: 2024-03-15 16:30:22
Name: Kristina Clements, CheckinDateTime: 2024-03-06 16:30:22, CheckoutDateTime: 2024-03-16 16:30:22
Name: David Oconner, CheckinDateTime: 2024-03-06 16:30:22, CheckoutDateTime: 2024-03-17 16:30:22
```

5. Display the guests that are checking out on a specific date.
   a. get guests by checkout date
   b. Prompts user for hotel name and specific date, before displaying list of guests.

```
You> 5
Hotel name: Weston Hotel
Check-out date (yy-MM-dd): 2024-03-13
Guests checking out on 2024-03-13 at Weston Hotel:
Name: Ruben Reeves, CheckoutDateTime: 2024-03-13 16:30:22
```

6. Display the guests that are checking in on a specific date.
   a. get guests by check-in date.
   b. Prompts user for hotel name and specific date, before displaying list of guests.

```
You> 6
Hotel name: Weston Hotel
Check-in date (yy-MM-dd): 2024-03-26
Guests checking in on 2024-03-26 at Weston Hotel:
Name: Zohraan Badar, CheckinDateTime: 2024-03-26 17:15:00
```

7. Create a new booking for a guest
   a. book room
   b. Prompts the user for email, hotel name, check-in time, checkout time, # of adults, Room number, before creating a booking.

```
You> 7
What is the email of the guest?
Email: z1badar@torontomu.ca
Hotel name: Weston Hotel
What is the check-in and check-out time?
Check-in time (yy-MM-dd HH:mm:ss): 2024-03-26 17:15:00
Check-out time (yy-MM-dd HH:mm:ss): 2024-03-31 17:15:00
# of adults: 2
Available rooms
1
2
3
4
5
Room number: 2
Booking created successfully.
```

8. Display all guests that made a booking on a given date at a particular hotel.
   a. get guests by booking date.
   b. Prompts the user for hotel name and booking date before printing the list of guests.

```
You> 8
Hotel name: Weston Hotel
Booking date (YY-mm-dd): 2024-03-26
Guests booking on 2024-03-26 at Weston Hotel:
Name: Zohraan Badar, BookingDateTime: 2024-03-26 17:33:02
```

9. Display all staff whose first names start with a given string.
   a. get staff by first name
   b. Prompts the user for hotel name and firstname before listing the staff members.

```
You> 9
Hotel name: Weston Hotel
First name: T
Teresa Zamora
```

10. Display the most popular service at a particular hotel.
    a. get most popular service
    b. Prompts the user for the hotel name then displays the most popular service.

```
You> 10
Hotel name: Weston Hotel
ServiceName: WiFi Access, NumberOfTimesOrdered: 1
```

SQL Dump

```sql
PRAGMA foreign_keys=OFF;
BEGIN TRANSACTION;
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);
```

```sql
INSERT INTO Staff
VALUES(3,1,'Pablo','Rivers',NULL,'M','pablo.rivers@hotel.com',NULL,'$2b$12
$nyrSDwO1cSMd8VEt4tRhSe71u1mi7zSkFQMMTg/u4gILCFupDwYF6',NULL,NULL);
INSERT INTO Staff
VALUES(4,1,'Richard','Gilmore',NULL,'M','richard.gilmore@hotel.com',NULL,'
$2b$12$iMtAxDvhkThUugFNAs1erunaBi416zrb0IajY0tBp4e2VinNN3g1S',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.Y3Gs3j1oSOlwaquX1iAvbWf5koa4wjLEyRudRDJxK',NULL,NULL);
INSERT INTO Staff
VALUES(9,2,'Leanne','Davies',NULL,'F','ldavies@hotel.com',NULL,'$2b$12$7N8
.hEbaVha8da/lKOld6uLpPkal9biNj1Uqent8.1LwrTr345v1W',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',81.999999999999998,1);
INSERT INTO Room VALUES(2,1,'Guest',145.0,2);
INSERT INTO Room VALUES(3,1,'Guest',81.999999999999998,1);
INSERT INTO Room VALUES(4,1,'Office',81.999999999999998,1);
INSERT INTO Room VALUES(5,1,'Public',81.999999999999998,1);
INSERT INTO Room VALUES(1,2,'Guest',81.999999999999998,1);
INSERT INTO Room VALUES(2,2,'Guest',145.0,2);
INSERT INTO Room VALUES(3,2,'Guest',81.999999999999998,1);
INSERT INTO Room VALUES(4,2,'Office',81.999999999999998,1);
INSERT INTO Room VALUES(5,2,'Public',81.999999999999998,1);
```

```sql
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','davidoconner',NULL,NULL);
```

```sql
INSERT INTO Guest
VALUES(11,'Zohraan','Badar',NULL,NULL,'z1badar@torontomu.ca','abdurr_6621*
',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',76.999999999999998);
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,
```

```sql
                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);
INSERT INTO Booking VALUES(12,2,2,11,'2024-03-26 17:33:02','2024-03-26
17:15:00','2024-03-31 17:15:00',2);
CREATE TABLE Bill (
                InvoiceNum INTEGER PRIMARY KEY,
                BookingID INTEGER NOT NULL,
                Amount REAL NOT NULL,
                PaidDate DATE,
                PaymentMode TEXT,
                ExpireDate DATE NOT NULL,
```

```sql
                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(9,9,129.9999999999999,'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',17.999999999999999,'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');
```

```sql
INSERT INTO Service VALUES(10,8,'Laundry',20.0,'Cleaning and ironing of
clothes');
CREATE TABLE IF NOT EXISTS "Hotel" (
    HotelCode INTEGER PRIMARY KEY,
    Address TEXT,
    Postcode TEXT,
    City TEXT,
    Country TEXT,
    NumRooms INTEGER,
    DeskPhone TEXT,
    ManagementPhone TEXT,
    StaffCount INTEGER,
    EstablishmentDate DATE
, Name TEXT);
INSERT INTO Hotel VALUES(1,'4944 Germantown Ave, Philadelphia,
Pennsylvania, United States','PA
19144','Philadelphia','USA',345,'+12673686167',NULL,NULL,NULL,'Germantown
Hotel');
INSERT INTO Hotel VALUES(2,'874-A Weston Rd, York, ON','M6N
3R6','York','Canada',455,'+14162435320',NULL,NULL,NULL,'Weston Hotel');
INSERT INTO Hotel VALUES(3,'41 Lebovic Ave Unit A110, Scarborough,
ON','M1L
0H2','Scarborough','Canada',277,'+14162859973',NULL,NULL,NULL,'Scarborough
Hotel');
INSERT INTO Hotel VALUES(4,'1172 Walkley Rd, Ottawa, ON','K1V
2P7','Ottawa','Canada',510,'+16135239600',NULL,NULL,NULL,'Ottawa Hotel');
INSERT INTO Hotel VALUES(5,'2 Whitehall Ct, London, United Kingdom','SW1A
2EJ','London','United Kingdom',332,'+442075235062',NULL,NULL,NULL,'London
Hotel');
INSERT INTO Hotel VALUES(6,'4 Woodcock St, Birmingham, United Kingdom','B7
4BL','Birmingham','United
Kingdom',510,'+441218206000',NULL,NULL,NULL,'Birmingham Hotel');
INSERT INTO Hotel VALUES(7,'19 Loughborough Rd, Leicester, United
Kingdom','LE4 5LJ','Leicester','United
Kingdom',82,'+441162682626',NULL,NULL,NULL,'Leicester Hotel');
INSERT INTO Hotel VALUES(8,'4289, Al Hajlah, Makkah, Saudi
Arabia','24231','Makkah','Saudi
Arabia',602,'+966125768888',NULL,NULL,NULL,'Makkah Hotel');
INSERT INTO Hotel VALUES(9,'JPRC+PF3, Omar Almukhtar St, Al Amal, Riyadh,
Saudi Arabia','11561','Riyadh','Saudi
Arabia',188,'+966114024121',NULL,NULL,NULL,'Riyadh Hotel');
```

```sql
INSERT INTO Hotel VALUES(10,'Mutlaq Abbas Munawir St, Kuwait City,
Kuwait','','Kuwait
City','Kuwait',734,'+96522262000',NULL,NULL,NULL,'Kuwait City Hotel');
INSERT INTO Hotel VALUES(11,'Al Mahatta - Al Qasimia - Sharjah - United
Arab Emirates','89XR+V9XAl','Sharjah','United Arab
Emirates',221,'+97165066222',NULL,NULL,NULL,'Sharjah Hotel');
CREATE UNIQUE INDEX idx_unique_name ON Hotel (Name);
COMMIT;
```