Ahsanullah University of Science and Technology

Department of Computer Science & Engineering

Project Title: Hotel Management System

Course No.	**CSE 4126**
Course Title	**Distributed Database System**

Submitted To

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Introduction:

Travelling in different places is so easy if we can book the perfect hotel and it will be great when we can book them staying at our home. It can be possible through the hotel website. Managing a hotel is a true 24 hours a day, 7 days a week operation. Managing daily responsibilities, team members, operational performance and the guest experience is a complex balancing act that requires great attention to detail, organization and flexibility. Web-based technology, from personal computing programs to online data storage, has greatly reduced the cost of developing, deploying and maintaining the software and systems that individuals and businesses use daily. That's why we choose it to make the management system easier. Here we tried to make a hotel website using Distributed Database System. The hotel has two branches in Sylhet and Chittagong and a main branch in Dhaka. We tried to make the system more smooth and user friendly.

Project Description:

The name of our project is Hotel Management System. We tried to make a perfect use of Distributed Database System. At first we created an ERD (Entity Relationship Diagram) to design our project. Here we kept two branches of the hotel in two different sites and made Dhaka branch the main branch. All the data and information are distributed in the sites. From a site we can only see the data of that particular site. But from the main branch the server, we can access all the data from all sites. After creating the ERD, we created our necessary tables and inserted data. We kept different data in site and host and created a link between them so host can access the sites. Then some functions and procedures were created. Then we fragmented the tables in two different sites and inserted data according to the fragmentation schema. We also made operator trees and triggers.

My Contribution:

This was a group project and we are three members in the group. So we divided our works to complete it. In this project, my contribution is-

1. **Creating table and data insertion**: I have some contribution in table creation and data insertion. I created and inserted data at the server and also created and inserted the respective tables in the sites denoting fragments.

2. **Creating database link**: I was the server when the database link was created. I contributed in the process.

3. **Fragmentation**: We did it together. My laptop was one of the server and we did this fragmentation using those.

4. **Procedure & Function Creation**: I have made two of the functions and one of the procedures.

5. **Operator Tree:** I have made an operator tree between the three operator trees is showed in this report. The operator tree from the query, application of criteria and the fragmented tree is done.

6. **Trigger:** I have created trigger for our projects. There are two triggers. One for update in roomRate of RoomDetails table, and the other is for inserting and deleting data from global relation RoomDetails table.

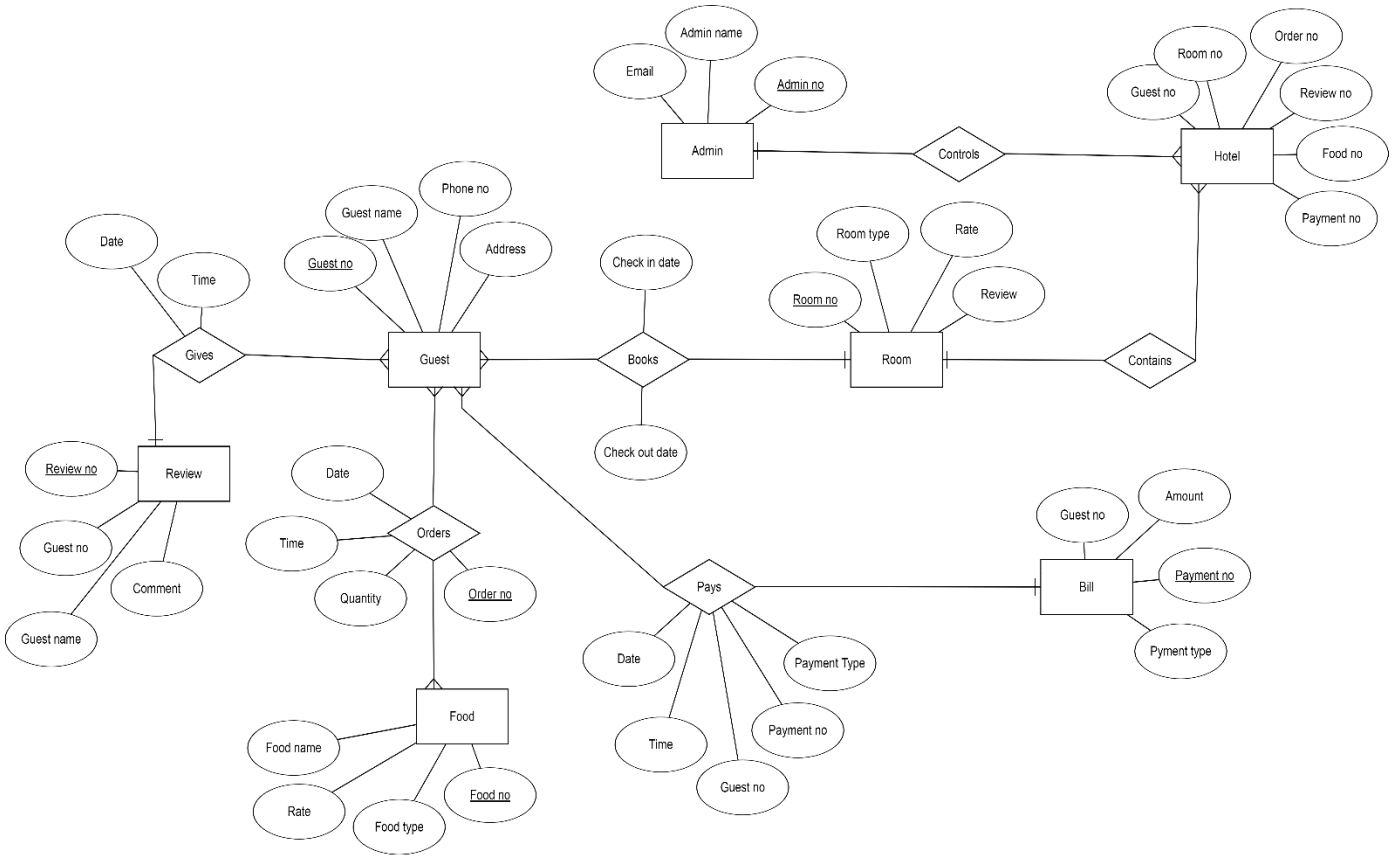
7. **Effect of Update:** I have done it using trigger. The details are given later in this report.

8. **Semi-Join Program:** The theory of semi-join program is also proven here. I have shown it with an example.

9. **DB Profile:** I have created database profile for Customer and Room details table.

In this report, I have described all the details of my part of work as well as others' works and contribution but not in descriptively.

Entity Relationship Diagram (ERD):



Entity Relationship Diagram

Database Link:

In database link there are two part host and site. The link is created by myself. First I needed to switch off firewall in both host and site computer. Then I had to check the connection by IP address ping. I have made some slight changes on the listener of the site computer as per instructions. Then I ran the command prompt in administration to see if the listener is working successfully. The host will create a database link and access the tables of the site computer.

Functions and Procedures:

We have created four functions and two procedures for our project. Among them, I made one procedure. The usefulness and name of the procedures are given below:

Functions:

1. **Function1:** Displays the mobile number of the given admin.

```
SQL> @C:\Users\Acer\Desktop\project\Hotel_Management_System\Codes\Function\Function1.sql;

Function created.

876

PL/SQL procedure successfully completed.
```

2. **Function2:** Displays the total employee number of the given room.

```
SQL> @C:\Users\Acer\Desktop\project\Hotel_Management_System\Codes\Function\Function2.sql;

Function created.

1

PL/SQL procedure successfully completed.
```

3. **Function3:** Displays the review of the given room.

```
SQL> @C:\Users\Acer\Desktop\project\Hotel_Management_System\Codes\Function\Function3.sql;

Function created.

Excellent

PL/SQL procedure successfully completed.
```

4. **Function4:** Displays the nationality of the given customer.

```
SQL> @C:\Users\Acer\Desktop\project\Hotel_Management_System\Codes\Function\Function4.sql;

Function created.

Bangladeshi

PL/SQL procedure successfully completed.
```

Procedures:

1. **Procedure1:** Displays the room rate, review, room type of the given room.

```
SQL> @C:\Users\Acer\Desktop\project\Hotel_Management_System\Codes\Procedure\Procedure1.sql;

Procedure created.

8000 Excellent Standard

PL/SQL procedure successfully completed.
```

2. **Procedure2:** Inserts the total amount of the given bill.

```
SQL> @C:\Users\Acer\Desktop\project\Hotel_Management_System\Codes\Procedure\Procedure2.sql;

Procedure created.
```

Database Tables (Global Schema):

1. **Customer** (c_id, name, mobile, email, date_of_birth, nationality)

```
SQL> @"D:\4.1\Lab\DDBS\project\hotel\access for ss.sql";

      C_ID NAME       MOBILE EMAIL           DATE_OF_B NATIONALITY  CITY
---------- ------ ---------- --------------- --------- ------------ ----------
         1 Laboni        123 laboni@gmail.com 09-OCT-95 Bangladeshi  Chittagong
         2 James         234 james@gmail.com  11-JAN-90 American     Chittagong
         3 Prima         345 prima@gmail.com  14-DEC-95 Bangladeshi  Sylhet
         4 Kavin         456 kavin@gmail.com  13-APR-90 American     Sylhet
         5 Sharif        567 sharif@gmail.com 21-DEC-91 Bangladeshi  Dhaka


Commit complete.

SQL>
```

2. **Admin** (admin_id, name, address, email, mobile_no)

```
SQL> @"D:\4.1\Lab\DDBS\project\hotel\access for ss.sql";

  ADMIN_ID NAME   ADDRESS              EMAIL                MOBILE_NO
---------- ------ -------------------- -------------------- ----------
         1 Laboni 27-Azimpur           laboni@gmail.com            298
         2 Prima  99-Niketon           prima@gmail.com             876
         3 Neaz   20-Bakshibzar        neaz@gmail.com              654


Commit complete.

SQL>
```

3. **RoomDetails** (roomNo, roomType, roomRate, review)

```
SQL> @"D:\4.1\Lab\DDBS\project\hotel\access for ss.sql";

    ROOMNO ROOMTYPE                       ROOMRATE REVIEW
---------- ------------------------------ ---------- --------------------
         1 Standard                             8000 Excellent
         2 Deluxe                              12000 Good
         3 Superior-Deluxe                     14000 Excellent
         4 Junior-Suite                        16000 Average


Commit complete.

SQL>
```

4. **Reservation** (rsrv_no, c_id, roomNo, checkin, checkout)

```
SQL> @"D:\4.1\Lab\DDBS\project\hotel\access for ss.sql";

   RSRV_NO       C_ID     ROOMNO CHECKIN   CHECKOUT
---------- ---------- ---------- --------- ---------
         1          2          4 01-JAN-18 06-JAN-18
         2          4          1 03-MAR-18 06-MAR-18
         3          2          3 07-APR-18 15-APR-18
         4          5          2 10-JUN-18 15-JUN-18


Commit complete.
```

5. **Employee** (Emp_id, name, dutyHour, roomNo)

```
SQL> @"D:\4.1\Lab\DDBS\project\hotel\access for ss.sql";

    EMP_ID NAME   DUTYHOUR                  ROOMNO
---------- ------ -------------------- ----------
         1 Rahim  8am-2pm                       2
         2 Karim  2pm-8pm                       4
         3 Abul   8pm-2am                       1
         4 Jabbar 2am-8am                       3


Commit complete.
```

6. **Food** (foodNo, Type, name, rate)

```
SQL> @"D:\4.1\Lab\DDBS\project\hotel\access for ss.sql";

    FOODNO TYPE                 NAME            RATE
---------- -------------------- ---------- ----------
         1 Breakfast            Muffin            200
         2 Lunch                Steak            1000
         3 Lunch                Chicken           300
         4 Dinner               Beef              400


Commit complete.
```

7. **Bill** (bill_id, c_id, tot_cost)

```
SQL> @"D:\4.1\Lab\DDBS\project\hotel\access for ss.sql";

   BILL_ID       C_ID     ROOMNO     AMOUNT PAYMENTSTATUS
---------- ---------- ---------- ---------- --------------------
         1          2          4      10300 Done
         2          4          1      25000 Done
         3          2          3      15200 Done
         4          5          2      30000 Not Done


Commit complete.
```

Fragmentation Schema:

Customer1 = SL city= 'Sylhet' PJ c_id, name, mobile, email, date_of_birth, nationality, city (Customer)

```
      C_ID NAME       MOBILE EMAIL           DATE_OF_B NATIONALITY  CITY
---------- ------ ---------- --------------- --------- ------------ ----------
         3 Prima         345 prima@gmail.com  14-DEC-95 Bangladeshi  Sylhet
         4 Kavin         456 kavin@gmail.com  13-APR-90 American     Sylhet

Commit complete.
```

Customer2 = SL city! = 'Sylhet' PJ c_id, name, mobile, email, date_of_birth, nationality, city (Customer)

```
      C_ID NAME       MOBILE EMAIL           DATE_OF_B NATIONALITY  CITY
---------- ------ ---------- --------------- --------- ------------ ----------
         1 Laboni        123 laboni@gmail.com 09-OCT-95 Bangladeshi  Chittagong
         2 James         234 james@gmail.com  11-JAN-90 American     Chittagong
         5 Sharif        567 sharif@gmail.com 21-DEC-91 Bangladeshi  Dhaka

Commit complete.
```

Admin1 = SL name = 'Prima' PJ admin_id, name, address, email, mobile_no (Admin)
Admin2 = SL name! = 'Prima' PJ admin_id, name, address, email, mobile_no (Admin)
RoomDetails1 = SL roomRate > 12000 PJ roomNo, roomType, roomRate, review (RoomDetails)
RoomDetails2 = SL roomRate <= 12000 PJ roomNo, roomType, roomRate, review (RoomDetails)
Reservation1 = SL cid = 4 PJ rsrv_no, c_id, roomNo, checkin, checkout (Reservation)
Reservation2 = SL cid! = 4 PJ rsrv_no, c_id, roomNo, checkin, checkout (Reservation)
Employee1 = SL name = 'Rahim' PJ Emp_id, name, dutyHour, roomNo (Employee)
Employee2 = SL name! = 'Rahim' PJ Emp_id, name, dutyHour, roomNo (Employee)
Food1 = SL rate >= 400 PJ foodNo, type, name, rate (Food)
Food2 = SL rate < 400 PJ foodNo, type, name, rate (Food)
Bill1 = SL amount >=25000 PJ bill_id, c_id, roomNo, amount, paymentStatus (Bill)
Bill2 = SL amount <25000 PJ bill_id, c_id, roomNo, amount, paymentStatus (Bill)
RoomDetails1 = PJ roomNo, bill_id, amount (RoomDetails JN roomNo = roomNo Bill1)
RoomDetails2 = PJ roomNo, bill_id, amount (RoomDetails JN roomNo = roomNo Bill2)

Database Profile:

Database profiles for customer and room details table were created.

Card (**Customer**): 5

```
SQL> @"C:\Users\Acer\Desktop\project\Hotel_Management_System\Codes\Database Profile\Database Profile1.sql";
Table dropped.

Table created.
Card(Customer) = 5
PL/SQL procedure successfully completed.
```

Card (**RoomDetails**): 4

```
SQL> @"C:\Users\Acer\Desktop\project\Hotel_Management_System\Codes\Database Profile\Database Profile2.sql";
Table dropped.

Table created.
Card(RoomDetails) = 4
PL/SQL procedure successfully completed.
```

From database profile the profile of results of algebraic operations can be estimated.

Database Trigger:

In our project, two triggers were created. One for update operation and one for insert or delete operation. In update operation, if the new room rate is greater than or equal to fourteen thousand and old room rate is less than fourteen thousand then data will be inserted in site one and data will be deleted from site two and vice versa. Similarly, if the new and old room rate is greater than or equal to fourteen thousand, data will only be updated in site one and vice versa. For insert operation, if new capacity is greater than or equal to fourteen thousand then data will be inserted in site one and for delete operation, if the old capacity is greater than or equal to fifty thousand, data will be deleted from site one.

```
SQL> @C:\Users\Acer\Desktop\project\hotel\trigger\trigger.sql;
Trigger created.
SQL>
```

Semi-Join program:

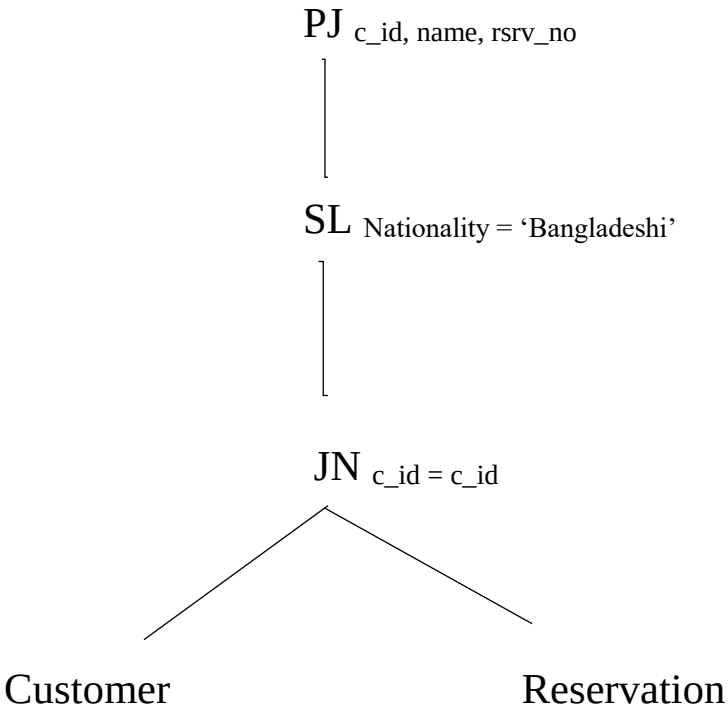
Semi-join program is more profitable than natural join. In our project, semi-join program is implemented and proved that it's superior.
As example:
For joining RoomDetails and Bill1 in site of Bill1:
Using semi-join would be more profitable here than bringing all data from table RoomDetails to site of Bill2.

RoomDetails **JN** roomNo=roomNo Bill1 (RoomDetails **SJ** roomNo=roomNo **PJ** roomNoBill2) **JN** roomNo=roomNo Bill1

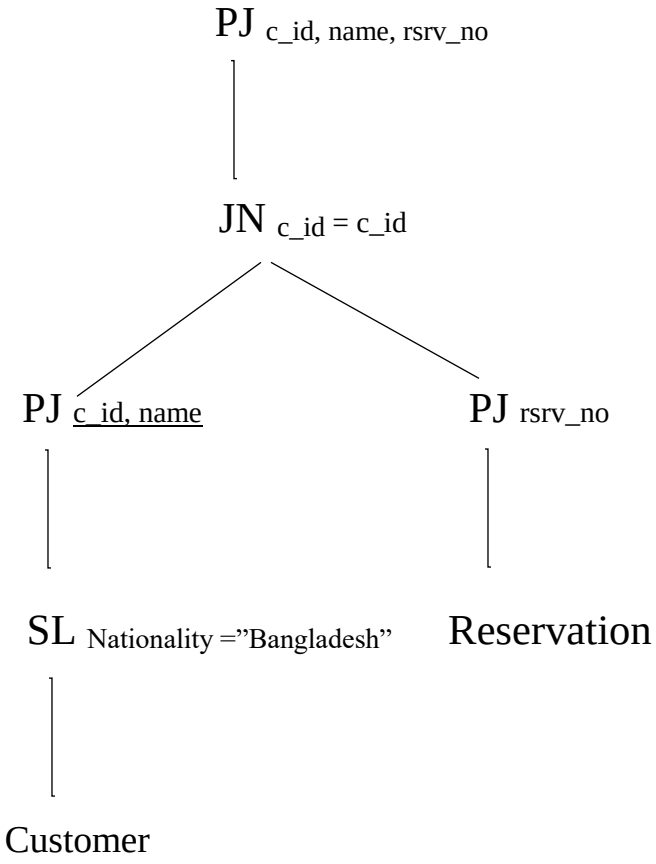
Operator Tree:

An internal representation of the query is created such as a query tree or query graph. We made two operator trees for our project. I made one of them. Then I derived a fragmentation query from there.
My operator tree query and fragmented query:

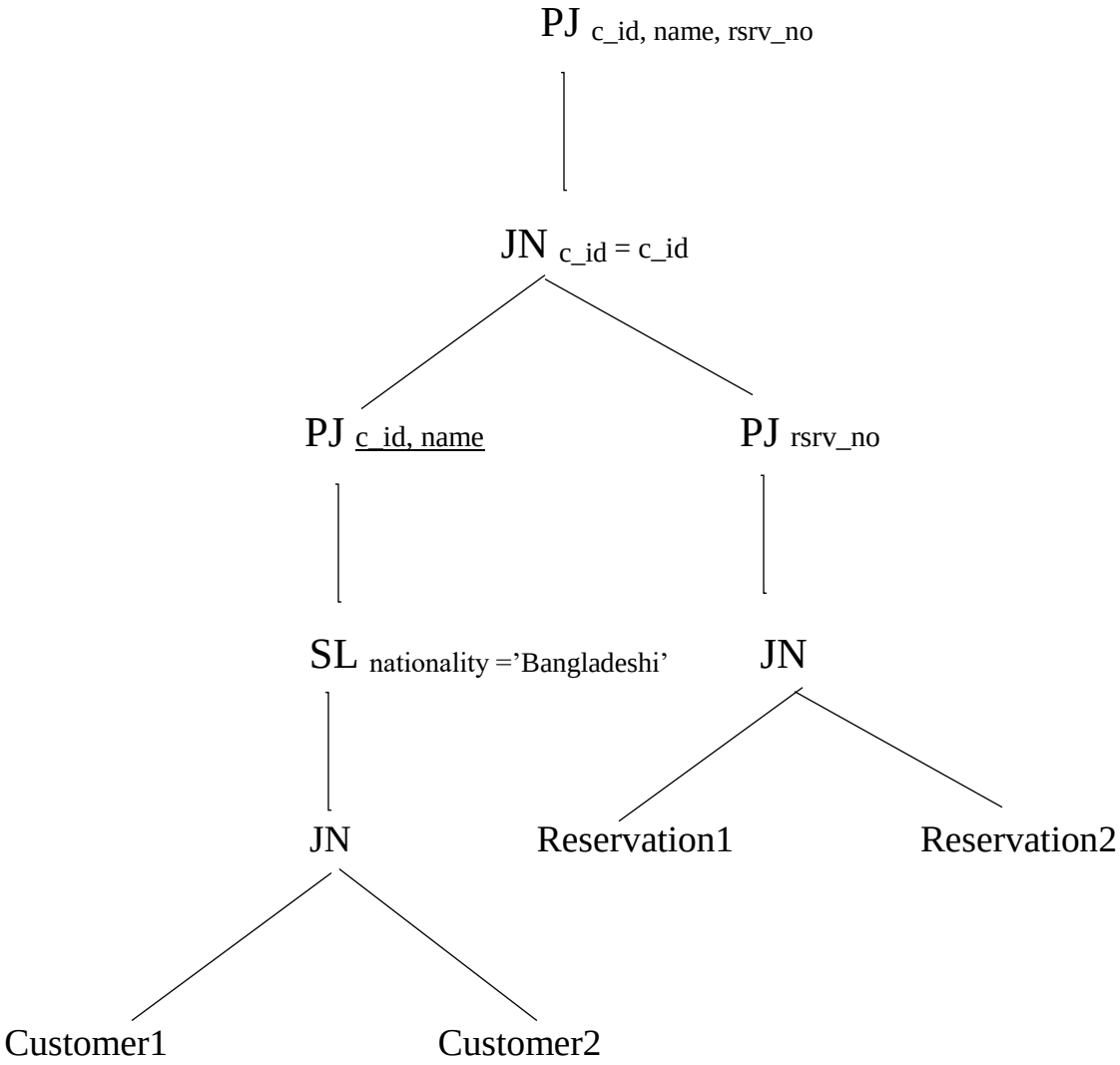
Q1: PJ c_id, name, rsrv_no (SL Nationality ="Bangladesh" (Customer JN c_id = c_id Bill))



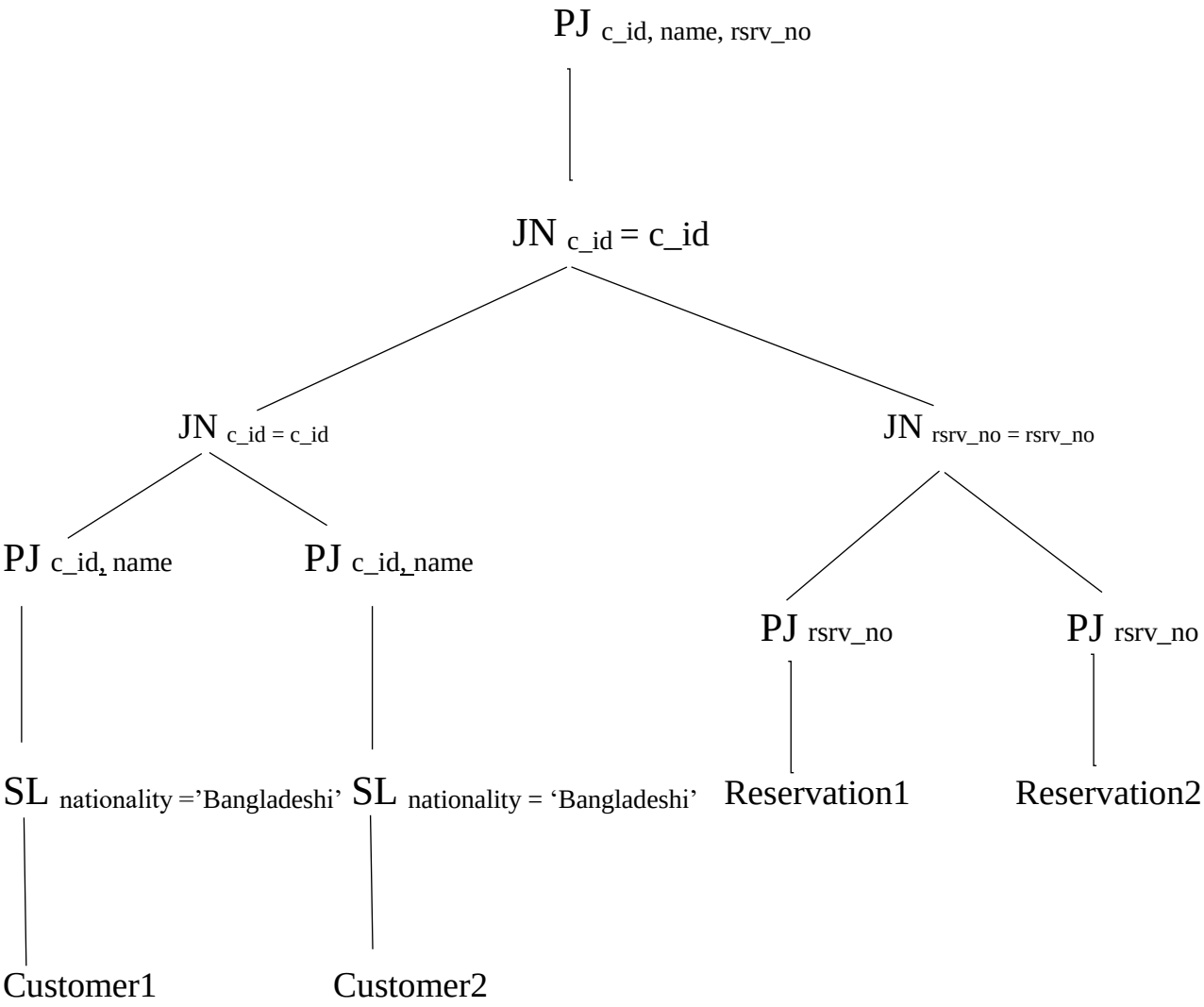
Applying Criterion 1 & 2:



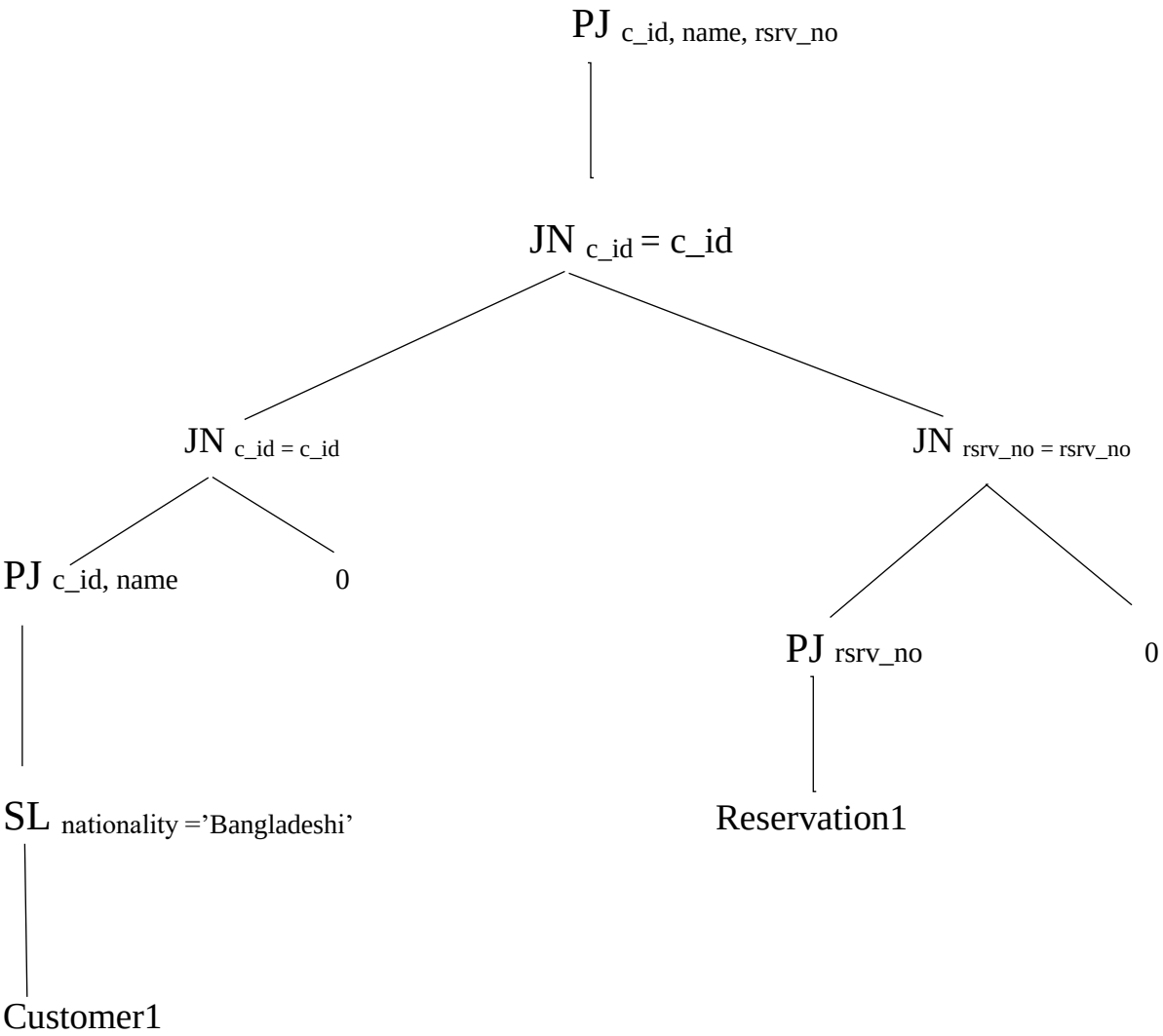
Canonical Expression:



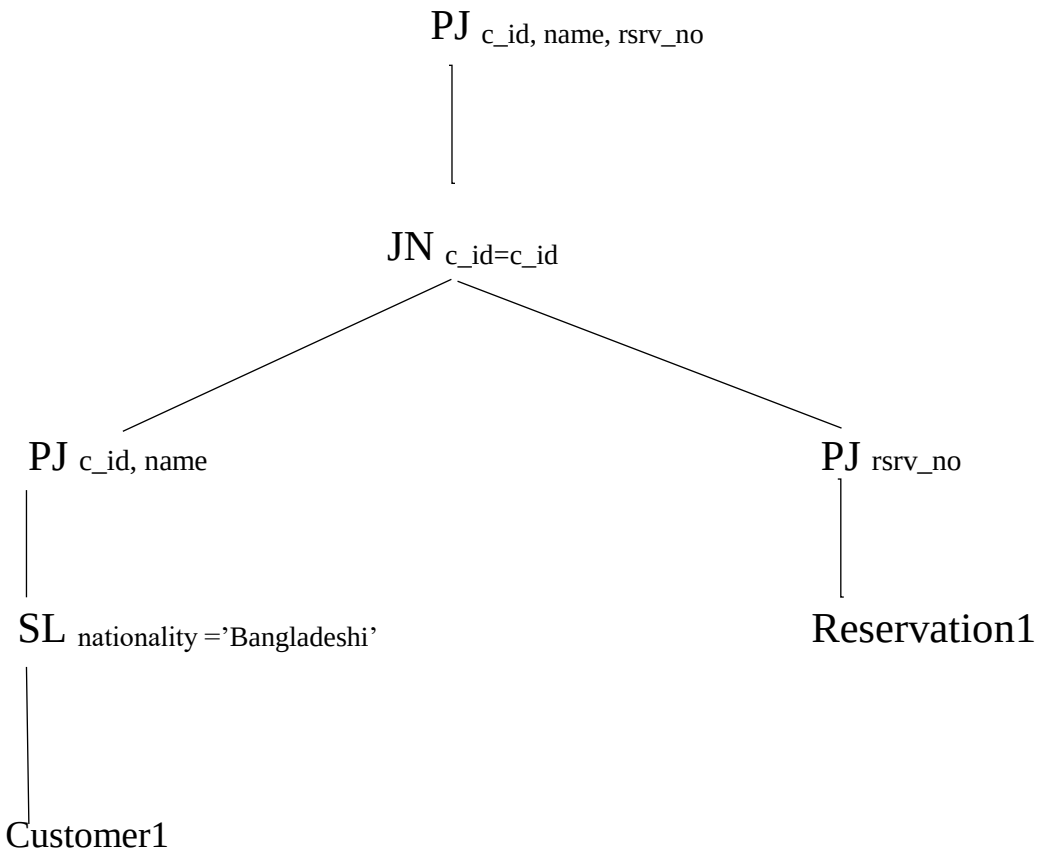
Applying Criteria 1 & 2:



Algebra of Qualified Relation: $SL_F[R: qR] \rightarrow [SL_F R: F \& qR]$



Applying Criteria 3:



Fragmented Query:

QF: PJ c_id, name, rsrv_no ((PJ rsrv_no (Reservation1)) JN c_id=c_id (PJ c_id, name SL nationality =”Bangladeshi” (Customer1)))

Conclusion:

We tried our best to make our project as appropriate as we can. There are still many sectors that we can improve and implement more features. In the future, we will try to make it more efficient and make a proper application using this database.