

University of British Columbia, Vancouver

Department of Computer Science

Short Description:

Our project is a Vancouver Restaurant Recommendation System.

Our users include customers and restaurant business owners. To get started, they can either login with the username, email and password or sign up easily. Users can also update the password of an existing account or delete an existing account.

For our customer, they can search the restaurant by:

- Location (several popular areas in Vancouver)
- Dish style (Different country dishes around the world)
- Type (Diverse food type)

For our customer, they can get some recommendation based on:

- Most popular restaurants (determine by the number of ratings the restaurant received)
- The restaurants with high ratings (> the highest average rating among all locations) in each location
- The restaurants with at least 3 features
- The restaurants with specific selected features

- a. A copy of the schema and screenshots that show what data is present in each relation after the SQL script from item #2 is run.

- **Business_Owner**

```
CREATE TABLE Business_Owner (
    Email varchar(50),
    ID varchar(50),
    pwd varchar(18),
    PRIMARY KEY (Email, ID)
);
grant select on Business_Owner to public;

INSERT INTO Business_Owner (Email, ID, pwd) VALUES
('johndoe@gmail.com', 'JD123', '12345');
INSERT INTO Business_Owner (Email, ID, pwd) VALUES
('janedoe@gmail.com', 'JD456', '12345');
INSERT INTO Business_Owner (Email, ID, pwd) VALUES
('bobsmith@gmail.com', 'BS789', '12345');
INSERT INTO Business_Owner (Email, ID, pwd) VALUES
('amandajones@gmail.com', 'AJ012', '12345');
INSERT INTO Business_Owner (Email, ID, pwd) VALUES
('peterparker@gmail.com', 'PP345', '12345');
```

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Email	ID	pwd
amandajones@gmail.com	AJ012	12345
bobsmith@gmail.com	BS789	12345
janedoe@gmail.com	JD456	12345
johndoe@gmail.com	JD123	12345
peterparker@gmail.com	PP345	12345

• Customer

```
CREATE TABLE Customer (
    Email varchar(50),
    ID varchar(50),
    pwd varchar(18),
    address varchar(50),
    PRIMARY KEY (Email, ID)
);
grant select on Customer to public;

INSERT INTO Customer(Email, ID, pwd, address) VALUES
('alice@example.com', '111111', 'pass123', '123 Main St.');
INSERT INTO Customer(Email, ID, pwd, address) VALUES
('bob@example.com', '222222', 'pass456', '456 Second St.');
INSERT INTO Customer(Email, ID, pwd, address) VALUES
('charlie@example.com', '333333', 'pass789', '789 Third St.');
INSERT INTO Customer(Email, ID, pwd, address) VALUES
('diana@example.com', '444444', 'pass012', '012 Fourth St.');
INSERT INTO Customer(Email, ID, pwd, address) VALUES
('eric@example.com', '555555', 'pass345', '345 Fifth St.');
INSERT INTO Customer(Email, ID, pwd, address) VALUES
('apple@example.com', '666666', 'pass123', '123 Main St.');
INSERT INTO Customer(Email, ID, pwd, address) VALUES
('banana@example.com', '777777', 'pass123', '100 Main St.');
INSERT INTO Customer(Email, ID, pwd, address) VALUES
('peach@example.com', '888888', 'pass123', '154 Main St.');
INSERT INTO Customer(Email, ID, pwd, address) VALUES
('grape@example.com', '999999', 'pass123', '897 Main St.');
```

Email	ID	pwd	address
alice@example.com	111111	pass123	123 Main St.
apple@example.com	666666	pass123	123 Main St.
banana@example.com	777777	pass123	100 Main St.
bob@example.com	222222	pass456	456 Second St.
charlie@example.com	333333	pass789	789 Third St.
diana@example.com	444444	pass012	012 Fourth St.
eric@example.com	555555	pass345	345 Fifth St.
grape@example.com	999999	pass123	897 Main St.
peach@example.com	888888	pass123	154 Main St.

• Restaurant

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```
CREATE TABLE Restaurant (
    r_Address VARCHAR(50),
    r_Name VARCHAR(50),
    Location VARCHAR(50),
    Open_hour varchar(50),
    Max_allowance INTEGER,
    PRIMARY KEY (r_Address, r_Name)
);
grant select on Restaurant to public;

INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('123 Main St', 'The Rusty Spoon', 'Downtown', '10am - 10pm', 50);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('456 Oak Ave', 'The Hungry Wolf', 'Kitsilano', '11am - 9pm', 30);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('789 Pine St', 'The Gourmet Kitchen', 'West End', '9am - 11pm', 70);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('321 Elm St', 'The Cheesy Grin', 'Yaletown', '12pm - 10pm', 40);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('654 Cedar Ave', 'The Spicy Bite', 'Gastown', '11am - 11pm', 50);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('123 Robson St', 'The Pretty Knife', 'Downtown', '5pm - 10pm', 100);
```

r_Address	r_Name	Location	Open_hour	Max_allowance
123 Main St	The Rusty Spoon	Downtown	10am - 10pm	50
123 Robson St	The Pretty Knife	Downtown	5pm - 10pm	100
321 Elm St	The Cheesy Grin	Yaletown	12pm - 10pm	40
456 Oak Ave	The Hungry Wolf	Kitsilano	11am - 9pm	30
654 Cedar Ave	The Spicy Bite	Gastown	11am - 11pm	50
789 Pine St	The Gourmet Kitchen	West End	9am - 11pm	70

- Price

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```
CREATE TABLE Price (
    priceID varchar(50),
    price_range varchar(50),
    PRIMARY KEY (priceID)
);
grant select on Price to public;

INSERT INTO Price(priceID, price_range) VALUES
('P001', 'Under $10');
INSERT INTO Price(priceID, price_range) VALUES
('P002', '$10 - $50');
INSERT INTO Price(priceID, price_range) VALUES
('P003', '$50 - $30');
INSERT INTO Price(priceID, price_range) VALUES
('P004', '$30 - $40');
INSERT INTO Price(priceID, price_range) VALUES
('P005', 'Over $40');
```

priceID	price_range
P001	Under \$10
P002	\$10 - \$50
P003	\$50 - \$30
P004	\$30 - \$40
P005	Over \$40

- RType

```
CREATE TABLE RType (
    RTypeID varchar(50),
    Rtypename varchar(50),
    PRIMARY KEY (RTypeID)
);
grant select on RType to public;

INSERT INTO RType(RTypeID, Rtypename) VALUES
('T001', 'Hot pot');
INSERT INTO RType(RTypeID, Rtypename) VALUES
('T002', 'Pizza');
INSERT INTO RType(RTypeID, Rtypename) VALUES
('T003', 'Tacos');
INSERT INTO RType(RTypeID, Rtypename) VALUES
('T004', 'Seafood');
INSERT INTO RType(RTypeID, Rtypename) VALUES
('T005', 'Burger');
```

RTypeID	Rtypename
T001	Hot pot
T002	Pizza
T003	Tacos
T004	Seafood
T005	Burger

- **Feature**

```
CREATE TABLE Feature (
    FeatureID varchar(50),
    description varchar(50),
    PRIMARY KEY (FeatureID)
);
grant select on Feature to public;

INSERT INTO Feature(FeatureID, description) VALUES
('F001', 'Outdoor Seating');
INSERT INTO Feature(FeatureID, description) VALUES
('F002', 'Vegetarian Options');
INSERT INTO Feature(FeatureID, description) VALUES
('F003', 'Gluten-free Options');
INSERT INTO Feature(FeatureID, description) VALUES
('F004', 'Live Music');
INSERT INTO Feature(FeatureID, description) VALUES
('F005', 'Happy Hour');
```

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FeatureID	description
F001	Outdoor Seating
F002	Vegetarian Options
F003	Gluten-free Options
F004	Live Music
F005	Happy Hour

- **Dish_style**

```
CREATE TABLE Dish_Style (
    StyleID varchar(50),
    DS_name varchar(50),
    PRIMARY KEY (StyleID)
);
grant select on Dish_Style to public;

INSERT INTO Dish_Style(StyleID, DS_name) VALUES
('DS001', 'Chinese');
INSERT INTO Dish_Style(StyleID, DS_name) VALUES
('DS002', 'Italian');
INSERT INTO Dish_Style(StyleID, DS_name) VALUES
('DS003', 'Mexican');
INSERT INTO Dish_Style(StyleID, DS_name) VALUES
('DS004', 'Japanese');
INSERT INTO Dish_Style(StyleID, DS_name) VALUES
('DS005', 'American');
```

StyleID	DS_name
DS001	Chinese
DS002	Italian
DS003	Mexican
DS004	Japanese
DS005	American

- **R_is_DS**

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```
CREATE TABLE R_is_DS (
    r_Address varchar(50),
    r_Name varchar(50),
    styleID varchar(50) NOT NULL,
    PRIMARY KEY (r_Address, r_Name, styleID),
    FOREIGN KEY (styleID) REFERENCES Dish_Style (StyleID)
);
grant select on R_is_DS to public;

INSERT INTO R_is_DS (r_Address, r_Name, StyleID) VALUES
('123 Main St', 'The Rusty Spoon', 'DS001');
INSERT INTO R_is_DS (r_Address, r_Name, StyleID) VALUES
('456 Oak Ave', 'The Hungry Wolf', 'DS002');
INSERT INTO R_is_DS (r_Address, r_Name, StyleID) VALUES
('789 Pine St', 'The Gourmet Kitchen', 'DS003');
INSERT INTO R_is_DS (r_Address, r_Name, StyleID) VALUES
('321 Elm St', 'The Cheesy Grin', 'DS004');
INSERT INTO R_is_DS (r_Address, r_Name, StyleID) VALUES
('654 Cedar Ave', 'The Spicy Bite', 'DS005');
```

StyleID	DS_name
DS001	Chinese
DS002	Italian
DS003	Mexican
DS004	Japanese
DS005	American

- R_has_F

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```
CREATE TABLE R_has_F (
    r_Address VARCHAR(50),
    r_Name VARCHAR(50),
    featureID VARCHAR(50) NOT NULL,
    PRIMARY KEY (r_Address, r_Name, featureID),
    FOREIGN KEY (featureID) REFERENCES Feature(FeatureID)
);
grant select on R_has_F to public;

INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('123 Main St', 'The Rusty Spoon', 'F001');
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('456 Oak Ave', 'The Hungry Wolf', 'F003');
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('789 Pine St', 'The Gourmet Kitchen', 'F002');
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('321 Elm St', 'The Cheesy Grin', 'F003');
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('654 Cedar Ave', 'The Spicy Bite', 'F005');
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('654 Cedar Ave', 'The Spicy Bite', 'F001');
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('654 Cedar Ave', 'The Spicy Bite', 'F002');
```

r_Address	r_Name	featureID
123 Main St	The Rusty Spoon	F001
654 Cedar Ave	The Spicy Bite	F001
654 Cedar Ave	The Spicy Bite	F002
789 Pine St	The Gourmet Kitchen	F002
321 Elm St	The Cheesy Grin	F003
456 Oak Ave	The Hungry Wolf	F003
654 Cedar Ave	The Spicy Bite	F005

- [R_Include_T](#)

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```
CREATE TABLE R_Include_T (
    r_Address VARCHAR(50),
    r_Name VARCHAR(50),
    RtypeID VARCHAR(50) NOT NULL,
    PRIMARY KEY (r_Address, r_Name, RtypeID),
    FOREIGN KEY (RtypeID) REFERENCES RType(RtypeID)
);
grant select on R_Include_T to public;

INSERT INTO R_Include_T (r_Address, r_Name, RtypeID) VALUES
('123 Main St', 'The Rusty Spoon', 'T001');
INSERT INTO R_Include_T (r_Address, r_Name, RtypeID) VALUES
('456 Oak Ave', 'The Hungry Wolf', 'T002');
INSERT INTO R_Include_T (r_Address, r_Name, RtypeID) VALUES
('789 Pine St', 'The Gourmet Kitchen', 'T003');
INSERT INTO R_Include_T (r_Address, r_Name, RtypeID) VALUES
('321 Elm St', 'The Cheesy Grin', 'T004');
INSERT INTO R_Include_T (r_Address, r_Name, RtypeID) VALUES
('654 Cedar Ave', 'The Spicy Bite', 'T001');
```

r_Address	r_Name	RtypeID
123 Main St	The Rusty Spoon	T001
654 Cedar Ave	The Spicy Bite	T001
456 Oak Ave	The Hungry Wolf	T002
789 Pine St	The Gourmet Kitchen	T003
321 Elm St	The Cheesy Grin	T004

- R_offer_price

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```
CREATE TABLE R_offer_price (
    r_Address VARCHAR(50),
    r_Name VARCHAR(50),
    priceID VARCHAR(50) NOT NULL,
    PRIMARY KEY (r_Address, r_Name, priceID),
    FOREIGN KEY (priceID) REFERENCES Price(priceID)
);
grant select on R_offer_price to public;

INSERT INTO R_offer_price (r_Address, r_Name, priceID) VALUES
('123 Main St', 'The Rusty Spoon', 'P001');
INSERT INTO R_offer_price (r_Address, r_Name, priceID) VALUES
('456 Oak Ave', 'The Hungry Wolf', 'P002');
INSERT INTO R_offer_price (r_Address, r_Name, priceID) VALUES
('789 Pine St', 'The Gourmet Kitchen', 'P003');
INSERT INTO R_offer_price (r_Address, r_Name, priceID) VALUES
('321 Elm St', 'The Cheesy Grin', 'P002');
INSERT INTO R_offer_price (r_Address, r_Name, priceID) VALUES
('654 Cedar Ave', 'The Spicy Bite', 'P001');
```

r_Address	r_Name	priceID
123 Main St	The Rusty Spoon	P001
654 Cedar Ave	The Spicy Bite	P001
321 Elm St	The Cheesy Grin	P002
456 Oak Ave	The Hungry Wolf	P002
789 Pine St	The Gourmet Kitchen	P003

- C_give_rating

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```
CREATE TABLE C_give_rating (
    ratingID VARCHAR(50),
    c_Email VARCHAR(50),
    c_ID VARCHAR(50),
    stars INTEGER,
    PRIMARY KEY (c_Email, c_ID, ratingID)
);
grant select on C_give_rating to public;

INSERT INTO C_give_rating (ratingID, c_Email, c_ID, stars) VALUES
('R001', 'alice@example.com', '111111', 2);
INSERT INTO C_give_rating (ratingID, c_Email, c_ID, stars) VALUES
('R002', 'bob@example.com', '222222', 3);
INSERT INTO C_give_rating (ratingID, c_Email, c_ID, stars) VALUES
('R003', 'charlie@example.com', '333333', 4);
INSERT INTO C_give_rating (ratingID, c_Email, c_ID, stars) VALUES
('R004', 'diana@example.com', '444444', 2);
INSERT INTO C_give_rating (ratingID, c_Email, c_ID, stars) VALUES
('R005', 'eric@example.com', '555555', 5);
INSERT INTO C_give_rating (ratingID, c_Email, c_ID, stars) VALUES
('R006', 'apple@example.com', '666666', 5);
INSERT INTO C_give_rating (ratingID, c_Email, c_ID, stars) VALUES
('R007', 'banana@example.com', '777777', 5);
INSERT INTO C_give_rating (ratingID, c_Email, c_ID, stars) VALUES
('R008', 'peach@example.com', '888888', 5);
INSERT INTO C_give_rating (ratingID, c_Email, c_ID, stars) VALUES
('R009', 'grape@example.com', '999999', 5);
INSERT INTO C_give_rating (ratingID, c_Email, c_ID, stars) VALUES
('R0010', 'grape@example.com', '999999', 1);
```

ratingID	c_Email	c_ID	stars
R001	alice@example.com	111111	2
R006	apple@example.com	666666	5
R007	banana@example.com	777777	5
R002	bob@example.com	222222	3
R003	charlie@example.com	333333	4
R004	diana@example.com	444444	2
R005	eric@example.com	555555	5
R0010	grape@example.com	999999	1
R009	grape@example.com	999999	5
R008	peach@example.com	888888	5

- [R_got_rating](#)

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```
CREATE TABLE R_got_rating (
    ratingID VARCHAR(50),
    stars INTEGER,
    r_Address VARCHAR(50),
    r_Name VARCHAR(50),
    c_Email VARCHAR(50),
    c_ID VARCHAR(50),
    PRIMARY KEY (r_Address, r_Name, ratingID),
    FOREIGN KEY (c_Email, c_ID, ratingID)
        REFERENCES C_give_rating(c_Email, c_ID, ratingID)
);
grant select on R_got_rating to public;

INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES
('R001', 2, '789 Pine St', 'The Gourmet Kitchen', 'alice@example.com', '111111');
INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES
('R002', 3, '456 Oak Ave', 'The Hungry Wolf', 'bob@example.com', '222222');
INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES
('R003', 4, '654 Cedar Ave', 'The Spicy Bite', 'charlie@example.com', '333333');
INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES
('R004', 2, '321 Elm St', 'The Cheesy Grin', 'diana@example.com', '444444');
INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES
('R005', 5, '123 Main St', 'The Rusty Spoon', 'eric@example.com', '555555');
INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES
('R006', 5, '123 Main St', 'The Rusty Spoon', 'apple@example.com', '666666');
INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES
('R007', 5, '123 Main St', 'The Rusty Spoon', 'banana@example.com', '777777');
INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES
('R008', 5, '123 Main St', 'The Rusty Spoon', 'peach@example.com', '888888');
INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES
('R009', 5, '123 Main St', 'The Rusty Spoon', 'grape@example.com', '999999');
INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES
('R0010', 1, '123 Robson St', 'The Pretty Knife', 'grape@example.com', '999999');
```

ratingID	stars	r_Address	r_Name	c_Email	c_ID
R005	5	123 Main St	The Rusty Spoon	eric@example.com	555555
R006	5	123 Main St	The Rusty Spoon	apple@example.com	666666
R007	5	123 Main St	The Rusty Spoon	banana@example.com	777777
R008	5	123 Main St	The Rusty Spoon	peach@example.com	888888
R009	5	123 Main St	The Rusty Spoon	grape@example.com	999999
R0010	1	123 Robson St	The Pretty Knife	grape@example.com	999999
R004	2	321 Elm St	The Cheesy Grin	diana@example.com	444444
R002	3	456 Oak Ave	The Hungry Wolf	bob@example.com	222222
R003	4	654 Cedar Ave	The Spicy Bite	charlie@example.com	333333
R001	2	789 Pine St	The Gourmet Kitchen	alice@example.com	111111

- b. A list of all SQL queries used and where it can be found in the Code (i.e., file name and line number(s)). For SQL query requirements, check the rubric listed on Canvas for Milestone 4.
- c. Screenshots demonstrating the functionality of each query using the GUI. We want to see a Before (in data.sql)/during/after progression of events. For example, the Before (in data.sql) screenshot would be what data is in the table Before (in data.sql) you run the query, the during screenshot(s) is how the query is triggered using the GUI, and the after screenshot is what data is in your table afterwards. Please label each set of screenshots with the name of the query it is meant to address (e.g., “Insert Operation”). You need only to include screenshots for the required queries – if you implemented more than what was required, screenshots are not needed for those extra queries.

1. Insertion

- a. Code reference (in userInterface.php)

```
function handleInsertRequest() {
    global $db_conn;
    //Getting the values from user and insert data into the table
    $tuple = array (
        ":email" => $_POST['Email'],
        ":id" => $_POST['ID'],
        ":pwd" => $_POST['pwd'],
        ":address" => $_POST['address']
    );
    $alltuples = array []
    $tuple
];
executeBoundSQL("insert into Customer values (:email, :id, :pwd, :address)",
    $alltuples);
OCICommit($db_conn);
}
```

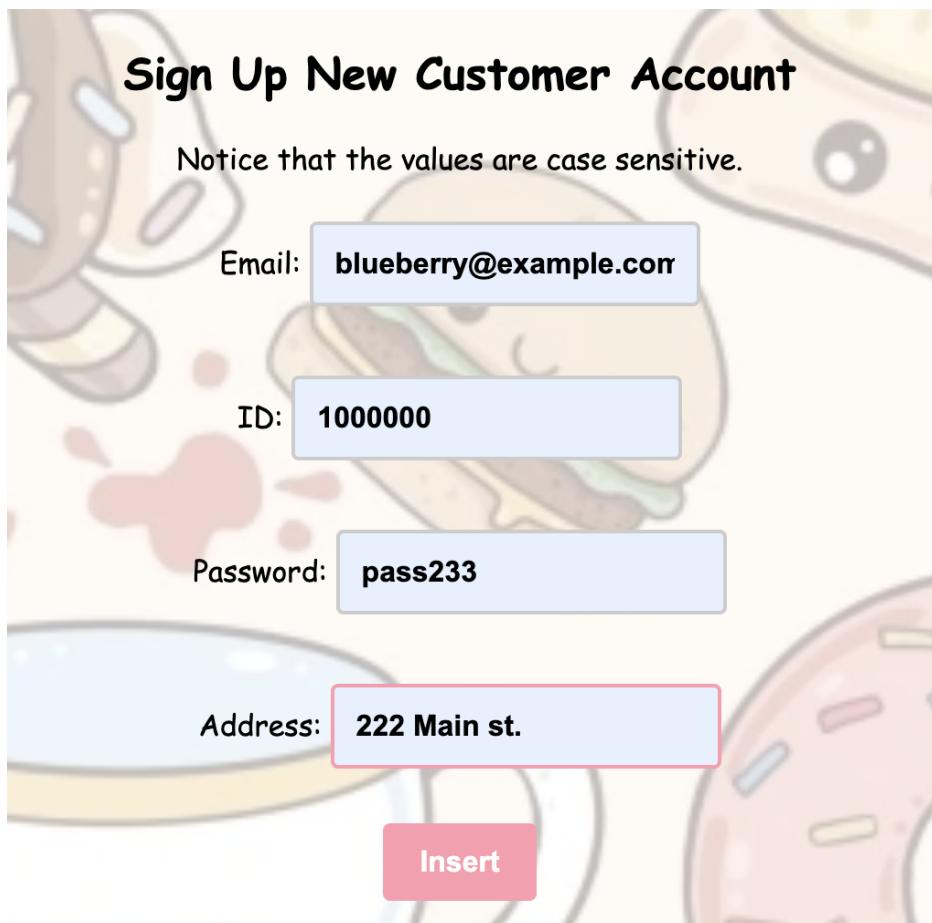
- b. Before (in data.sql)

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Email	ID	pwd	address
alice@example.com	111111	pass123	123 Main St.
bob@example.com	222222	pass456	456 Second St.
charlie@example.com	333333	pass789	789 Third St.
diana@example.com	444444	pass012	012 Fourth St.
eric@example.com	555555	pass345	345 Fifth St.
apple@example.com	666666	pass123	123 Main St.
banana@example.com	777777	pass123	100 Main St.
peach@example.com	888888	pass123	154 Main St.
grape@example.com	999999	pass123	897 Main St.

c. GUI input



d. After

Email	ID	pwd	address
alice@example.com	111111	pass123	123 Main St.
bob@example.com	222222	pass456	456 Second St.
charlie@example.com	333333	pass789	789 Third St.
diana@example.com	444444	pass012	012 Fourth St.
eric@example.com	555555	pass345	345 Fifth St.
apple@example.com	666666	pass123	123 Main St.
banana@example.com	777777	pass123	100 Main St.
peach@example.com	888888	pass123	154 Main St.
grape@example.com	999999	pass123	897 Main St.
blueberry@example.com	100000	pass233	222 Main St.

2. Deletion

a. Code reference (in userInterface.php)

```
function handleDeleteRequest() {
    global $db_conn;

    $id = $_POST['id'];
    $pwd = $_POST['pwd'];
    $email = $_POST['email'];

    $result = executePlainSQL("SELECT COUNT(*) FROM Customer WHERE ID = '" . $id . "'"
        AND Email = '" . $email . "' AND pwd = '" . $pwd . "'");
    $row = oci_fetch_row($result);

    if ($row[0] == 0) {
        echo "Oops! No account found, or you might have input a wrong password! <br>";
    } else {
        // Delete the row with the given ID, email, and password
        executePlainSQL("DELETE FROM Customer WHERE ID = '" . $id . "' AND Email = '" .
            $email . "' AND pwd = '" . $pwd . "'");
        echo "Account with ID $id and Email $email has been successfully deleted. <br>";
        OCICommit($db_conn);
    }
}
```

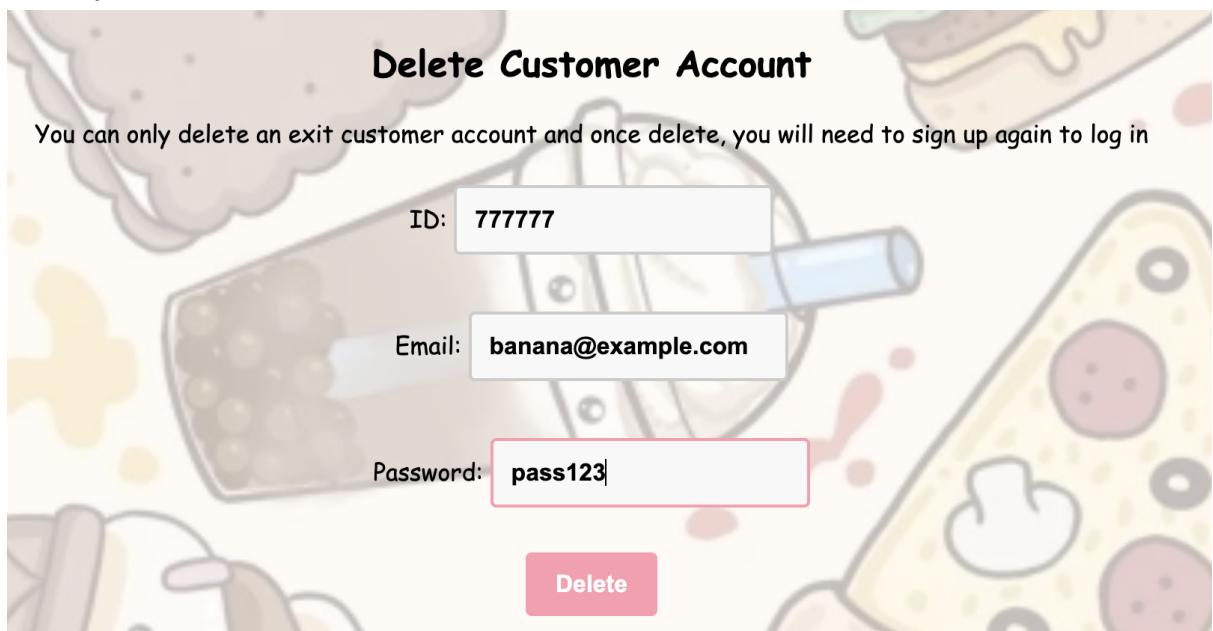
b. Before (in data.sql)

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Email	ID	pwd	address
<u>alice@example.com</u>	111111	pass123	123 Main St.
<u>bob@example.com</u>	222222	pass456	456 Second St.
<u>charlie@example.com</u>	333333	pass789	789 Third St.
<u>diana@example.com</u>	444444	pass012	012 Fourth St.
<u>eric@example.com</u>	555555	pass345	345 Fifth St.
<u>apple@example.com</u>	666666	pass123	123 Main St.
<u>banana@example.com</u>	777777	pass123	100 Main St.
<u>peach@example.com</u>	888888	pass123	154 Main St.
<u>grape@example.com</u>	999999	pass123	897 Main St.
<u>blueberry@example.com</u>	100000	pass233	222 Main St.

c. GUI input



d. After

Email	ID	pwd	address
<u>alice@example.com</u>	111111	pass123	123 Main St.
<u>bob@example.com</u>	222222	pass456	456 Second St.
<u>charlie@example.com</u>	333333	pass789	789 Third St.
<u>diana@example.com</u>	444444	pass012	012 Fourth St.
<u>eric@example.com</u>	555555	pass345	345 Fifth St.
<u>apple@example.com</u>	666666	pass123	123 Main St.
<u>peach@example.com</u>	888888	pass123	154 Main St.
<u>grape@example.com</u>	999999	pass123	897 Main St.
<u>blueberry@example.com</u>	100000	pass233	222 Main St.

3. Update Operation

- Code reference (in userInterface.php)

```
function handleUpdateRequest() {
    global $db_conn;

    $email = $_POST['email'];
    $id = $_POST['id'];
    $new_pwd = $_POST['new_pwd'];

    // you need to wrap the old name and new name values with single quotations
    executePlainSQL("UPDATE Customer SET pwd ='" . $new_pwd . "'"
                    | | | | | | | | WHERE id ='" . $id . "' AND Email = '" . $email . "'");
    OCICommit($db_conn);
}
```

- Before (in data.sql)

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Email	ID	pwd	address
alice@example.com	111111	pass123	123 Main St.
bob@example.com	222222	pass456	456 Second St.
charlie@example.com	333333	pass789	789 Third St.
diana@example.com	444444	pass012	012 Fourth St.
eric@example.com	555555	pass345	345 Fifth St.
apple@example.com	666666	pass123	123 Main St.
peach@example.com	888888	pass123	154 Main St.
grape@example.com	999999	pass123	897 Main St.
blueberry@example.com	100000	pass233	222 Main St.

c. GUI input (For customer: blueberry@example.com)

Change Password in Customer

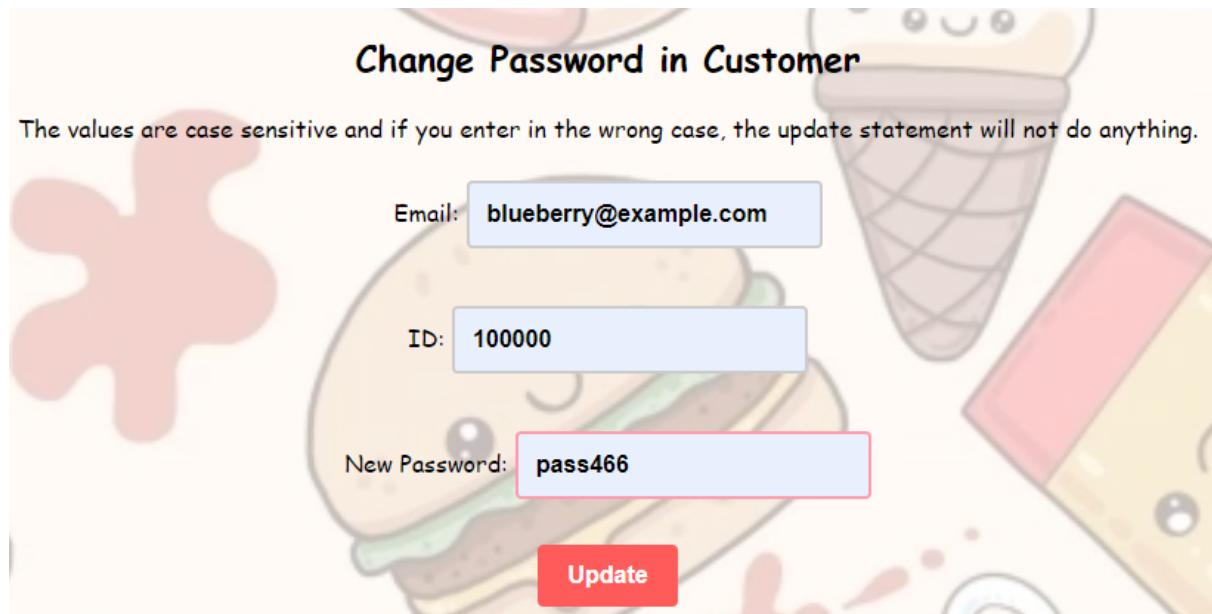
The values are case sensitive and if you enter in the wrong case, the update statement will not do anything.

Email:

ID:

New Password:

Update



d. After

Email	ID	pwd	address
alice@example.com	111111	pass123	123 Main St.
bob@example.com	222222	pass456	456 Second St.
charlie@example.com	333333	pass789	789 Third St.
diana@example.com	444444	pass012	012 Fourth St.
eric@example.com	555555	pass345	345 Fifth St.
apple@example.com	666666	pass123	123 Main St.
peach@example.com	888888	pass123	154 Main St.
grape@example.com	999999	pass123	897 Main St.
blueberry@example.com	100000	pass466	222 Main St.

4. Selection

- Code reference (in userInterface.php)

```
/* HANDLING */
// Select restaurant by Location
function handleSearchByLocation() {
    global $db_conn;
    $Location = $_GET['Location'];
    $result = executePlainSQL(
        "SELECT DISTINCT *
         FROM Restaurant r
         WHERE r.Location LIKE '%". $Location . "%'");
    printRestaurantResultLoc($result);
}
```

- Before (in data.sql)

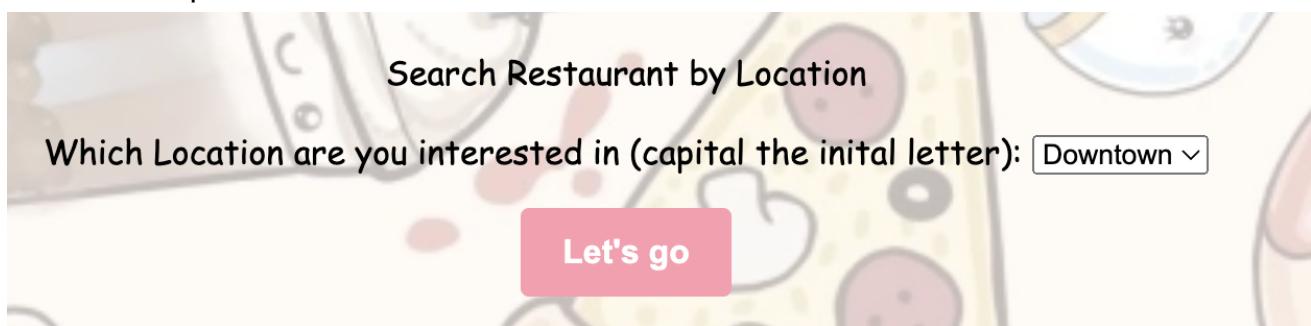
```
CREATE TABLE Restaurant (
    r_Address VARCHAR(50),
    r_Name VARCHAR(50),
    Location VARCHAR(50),
    Open_hour varchar(50),
    Max_allowance INTEGER,
    PRIMARY KEY (r_Address, r_Name)
);
grant select on Restaurant to public;
```

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```
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES ('123 Main St', 'The Rusty Spoon', 'Downtown', '10am - 10pm', 50);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES ('456 Oak Ave', 'The Hungry Wolf', 'Kitsilano', '11am - 9pm', 30);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES ('789 Pine St', 'The Gourmet Kitchen', 'West End', '9am - 11pm', 70);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES ('321 Elm St', 'The Cheesy Grin', 'Yaletown', '12pm - 10pm', 40);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES ('654 Cedar Ave', 'The Spicy Bite', 'Gastown', '11am - 11pm', 50);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES ('123 Robson St', 'The Pretty Knife', 'Downtown', '5pm - 10pm', 100);
```

c. GUI input



d. After

Name	Address	Location	Open Hour	Max Allowance
The Rusty Spoon	123 Main St	Downtown	10am - 10pm	50
The Pretty Knife	123 Robson St	Downtown	5pm - 10pm	100

5. Join

a. Code reference (in userInterface.php)

```
// Join Restaurant, R_is_DS, Dish_Style
function handleSearchByDishStyle() {
    global $db_conn;
    $DishStyle = $_GET['DishStyle'];
    $result = executePlainSQL(
        "SELECT DISTINCT r.r_Name, r.r_Address, r.Location, r.Open_hour, r.Max_allowance
         FROM Restaurant r, R_is_DS ri, Dish_Style d
        WHERE ri.r_Address = r.r_Address AND ri.r_Name = r.r_Name
              AND ri.StyleID = d.StyleID
              AND d.DS_name LIKE '%" . $DishStyle . "%'");
    printRestaurantResultDS($result);
}
```

b. Before (in data.sql)

```
CREATE TABLE Restaurant (
    r_Address VARCHAR(50),
    r_Name VARCHAR(50),
    Location VARCHAR(50),
    Open_hour varchar(50),
    Max_allowance INTEGER,
    PRIMARY KEY (r_Address, r_Name)
```

```
CREATE TABLE Dish_Style (
    StyleID varchar(50),
    DS_name varchar(50),
    PRIMARY KEY (StyleID))
```

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```
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('123 Main St', 'The Rusty Spoon', 'Downtown', '10am - 10pm', 50);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('456 Oak Ave', 'The Hungry Wolf', 'Kitsilano', '11am - 9pm', 30);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('789 Pine St', 'The Gourmet Kitchen', 'West End', '9am - 11pm', 70);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('321 Elm St', 'The Cheesy Grin', 'Yaletown', '12pm - 10pm', 40);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('654 Cedar Ave', 'The Spicy Bite', 'Gastown', '11am - 11pm', 50);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('123 Robson St', 'The Pretty Knife', 'Downtown', '5pm - 10pm', 100);
```

```
INSERT INTO Dish_Style(StyleID, DS_name) VALUES
('DS001', 'Chinese');
INSERT INTO Dish_Style(StyleID, DS_name) VALUES
('DS002', 'Italian');
INSERT INTO Dish_Style(StyleID, DS_name) VALUES
('DS003', 'Mexican');
INSERT INTO Dish_Style(StyleID, DS_name) VALUES
('DS004', 'Japanese');
INSERT INTO Dish_Style(StyleID, DS_name) VALUES
('DS005', 'American');
```

```
INSERT INTO R_is_DS (r_Address, r_Name, StyleID) VALUES
('123 Main St', 'The Rusty Spoon', 'DS001');
INSERT INTO R_is_DS (r_Address, r_Name, StyleID) VALUES
('456 Oak Ave', 'The Hungry Wolf', 'DS002');
INSERT INTO R_is_DS (r_Address, r_Name, StyleID) VALUES
('789 Pine St', 'The Gourmet Kitchen', 'DS003');
INSERT INTO R_is_DS (r_Address, r_Name, StyleID) VALUES
('321 Elm St', 'The Cheesy Grin', 'DS004');
INSERT INTO R_is_DS (r_Address, r_Name, StyleID) VALUES
('654 Cedar Ave', 'The Spicy Bite', 'DS005');
```

c. GUI input



d. After

Nice Style choice!
Here are the restaurants we recommend:

Name	Address	Location	Open Hour	Max Allowance
The Rusty Spoon	123 Main St	Downtown	10am - 10pm	50

6. Projection

a. Code reference (in userInterface.php)

```
// Only Select the restaurant information in the cross-product of Restaurant, R_Include_T, RType
function handleSearchByType() {
    global $db_conn;
    $Type = $_GET['Type'];
    $result = executePlainSQL(
        "SELECT DISTINCT r.r_Name, r.r_Address, r.Location, r.Open_hour, r.Max_allowance
         FROM Restaurant r, R_Include_T ri, RTyple t
         WHERE ri.r_Address = r.r_Address AND ri.r_Name = r.r_Name
             AND ri.RtypeID = t.RtypeID
             AND t.Rtypename LIKE '%" . $Type . "%'");
    printRestaurantResultT($result);
}
```

b. Before (in data.sql)

```
CREATE TABLE Restaurant (
    r_Address VARCHAR(50),
    r_Name VARCHAR(50),
    Location VARCHAR(50),
    Open_hour varchar(50),
    Max_allowance INTEGER,
    PRIMARY KEY (r_Address, r_Name)
);
grant select on Restaurant to public;
```

```
CREATE TABLE RTyple (
    RTypeID varchar(50),
    Rtypename varchar(50),
    PRIMARY KEY (RTypeID)
);
grant select on RTyple to public;
```

```
CREATE TABLE R_Include_T (
    r_Address VARCHAR(50),
    r_Name VARCHAR(50),
    RtypeID VARCHAR(50) NOT NULL,
    PRIMARY KEY (r_Address, r_Name, RtypeID),
    FOREIGN KEY (RtypeID) REFERENCES RTyple(RTypeID)
);
```

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```
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES  
('123 Main St', 'The Rusty Spoon', 'Downtown', '10am - 10pm', 50);  
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES  
('456 Oak Ave', 'The Hungry Wolf', 'Kitsilano', '11am - 9pm', 30);  
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES  
('789 Pine St', 'The Gourmet Kitchen', 'West End', '9am - 11pm', 70);  
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES  
('321 Elm St', 'The Cheesy Grin', 'Yaletown', '12pm - 10pm', 40);  
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES  
('654 Cedar Ave', 'The Spicy Bite', 'Gastown', '11am - 11pm', 50);  
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES  
('123 Robson St', 'The Pretty Knife', 'Downtown', '5pm - 10pm', 100);
```

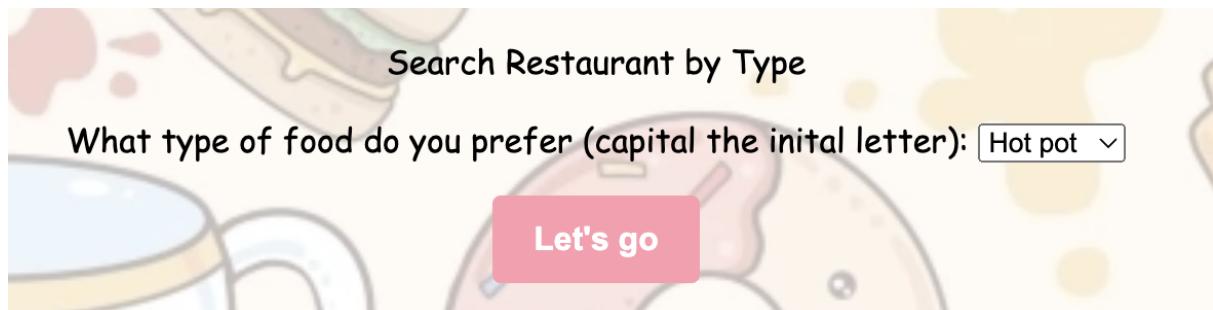
```
INSERT INTO RType(RtypeID, Rtypename) VALUES  
('T001', 'Hot pot');  
INSERT INTO RType(RtypeID, Rtypename) VALUES  
('T002', 'Pizza');  
INSERT INTO RType(RtypeID, Rtypename) VALUES  
('T003', 'Tacos');  
INSERT INTO RType(RtypeID, Rtypename) VALUES  
('T004', 'Seafood');  
INSERT INTO RType(RtypeID, Rtypename) VALUES  
('T005', 'Burger');
```

```
INSERT INTO R_Include_T (r_Address, r_Name, RtypeID) VALUES  
('123 Main St', 'The Rusty Spoon', 'T001');  
INSERT INTO R_Include_T (r_Address, r_Name, RtypeID) VALUES  
('456 Oak Ave', 'The Hungry Wolf', 'T002');  
INSERT INTO R_Include_T (r_Address, r_Name, RtypeID) VALUES  
('789 Pine St', 'The Gourmet Kitchen', 'T003');  
INSERT INTO R_Include_T (r_Address, r_Name, RtypeID) VALUES  
('321 Elm St', 'The Cheesy Grin', 'T004');  
INSERT INTO R_Include_T (r_Address, r_Name, RtypeID) VALUES  
('654 Cedar Ave', 'The Spicy Bite', 'T001');
```

c. GUI input

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d. After

A screenshot of a web application interface showing a table of recommended restaurants. The table has columns: Name, Address, Location, Open Hour, and Max Allowance. Two rows are shown: "The Rusty Spoon" at "123 Main St" in "Downtown" from "10am - 10pm" with a "Max Allowance" of "50", and "The Spicy Bite" at "654 Cedar Ave" in "Gastown" from "11am - 11pm" with a "Max Allowance" of "50".

Name	Address	Location	Open Hour	Max Allowance
The Rusty Spoon	123 Main St	Downtown	10am - 10pm	50
The Spicy Bite	654 Cedar Ave	Gastown	11am - 11pm	50

7. Aggregation with Group by

a. Code reference (in userInterface.php) (in userInterface.php)

```
// List the number of ratings for restaurants in each location (decreasing order)
//Aggregation with group by
function handleDisplayPopularRequest(){
    global $db_conn;
    $result = executePlainSQL("SELECT COUNT(rr2.ratingID), rr2.r_Name, rr2.r_Address,
    r.Location
    from R_got_rating rr2, Restaurant r
    where rr2.r_Name = r.r_Name and
    rr2.r_Address = r.r_Address
    group by r.Location, rr2.r_Name, rr2.r_Address
    ORDER BY COUNT(rr2.ratingID) DESC");
    printNRResult($result);}
```

b. Before (in data.sql) (in data.sql)

```
CREATE TABLE R_got_rating (
    ratingID VARCHAR(50),
    stars INTEGER,
    r_Address VARCHAR(50),
    r_Name VARCHAR(50),
    c_Email VARCHAR(50),
    c_ID VARCHAR(50),
    PRIMARY KEY (r_Address, r_Name, ratingID),
    FOREIGN KEY (c_Email, c_ID, ratingID)
    REFERENCES C_give_rating(c_Email, c_ID, ratingID)
);
grant select on R_got_rating to public;
```

```
CREATE TABLE Restaurant (
    r_Address VARCHAR(50),
    r_Name VARCHAR(50),
    Location VARCHAR(50),
    Open_hour varchar(50),
    Max_allowance INTEGER,
    PRIMARY KEY (r_Address, r_Name)
);
grant select on Restaurant to public;
```

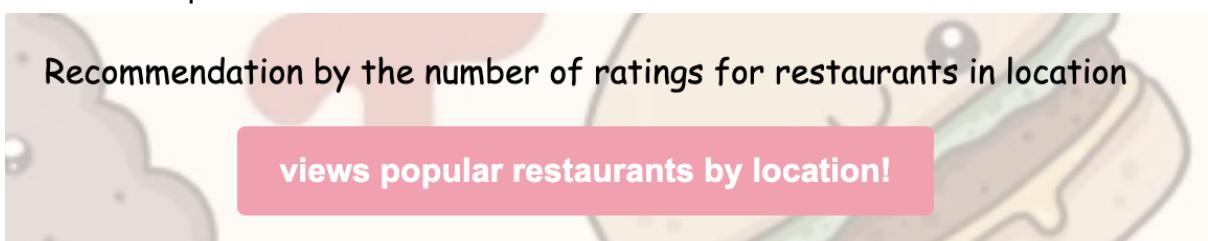
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```
|  
INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES  
('R001', 2, '789 Pine St', 'The Gourmet Kitchen', 'alice@example.com', '1111111');  
INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES  
('R002', 3, '456 Oak Ave', 'The Hungry Wolf', 'bob@example.com', '2222222');  
INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES  
('R003', 4, '654 Cedar Ave', 'The Spicy Bite', 'charlie@example.com', '3333333');  
INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES  
('R004', 2, '321 Elm St', 'The Cheesy Grin', 'diana@example.com', '4444444');  
INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES  
('R005', 5, '123 Main St', 'The Rusty Spoon', 'eric@example.com', '5555555');  
INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES  
('R006', 5, '123 Main St', 'The Rusty Spoon', 'apple@example.com', '6666666');  
INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES  
('R007', 5, '123 Main St', 'The Rusty Spoon', 'banana@example.com', '7777777');  
INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES  
('R008', 5, '123 Main St', 'The Rusty Spoon', 'peach@example.com', '8888888');  
INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES  
('R009', 5, '123 Main St', 'The Rusty Spoon', 'grape@example.com', '9999999');  
INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES  
('R0010', 1, '123 Robson St', 'The Pretty Knife', 'grape@example.com', '9999999');
```

```
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES  
('123 Main St', 'The Rusty Spoon', 'Downtown', '10am - 10pm', 50);  
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES  
('456 Oak Ave', 'The Hungry Wolf', 'Kitsilano', '11am - 9pm', 30);  
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES  
('789 Pine St', 'The Gourmet Kitchen', 'West End', '9am - 11pm', 70);  
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES  
('321 Elm St', 'The Cheesy Grin', 'Yaletown', '12pm - 10pm', 40);  
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES  
('654 Cedar Ave', 'The Spicy Bite', 'Gastown', '11am - 11pm', 50);  
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES  
('123 Robson St', 'The Pretty Knife', 'Downtown', '5pm - 10pm', 100);
```

c. GUI input



d. After

Here are the restaurants we recommend:

Location	Num of Ratings	Restaurant Name	Restaurant Address
Downtown	5	The Rusty Spoon	123 Main St
Kitsilano	1	The Hungry Wolf	456 Oak Ave
Gastown	1	The Spicy Bite	654 Cedar Ave
Yaletown	1	The Cheesy Grin	321 Elm St
Downtown	1	The Pretty Knife	123 Robson St
West End	1	The Gourmet Kitchen	789 Pine St

8. Aggregation with Having

a. Code reference (in userInterface.php) (in userInterface.php)

```
//return the restaurant name and address of the selecting location, only list the
restaurants with at least 3 features
//Aggregation with having
function handleDisplayMostPopularRequest(){
    global $db_conn;
    $result = executePlainSQL("SELECT COUNT(rf.featureID), rf.r_Name, rf.r_Address
                                FROM Restaurant r, R_has_F rf, Feature f
                                WHERE r.r_Name = rf.r_Name AND
                                      r.r_Address = rf.r_Address AND
                                      rf.featureID = f.featureID
                                GROUP BY rf.r_Address, rf.r_Name
                                HAVING COUNT(rf.featureID) > 2");
    printMFRResult($result);}

```

b. Before (in data.sql) (in data.sql)

```
CREATE TABLE Feature (
    FeatureID varchar(50),
    description varchar(50),
    PRIMARY KEY (FeatureID)
);
grant select on Feature to public;
```

```
CREATE TABLE Restaurant (
    r_Address VARCHAR(50),
    r_Name VARCHAR(50),
    Location VARCHAR(50),
    Open_hour varchar(50),
    Max_allowance INTEGER,
    PRIMARY KEY (r_Address, r_Name)
);
grant select on Restaurant to public;
```

```
CREATE TABLE R_has_F (
    r_Address VARCHAR(50),
    r_Name VARCHAR(50),
    featureID VARCHAR(50) NOT NULL,
    PRIMARY KEY (r_Address, r_Name, featureID),
    FOREIGN KEY (featureID) REFERENCES Feature(FeatureID)
);
grant select on R_has_F to public;
```

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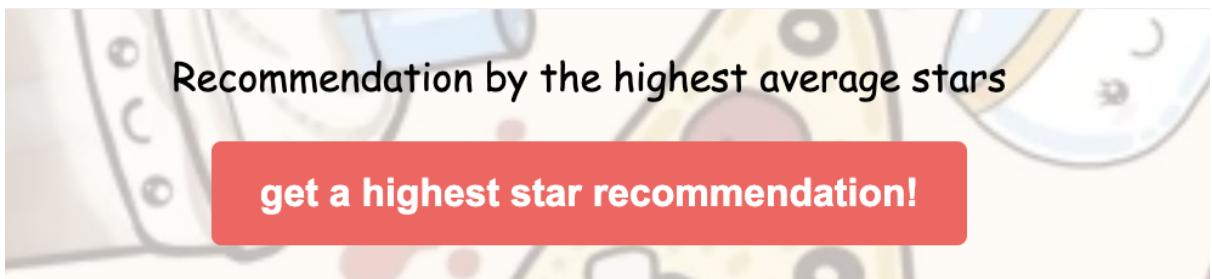
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```
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('123 Main St', 'The Rusty Spoon', 'F001');
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('456 Oak Ave', 'The Hungry Wolf', 'F003');
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('789 Pine St', 'The Gourmet Kitchen', 'F002');
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('321 Elm St', 'The Cheesy Grin', 'F003');
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('654 Cedar Ave', 'The Spicy Bite', 'F005');
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('654 Cedar Ave', 'The Spicy Bite', 'F001');
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('654 Cedar Ave', 'The Spicy Bite', 'F002');
```

```
INSERT INTO Feature(FeatureID, description) VALUES
('F001', 'Outdoor Seating');
INSERT INTO Feature(FeatureID, description) VALUES
('F002', 'Vegetarian Options');
INSERT INTO Feature(FeatureID, description) VALUES
('F003', 'Gluten-free Options');
INSERT INTO Feature(FeatureID, description) VALUES
('F004', 'Live Music');
INSERT INTO Feature(FeatureID, description) VALUES
('F005', 'Happy Hour');
```

```
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('123 Main St', 'The Rusty Spoon', 'Downtown', '10am - 10pm', 50);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('456 Oak Ave', 'The Hungry Wolf', 'Kitsilano', '11am - 9pm', 30);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('789 Pine St', 'The Gourmet Kitchen', 'West End', '9am - 11pm', 70);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('321 Elm St', 'The Cheesy Grin', 'Yaletown', '12pm - 10pm', 40);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('654 Cedar Ave', 'The Spicy Bite', 'Gastown', '11am - 11pm', 50);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('123 Robson St', 'The Pretty Knife', 'Downtown', '5pm - 10pm', 100);
```

c. GUI input



d. After

Here are the restaurants we recommend:

Stars	Restaurant Name	Restaurant Address
5	The Rusty Spoon	123 Main St

9. Nested Aggregation with Group by

a. Code reference (in userInterface.php)

```
// List the number of ratings for restaurants in each location (decreasing order)
//Aggregation with group by
function handleDisplayPopularRequest(){
    global $db_conn;
    $result = executePlainSQL("SELECT COUNT(rr2.ratingID), rr2.r_Name, rr2.r_Address,
    r.Location
    from R_got_rating rr2, Restaurant r
    where rr2.r_Name = r.r_Name and
    |   | rr2.r_Address = r.r_Address
    group by r.Location, rr2.r_Name, rr2.r_Address
    ORDER BY COUNT(rr2.ratingID) DESC");
    printNRResult($result);}
```

b. Before (in data.sql)

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```
CREATE TABLE R_got_rating (
    ratingID VARCHAR(50),
    stars INTEGER,
    r_Address VARCHAR(50),
    r_Name VARCHAR(50),
    c_Email VARCHAR(50),
    c_ID VARCHAR(50),
    PRIMARY KEY (r_Address, r_Name, ratingID),
    FOREIGN KEY (c_Email, c_ID, ratingID)
        REFERENCES C_give_rating(c_Email, c_ID, ratingID)
);
grant select on R_got_rating to public;

CREATE TABLE Restaurant (
    r_Address VARCHAR(50),
    r_Name VARCHAR(50),
    Location VARCHAR(50),
    Open_hour varchar(50),
    Max_allowance INTEGER,
    PRIMARY KEY (r_Address, r_Name)
);
grant select on Restaurant to public;

| INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES ('R001', 2, '789 Pine St', 'The Gourmet Kitchen', 'alice@example.com', '1111111');
| INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES ('R002', 3, '456 Oak Ave', 'The Hungry Wolf', 'bob@example.com', '2222222');
| INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES ('R003', 4, '654 Cedar Ave', 'The Spicy Bite', 'charlie@example.com', '3333333');
| INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES ('R004', 2, '321 Elm St', 'The Cheesy Grin', 'diana@example.com', '4444444');
| INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES ('R005', 5, '123 Main St', 'The Rusty Spoon', 'eric@example.com', '5555555');
| INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES ('R006', 5, '123 Main St', 'The Rusty Spoon', 'apple@example.com', '6666666');
| INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES ('R007', 5, '123 Main St', 'The Rusty Spoon', 'banana@example.com', '7777777');
| INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES ('R008', 5, '123 Main St', 'The Rusty Spoon', 'peach@example.com', '8888888');
| INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES ('R009', 5, '123 Main St', 'The Rusty Spoon', 'grape@example.com', '9999999');
| INSERT INTO R_got_rating (ratingID, stars, r_Address, r_Name, c_Email, c_ID) VALUES ('R0010', 1, '123 Robson St', 'The Pretty Knife', 'grape@example.com', '9999999');

INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES ('123 Main St', 'The Rusty Spoon', 'Downtown', '10am - 10pm', 50);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES ('456 Oak Ave', 'The Hungry Wolf', 'Kitsilano', '11am - 9pm', 30);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES ('789 Pine St', 'The Gourmet Kitchen', 'West End', '9am - 11pm', 70);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES ('321 Elm St', 'The Cheesy Grin', 'Yaletown', '12pm - 10pm', 40);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES ('654 Cedar Ave', 'The Spicy Bite', 'Gastown', '11am - 11pm', 50);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES ('123 Robson St', 'The Pretty Knife', 'Downtown', '5pm - 10pm', 100);
```

c. GUI input

The screenshot shows a mobile application interface. At the top, there is a banner with the text "Recommendation for restaurants having at least 3 features". Below this, a pink button contains the text "get restaurants with at least 3 features!". The main content area has a background of a stylized city skyline at night. It displays the message "Here are the restaurants we recommend:" followed by a table. The table has three columns: "Num of features", "Restaurant Name", and "Restaurant Address". The first row shows a value of "3" under "Num of features", "The Spicy Bite" under "Restaurant Name", and "654 Cedar Ave" under "Restaurant Address".

Num of features	Restaurant Name	Restaurant Address
3	The Spicy Bite	654 Cedar Ave

d. After

10. Division

a. Code reference (in userInterface.php)

```
//list the recipe names without selected gradient(Division)
function handleDivisionRestaurantRequest(){
    global $db_conn;
    if(isset($_POST['features'])) {
        $features = $_POST['features'];
        $num_features = count($features);

        // BuserInterfaceld the SQL query
        $query = "SELECT DISTINCT *
                  FROM Restaurant r
                 WHERE NOT EXISTS (
                     SELECT f.Description
                       FROM Feature f
                      WHERE f.FeatureID NOT IN (
                          SELECT rf.featureID
                            FROM R_has_F rf
                           WHERE rf.r_Address = r.r_Address
                             AND rf.r_Name = r.r_Name
                        )
                     AND f.Description IN ('" . implode("'", "'", $features) . "')
                )";
        $result = executePlainSQL($query);

        // Print the result
        printDRResult($result);

    } else {
        // If no features are selected, display all restaurants
        $result = executePlainSQL("SELECT * FROM Restaurant");

        // Print the result
        printDRResult($result);
    }
}
```

b. Before (in data.sql)

```
CREATE TABLE Restaurant (
    r_Address VARCHAR(50),
    r_Name VARCHAR(50),
    Location VARCHAR(50),
    Open_hour varchar(50),
    Max_allowance INTEGER,
    PRIMARY KEY (r_Address, r_Name)
);
grant select on Restaurant to public;
```

```
CREATE TABLE Feature (
    FeatureID varchar(50),
    description varchar(50),
    PRIMARY KEY (FeatureID)
);
grant select on Feature to public;
```

```
CREATE TABLE R_has_F (
    r_Address VARCHAR(50),
    r_Name VARCHAR(50),
    featureID VARCHAR(50) NOT NULL,
    PRIMARY KEY (r_Address, r_Name, featureID),
    FOREIGN KEY (featureID) REFERENCES Feature(FeatureID)
);
grant select on R_has_F to public;
```

```
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('123 Main St', 'The Rusty Spoon', 'F001');
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('456 Oak Ave', 'The Hungry Wolf', 'F003');
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('789 Pine St', 'The Gourmet Kitchen', 'F002');
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('321 Elm St', 'The Cheesy Grin', 'F003');
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('654 Cedar Ave', 'The Spicy Bite', 'F005');
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('654 Cedar Ave', 'The Spicy Bite', 'F001');
INSERT INTO R_has_F (r_Address, r_Name, featureID) VALUES
('654 Cedar Ave', 'The Spicy Bite', 'F002');
```

```
INSERT INTO Feature(FeatureID, description) VALUES
('F001', 'Outdoor Seating');
INSERT INTO Feature(FeatureID, description) VALUES
('F002', 'Vegetarian Options');
INSERT INTO Feature(FeatureID, description) VALUES
('F003', 'Gluten-free Options');
INSERT INTO Feature(FeatureID, description) VALUES
('F004', 'Live Music');
INSERT INTO Feature(FeatureID, description) VALUES
('F005', 'Happy Hour');
```

```
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('123 Main St', 'The Rusty Spoon', 'Downtown', '10am - 10pm', 50);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('456 Oak Ave', 'The Hungry Wolf', 'Kitsilano', '11am - 9pm', 30);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('789 Pine St', 'The Gourmet Kitchen', 'West End', '9am - 11pm', 70);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('321 Elm St', 'The Cheesy Grin', 'Yaletown', '12pm - 10pm', 40);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('654 Cedar Ave', 'The Spicy Bite', 'Gastown', '11am - 11pm', 50);
INSERT INTO Restaurant (r_Address, r_Name, Location, Open_hour, Max_allowance) VALUES
('123 Robson St', 'The Pretty Knife', 'Downtown', '5pm - 10pm', 100);
```

c. GUI input

Want a Perfect Match?

Pick the restaurant with your ideal features! :P

I want Vegetarian Options!

I want Gluten-free Options!

I want Happy Hour!

I want Outdoor Seating!

I want Live Music!

Submit

University of British Columbia, Vancouver
Department of Computer Science

d. After



Nice Style choice!
Here are the restaurants we recommend:

Name	Address	Location	Open Hour	Max Allowance
The Spicy Bite	654 Cedar Ave	Gastown	11am - 11pm	50

Thanks for reviewing!