CS 166 Project Report

Group Information

Group #65

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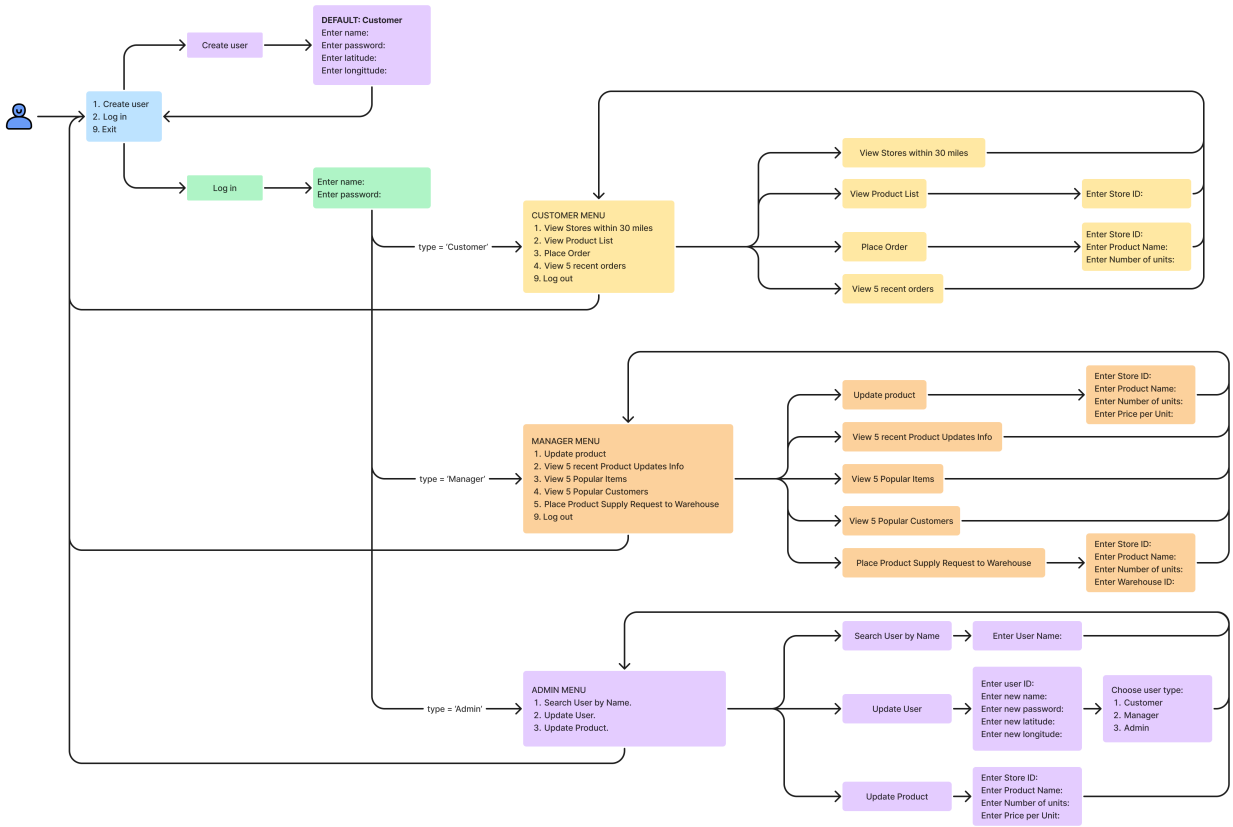
Implementation Description

You can create a new account using `Create user`. By default every new user has the type `Customer` which can later be modified by `Admin`. When the account is created you can log in using `Log in` option. Depending on the user type you have different menu options. For example, if your user type is `Customer`, you can view stores within 30 miles, view product list, place an order or view 5 recent orders. Here is the interface flow to better understand what options are available:



Queries

Return tuples with a given store ID.

```
SELECT *
FROM Store
WHERE storeid = <storeID>;
```

This query is to validate the store ID input.

Add new user.

```
INSERT INTO USERS (name, password, latitude, longitude, type) VALUES
(<name>, <password>, <latitude>, <longitude>, <type>);
```

This query is for `Create User` menu option.

Find existing user.

```
SELECT *
FROM USERS
WHERE name = <name> AND password = <password>;
```

This query is for `Log in` menu option.

Return the user type given user ID.

```
SELECT type
FROM Users
WHERE userid = <userID>;
```

This query is to determine which menu to display after `Log in`.

Return manager ID given store ID.

```
SELECT managerid
FROM Store
WHERE storeid = <storeID>;
```

This query is used to validate that the manager has access only to their storefront.

Return product infromation given store ID and product name.

```

```

```
SELECT *
FROM Product
WHERE storeid = <storeID> AND productname = <productName>;
```

This query is used to check if the store carries the product.

Update product information in a given store.

```
UPDATE Product SET priceperunit = <PricePerUnit>, numberofunits =
<NumberofUnits> WHERE storeid = <StoreID> AND productname = <ProductName>;
```

This query is to update the product information.

Add information about the product update to the ProductUpdates table.

```
INSERT INTO ProductUpdates (managerID, storeid, productname, updatedOn)
VALUES (<ManagerID>, <StoreID>, <ProductName>, <CurrentDate>);
```

This query is to add information about the product update by the `Manager` or `Admin`.

Return the last 5 updates given the store ID.

```
SELECT *
FROM ProductUpdates
WHERE storeid = <StoreID>
ORDER BY updatedOn DESC
LIMIT 5;
```

This query is used to return the last 5 updates in the store.

For each product in a given store return the product name and the amount of that prosuct ordered. Print 5 most ordered products.

```
SELECT productname, SUM(unitsordered) AS total_units_sold
FROM Orders
WHERE storeid = <StoreID>
GROUP BY productname
ORDER BY total_units_sold DESC
LIMIT 5;
```

This query is used to print the most popular products in the store.

For each customer return the number of orders that customaer made. Return 5 customers with the most orders.

```
SELECT customerid, COUNT(*) AS total_orders
FROM Orders
WHERE storeid = <StoreID>
GROUP BY customerid
ORDER BY total_orders DESC
LIMIT 5;
```

This query is used to print the most popular `Customer`s.

Return all warehouse information given warehouse ID.

```
SELECT *
FROM Warehouse
WHERE warehouseid = <WarehouseID>;
```

This query is used to check if the given warehouse exists.

Add a new record to the product supply request.

```
INSERT INTO ProductSupplyRequests (managerid, storeid, productname,
unitsrequested, warehouseid) VALUES (<ManagerID>, <StoreID>, <ProductName>,
<UnitsRequested>, <WarehouseID>);
```

This query is sused to add the product supply request from the `Manager`.

Change user information.

```
UPDATE Users SET name = <UserName>, password = <Password>, latitude =
<Latitude>, longitude = <Longitude>, type = <UserType> WHERE userid =
<UserID>;
```

This query is used by `Admin` to update user information.

Return all store's latitude and longitude.

```
SELECT storeID, latitude, longitude FROM Store
```

This is query is used to get all store's latitude and longitude for checking distance to customer.

Return user's latitude and longitude given user ID.

```
SELECT latitude, longitude FROM Users WHERE userid = <UserID>
```

This is query is used to get the users latitude and longitude for checking store distance.

Return all store's givin store IDs.

```
SELECT storeID FROM Store WHERE storeID IN <StoreIDs>
```

This query is used to check if stores are within a set of store IDs with a valid distance to customer.

Return products given store ID.

```
SELECT productName, numberOfUnits, pricePerUnit FROM Product WHERE storeID
= <StoreId>
```

This query if used to return all products within a store.

Return store latitude and longitdue given store ID.

```
SELECT latitude, longitude FROM Store WHERE storeid = <StoreID>
```

This query is used to get a store to check its distance to a customer.

Update product number of units in a given store.

```
UPDATE Product SET numberofunits = <NumberofUnits> WHERE storeid =
<StoreID> AND productname = <ProductName>
```

This query is used to update a prouduct from a order from a `Customer`.

Add a new record to the order.

```
INSERT INTO Orders (customerid, storeid, productname, unitsOrdered,
orderTime) VALUES (<CustomerID>, <StoreID>, <ProductName>, <UnitsOrdered>,
<CurrentDate>)
```

This query is to insert a new order from a `Customer`

Return the last 5 orders given customer ID.

```
SELECT productName, unitsOrdered, orderTime FROM Orders WHERE customerID =
<CustomerID> ORDER BY orderTime DESC LIMIT 5
```

This query is used to get the five latest orders from a `Customer`.

Extra credit

Triggers

```
DROP TRIGGER IF EXISTS trg_product_update ON Product;

CREATE OR REPLACE LANGUAGE plpgsql;
CREATE OR REPLACE FUNCTION product_update()
RETURNS "trigger" AS
$BODY$
BEGIN
  INSERT INTO ProductUpdates (storeid, productname, updatedon, managerid)
  VALUES (NEW.storeid, NEW.productname, now(), (SELECT managerid FROM Store
WHERE storeid = NEW.storeid));
  RETURN NEW;
END;
$BODY$
LANGUAGE plpgsql VOLATILE;

CREATE TRIGGER trg_product_update
AFTER UPDATE ON Product
FOR EACH ROW EXECUTE PROCEDURE product_update();
```

This trigger adds information to the `ProductUpdates` after a `Manager` updates the product.

```
DROP TRIGGER IF EXISTS trg_new_order ON Orders;

CREATE OR REPLACE LANGUAGE plpgsql;
CREATE OR REPLACE FUNCTION product_units_update()
RETURNS "trigger" AS
$BODY$
DECLARE
  oldUnits  integer;
BEGIN
  oldUnits := (SELECT numberOfUnits FROM Product WHERE storeID =
NEW.storeID AND productName = NEW.productName);
  UPDATE Product SET numberOfUnits = oldUnits - NEW.unitsOrdered WHERE
storeID = NEW.storeID AND productname = NEW.productName;
```

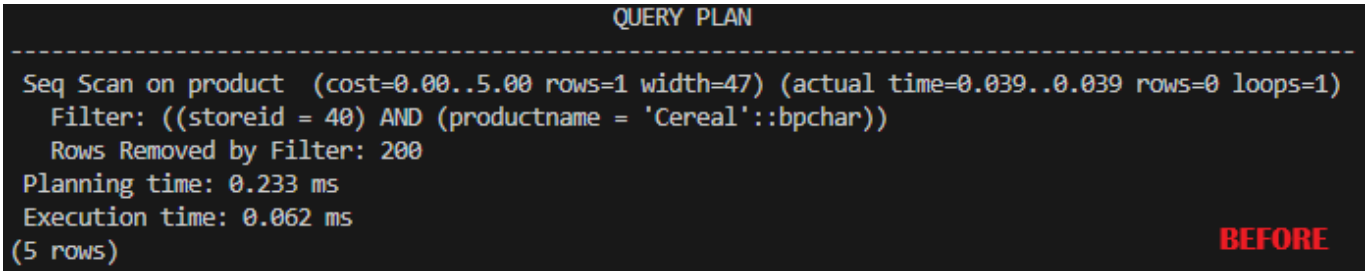
```
    RETURN NEW;
  END;
  $BODY$
  LANGUAGE plpgsql VOLATILE;

  CREATE TRIGGER trg_new_order
  AFTER INSERT ON Orders
  FOR EACH ROW EXECUTE PROCEDURE product_units_update();
```

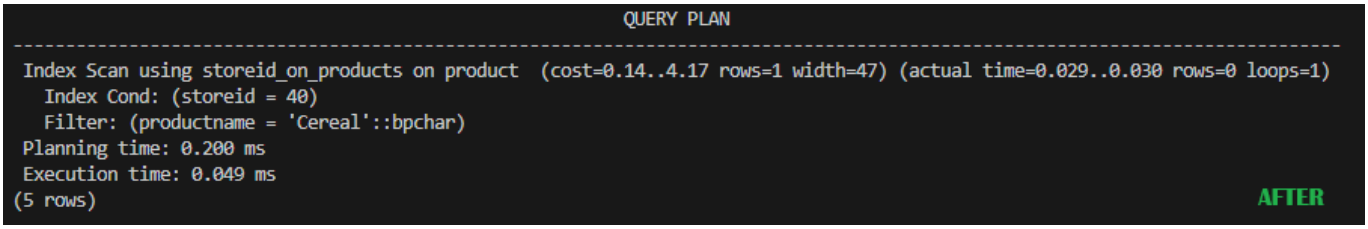
This trigger updates information on the `Product` after a `Customer` places an order.

Indices

```
  CREATE INDEX storeID_on_products ON product USING btree (storeid);
```

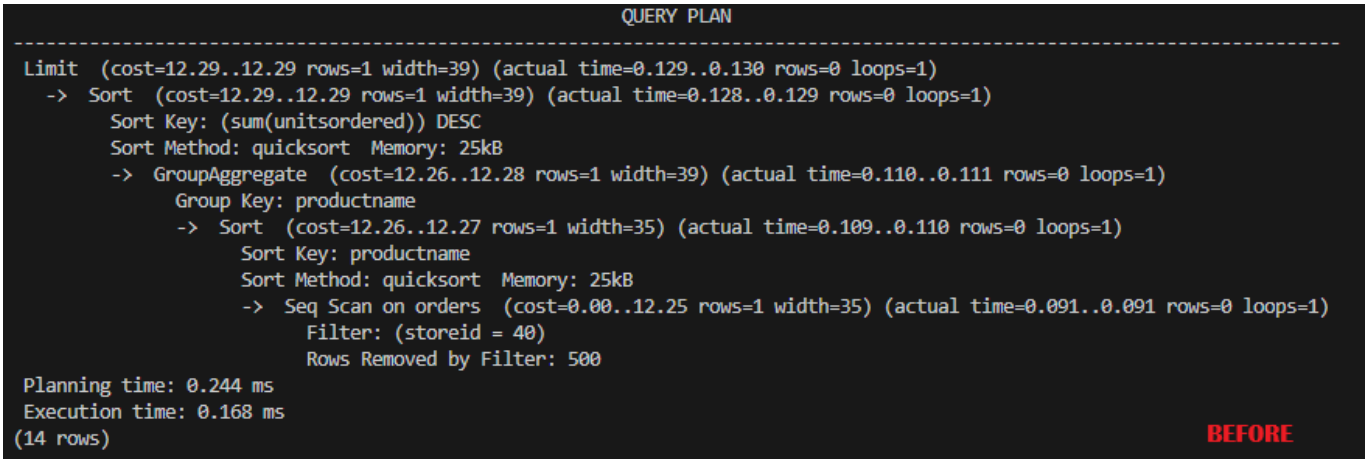
This index improves the query on `Product`.






```
  CREATE INDEX storeID_on_orders ON orders USING btree (storeid);
```

This index improves the query on `Orders`.



```
                                    QUERY PLAN
---------------------------------------------------------------------------------------------------------------------------------------
 Limit  (cost=8.31..8.31 rows=1 width=39) (actual time=0.055..0.056 rows=0 loops=1)
   ->  Sort  (cost=8.31..8.31 rows=1 width=39) (actual time=0.054..0.055 rows=0 loops=1)
         Sort Key: (sum(unitsordered)) DESC
         Sort Method: quicksort  Memory: 25kB
         ->  GroupAggregate  (cost=8.28..8.30 rows=1 width=39) (actual time=0.048..0.049 rows=0 loops=1)
               Group Key: productname
               ->  Sort  (cost=8.28..8.28 rows=1 width=35) (actual time=0.047..0.048 rows=0 loops=1)
                     Sort Key: productname
                     Sort Method: quicksort  Memory: 25kB
                     ->  Index Scan using storeid_on_orders on orders  (cost=0.27..8.27 rows=1 width=35) (actual time=0.038..0.038 rows=0 loops=1)
                           Index Cond: (storeid = 40)
 Planning time: 0.243 ms
 Execution time: 0.097 ms
(13 rows)                                                                                                                     AFTER
```

```
CREATE INDEX customerID_on_orders ON orders USING btree (customerid);
```

This index improves the query on `Orders`.

```
                                    QUERY PLAN
-------------------------------------------------------------------------------------------------------------
 Limit  (cost=12.33..12.34 rows=5 width=43) (actual time=0.169..0.171 rows=5 loops=1)
   ->  Sort  (cost=12.33..12.34 rows=6 width=43) (actual time=0.168..0.169 rows=5 loops=1)
         Sort Key: ordertime DESC
         Sort Method: quicksort  Memory: 25kB
         ->  Seq Scan on orders  (cost=0.00..12.25 rows=6 width=43) (actual time=0.025..0.144 rows=8 loops=1)
               Filter: (customerid = 3)
               Rows Removed by Filter: 494
 Planning time: 0.280 ms
 Execution time: 0.194 ms                                                                          BEFORE
(9 rows)
```

```
                                    QUERY PLAN
--------------------------------------------------------------------------------------------------------------------------------
 Limit  (cost=10.67..10.69 rows=5 width=43) (actual time=0.062..0.074 rows=5 loops=1)
   ->  Sort  (cost=10.67..10.69 rows=6 width=43) (actual time=0.062..0.063 rows=5 loops=1)
         Sort Key: ordertime DESC
         Sort Method: quicksort  Memory: 25kB
         ->  Bitmap Heap Scan on orders  (cost=4.32..10.60 rows=6 width=43) (actual time=0.039..0.050 rows=8 loops=1)
               Recheck Cond: (customerid = 3)
               Heap Blocks: exact=5
               ->  Bitmap Index Scan on customerid_on_orders  (cost=0.00..4.32 rows=6 width=0) (actual time=0.031..0.032 rows=8 loops=1)
                     Index Cond: (customerid = 3)
 Planning time: 0.242 ms
 Execution time: 0.100 ms                                                                                              AFTER
(11 rows)
```

Problems/Findings

- Some user types in the USER schema have extra whispaces. So when we compare type `Manager` with the string "Manager" it returns `false`. We solved it by trimming the return type from the schema.
- There was no type checking for user input. So we implemented `isInteger()` and `isDouble()` functions to check if the user inputs correct values.
- The trigger to add information product update assumes that only `Manager`s are responsible for product updates. So if `Admin` makes any changes to the product, their ID will not be in the `managerid` column.

Contributions

Denis Melnikov

- Added Update Product for Managers and Admins
- Added ViewRecentUpdates for Managers
- Added viewPopularProducts for Managers

- Added viewPopularCustomers for Managers
- Added placeProductSupplyRequests for Managers
- Added searchUserbyName for Admins
- Added updateUser for Admins
- Added indices for Products and Orders
- Added trigger for product updates

Adlai Morales-Bravo

- Added viewStores for Customers
- Added viewProducts for Customers
- Added placeOrders for Customers
- Added viewRecentOrders for Customers
- Added index for Orders
- Added trigger for Orders