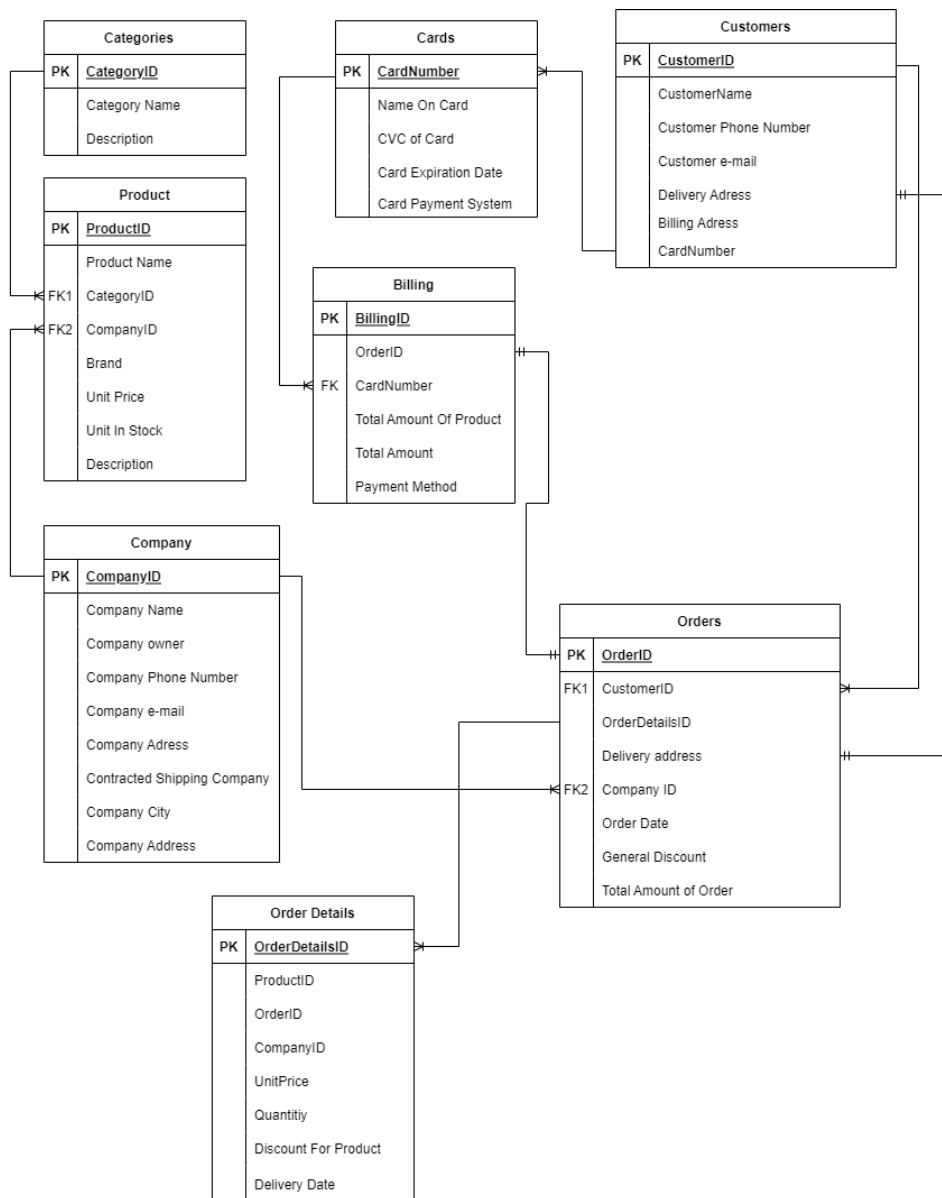


## ONLINE MARKETING SYSTEM DATABASE

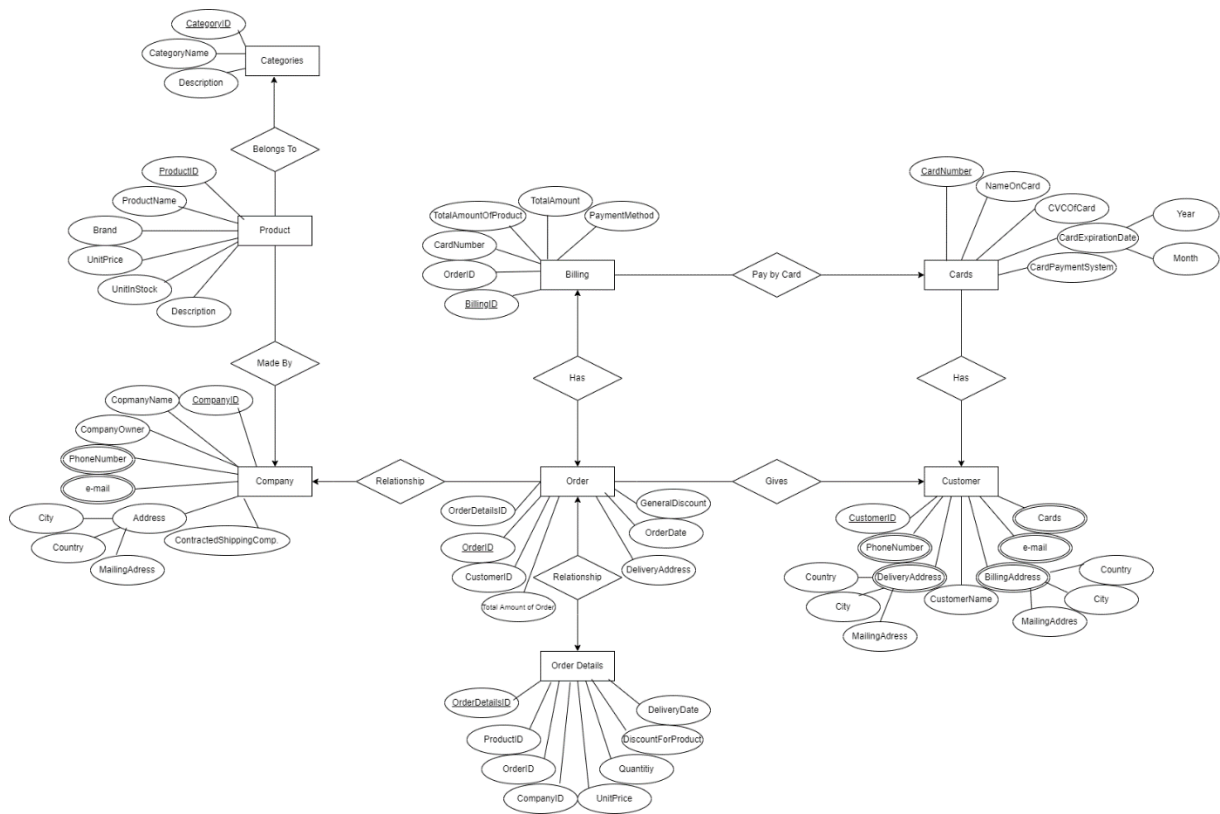
Online Marketing Database System construction processes are declared in report. This database system project has prepared for SEN2104 Lecture Term Project by Emirhan Serveren (1902003) and Zeynep Tuba Çalışkan (1805207).

Processes of creating and evaluating database systems can be divided into two parts: Diagram Creation Process and SQL Process. For diagram process, entities of database system must be determined. After creating tables of database, relations and their types are defined.

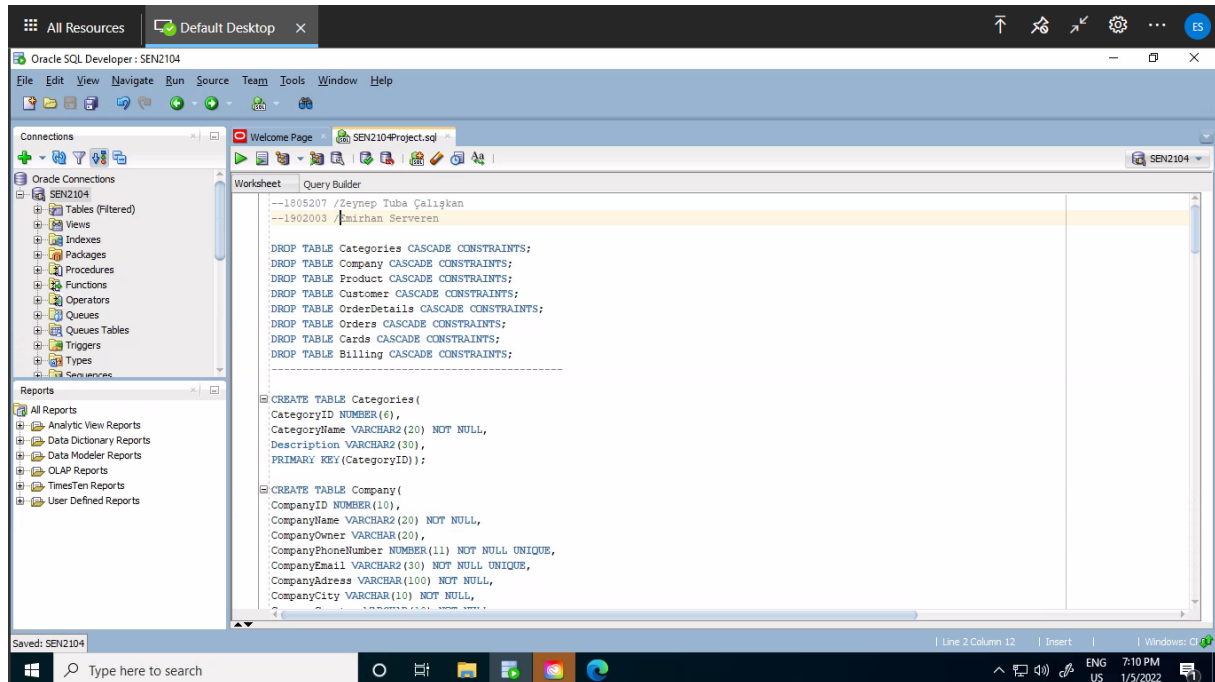
In first step, necessary tables have been created for online marketing database system. Tables are connected between each other using relations. Relation diagram has been evaluated after defining primary and foreign keys of tables.



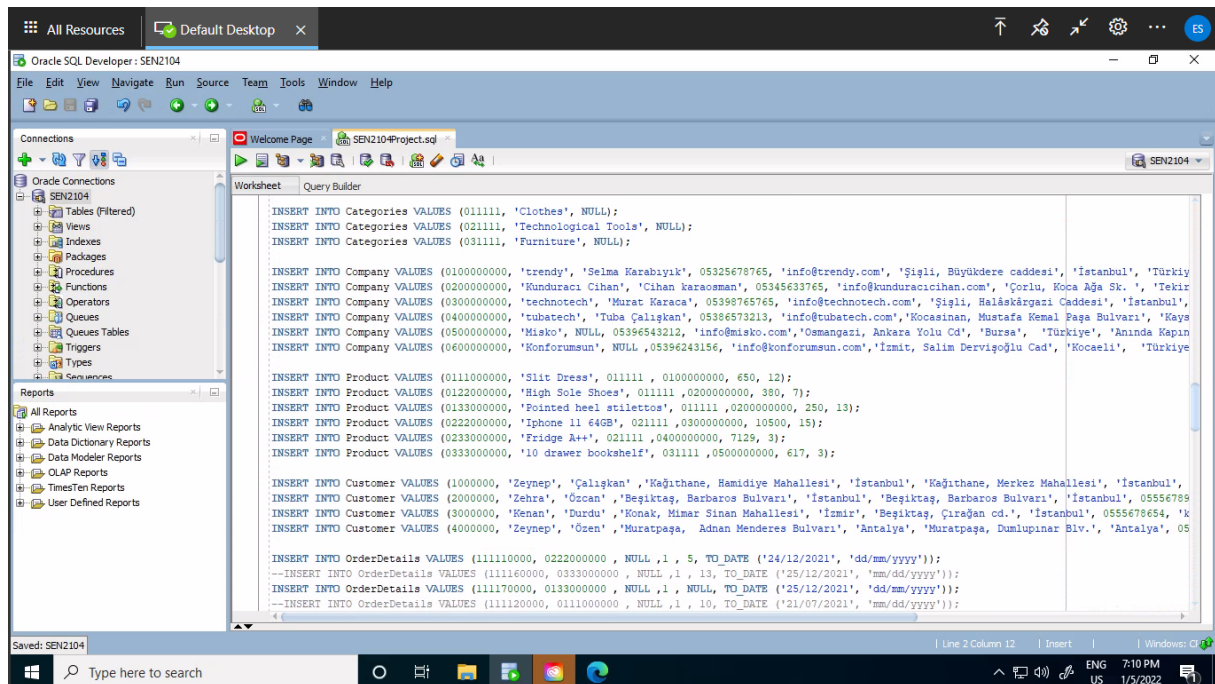
We can understand attributes, tables and keys using relation diagram. On the other hand, relationship types are important to understand database. To visualize relationship types, E-R Diagram is useful method.



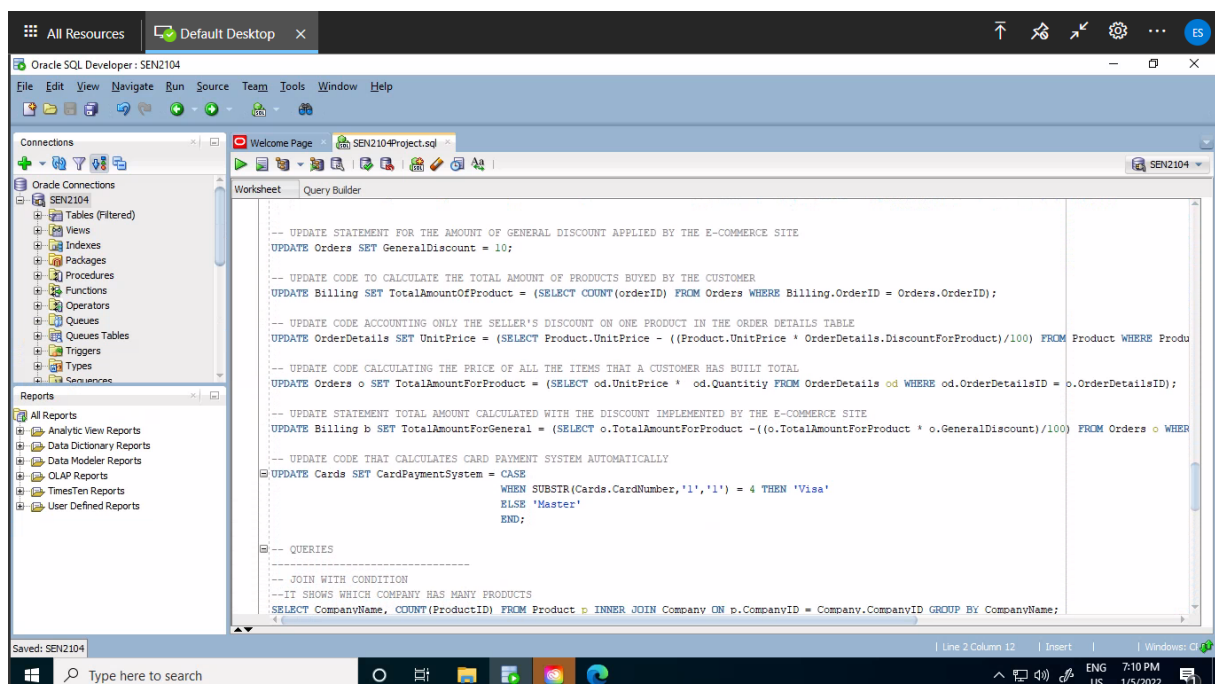
SQL code snippet can be written using diagrams. Before creating tables, 'DROP TABLE' method will be used. It is necessary to refresh database, if code snippet is executed before following execution. Tables will be created on SQL using 'CREATE TABLE' method. Keys will be declared using 'PRIMARY KEY' and 'FOREIGN KEY...REFERENCES' keyword. Keys will be written based on diagrams. Keys are declared on relation diagram.



In following step, insertion operation will be completed. We will be inserting data to write updates and queries in further steps.

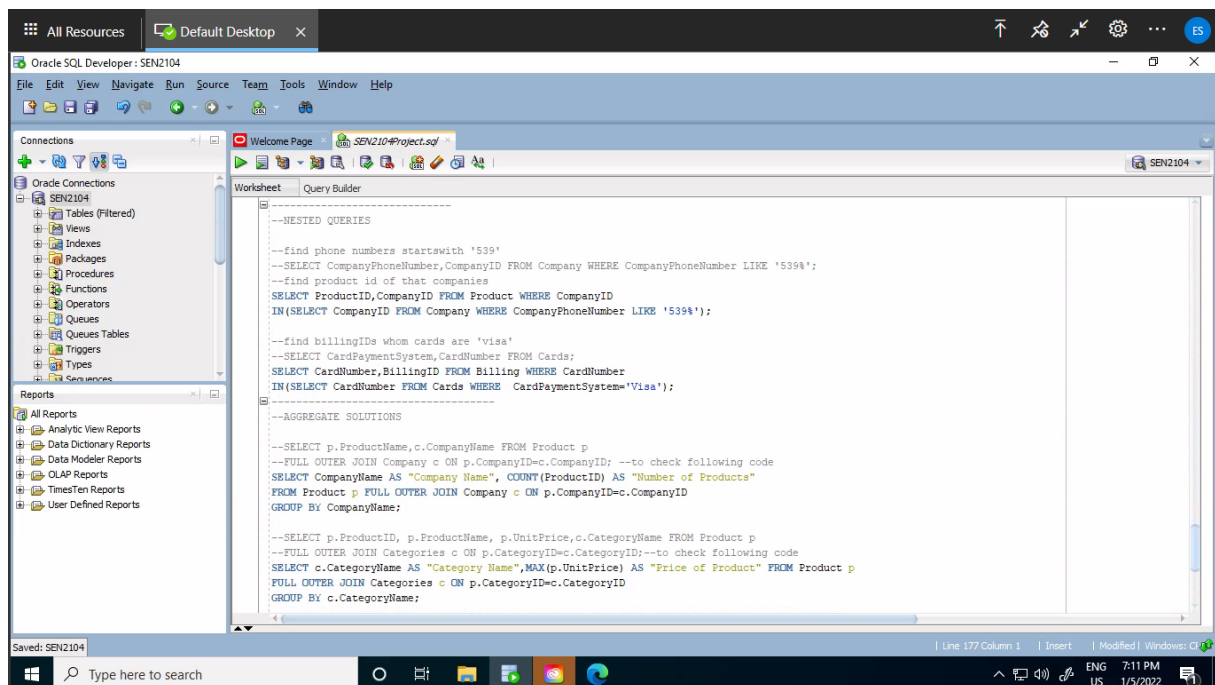


Some attributes of tables need to get updated to handle data. This attributes can be updated using cases, calculations etc. Tables can be updated using 'UPDATE'. Necessary additional commands can be written in updates.



There must two nested queries, two aggregate functions with conditions, two set operations and two join operation with conditions must be handled on SQL according to project submission file. There are two aggregate operations handled in following screenshot. One of those operation includes 'COUNT' and other operation includes 'MAX' function. COUNT function is used to count number of products of each companies. MAX function finds out the most expensive product of each category.

Also there are two nested queries in following screenshot. First query prints out IDs of products which products' company has phone number starts with 539. In the second nested query, billing IDs which have been paid by Visa card is printed.



The screenshot displays the Oracle SQL Developer interface. The main window shows a SQL query with the following structure:

```
--NESTED QUERIES

--find phone numbers startswith '539'
--SELECT CompanyPhoneNumber,CompanyID FROM Company WHERE CompanyPhoneNumber LIKE '539%';
--find product id of that companies
SELECT ProductID,CompanyID FROM Product WHERE CompanyID
IN(SELECT CompanyID FROM Company WHERE CompanyPhoneNumber LIKE '539%');

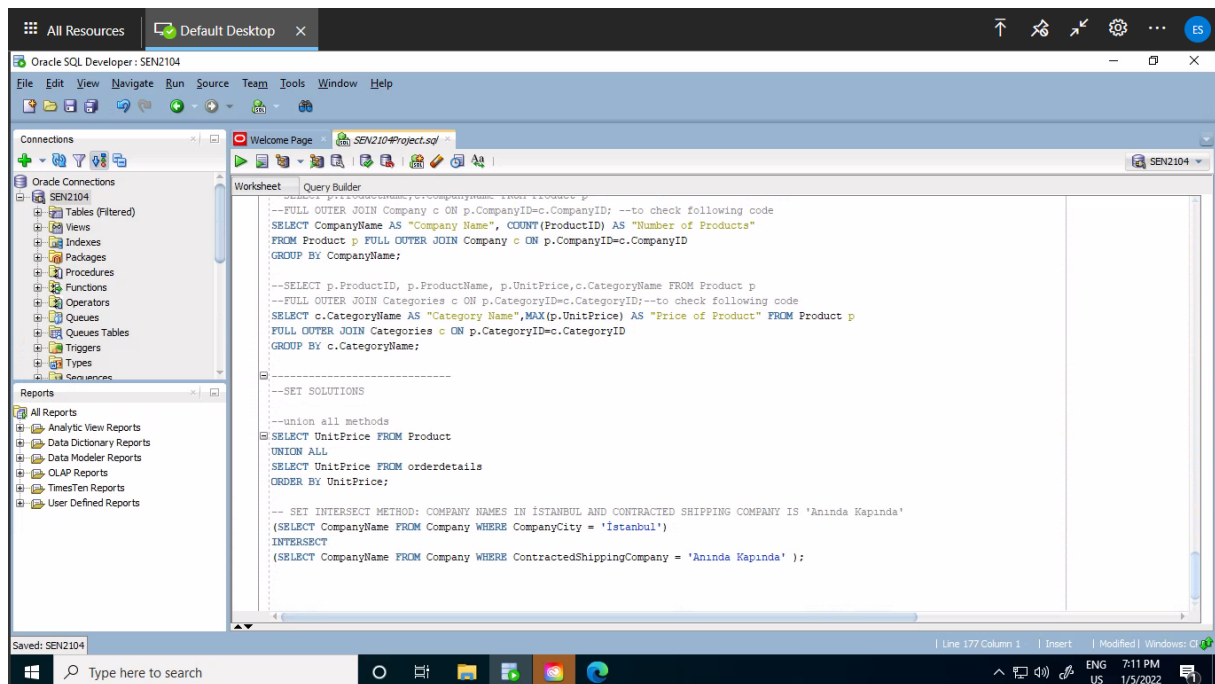
--find billingIDs whom cards are 'visa'
--SELECT CardPaymentSystem,CardNumber FROM Cards;
SELECT CardNumber,BillingID FROM Billing WHERE CardNumber
IN(SELECT CardNumber FROM Cards WHERE CardPaymentSystem='Visa');

--AGGREGATE SOLUTIONS

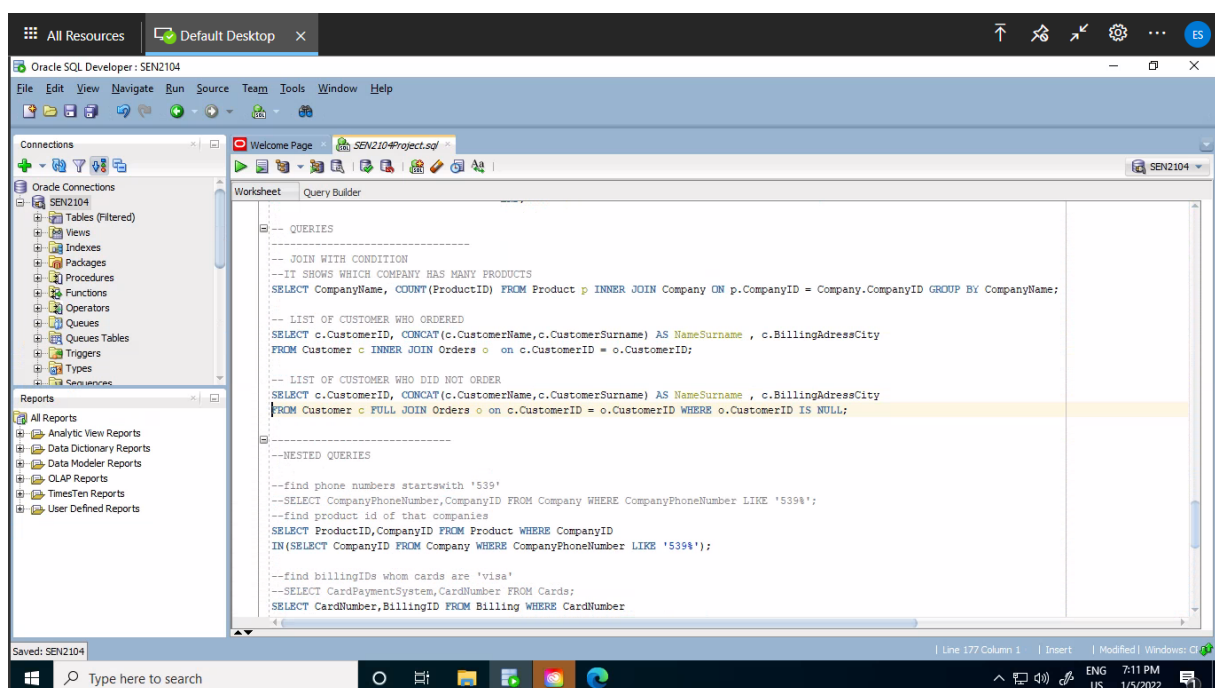
--SELECT p.ProductName,c.CompanyName FROM Product p
--FULL OUTER JOIN Company c ON p.CompanyID=c.CompanyID; --to check following code
SELECT CompanyName AS "Company Name", COUNT(ProductID) AS "Number of Products"
FROM Product p FULL OUTER JOIN Company c ON p.CompanyID=c.CompanyID
GROUP BY CompanyName;

--SELECT p.ProductID, p.ProductName, p.UnitPrice,c.CategoryName FROM Product p
--FULL OUTER JOIN Categories c ON p.CategoryID=c.CategoryID;--to check following code
SELECT c.CategoryName AS "Category Name",MAX(p.UnitPrice) AS "Price of Product" FROM Product p
FULL OUTER JOIN Categories c ON p.CategoryID=c.CategoryID
GROUP BY c.CategoryName;
```

The interface includes a 'Connections' pane on the left showing 'SEN2104' and a 'Reports' pane below it. The bottom status bar indicates 'Line: 177 Column: 1' and 'Modified: 1/5/2022 7:11 PM'.



Set operations' handling is available in screenshot above. 'UNION ALL' operates set operation in first query. In the second query, 'INTERSECT' operator handles set operation. This operator finds out companies which based on İstanbul city and dealt with shipping company named 'Aninda Kapinda'.



Join operations are available in the following screenshot. In the first query, 'INNER JOIN' operation is used to handle query. 'CONCAT' operation is used for the second query, which finds out the list of customers who had order or not.

*Zeynep Tuba Çalışkan and Emirhan Serveren*