INF 280 Database Systems

Prof. Tuparov

Airport Database

Project

Members:

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Kristina Nikiforova

Borislav Georgiev

Sagyndyk Tukovayev

# Project Description

For our project, we have chosen to create an airport database. The database consists of two *Terminals* – International and Domestic. They work with different *Airlines, Restaurants* and *Shops* and that is noted in the *\*\_Contracts(3)* tables. The Terminals have *Gates* with flights assigned to them, which are connected with the different *Planes* (Plane Model, Type). The Shops and Restaurants are placed in particular Gates of the Terminals. Restaurants, Shops and Airlines have *Suppliers,* with different types of Suppliers specified in the *Supplier\_Type* table, who supply them different *Items*. The orders are recorded in the *\*\_Orders(3)* tables. There are also *Projects*, assigned to the Terminals, which deal with monthly checks for security and supply of the Items. The schedules for the Projects are stored in the *Project\_Execution* table. We have the *Staff* table that holds data about the employees who work for the terminal and the *Staff\_Type* table that specifies the particular job of each employee acting as a multivalued attribute of the Staff table. Those employees have working contracts with the Airlines, Shops, Restaurants and Projects specified in the *\*\_Employees(4)* tables.

Member participation:

Designer (DS):

Kristina – Helped with: queries, filling up the database with data, design of the DB, documentation

Developer (DV):

Martin – Creation of: queries, normalization, ER Diagram, EER Diagram, Relational Model, optimization of queries, implementation and design of DB, data for the database, documentation

DS/DV:

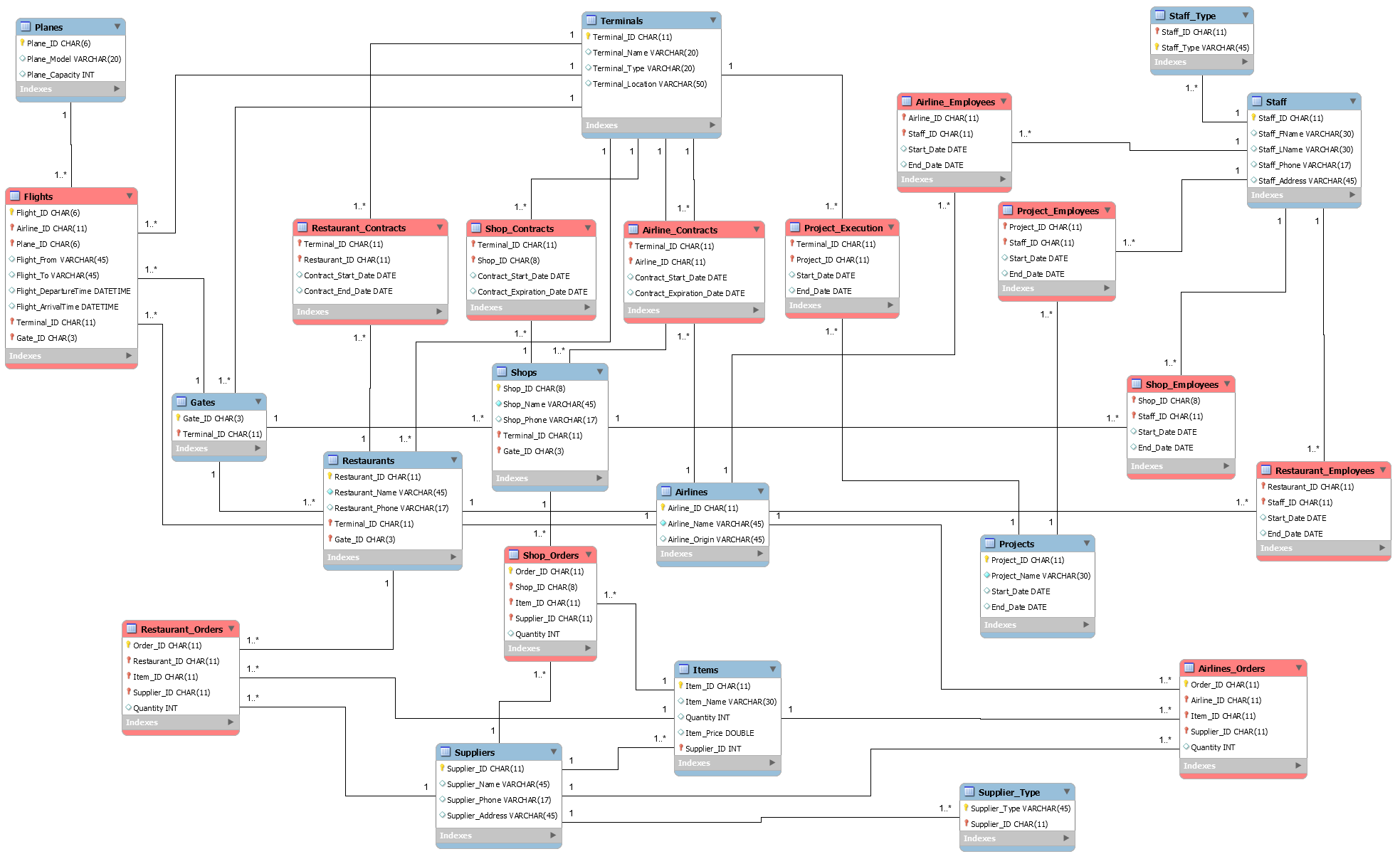
Borislav – Helped with design of DB

Team Leader (LD):

Sagyndyk - Helped with design of DB

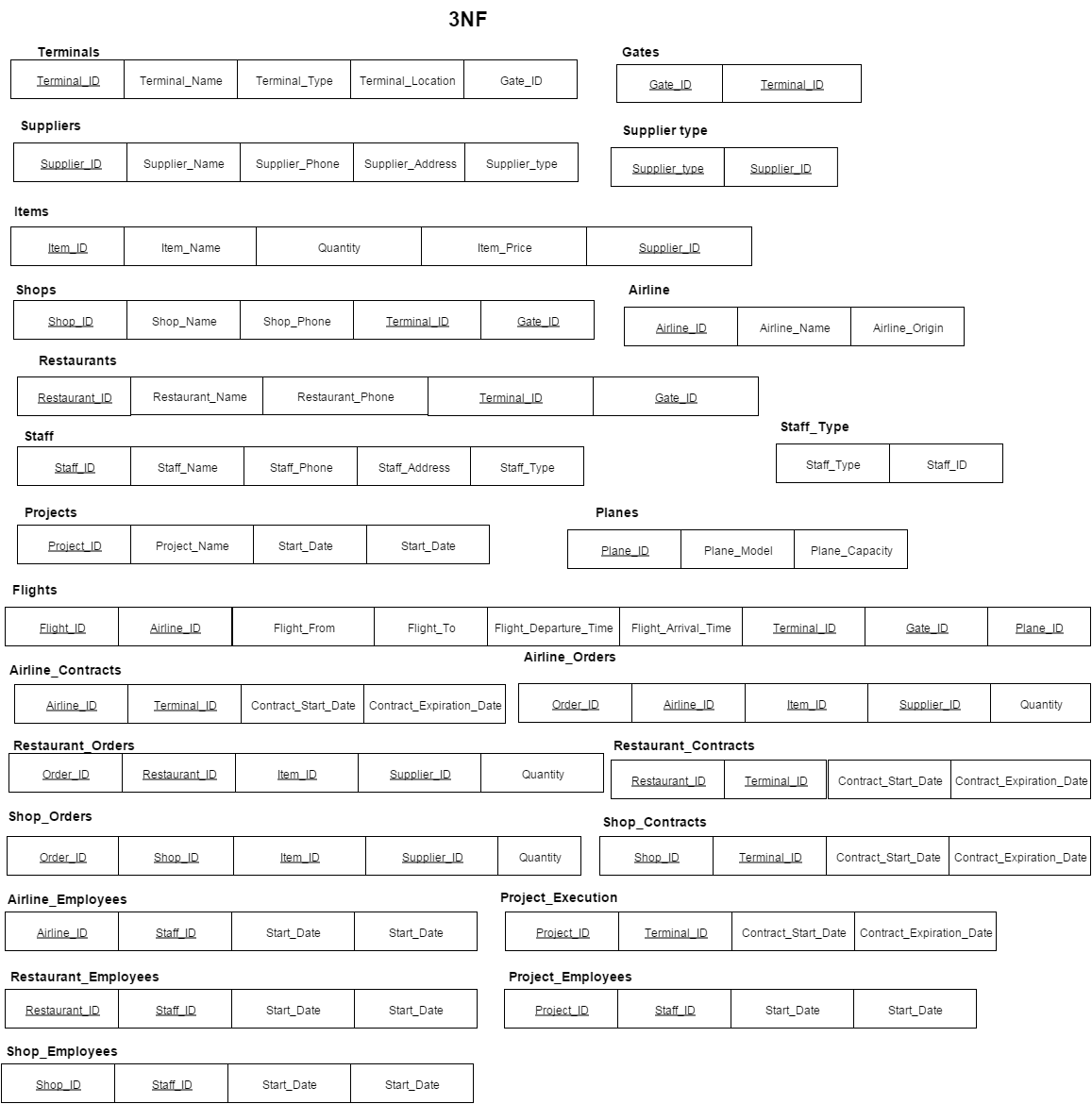
# C:\Users\mki130\Downloads\ER.pngER Diagram

# EER Diagram as generated by MySQL Workbench

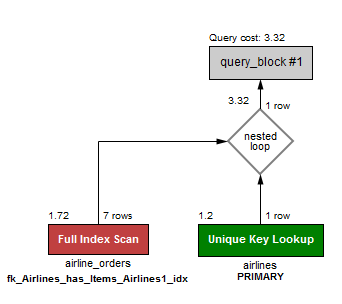


# Relational Model

# Normalization



# Simple Queries



**1. Query that selects airlines that have ordered item with Item\_ID = I00003**

Select airlines.\*

From airlines

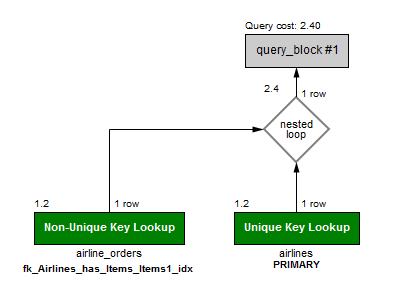
Where Airline\_ID in

(Select Airline\_ID

From airline\_orders

Where Item\_ID = 'I00003');

D:\Stuff\INF 280 Database\Fall2015\OneManTeamProject_Fall2015\query1.png

*Execution time: 0:00:0.00130091*

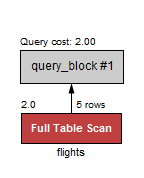
**After optimization**

Select airlines.\*

From airlines Inner Join airline\_orders Using (Airline\_ID)

Where Item\_ID = 'I00003';

*Execution time: 0:00:0.00063891*

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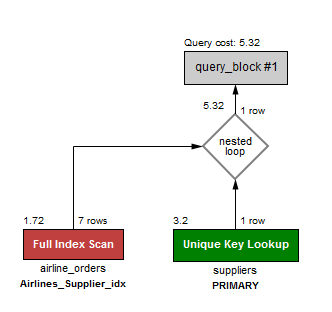
**2. Query that selects flights that are leaving from gates A1 and B2**

Select flights.\*

From flights

Where Gate\_ID IN ('A1','B2'); *Execution time: 0:00:0.01825674*

**3. Query that selects suppliers that have supplied KLM**

[Select](http://172.17.48.17:81/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fselect.html&server=0&token=69e2a160ba6d69568eddefc554a5ad60) Supplier\_Name

From suppliers

Where Supplier\_ID [In](http://172.17.48.17:81/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fcomparison-operators.html&server=0&token=69e2a160ba6d69568eddefc554a5ad60#function_in)

([Select](http://172.17.48.17:81/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fselect.html&server=0&token=69e2a160ba6d69568eddefc554a5ad60) Supplier\_ID

 From airline\_orders

Where airline\_ID = 'KLM');



*Execution time: 0:00:0.01225877*

**4. Query that displays the number of orders made by Air France**

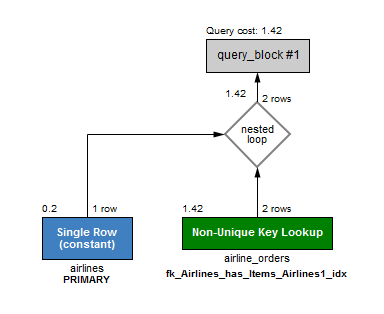
[Select](http://172.17.48.17:81/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fselect.html&server=0&token=e523939ce01ec0696a39527dc3a9a04e) [COUNT](http://172.17.48.17:81/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fgroup-by-functions.html&server=0&token=e523939ce01ec0696a39527dc3a9a04e#function_count)(Order\_ID)

From airline\_orders Inner Join airlines Using (Airline\_ID)

Where airline\_orders.Airline\_ID ='AF';

D:\Stuff\INF 280 Database\Fall2015\OneManTeamProject_Fall2015\query4.png

*Execution time: 0:00:0.00123456*



**5. Query that selects only restaurants on Terminal 1, Gate A1**

D:\Stuff\INF 280 Database\Fall2015\OneManTeamProject_Fall2015\query5.png[SELECT](http://172.17.48.17:81/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fselect.html&server=0&token=e523939ce01ec0696a39527dc3a9a04e) Restaurant\_ID, Restaurant\_Name

FROM restaurants

WHERE Terminal\_ID [IN](http://172.17.48.17:81/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fcomparison-operators.html&server=0&token=e523939ce01ec0696a39527dc3a9a04e#function_in)

([SELECT](http://172.17.48.17:81/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fselect.html&server=0&token=e523939ce01ec0696a39527dc3a9a04e" \t "mysql_doc) Terminal\_ID  *Execution time: 0:00:0.02679862*

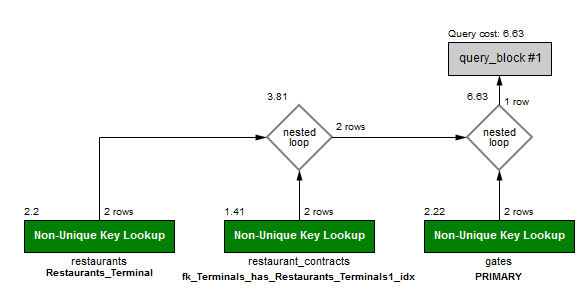
 FROM restaurant\_contracts

WHERE restaurants.Terminal\_ID [IN](http://172.17.48.17:81/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fcomparison-operators.html&server=0&token=e523939ce01ec0696a39527dc3a9a04e#function_in) ('T01')

[And](http://172.17.48.17:81/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Flogical-operators.html&server=0&token=e523939ce01ec0696a39527dc3a9a04e#operator_and) Gate\_ID [IN](http://172.17.48.17:81/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fcomparison-operators.html&server=0&token=e523939ce01ec0696a39527dc3a9a04e#function_in)

([Select](http://172.17.48.17:81/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fselect.html&server=0&token=e523939ce01ec0696a39527dc3a9a04e) Gate\_ID

From gates

Where gates.Gate\_ID [IN](http://172.17.48.17:81/phpmyadmin/url.php?url=http%3A%2F%2Fdev.mysql.com%2Fdoc%2Frefman%2F5.5%2Fen%2Fcomparison-operators.html&server=0&token=e523939ce01ec0696a39527dc3a9a04e" \l "function_in" \t "mysql_doc) ('A1')));

# Complex queries

**6. Query that selects every airline, restaurant and shop who bought I00001**

Select "Restaurants" as Category, Restaurant\_Name As "Name"

From restaurants

Where Restaurant\_ID IN

(Select Restaurant\_ID

From restaurant\_orders

Where Item\_ID='I00001')

Union

Select "Airlines",Airline\_Name *Execution time: 0:00:0.01325983*

From airlines

Where Airline\_ID IN

(Select Airline\_ID

From airline\_orders

Where Item\_ID='I00001')

Union

Select "Shops",Shop\_Name

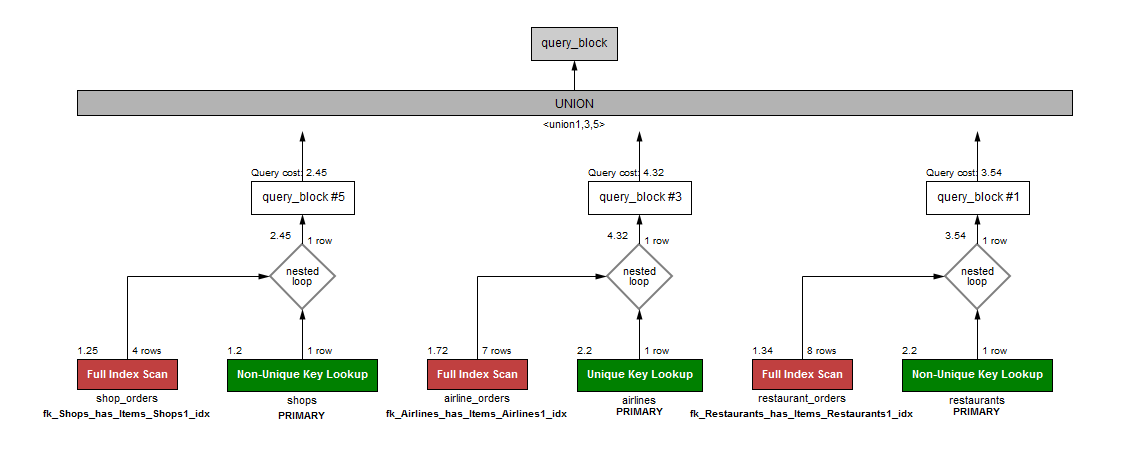
From shops

Where Shop\_ID IN

(Select Shop\_ID

From shop\_orders

Where Item\_ID='I00001');

**

**After optimization**

Select "Restaurants" As Category, Restaurant\_Name As Name

From restaurants Inner Join restaurant\_orders Using (Restaurant\_ID)

Where Item\_ID='I00001'

Union

Select "Airlines",Airline\_Name

From airlines Inner Join airline\_orders Using (Airline\_ID)

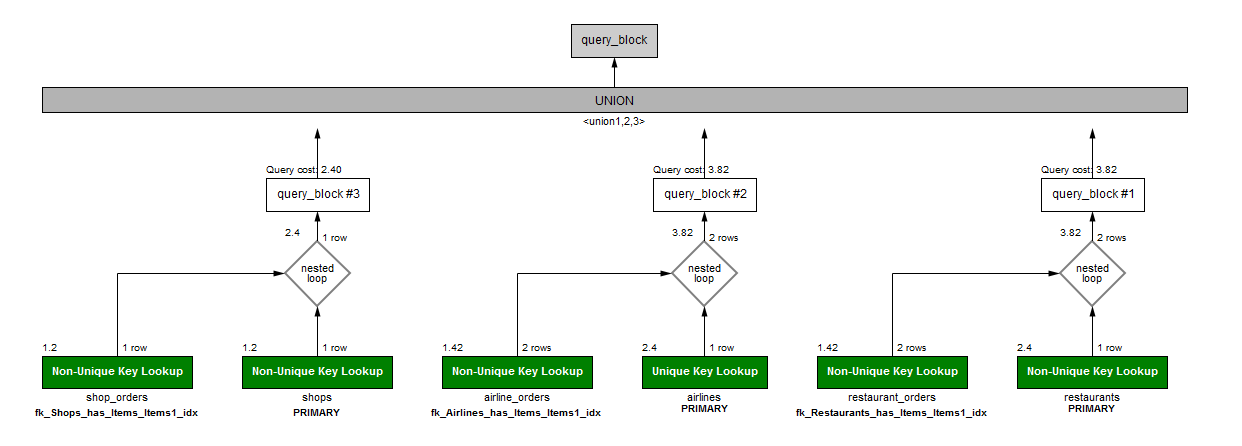
Where Item\_ID='I00001'

Union

Select "Shops",Shop\_Name

From shops Inner Join shop\_orders Using (Shop\_ID)

Where Item\_ID='I00001';

*Execution time: 0:00:0.00131337*

**7. Query that selects restaurants that ordered more than 100 items, the order\_ID, supplier and item\_Name**

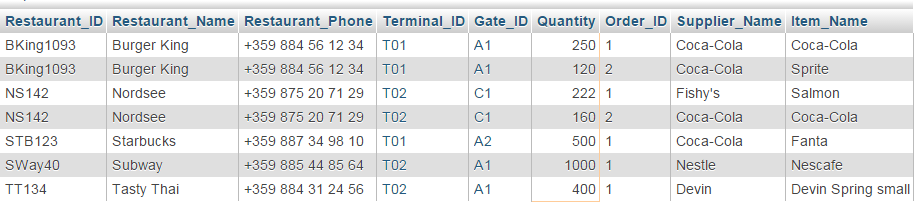
Select restaurants.\*, restaurant\_orders.Quantity, restaurant\_orders.Order\_ID, suppliers.Supplier\_Name, items.Item\_Name

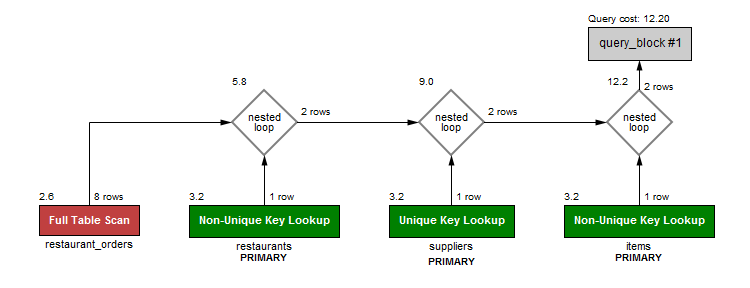
From restaurants Inner Join restaurant\_orders Using (restaurant\_ID)

Inner Join suppliers Using (Supplier\_ID)

Inner Join items Using (Item\_ID)

Where restaurant\_orders.Quantity > 100;



*Execution time: 0:00:0.02696351*

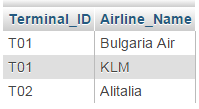
**8. Query that selects the terminal and airline whose contract ends between 2020 and 2025**

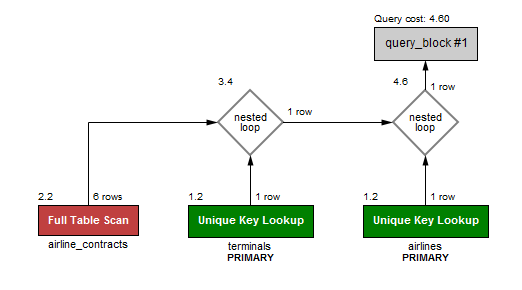
Select terminals.Terminal\_ID, airlines.Airline\_Name

From terminals Inner Join airline\_contracts Using (Terminal\_ID)

Inner Join airlines Using (Airline\_ID)

Where Contract\_Expiration\_Date Between '2020-01-01' And '2025-12-31';



*Execution time: 0:00:0.01949863*

**9. Query that shows the names of the employees, their positions and their working place who are still working there**

SELECT staff.Staff\_FName, staff.Staff\_LName, staff\_type.Staff\_Type, shops.Shop\_Name

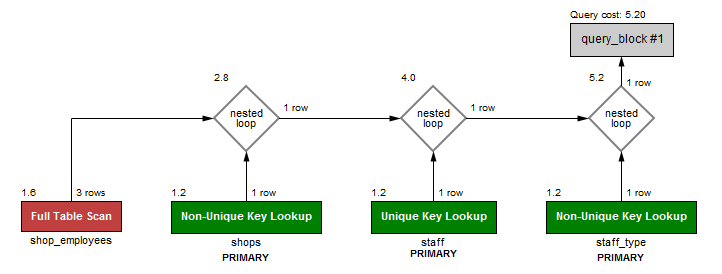
From staff Inner Join shop\_employees Using (Staff\_ID)

Inner Join staff\_type Using (Staff\_ID)

Inner Join shops Using (Shop\_ID)

Where shop\_employees.End\_Date Is NULL;

D:\Stuff\INF 280 Database\Fall2015\OneManTeamProject_Fall2015\query9.png *Execution time: 0:00:0.00691656*

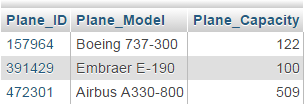


**10. Query that selects all planes that didn’t do any flights**

Select planes.\*

From flights Right Outer Join planes on (flights.Plane\_ID = planes.Plane\_ID)

Where Flight\_ID Is Null;



*Execution time: 0:00:0.00379973*

