

Introduction to SQL - 1

(for Lab 1)

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Outline

- Introduction to SQL
- SQL sub-languages
- DDL – Data Definition Language
- CREATE database
- SHOW databases
- USE database
- CREATE table
- DESC table

What is SQL?

- SQL – Structured Query Language
- Nonprocedural language with basic command vocabulary set of less than 100 words
- Create database and table structures
- Perform various types of data manipulation and data administration,
- Query the database to extract useful information
- Differences in SQL dialects are minor

SQL Sub-languages

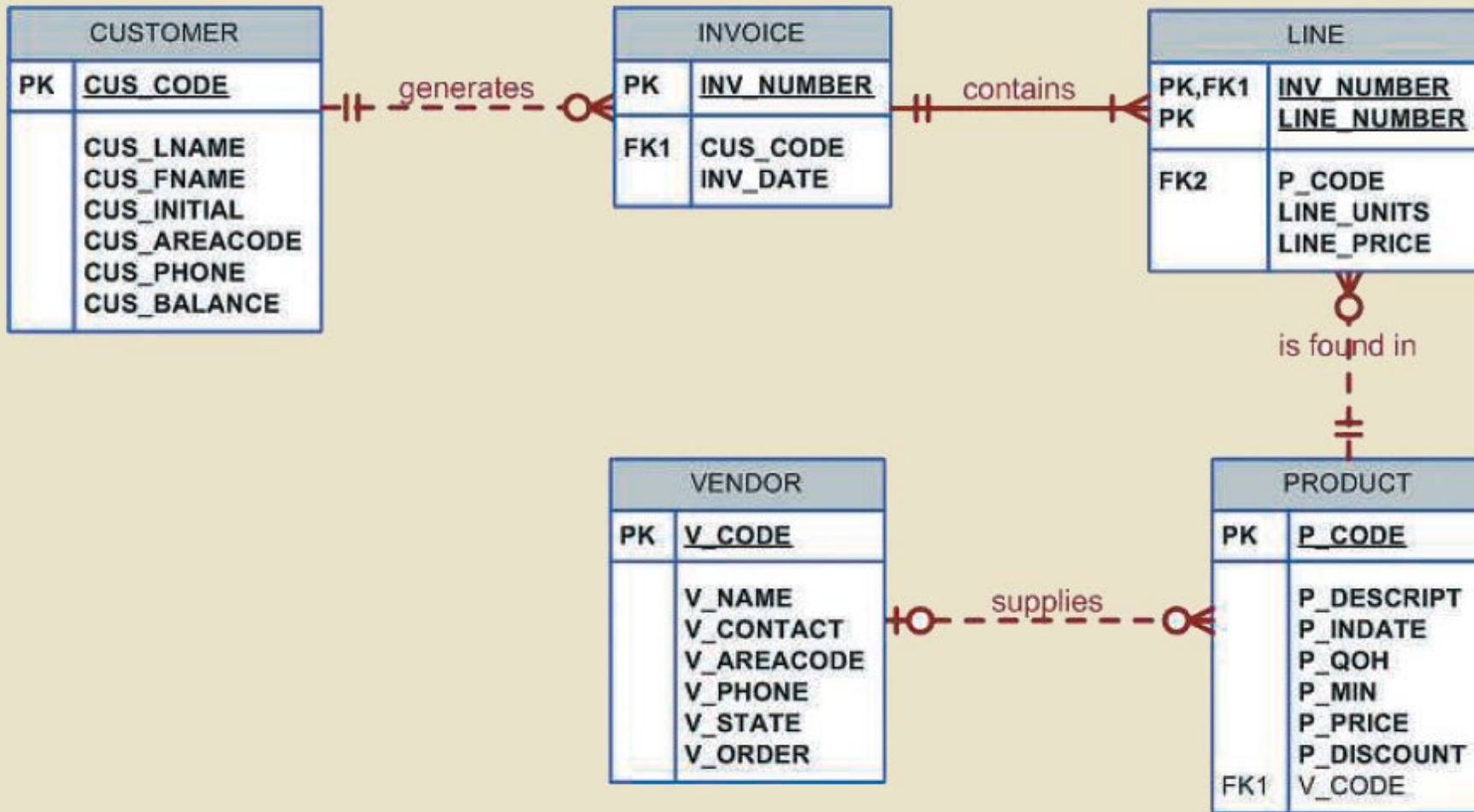
- SQL functions are divided into two categories:
 - Data Definition Language(DDL)
 - DDL statements are used to build and modify the structure of tables (relations) and other objects in the database
 - Data Manipulation Language
 - DML statements are used to work with the data
- Others
 - DQL – Data Query Language
 - DCL – Data Control Language
 - TCL – Transaction Control Language

Data Definition Language

- CREATE to create structures
 - ALTER to change structures
 - DROP to drop structures
 - RENAME to rename structures
 - TRUNCATE to remove all data
-
- In today's session we will use the CREATE DDL command to help us with creating databases and tables (relations).

A Database Model

FIGURE 7.1 THE DATABASE MODEL



This Database model comprises 4 tables, can you name them?

A Database Model

- Customer
- Invoice
- Line
- Vendor
- Product

What is a Table (Relation)?

- Tables
 - database objects that contain all the data
- Data in tables is logically organized in a row and column format (think of a spreadsheet structure)
- Each row in a table represents a unique record
- Each column in a table represents a field (in the record)

How many rows and columns are here?

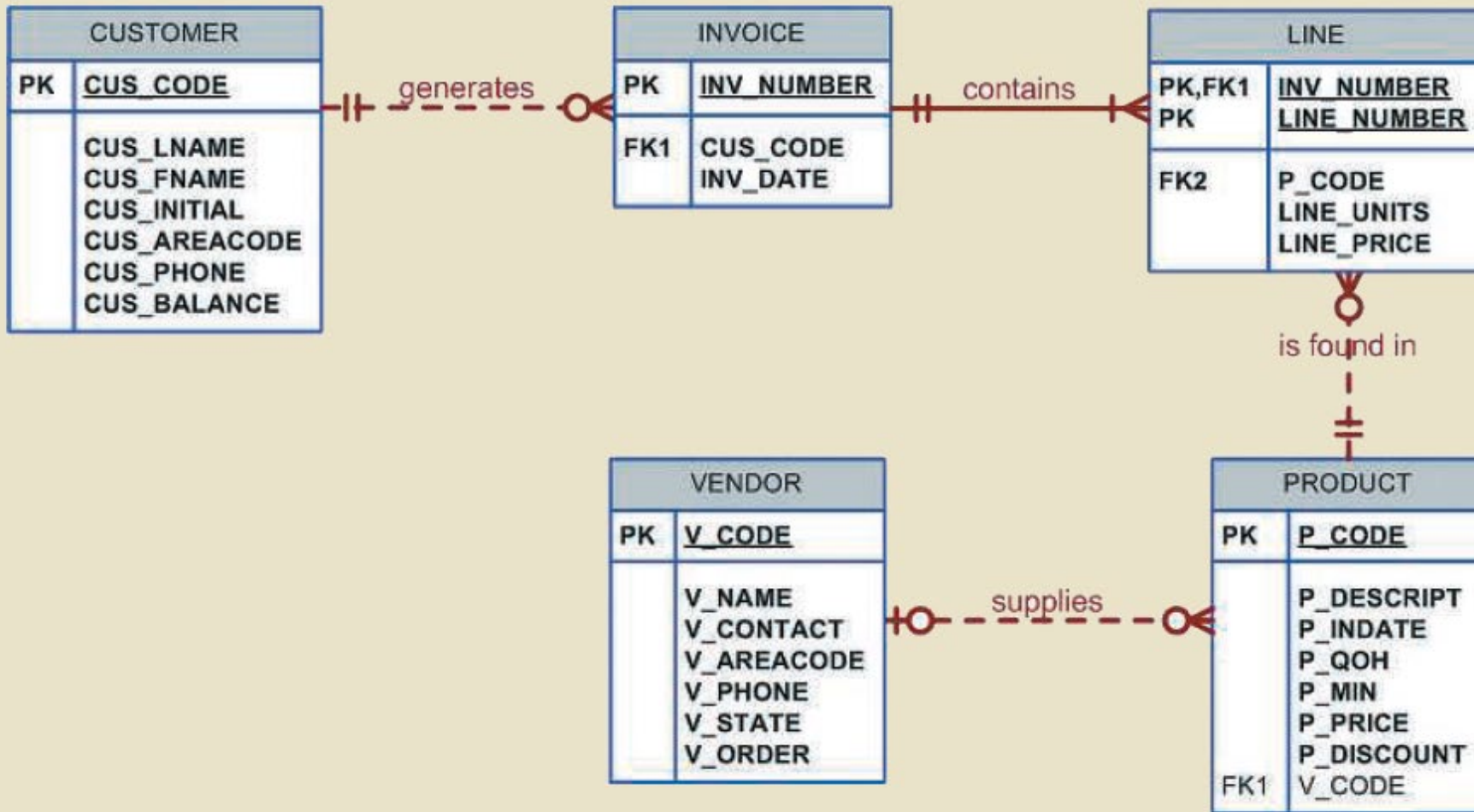
Table name: **VENDOR**

Datab

V_CODE	V_NAME	V_CONTACT	V_AREACODE	V_PHONE	V_STATE	V_ORDER
21225	Bryson, Inc.	Smithson	615	223-3234	TN	Y
21226	SuperLoo, Inc.	Flushing	904	215-8995	FL	N
21231	D&E Supply	Singh	615	228-3245	TN	Y
21344	Gomez Bros.	Ortega	615	889-2546	KY	N
22567	Dome Supply	Smith	901	678-1419	GA	N
23119	Randsets Ltd.	Anderson	901	678-3998	GA	Y
24004	Brackman Bros.	Browning	615	228-1410	TN	N
24288	ORDVA, Inc.	Hakford	615	898-1234	TN	Y
25443	B&K, Inc.	Smith	904	227-0093	FL	N
25501	Damal Supplies	Smythe	615	890-3529	TN	N
25595	Rubicon Systems	Orton	904	456-0092	FL	Y

A Database Model

FIGURE 7.1 THE DATABASE MODEL



How many columns are in each table?

Installation

- In this class, we'll be using the MySQL RDBMS
 - MySQL Server only
- The systems in the labs will have them loaded
- Installation guides for your personal PC on Ulwazi

Start up MySQL

 MySQL 8.0 Command Line Client

```
Enter password: ****
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 10
Server version: 8.0.31 MySQL Community Server - GPL

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>
```

View All Databases

- To view all the databases in your MySQL installation:

SHOW DATABASES;

```
mysql> show databases;
+-----+
| Database |
+-----+
| coms2002 |
| information_schema |
| my_first_database |
| mysql |
| performance_schema |
| sys |
| test_data |
+-----+
7 rows in set (0.00 sec)
```

Creating a database using CREATE command

- A new database can be created by issuing the below the SQL command at MySQL prompt

`CREATE DATABASE new_database_name;`

```
mysql> CREATE DATABASE my_first_database;
```

```
mysql> CREATE DATABASE my_first_database;  
Query OK, 1 row affected (0.01 sec)
```

```
mysql>
```

Select your Database

- Before you create a table or work on a database
 - Specify the database you want to use

USE *database_name*;

```
mysql> use my_first_database;  
Database changed  
mysql>
```

Creating a table using CREATE command

```
CREATE TABLE table_name (  
    Column_1    DATA_TYPE,  
    Column_2    DATA_TYPE,  
    ...  
    Column_N    DATA_TYPE  
);
```


Creating a table using CREATE command

- Create a Table with the following properties
 - Table name: students
 - Column1
 - Column_name: student_no
 - Data_type: INTEGER
 - Column 2
 - Column_name: student_first_name
 - Data type: VARCHAR(25)

Creating a table using CREATE command

```
mysql> CREATE TABLE students(  
    -> student_no INTEGER,  
    -> student_first_name VARCHAR(25)  
    -> );  
Query OK, 0 rows affected (0.03 sec)  
  
mysql>
```

Viewing our table and its properties

- To view the details about a table (metadata)

```
DESC table_name;
```

Creating a table from an existing table - 1

- CREATING a table from an existing table
 - Create a new table based on the selected columns

```
CREATE TABLE table_name
AS
SELECT column1, column2 ...
FROM existing_table_name;
```

Creating a table from an existing table - 1

- Creates table *students_2* with a structure similar to the *students* table with the selected attributes (columns)
- Newly created table does not inherit primary and foreign keys from the original table (more on this in coming lectures)

```
mysql> CREATE TABLE students_2
-> AS
-> SELECT student_no, student_first_name
-> FROM
-> students;
Query OK, 0 rows affected (0.02 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql>
```

```
mysql> DESC students_2;
+-----+-----+-----+-----+-----+-----+
| Field                | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| student_no           | int           | YES  |     | NULL    |       |
| student_first_name   | varchar(25)   | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
2 rows in set (0.01 sec)
```

Creating a table from an existing table - 2

- CREATING a table from an existing table
 - Create a new table based on the existing table structure

```
CREATE TABLE new_table_name  
LIKE existing_table_name;
```

Creating a table from an existing table - 2

```
mysql> CREATE TABLE students_3  
-> LIKE  
-> students;  
Query OK, 0 rows affected (0.01 sec)
```

```
mysql> DESC students_3;
```

Field	Type	Null	Key	Default	Extra
student_no	int	YES		NULL	
student_first_name	varchar(25)	YES		NULL	

```
2 rows in set (0.00 sec)
```

```
mysql>
```

Show Tables

- To show all the tables in your database

```
SHOW TABLES;
```

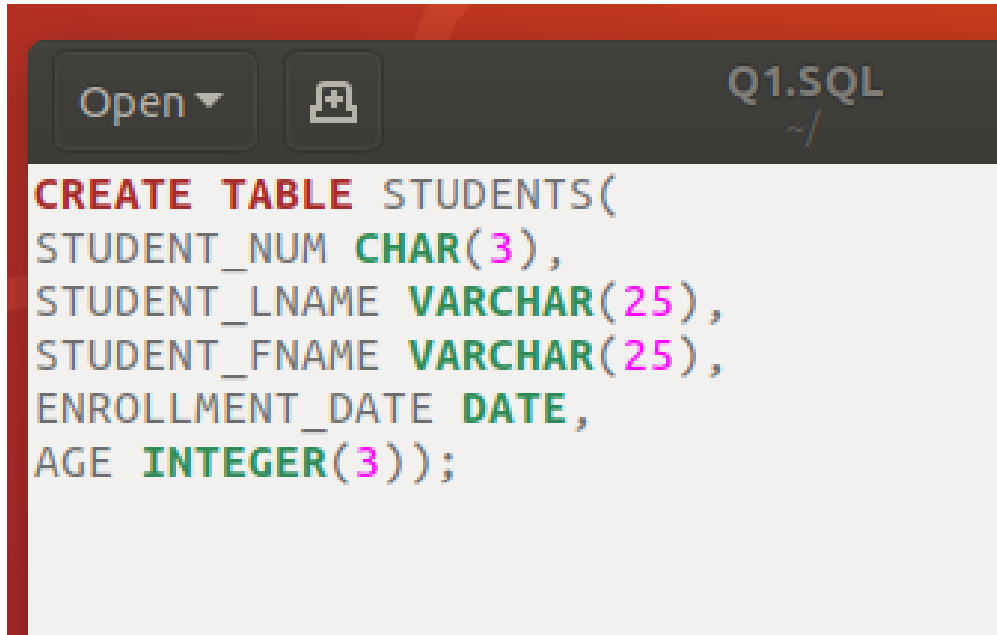

Drop a Database or Table

- If you need to 'drop' – completely delete a database/table with its data and structure
- `DROP DATABASE database_name;`
- `DROP TABLE table_name;`

Sourcing a File

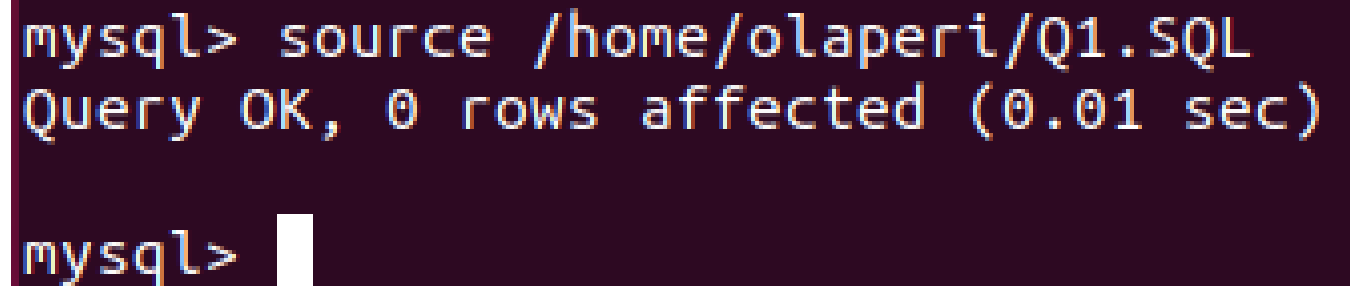
- When a file is sourced the lines of code in the file are executed as if they were printed at the command line.
- Create a new file in your local directory and populate with all the SQL queries you would like to execute
 - Save the file as *file_name.txt* or *file_name.sql*
- Source the file at mysql >
 - `source <Path to the file>`

Sourcing a File



A screenshot of a SQL editor window. The title bar shows "Q1.SQL" and a file icon. The editor contains the following SQL code:

```
CREATE TABLE STUDENTS(  
  STUDENT_NUM CHAR(3),  
  STUDENT_LNAME VARCHAR(25),  
  STUDENT_FNAME VARCHAR(25),  
  ENROLLMENT_DATE DATE,  
  AGE INTEGER(3));
```



A screenshot of a MySQL command-line interface. The prompt is "mysql>". The user has entered the command "source /home/olaperi/Q1.SQL". The output is "Query OK, 0 rows affected (0.01 sec)". The prompt "mysql>" is shown again with a cursor.

```
mysql> source /home/olaperi/Q1.SQL  
Query OK, 0 rows affected (0.01 sec)  
  
mysql> 
```

Exit your database

- Once done, exit the mysql> prompt by typing:
`exit`

```
mysql> exit
Bye
(base) olaperi@olaperi-VirtualBox:~$
```

Additional Readings

- Chapter 7 – Recommended Textbook
- <https://dev.mysql.com/doc/refman/8.0/en/creating-database.html>
- <https://dev.mysql.com/doc/refman/8.0/en/database-use.html>
- <https://dev.mysql.com/doc/refman/8.0/en/creating-tables.html>
- <https://dev.mysql.com/doc/refman/8.0/en/data-types.html>