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Lab #2 CAP3  
9/15/16

1)

The screenshot shows the pgAdmin3 interface. The SQL Editor contains the following query:

```
INSERT INTO Orders( ordnum, mon, cid, aid, pid, qty, totalUSD )  
VALUES(1026, 'may', 'c002', 'a05', 'p03', 800, 744.00);  
  
select *  
from customers;
```

The Output pane shows the results of the 'select \* from customers;' query:

	cid	name	city	discount
	character(4)	text	text	numeric(5,2)
1	c001	Tiptop	Duluth	10.00
2	c002	Tyrell	Dallas	12.00
3	c003	Allied	Dallas	8.00
4	c004	ACME	Duluth	8.50
5	c005	Weyland	Acheron	0.00
6	c006	ACME	Kyoto	0.00

The status bar at the bottom indicates: Unix Ln 166, Col 1, Ch 4892, 6 rows, 113 msec.

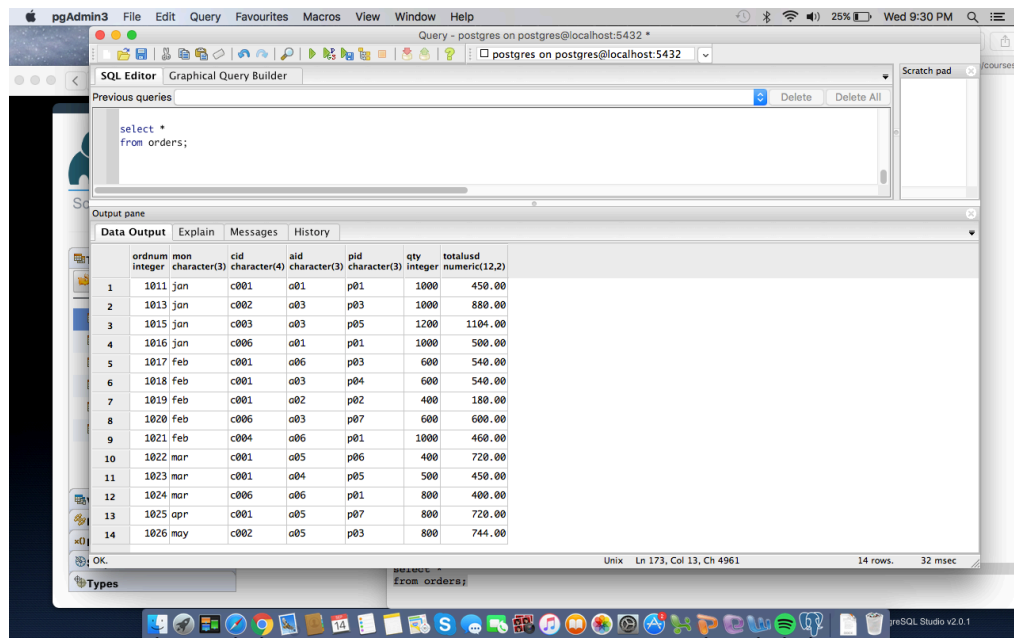
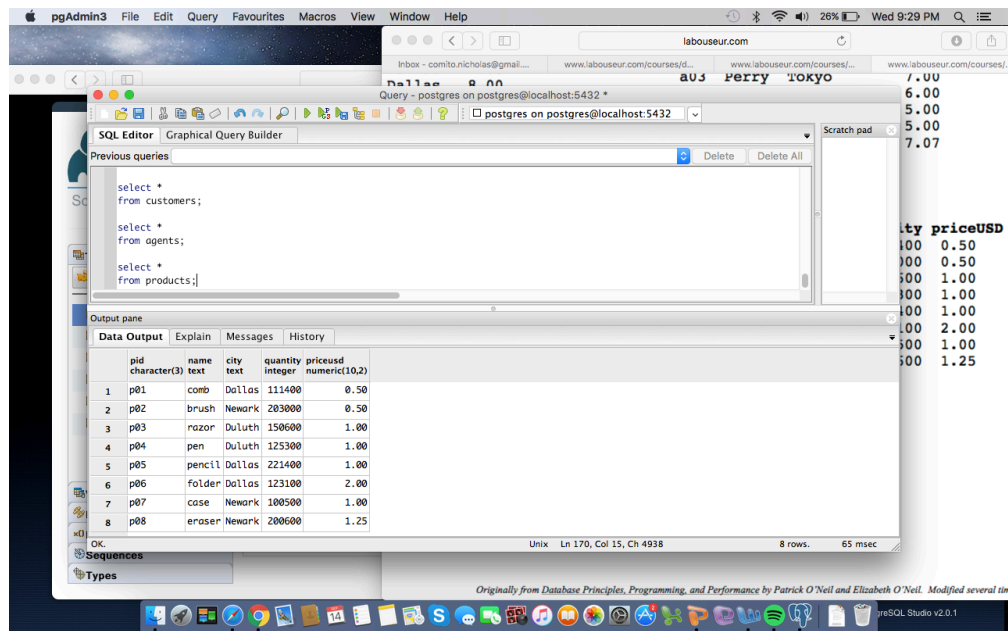
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VALUES(1026, 'may', 'c002', 'a05', 'p03', 800, 744.00);  
  
select *  
from customers;  
  
select *  
from agents;
```

The Output pane shows the results of the 'select \* from customers;' query:

	aid	name	city	commission
	character(3)	text	text	numeric(5,2)
1	a01	Smith	New York	6.50
2	a02	Jones	Newark	6.00
3	a03	Perry	Tokyo	7.00
4	a04	Grey	New York	6.00
5	a05	Otasi	Duluth	5.00
6	a06	Smith	Dallas	5.00
7	a08	Bond	London	7.07

The status bar at the bottom indicates: Unix Ln 167, Col 13, Ch 4913, 7 rows, 35 msec.



2)

A primary key is a special database column used to uniquely identify table records. The important features of the primary key are that it must have a unique value for each row of data and it can't have any null values. Examples of primary keys include a social security number or a driver's license ID number. In both situations, every

individual will have their own unique identification number. (Techopedia). A primary key is considered to be a minimal candidate key.

Candidate keys the individual columns of a table that qualify for uniqueness of all of the rows (Code project). Each table can have one or more candidate keys but one unique candidate key is the same as a primary key. Candidate keys that are not chosen as the primary key are considered to be alternate keys.

A superkey is a set of attributes that contains a key meaning that every key is a superkey but not every superkey is a key (Database pg 86). Superkeys satisfy the first condition of key but not always the second condition. The first condition of a key is that the function of the key determines the other attributes of the relation and the second condition is minimality. In essence, a superkey is a non-minimal candidate key.

### 3) **Data Types:**

There are multiple data types regarding databases. A data type is the kind of data item determined by the domain, or the value it can hold. The smallest data type is a Boolean. Boolean values can only return true or false values. Other examples of data types are numeric, character, binary, and date and time. Different data types are important for storing data to return information. For example, a company uses integer data for salary and compensation for its employees, but also will use date and time to keep track of how long employees and or clients have been with the business.

Financial institutions may develop a data table for client records. This table would include client ID number, first name, last name, phone number, address, Social

Security Number, date of birth, and bank account total. There are a variety of data types regarding the fields being used by the bank keeping track of their clients.

The client ID and SSN field would be considered character strings even though they are nominal. The two numbers are not used for calculation purposes but they are used as identifiers and will never change for the specific clients. These fields are also unable to be null because they will always be known, applicable, and will not be withheld (Database 248). The phone number field will also be a character data type due to the same reasons but will be nullable. The bank may not know the current phone number of client or he or she may not provide the number to the bank. There is a value for that field but it has the potential to be unknown. Address is another character data type however it will be a variable character type due to the fact that the string can vary in length since each address has the potential of being longer or shorter than the next. Client ID, SSN, and phone number all have a fixed number of characters they can contain. A client's bank account will always be changing and re-calculated based on deposits, withdrawals, or any other transactions the bank or financial institution may perform. For this reason, the field will be numeric and will not be nullable. The value of this field must always be known for both the purpose of the bank and client, will always be applicable since it affects both parties, and cannot be withheld from either party. The final field, date of birth, will be a date/ time data type. This field could potentially be nullable since it may be unknown by the bank but in this specific scenario it probably would not be due to the fact that age plays a role in specific financial strategies such as receiving retirement payments from their accounts.

4)

**“First Normal Form Rule”:**

The first relational rule is the first normal form rule which states that all fields must be atomic. A field is an intersection between a row and a column and to satisfy this rule there can be no internal structure or sub column at this intersection. There can be no repeating columns and the primary keys must be able to uniquely identify each row. The importance of this rule is that it eliminates repeating and redundancy and makes it easier to enter and retrieve data. An example of the 1NF is a student record that includes the data elements: Student ID, First Name, Last Name, and Advisor ID. There is no repeated data and each column cannot be broken down any further. Another example is a database used to for the NFL combine. A table may be created for the physical attributes of a player. A row cannot describe both height and weight. There would need to be a row for height (in the units used to measure) and a second row for weight. Similarly, if the athlete played multiple positions, there would need to be a row for position one and position two. For those athletes who only play one position, position two would be null.

**“Access Rows by Content Only”:**

The second relational rule is the “what, not where” rule. This rule states that a data can only be retrieved based on the content you are looking for, not the location of the field. The purpose of this rule is to be able to form information from the data. Elements of a set have no order so it is impossible to understand the data without context. Stemming off the previous example, you would not be able analyze the data of a player

unless there was content supporting it. “Column 5 Row 6” has no meaning is the data does not need to be organized in order.

### **“All Rows Must be Unique”**

The third rational rule states that all rows must be unique. This is important because without this rule, there could be repeated data and inaccuracies. Data is used to create into information and if there are chances of duplicates, the data can be distorted. An example of this would be a data table describing stock prices and returns. The data table would need to use date and time data types to show the stock performance on specific days but each row would need to show unique characteristics of the stock. For example, opening price (USD), closing price (USD), return YTD, and any other data regarding the stocks. There cannot be a row that just says stock price because, one that is not unique and two it would violate the first normal rule as well since the field is not atomic.

Resources:

<http://www.codeproject.com/Answers/650853/Difference-between-primary-key-candidate-key-and-s#answer4>

Database: The Complete Book Second Edition

<https://www.techopedia.com/definition/5547/primary-key>