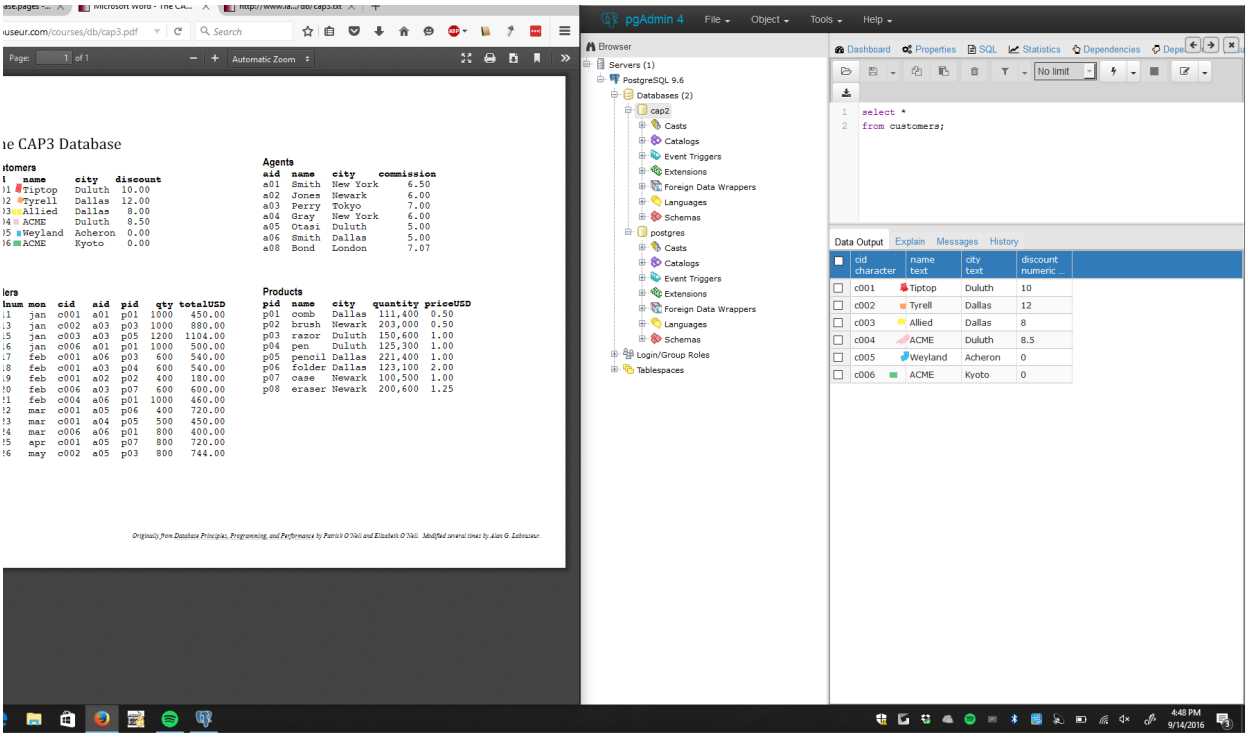
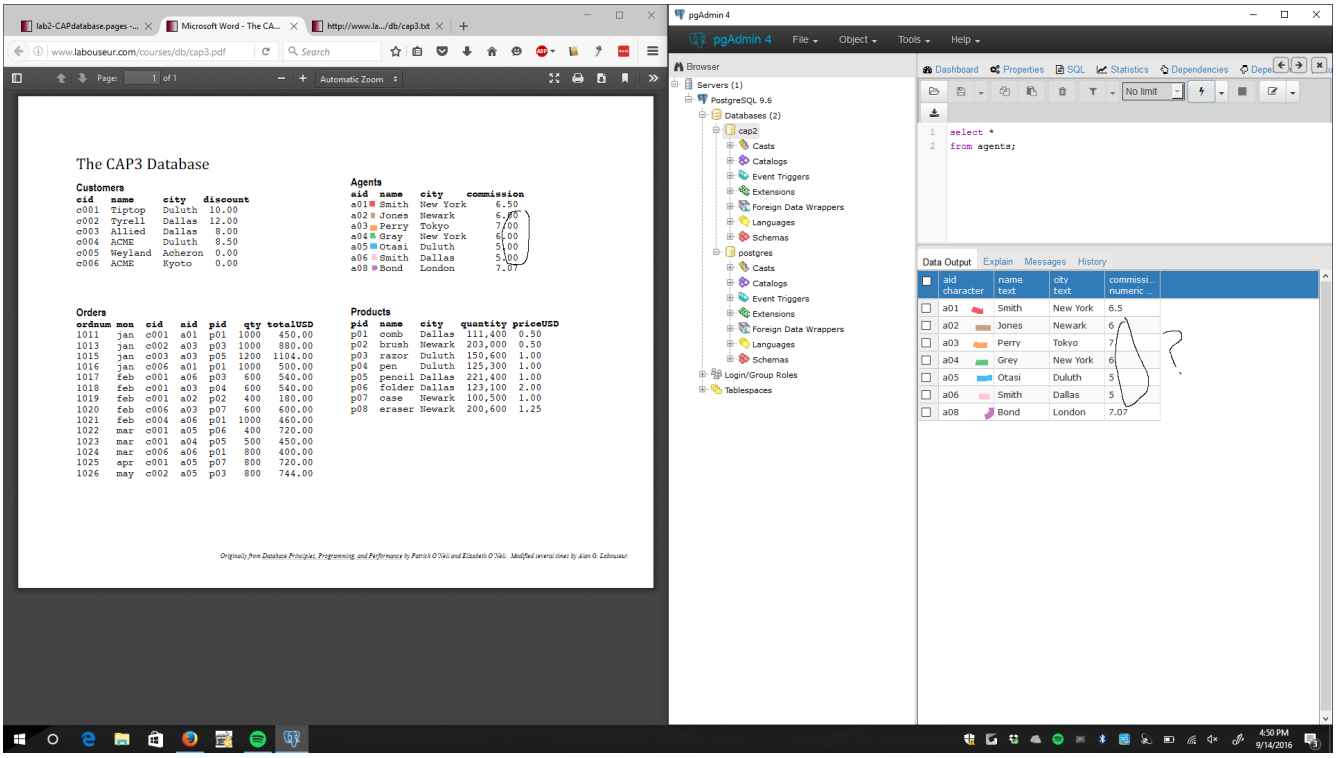
G Leaden
Database Management Lab2

1. Below are the 4 screenshots of the queries. The only inconsistency I found was that my PgAdmin4 program was truncating .0 and .00s from the numbers when compared to the PDF.





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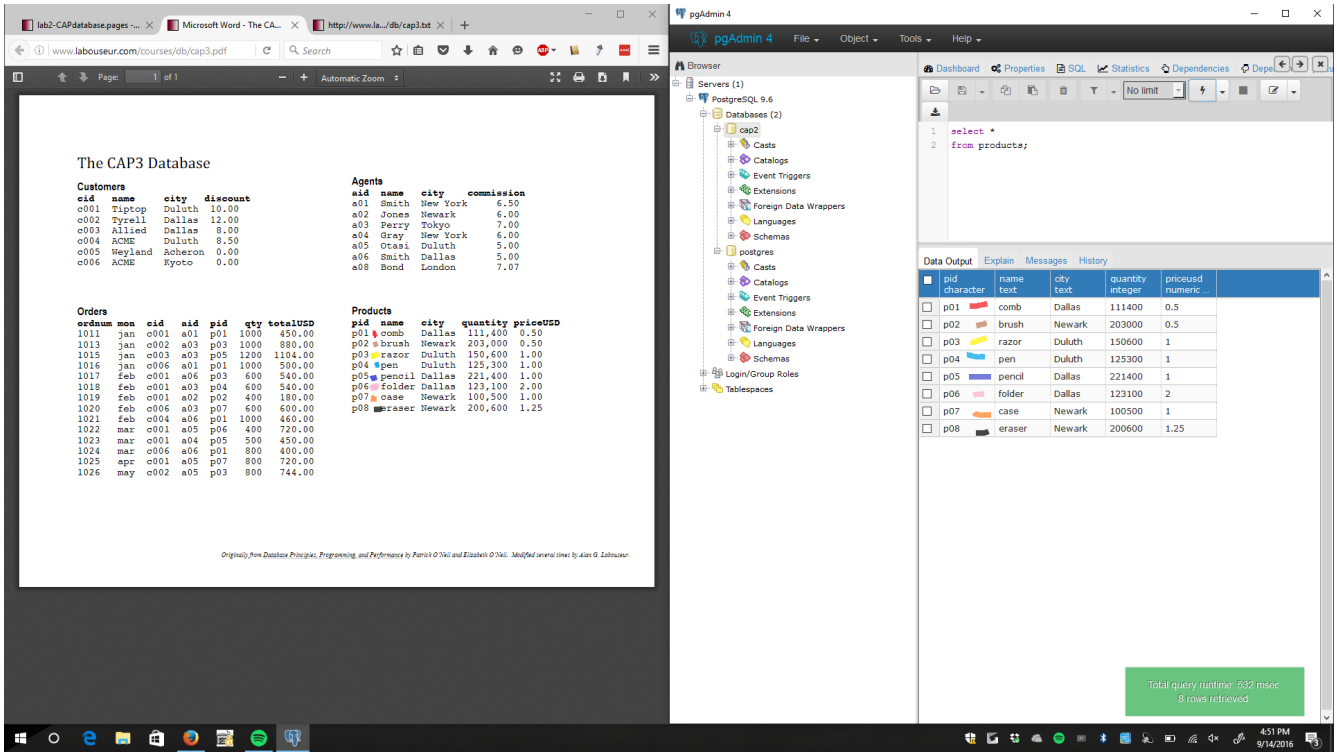


The CAP3 Database

Customers

cid	name	city	discount
c001	Tiptop	Duluth	10.00
c002	Tyrell	Dallas	12.00
c003	Allied	Dallas	8.00
c004	ACME	Duluth	8.50
c005	Weyland	Acheron	0.00
c006	ACME	Kyoto	0.00

Agents

aid	name	city	commission
a01	Smith	New York	6.50
a02	Jones	Newark	6.00
a03	Perry	Tokyo	7.00
a04	Gray	New York	6.00
a05	Otasi	Duluth	5.00
a06	Smith	Dallas	5.00
a08	Bond	London	7.07

Orders

ordnum	mon	cid	aid	pid	qty	totalUSD
1011	jan	c001	a01	p01	1000	450.00
1013	jan	c002	a03	p03	1000	880.00
1015	jan	c003	a03	p05	1200	1104.00
1016	jan	c006	a01	p01	1000	500.00
1017	feb	c001	a06	p03	600	540.00
1018	feb	c001	a03	p04	600	540.00
1019	feb	c001	a02	p02	400	180.00
1020	feb	c006	a03	p07	600	600.00
1021	feb	c004	a06	p01	1000	460.00
1022	mar	c001	a05	p06	400	720.00
1023	mar	c001	a04	p05	500	450.00
1024	mar	c006	a06	p01	800	400.00
1025	apr	c001	a05	p07	800	720.00
1026	may	c002	a05	p03	800	744.00

Products

pid	name	city	quantity	priceUSD
p01	comb	Dallas	111,400	0.50
p02	brush	Newark	203,000	0.50
p03	razor	Duluth	150,600	1.00
p04	pen	Duluth	125,300	1.00
p05	pencil	Dallas	221,400	1.00
p06	folder	Dallas	123,100	2.00
p07	case	Newark	100,500	1.00
p08	eraser	Newark	200,600	1.25

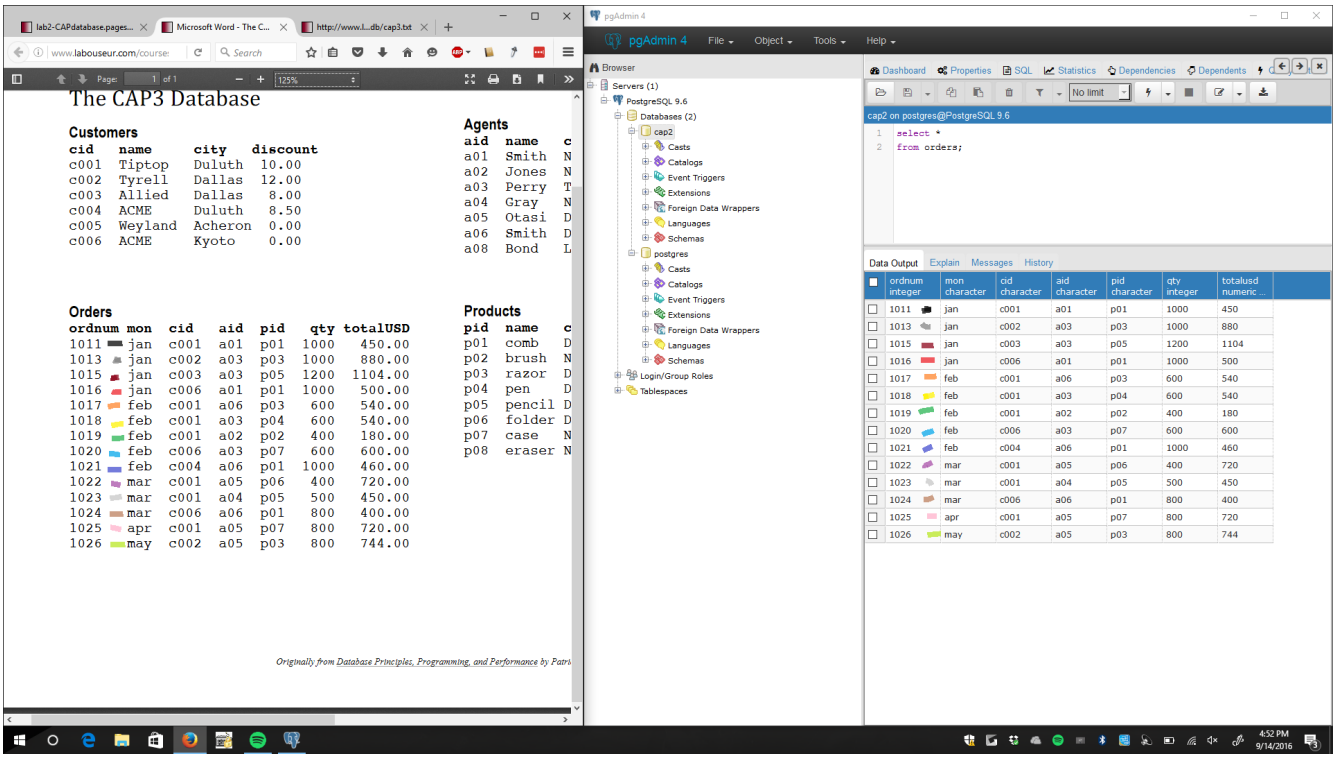
Originally from Database Principles, Programming, and Performance by Patrick O'Neil and Elizabeth O'Neil. Modified several times by Alan G. Labouseur.

```
select *
from products;
```

Data Output | Explain | Messages | History

pid character	name text	city text	quantity integer	priceusd numeric ...
p01	comb	Dallas	111400	0.5
p02	brush	Newark	203000	0.5
p03	razor	Duluth	150600	1
p04	pen	Duluth	125300	1
p05	pencil	Dallas	221400	1
p06	folder	Dallas	123100	2
p07	case	Newark	100500	1
p08	eraser	Newark	200600	1.25

Total query runtime: 532 msec.
8 rows retrieved.



The CAP3 Database

Customers

cid	name	city	discount
c001	Tiptop	Duluth	10.00
c002	Tyrell	Dallas	12.00
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c004	ACME	Duluth	8.50
c005	Weyland	Acheron	0.00
c006	ACME	Kyoto	0.00

Agents

aid	name	c
a01	Smith	N
a02	Jones	N
a03	Perry	T
a04	Gray	N
a05	Otasi	D
a06	Smith	D
a08	Bond	L

Orders

ordnum	mon	cid	aid	pid	qty	totalUSD
1011	jan	c001	a01	p01	1000	450.00
1013	jan	c002	a03	p03	1000	880.00
1015	jan	c003	a03	p05	1200	1104.00
1016	jan	c006	a01	p01	1000	500.00
1017	feb	c001	a06	p03	600	540.00
1018	feb	c001	a03	p04	600	540.00
1019	feb	c001	a02	p02	400	180.00
1020	feb	c006	a03	p07	600	600.00
1021	feb	c004	a06	p01	1000	460.00
1022	mar	c001	a05	p06	400	720.00
1023	mar	c001	a04	p05	500	450.00
1024	mar	c006	a06	p01	800	400.00
1025	apr	c001	a05	p07	800	720.00
1026	may	c002	a05	p03	800	744.00

Products

pid	name	c
p01	comb	D
p02	brush	N
p03	razor	D
p04	pen	D
p05	pencil	D
p06	folder	D
p07	case	N
p08	eraser	N

Originally from Database Principles, Programming, and Performance by Patri

```
select *
from orders;
```

cap2 on postgres@PostgreSQL 9.6

Data Output | Explain | Messages | History

ordnum integer	mon character	cid character	aid character	pid character	qty integer	totalusd numeric ...
1011	jan	c001	a01	p01	1000	450
1013	jan	c002	a03	p03	1000	880
1015	jan	c003	a03	p05	1200	1104
1016	jan	c006	a01	p01	1000	500
1017	feb	c001	a06	p03	600	540
1018	feb	c001	a03	p04	600	540
1019	feb	c001	a02	p02	400	180
1020	feb	c006	a03	p07	600	600
1021	feb	c004	a06	p01	1000	460
1022	mar	c001	a05	p06	400	720
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2. Explain the distinctions among the terms primary key, candidate key, and superkey.

A primary key is a unique identifier of a table used inside a database, an example would be Marist CWID withing Marist's databases. A candidate key is a unique record/column that COULD be a primary key but does not have to be. A candidate key is a candidate to be a primary key meaning that it is unique within the database but it does not have to be an identifier, an example within Marist's database could be email (g.leaden1) (james.bond4) another example of a candidate key is a Marist CWID. A super key is a collection of records/columns that are unique, within Marist's database a good example would be CWID, and Name. While name might not be unique the CWID associated with the name will be and thus the key/record/column as a whole (CWID and name) is unique. A candidate key is a super key with just the always unique record/column, and a primary key is a candidate key that is used to identify a table.

3. Write a short essay on data types. Select a topic for which you might create a table. Name the table and list its Fields (columns). For each Field, give its data type and whether or not it is nullable.

Data types: CHAR/VARCHAR, BIT/BIT VARYING, BOOLEAN, INT, FLOAT, DECIMAL, DATE, TIME

Data types in SQL databases determine what type of data is going to be stored in each field. This helps the SQL program understand what is to be expected in each column and with that information it can how to interact with said data.

Topic: League of Legends Post-Match ScoreBoard

Table:

INT	Team1 ID
INT	Team2 ID
DATE	Date game was played
INT	Length of game in seconds
INT (isnullable)	Banned Blue Champion1
INT(isnullable)	Banned Red Champion2
INT(isnullable)	Banned Blue Champion3
INT(isnullable)	Banned Red Champion4
INT(isnullable)	Banned Blue Champion5
INT(isnullable)	Banned Red Champion6
INT	1st Blue Champion Pick ID
INT	1st Red Champion Pick ID

INT	2nd Red Champion Pick ID
INT	2nd Blue Champion Pick ID
INT	3rd Blue Champion Pick ID
INT	3rd Red Champion Pick ID
INT	4th Red Champion Pick ID
INT	4th Blue Champion Pick ID
INT	5th Blue Champion Pick ID
INT	5th Red Champion Pick ID
VARCHAR	Game Prediction by Analysts

4. Explain the following relational “rules” with examples and reasons why they are important. a. The “First normal form” rule b. The “access rows by content only” rule c. The “all rows must be unique” rule.

The first normal form rule is "the condition that every component of every tuple is an atomic value." Another definition could be "no multi-valued fields." The first normal form rule is important because it limits confusing or misleading data. For example, when we had superpowers for different Bond's Pierce had two super powers while Sean only had one. This did not follow the first normal form rule because we had more than one entry for a single field. When the first normal rule is not followed we are limited by the number of fields we start with (i.e. superpower 1 superpower 2, what if we wanted superpower 3) and it makes the database more easily searchable / filtered.

The access rows by content only rule means that you should only attempt to access a row by calling its content, not its location. For example, when attempting to access superpowers of James Bond actors you cannot simply request information from "second row from the bottom" because you don't know where the superpowers are located and neither does the computer. You can however request "Sean" and receive your information that way. Rows in databases have no order so their location does not matter. This rule is important because the rows could be anywhere the easiest and most effective way to access a row is by finding the content and not its location also you do not always know the field's location.

The all rows must be unique rule means that you cannot have two rows that have the same exact content in every single column. For example, you cannot have two Sean Connerys, despite how awesome that would be. The reason for this rule is to make the database as clear as possible. Another reason for the rule would be that relational databases are based in set theory which does not recognize duplicate entries.