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Professor Labouseur

Database Systems CMPT 308

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Lab 1

1. After comparing the screenshots (at the bottom of this document) to the data in the CAP snapshot, both results are the same.

2. A primary key is an attribute that uniquely identifies a row or record in a relation is known as primary key. There can be only one primary key per row. A Super Key is short for "superset of a key." It is a set of one or more attributes that are taken collectively and can identify all other attributes uniquely. Attributes within super keys can be repeated because super keys do not need to be minimal. A candidate key is a minimal super key which cannot have any redundant attributes. They are simplified down to the smallest attributes to define the data. A unique and distinct candidate key would become a primary key.

3. A data type is a data storage format that can contain a specific type or range of values. Some examples of data types include integers, Booleans, characters, strings, or date. Data types can be classified as enumerated domains which is data with set incremented numbers or values. These values are typically data such as states, months, days, grades, or ratings. This data is incremented but may not necessarily hold a specific number value. There are also generic domains that cannot be numerated. For example, text, integers, and dates are essentially infinite and do not have a set number of values.

One example of a table would be one for a Marist student. The table would named Students and have several wields. The following are the wields of the table and their respective data types: student ID number as an integer, first name as a string, last name as a string, date of

birth as a date, major as a string, and minor as a string. The only nullable field would be minor because every student must have data in all of the previous fields. Even if a student has no major, it would still be undecided as opposed to null.

4. The “First normal form” rule means that all fields must be atomic. Each intersection of a row and column must be expressed in the smallest possible unit. There can be no internal structures within each intersection. This rule is important because it decreases ambiguity and simplifies the data to avoid redundancies. When each field is simplified to the smallest unit, the data becomes more concise. Even if null fields need to be used, it is better to have atomic fields than inconsistent or repetitive data.

The “access rows by content only” rule means you cannot access data according to where it is in the data table. All data must be specified or referenced based upon the column or row names rather than just the location of the column or row. This will ensure the data has context. Accessing data by “what” rather than “where” will ensure the data is consistent. If the data were to be referenced by location, it is possible that the data could have been moved. In this case, it would be difficult to relocate the data by solely its location because it would have no context.

The “all rows must be unique” rule is a consequence of set theory. It is not a rule commonly enforced by databases. Each row must have at least one field that distinguishes it from another row. This is important because if rows could be identical there would be many cases of duplicate data which increases redundancy and allows for a higher chance of error. If there are two identical rows, one of them is likely to have an error or inconsistency in the data.

database (1).pdf - Adobe Acrobat Reader DC

Tools lab2: CAP database (...

Database Systems

CMPT 308

lab 2: CAP database - 20 points

Instructions

- More practice getting around in the PostgreSQL and pgAdmin III
- Familiarize yourself with the CAP database data.
- Get some easy lab points.

Create our beloved CAP database in PostgreSQL. Use the <http://www.labouseur.com/courses/db/cap3.txt>.

1. Execute the following queries (one at a time) from pgAdmin III:

```
select *
from customers;
```



```
select *
from agents;
```



```
select *
from products;
```



```
select *
from orders;
```


Take a screen shot of each query and its results. Compare with the snapshot at <http://www.labouseur.com/courses/db/cap3.txt>.
2. Explain the distinctions among the terms primary key, foreign key, and unique key.
3. Write a short essay on data types. Select a topic for which you can find examples. Name the table and list its fields (columns). For each field, indicate its data type and whether it is nullable or not it is nullable.
4. Explain the following relational "rules" with examples. Indicate which rule is most important.
 - a. The "first normal form" rule

Query - postgres on postgres@localhost:5432 *

SQL Editor Graphical Query Builder

Previous queries

```
select *
from orders;
```

Output pane

	ordnum integer	mon character(3)	cid character(4)	aid character(3)	pid character(3)	qty integer	totalusd numeric(12,2)
1	1011	jan	c001	a01	p01	1000	450.00
2	1013	jan	c002	a03	p03	1000	880.00
3	1015	jan	c003	a03	p05	1200	1104.00
4	1016	jan	c006	a01	p01	1000	500.00
5	1017	feb	c001	a06	p03	600	540.00
6	1018	feb	c001	a03	p04	600	540.00
7	1019	feb	c001	a02	p02	400	180.00
8	1020	feb	c006	a03	p07	600	600.00
9	1021	feb	c004	a06	p01	1000	460.00
10	1022	mar	c001	a05	p06	400	720.00
11	1023	mar	c001	a04	p05	500	450.00
12	1024	mar	c006	a06	p01	800	400.00
13	1025	apr	c001	a05	p07	800	720.00
14	1026	may	c002	a05	p03	800	744.00

OK. DOS Ln 2, Col 13, Ch 23 14 rows. 16 msec 16 msec

database (1).pdf - Adobe Acrobat Reader DC

pgAdmin III

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```

Output pane

	pid character(3)	name text	city text	quantity integer	priceusd numeric(10,2)
1	p01	comb	Dallas	111400	0.50
2	p02	brush	Newark	203000	0.50
3	p03	razor	Duluth	150600	1.00
4	p04	pen	Duluth	125300	1.00
5	p05	pencil	Dallas	221400	1.00
6	p06	folder	Dallas	123100	2.00
7	p07	case	Newark	100500	1.00
8	p08	eraser	Newark	200600	1.25

OK. DOS Ln 2, Col 15, Ch 25 8 rows. 20 msec 16 msec