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Database Management

Lab 2

1.)

The screenshot displays the pgAdmin 4 interface. On the left, the 'Browser' pane shows the database structure for 'PostgreSQL 9.6', including 'Databases (2)' with 'CAP4 Database' expanded to show 'Schemas (1)' with 'public' schema. The 'public' schema contains various objects like 'Collations', 'Domains', 'FTS Configurations', 'FTS Dictionaries', 'FTS Parsers', 'FTS Templates', 'Foreign Tables', 'Functions', 'Materialized Views', 'Sequences', 'Tables', 'Trigger Functions', 'Types', and 'Views'. The main pane shows the 'CAP4 Database on postgres@PostgreSQL 9.6' with a SQL query editor and a 'Data Output' tab. The query editor contains the following SQL statements:

```
-- SQL statements for displaying the example data
select *
from Customers;

select *
from Agents;
```

The 'Data Output' tab displays the results of the query, showing a table with columns: 'cid', 'character', 'name', 'city', and 'discount numeric ...'. The table contains six rows of data:

cid	character	name	city	discount numeric ...
c001	Tiptop	Duluth	10	
c002	Tyrell	Dallas	12	
c003	Allied	Dallas	8	
c004	ACME	Duluth	8.5	
c005	Weyland	Risa	0	
c006	ACME	Kyoto	0	

pgAdmin 4 File Object Tools Help

Browser

Servers (1)

PostgreSQL 9.6

Databases (2)

CAP4 Database

Casts

Catalogs

Event Triggers

Extensions

Foreign Data Wrappers

Languages

Schemas (1)

public

Collations

Domains

FTS Configurations

FTS Dictionaries

FTS Parsers

FTS Templates

Foreign Tables

Functions

Materialized Views

Sequences

Tables (4)

agents

customers

orders

products

Trigger Functions

Types

Views

postgres

Login/Group Roles

Tablespaces

Dashboard Properties SQL Statistics Dependencies Dependents Query- untitled

CAP4 Database on postgres@PostgreSQL 9.6

```
145 -- SQL statements for displaying the example data
146
147 select *
148 from Customers;
149
150 select *
151 from Agents;
152
```

Data Output Explain Messages History

	aid character	name text	city text	commissi... numeric ...
<input type="checkbox"/>	a01	Smith	New York	6.5
<input type="checkbox"/>	a02	Jones	Newark	6
<input type="checkbox"/>	a03	Perry	Tokyo	7
<input type="checkbox"/>	a04	Grey	New York	6
<input type="checkbox"/>	a05	Otasi	Duluth	5
<input type="checkbox"/>	a06	Smith	Dallas	5
<input type="checkbox"/>	a08	Bond	London	7.07

pgAdmin 4

FileObjectToolsHelp

Browser

Servers (1)

PostgreSQL 9.6

Databases (2)

CAP4 Database

CastsCatalogsEvent TriggersExtensionsForeign Data WrappersLanguagesSchemas (1)

public

CollationsDomainsFTS ConfigurationsFTS DictionariesFTS ParsersFTS TemplatesForeign TablesFunctionsMaterialized ViewsSequencesTables (4)

agentscustomersordersproductsTrigger FunctionsTypesViews

postgresLogin/Group RolesTablespaces

DashboardPropertiesSQLStatisticsDependenciesDependentsQuery- untitled

CAP4 Database on postgres@PostgreSQL 9.6

150select *
151from Agents;
152
153select *
154from Products;
155
156select *
157from Orders;

Data OutputExplainMessagesHistory

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

The screenshot shows the pgAdmin 4 interface. On the left, the 'Browser' pane displays a tree view of the database structure. The 'Servers' section shows a connection to 'PostgreSQL 9.6'. Under 'Databases (2)', the 'CAP4 Database' is expanded, showing various database objects like 'Casts', 'Catalogs', 'Event Triggers', 'Extensions', 'Foreign Data Wrappers', 'Languages', and 'Schemas (1)'. The 'public' schema is expanded, showing objects like 'Collations', 'Domains', 'FTS Configurations', 'FTS Dictionaries', 'FTS Parsers', 'FTS Templates', 'Foreign Tables', 'Functions', 'Materialized Views', 'Sequences', 'Tables (4)', 'Trigger Functions', 'Types', and 'Views'. The 'Tables (4)' section is expanded, showing 'agents', 'customers', 'orders', and 'products'. The 'orders' table is selected.

On the right, the 'Query' pane shows a SQL query:

```

150 select *
151 from Agents;
152
153 select *
154 from Products;
155
156 select *
157 from Orders;

```

Below the query, the 'Data Output' tab is active, displaying a table with 8 columns: 'ordnumb...', 'month', 'cid', 'aid', 'pid', 'qty', 'totalusd', and 'numeric ...'. The table contains 16 rows of data.

	ordnumb...	month	cid	aid	pid	qty	totalusd	numeric ...
<input type="checkbox"/>	1011	Jan	c001	a01	p01	1000	450	
<input type="checkbox"/>	1012	Jan	c002	a03	p03	1000	880	
<input type="checkbox"/>	1015	Jan	c003	a03	p05	1200	1104	
<input type="checkbox"/>	1016	Jan	c006	a01	p01	1000	500	
<input type="checkbox"/>	1017	Feb	c001	a06	p03	600	540	
<input type="checkbox"/>	1018	Feb	c001	a03	p04	600	540	
<input type="checkbox"/>	1019	Feb	c001	a02	p02	400	180	
<input type="checkbox"/>	1020	Feb	c006	a03	p07	600	600	
<input type="checkbox"/>	1021	Feb	c004	a06	p01	1000	460	
<input type="checkbox"/>	1022	Mar	c001	a05	p06	400	720	
<input type="checkbox"/>	1023	Mar	c001	a04	p05	500	450	
<input type="checkbox"/>	1024	Mar	c006	a06	p01	800	400	
<input type="checkbox"/>	1025	Apr	c001	a05	p07	800	720	
<input type="checkbox"/>	1026	May	c002	a05	p03	800	744	

2.) A super key is a column or set of columns that ensures that every row will be unique. A candidate key is a super key with the minimum number of columns. A primary key is simply the candidate key that you choose to use.

3.) An example topic for which one might create a table would be inventory in a video game store. One could have a table labeled "Inventory" and its fields could contain headings such as Game Title, Price in USD New, Price in USD Used, Quantity New, Quantity Used, Release Date, Number of DLCs, etc. Game Title would be a String data type, Price in USD New would be a Decimal data type, Price in USD Used would be a Decimal data type, Quantity New would

be an Integer data type, Quantity Used would be an integer data type, Release Date would be a Date data type, and Number of DLCs would be an Integer data type. Price in USD Used may be nullable because the store may not have received any used copies of a new game and therefore not have determined a price for the used game.

4.) The “first normal form” rule states that all intersections must be atomic, or not multivalued or structured. This means that for every cell in a table, there must be only one value within the cell. One cannot have a list within a cell.

The “access rows by content only” rule states that one has to look up rows based on content only, not the order of the rows. The order is completely irrelevant to the computer, so the way rows must be accessed based on their unique values.

The “all rows must be unique” rule states that no two rows can have the same exact content. If two rows did have the exact same content, the computer would not be able to distinguish the two. If two rows have the exact same content, then how does one know which row is meant to be accessed or changed? And if one is changed, then is the older one now incorrect? Should both have been changed? This depends on the situation, of course, but a problem like this could arise.