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Database Management
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Lab 2- CAPdatabase

1.

Customers:

The screenshot shows the pgAdmin 4 web interface. On the left is the 'Servers' tree with 'postgres' selected. The main pane displays a SQL query: `-- SQL statements for displaying the example data`, `select *`, `from Customers;`, and `select *`, `from Agents;`. Below the query editor is the 'Data Output' tab, which shows a table with 5 columns: `cid`, `character`, `name`, `city`, and `discount numeric`. The table contains 6 rows of data. A green box at the bottom right indicates 'Total query runtime: 60 msec. 6 rows retrieved'.

cid	character	name	city	discount numeric
c001	TipTop	Duluth	10	
c002	Tyrrell	Dallas	12	
c003	Allied	Dallas	8	
c004	ACME	Duluth	8.5	
c005	Weyland	Rosa	0	
c006	ACME	Kyoto	0	

Total query runtime: 60 msec.
6 rows retrieved

Agents:

pgAdmin 4

File Object Tools Help

Browser

- Servers (2)
 - DMS
 - Databases (1)
 - postgres
 - casts
 - Catalogs
 - Event Triggers
 - Extensions
 - Foreign Data Wrappers
 - Languages
 - Schemas
 - Login/Group Roles
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 - PostgreSQL 9.6

Dashboard Properties SQL Statistics Dependencies Debug

No limit

```
129 -- SQL statements for displaying the example data
130
131 select *
132 from Customers;
133
134 select *
135 from Agents;
136
```

Data Output Explain Messages History

aid	character	name	city	commission
<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	O'Leary	Duluth	5	
<input type="checkbox"/> a06	Smith	Dallas	5	
<input type="checkbox"/> a08	Bond	London	7.07	

Total query runtime: 141 msec.
7 rows retrieved

Products:

pgAdmin 4

File Object Tools Help

pgAdmin 4

Servers (2)

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PostgreSQL 9.6

SQL

Statistics

Dependencies

Display

No limit

```
135 from Agents;
136
137 select *
138 from Products;
139
140 select *
141 from Orders;
142
```

Data Output Explain Messages History

pid	character	name	city	quantity	priceused
<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	

Total query runtime: 100 msec.
8 rows retrieved

Orders:

pgAdmin 4

SQL query:

```
135 from Agents;
136
137 select *
138 from Products;
139
140 select *
141 from Orders;
142
```

Data Output:

orderid	month	cid	aid	pid	qty	totalused
1011	Jan	c001	a01	p01	1000	450
1012	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
1023	Mar	c001	a04	p05	500	450
1024	Mar	c006	a06	p01	800	400
1025	Apr	c001	a05	p07	800	720
1026	May	c002	a05	p03	800	744

Total query runtime: 70 msec.
14 rows retrieved

2.
 - a. Primary Key- a primary key is the chosen candidate key. There can only be one primary key in each table, and it is used as a special column to uniquely identify a row.
 - b. Candidate Key- a candidate key is one or many sets of columns that uniquely identifies data. There may be more than one candidate key, but it must be the minimal number of columns to uniquely identify everything possible.
 - c. Super Key- a super key is a columns or columns that ensures every row will be unique. The super keys are reduced to the minimal amount to form the candidate key.
3. A data type is a particular kind of data item. It can range from numeric types to monetary types to Boolean types. It allows the software to identify the information given and present it in a way that the system understands. For example, if we were to put together a small database for members of a club, we would create a table that contained different types of information about each member. Each column would be a different field and have a different data type based on what type of information would be inputted. We would obviously need a "first name" column and a "last name" column. The two fields would have the data type "text". Another column would be date of birth. This could be done using the data type "date". We would also need an "age" column and a "student ID" column. These would use the data types "smallint" and "numeric". Null values cannot be inserted into these columns.
4.
 - a. First Normal Form Rule- The first normal form rule states that an intersection of a row and column cannot have its own structure, and it must return data in its atomic form. This means that the data returned must be as basic and simple as possible. There cannot have multiple answers for an intersection. For example, first and last name would need to be broken into two different column, First Name and Last name. However, something like date of birth would be fine because there is a data type for dates.
 - b. Access Rows by Content Only Rule- The access rows by content only rule states that you must ask the database to return column "x". It is impossible to number column and rows because of set theory. The columns and rows are not ordered, and they could appear in a different order every time the database is viewed.
 - c. All Rows Must be Unique Rule- The third rule is self-explanatory. To eliminate data inconsistency and misuse of data, one needs to ensure that all rows are unique.