CMPSC 174A/174N Fundamentals of Database System

SQL

Discussion Session
Friday, 9:00am-9:50am
Zexi Huang

Session 7

Schedule

- SQL*Plus Instructions
  - Setting up and Connecting
  - Creating Tables and Inserting Values
  - Accessing Sample Dataset
- Query Examples
  - Customers, Agents and Products
- Query Exercises
  - Customers, Agents and Products

SQL*Plus Instructions

- **Setting up and Connecting**
  - Remote login to CSIL with ssh.
  - Set environment variables for SQL*Plus.
    - *vi ~/.bash_profile*
    - *export LD_LIBRARY_PATH=/cs/class/cs174a/instantclient_11_2:$LD_LIBRARY_PATH*
    - *export PATH=/cs/class/cs174a/instantclient_11_2:$PATH*
  - Logout and login again for this to take effect.
  - Enter *sqlplus*.
    - USERNAME = UCSBnetID@cloud-34-133.eci.ucsb.edu
    - PASSWORD = PERM number
  - Change your password with *password*.

SQL*Plus Instructions

- **Creating tables and inserting values:**
  - Once you connect to the server, you can create your own tables, insert values, ask queries, etc.
- **Create tables for the following schemas:**
  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)

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```
CREATE TABLE Customers
(
  cid   VARCHAR(20),
  cname VARCHAR(20),
  city  VARCHAR(20),
  discount REAL,
  PRIMARY KEY (cid)
);
```

- **Insert following values into Customers table:**

cid	cname	city	discount
361721022	Alfred Hitchcock	Los Angeles	0
231403227	Billy Clinton	Santa Barbara	0.1
412231856	Cindy Laugher	San Francisco	0.2
207843218	David Copperfill	Goleta	0

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```
INSERT INTO Customers VALUES
('361721022','Alfred Hitchcock','Los Angeles',0);
INSERT INTO Customers VALUES
('231403227','Billy Clinton','Santa Barbara',0.1);
INSERT INTO Customers VALUES
('412231856','Cindy Laugher','San Francisco',0.2);
INSERT INTO Customers VALUES
('207843218','David Copperfill','Goleta',0);
```

SQL*Plus Instructions

- **Sample dataset:**
  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)
- **Access to the sample dataset:**
  - Refer to sample table with `cs174.table_name`. For example, `SELECT cname FROM cs174.Customers`.
  - You can do whatever queries you like, but you cannot modify the sample dataset.

Query Examples

- **Sample dataset:**
  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)
- **Q1: Find city of all customers.**

Query Examples

- **Sample dataset:**
  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)
- **Q1: Find city of all customers.**
  - `SELECT city FROM cs174.Customers`
  - `SELECT DISTINCT city FROM cs174.Customers`

Query Examples

- **Sample dataset:**
  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)
- **Q2: Find the information for all customers.**

Query Examples

- **Sample dataset:**
  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)
- **Q2: Find the information for all customers.**
  - `SELECT cid,cname,city,discount FROM cs174.Customers`
  - `SELECT * FROM cs174.Customers`
  - What will happen if you `SELECT * FROM` two tables?
  - For example, `SELECT * FROM cs174.Customers, cs174.Products`

Query Examples

- **Sample dataset:**
  - Customers (cid, cname, city, discount)
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  - `SELECT cid,cname,city,discount FROM cs174.Customers`
  - `SELECT * FROM cs174.Customers`
  - What will happen if you `SELECT * FROM` two tables?
  - For example, `SELECT * FROM cs174.Customers, cs174.Products`
  - We'll get all the rows of the result of the cross product.

Query Examples

- **Sample dataset:**
  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)
- **Q3: Find the price of the product called Oreo Chocolate Cookies.**

Query Examples

- **Sample dataset:**
  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
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- **Q3: Find the price of the product called Oreo Chocolate Cookies.**
  - `SELECT price FROM cs174.Products WHERE pname='Oreo Chocolate Cookies'`
  - What if we can't remember exactly the name of the product? We want to have Oreo.

Query Examples

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  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)
- **Q3: Find the price of the product called Oreo Chocolate Cookies.**
  - `SELECT price FROM cs174.Products WHERE pname='Oreo Chocolate Cookies'`
  - What if we can't remember exactly the name of the product? We want to have Oreo.
  - `SELECT price FROM cs174.Products WHERE pname LIKE '%Oreo%'`

Query Examples

- **Sample dataset:**
  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)
- **Q4: Find the names of the customers who have purchased at least one product.**

Query Examples

- **Sample dataset:**
  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)
- **Q4: Find the names of the customers who have purchased at least one product.**
  - `SELECT C.cname FROM cs174.Customers C, cs174.Orders O WHERE C.cid=O.cid`
  - Any other solutions?

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- **Sample dataset:**
  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)

- **Q4: Find the names of the customers who have purchased at least one product.**
  - `SELECT C.cname FROM cs174.Customers C, cs174.Orders O WHERE C.cid=O.cid`
  - Any other solutions?
  - `SELECT C.cname FROM cs174.Customers C NATURAL JOIN cs174.Orders O`
  - `SELECT C.cname FROM cs174.Customers C JOIN cs174.Orders O ON C.cid=O.cid`

Query Examples

- **Sample dataset:**
  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
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  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)
- **Q5: Find the names of the customers who have purchased at least two products.**

Query Examples

- **Sample dataset:**
  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)

- **Q5: Find the names of the customers who have purchased at least two products.**
  - `SELECT C1.cname FROM cs174.Customers C1, cs174.Customers C2, cs174.Orders O1, cs174.Orders O2 WHERE C1.cid=O1.cid AND C2.cid=O2.cid AND C1.cid=C2.cid AND O1.pid<>O2.pid`
  - `SELECT C1.cname FROM (cs174.Customers C1 NATURAL JOIN cs174.Orders O1) CROSS JOIN (cs174.Customers C2 NATURAL JOIN cs174.Orders O2) WHERE O1.pid<>O2.pid`

Query Examples

- **Sample dataset:**
  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)
- **Q6: Find the names of the customers who have not purchased any products.**

Query Examples

- **Sample dataset:**
  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)

- **Q6: Find the names of the customers who have not purchased any products.**
  - `SELECT C1.cname FROM cs174.Customers C1 EXCEPT SELECT C2.cname FROM cs174.Customers C2, cs174.Orders O WHERE C2.cid=O.cid`

Query Examples

- **Sample dataset:**
  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)

- **Q6: Find the names of the customers who have not purchased any products.**
  - `SELECT C1.cname FROM cs174.Customers C1 EXCEPT SELECT C2.cname FROM cs174.Customers C2, cs174.Orders O WHERE C2.cid=O.cid`
  - `SELECT C1.cname FROM cs174.Customers C1 MINUS SELECT C2.cname FROM cs174.Customers C2, cs174.Orders O WHERE C2.cid=O.cid`
  - Any problem with this statement?

Query Exercises

- **Sample dataset:**
  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)
- **Q1: Find all triples of a customer name, an agent name, and a product name such that the product was ordered by the customer through the agent, and the customer, the agent, and the product are in different cities pairwise.**

Query Exercises

- **Sample dataset:**
  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)

- **Q1: Find all triples of a customer name, an agent name, and a product name such that the product was ordered by the customer through the agent, and the customer, the agent, and the product are in different cities pairwise.**
  - ```
    SELECT C.cname,A.aname,P.pname FROM cs174.Customers C, cs174.Agents A,
    cs174.Products P, cs174.Orders O WHERE C.cid=O.cid AND A.aid=O.aid AND P.pid=O.pid
    AND C.city<>A.city AND C.city<>P.city AND A.city<>P.city
    ```
    ```

Query Exercises

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  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)
- **Q2: Find the names and available quantities of the most expensive product.**

Query Exercises

- **Sample dataset:**
  - Customers (cid, cname, city, discount)
  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)
- **Q2: Find the names and available quantities of the most expensive product.**
  - `SELECT P1.pname,P1.quantity FROM cs174.Products P1 MINUS SELECT P2.pname,P2.quantity FROM cs174.Products P2, cs174.Products P3 WHERE P2.price<P3.price`
  - `SELECT P.pname,P.price FROM cs174.Products P`

Query Exercises

- **Sample dataset:**
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  - Agents (aid, aname, city, percent)
  - Products (pid, pname, city, quantity, price)
  - Orders (ordno, mon, cid, aid, pid, qty, dollars)
- **Q3: List names of all customers who ordered at least twice through an agent whose transaction fee is greater than 5 percent.**

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- **Q3: List names of all customers who ordered at least twice through an agent whose transaction fee is greater than 5 percent.**
  - ```
    SELECT C1.cname FROM cs174.Customers C1, cs174.Customers C2, cs174.Agents A1,
    cs174.Agents A2, cs174.Orders O1, cs174.Orders O2 WHERE C1.cid=O1.cid AND
    C2.cid=O2.cid AND C1.cid=C2.cid AND A1.aid=O1.aid AND A2.aid=O2.aid AND
    A1.percent>0.05 AND A2.percent>0.05 AND O1.ordno<>O2.ordno
    ```
    ```