CGS 2545: Database Concepts
Fall 2010

SQL In-class Exercises

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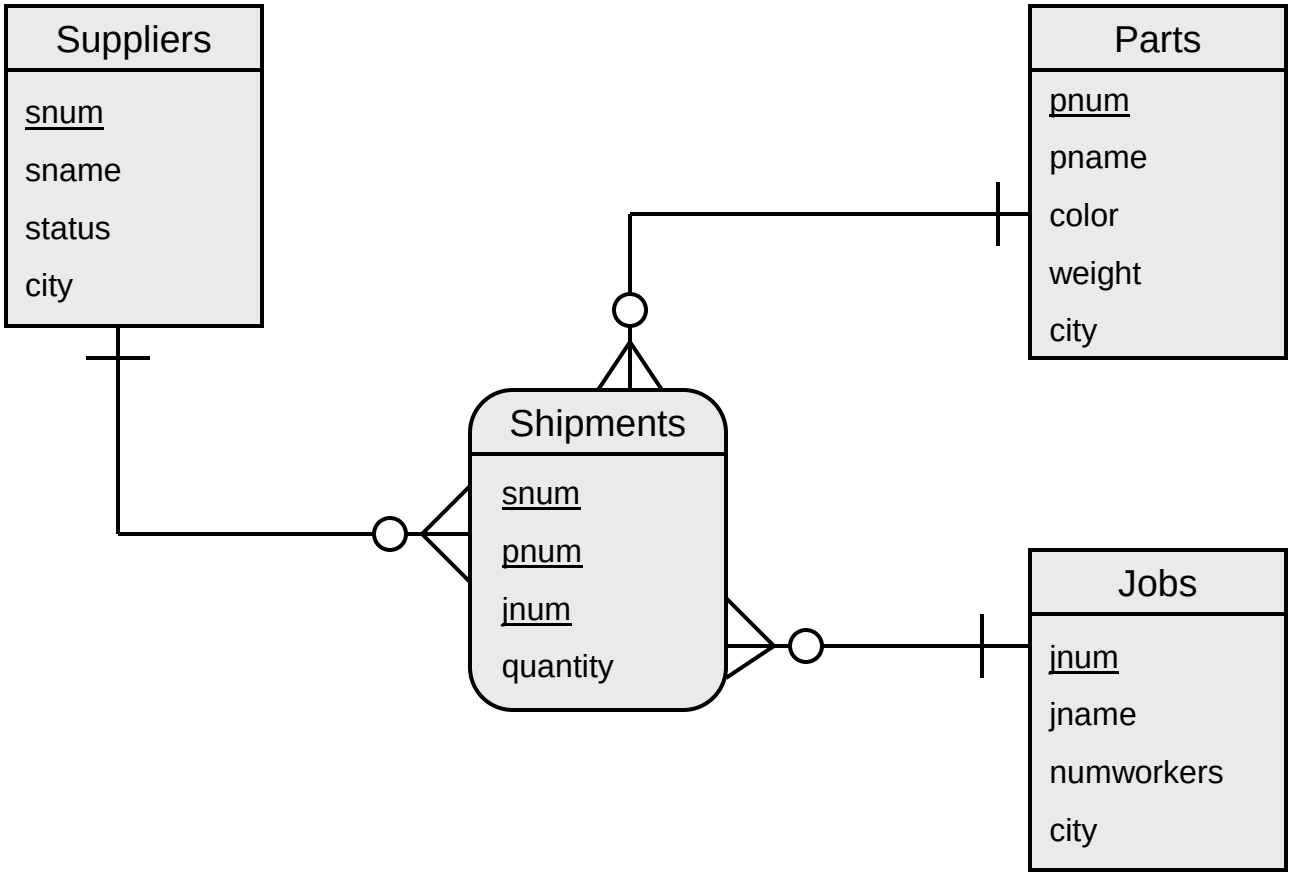
SQL In Class Exercises

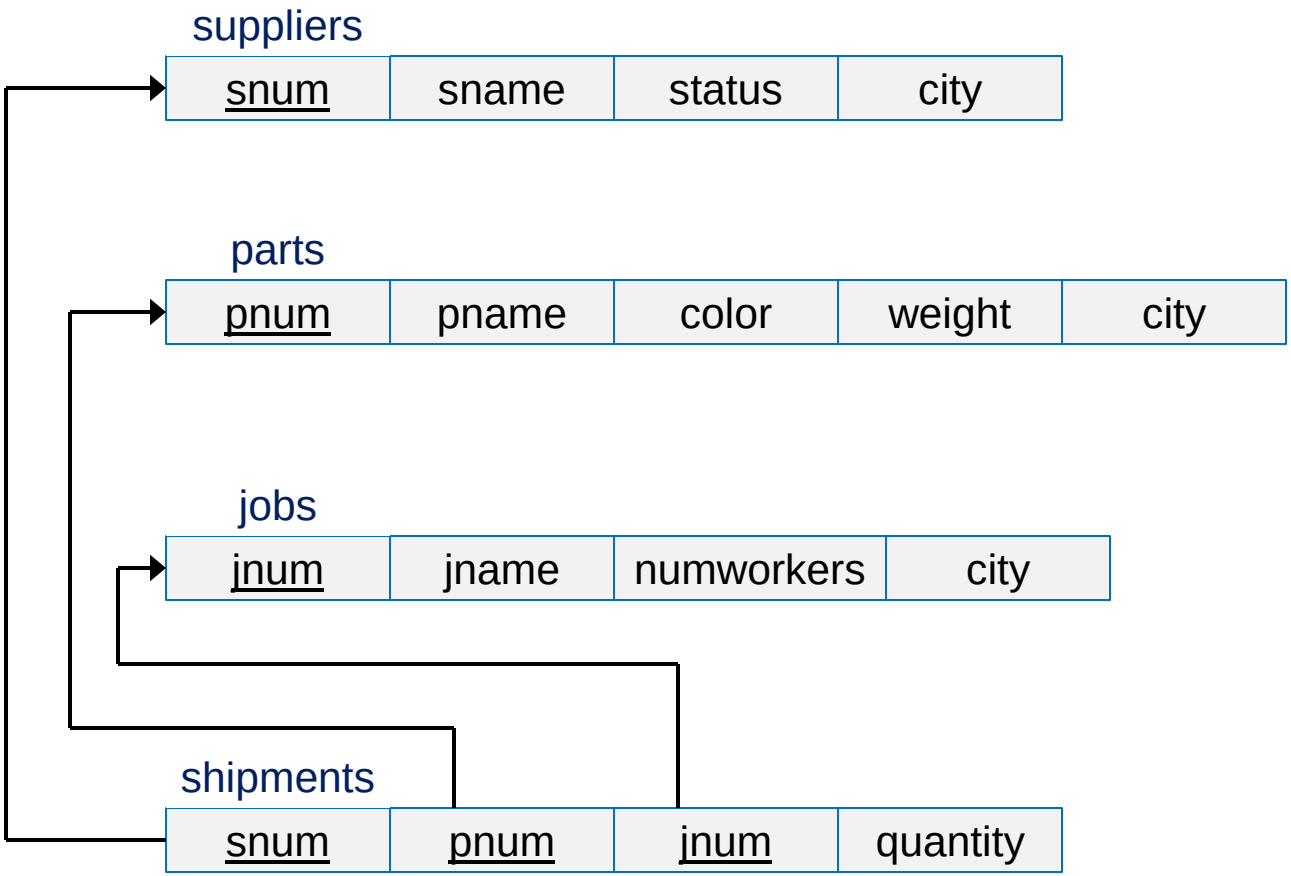
- Use the following database scheme for problems 1-9 in this exercise.



- Develop SQL expressions for each of the following queries:

SQL In Class Exercises

- The schema version of the database for problems 1-9.



1. List only the names of those suppliers who ship a part that weighs more than 200.

Solutions

```
SELECT sname
FROM suppliers NATURAL JOIN shipments CROSS JOIN parts
WHERE weight > 200 AND shipments.pnum = parts.pnum;
```

Note that a second natural join won't work here since the join would also occur on the city attribute, which would be a more restrictive query.

- or -

```
SELECT sname
FROM suppliers
WHERE snum IN (SELECT snum
                FROM shipments
                WHERE pnum IN (SELECT pnum
                               FROM parts
                               WHERE weight > 200) ) );
```


2. List the names of those cities in which both a supplier and a job are located.

Solutions

```
SELECT supplier.city
FROM suppliers NATURAL JOIN jobs;
```

- or -

```
SELECT supplier.city
FROM suppliers
WHERE city IN (SELECT city
               FROM jobs);
```


3. List the names of those jobs that receive a shipment from supplier number S1.

Solutions

```
SELECT jname
FROM jobs
WHERE jnum IN (SELECT jnum
               FROM shipments
               WHERE snum = "S1");
```

- or -

```
SELECT jname
FROM jobs NATURAL JOIN shipments
WHERE snum = "S1";
```


4. List the names of those parts that are not shipped to any job.

Solutions

```
SELECT pname
FROM parts
WHERE pnum NOT IN (SELECT pnum
                   FROM shipments);
```

- or -

```
SELECT pname
FROM parts
WHERE NOT EXISTS (SELECT *
                  FROM shipments
                  WHERE shipments.pnum = parts.pnum);
```


5. List the names of those suppliers who ship part number P2 to any job.

Solutions

```
SELECT sname
FROM suppliers
WHERE snum IN (SELECT snum
               FROM shipments
               WHERE pnum = “P2”);
```

- or -

```
SELECT sname
FROM suppliers NATURAL JOIN shipments
WHERE pnum = “P2”;
```


6. List the names of those suppliers who do not ship part number P2 to any job.

Note that neither of the following are correct!

```
SELECT sname
FROM suppliers
WHERE snum = (SELECT snum
      FROM shipments
      WHERE pnum ≠ "P2");
```

-or-

```
SELECT sname
FROM suppliers
WHERE snum IN (SELECT snum
    FROM shipments
    WHERE snum ≠ "P2");
```

Solutions

```
SELECT sname
FROM suppliers
WHERE snum NOT IN (SELECT snum
                   FROM shipments
                   WHERE pnum = "P2");
```

- or -

```
SELECT sname
FROM suppliers
WHERE NOT EXISTS (SELECT *
                  FROM shipments
                  WHERE shipments.snum = suppliers.snum AND shipments.pnum = "P2");
```


7. List the names of those suppliers who ship part at least one red part to any job.

Solutions

```
SELECT sname
FROM suppliers
WHERE snum IN (SELECT snum
                FROM shipments
                WHERE pnum IN (SELECT pnum
                               FROM parts
                               WHERE color = “red” ));
```

- or -

```
SELECT sname
FROM suppliers NATURAL JOIN shipments
WHERE pnum IN (SELECT pnum
                FROM parts
                WHERE color = “red”);
```


8. List the part number for every part that is shipped by more than one supplier.

Solution

```
SELECT pnum
FROM shipments
GROUP BY pnum
HAVING COUNT (snum) > 1;
```

WHERE clause restricts by rows

HAVING clause restricts by groups

9. List the names of those suppliers who ship every part.

Solutions

```
SELECT sname
FROM suppliers
WHERE  NOT EXISTS (SELECT *
                   FROM parts
                   WHERE NOT EXITS (SELECT *
                                    FROM shipments
                                    WHERE shipments.snum = suppliers.snum
                                      AND shipments.pnum = parts.pnum ) );
```

This solution is correct if the participation of parts in shipments is optional or mandatory.

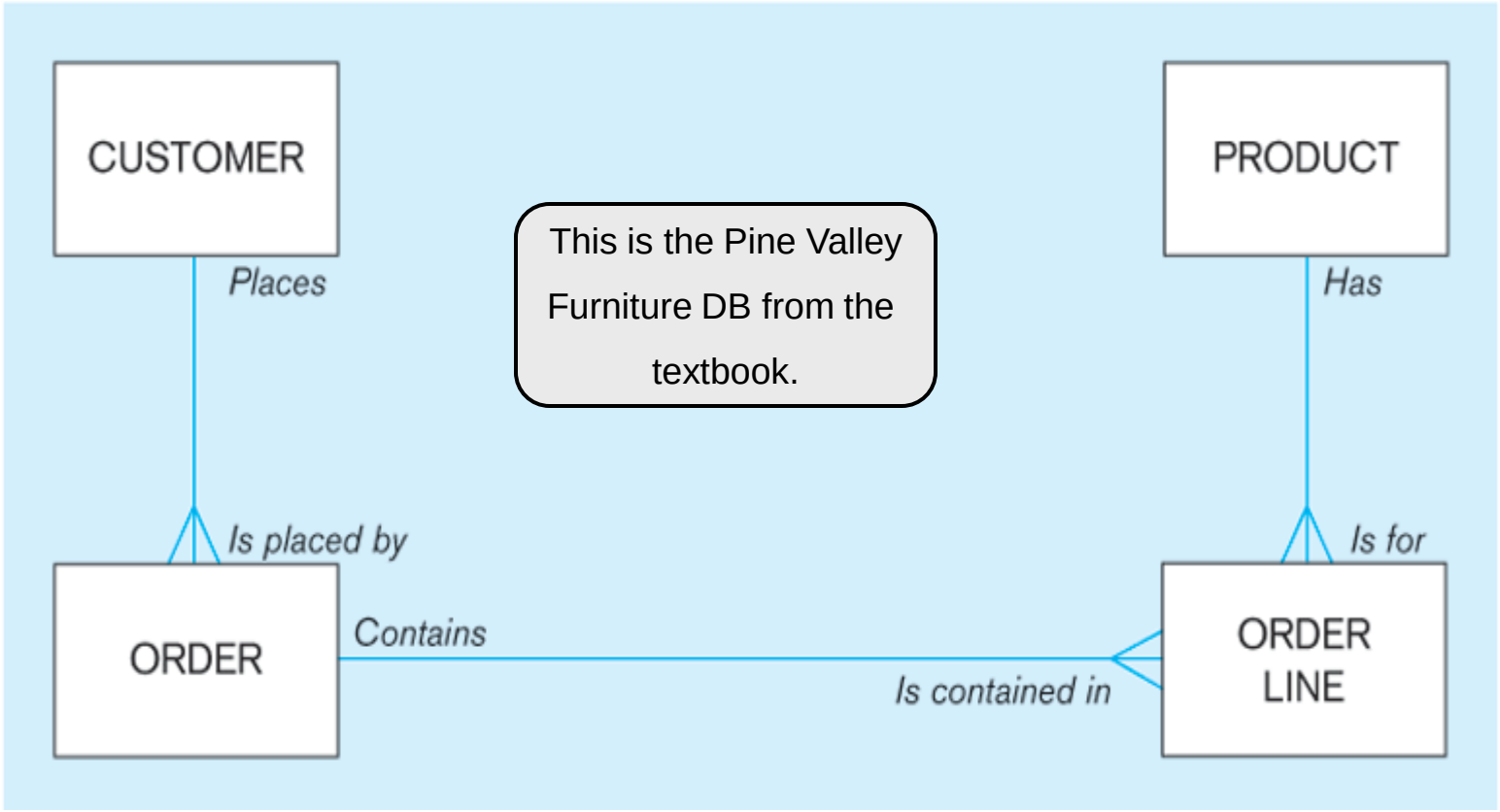
- or -

```
SELECT sname
FROM suppliers
WHERE (SELECT COUNT (shipments.pnum)
       FROM shipments
       WHERE shipments.snum = suppliers.snum)
      =
      (SELECT COUNT (parts.pnum)
       FROM parts);
```

This solution is correct only if the participation of parts in shipments is mandatory. It is incorrect if the participation of parts in shipments is optional.

SQL In Class Exercises

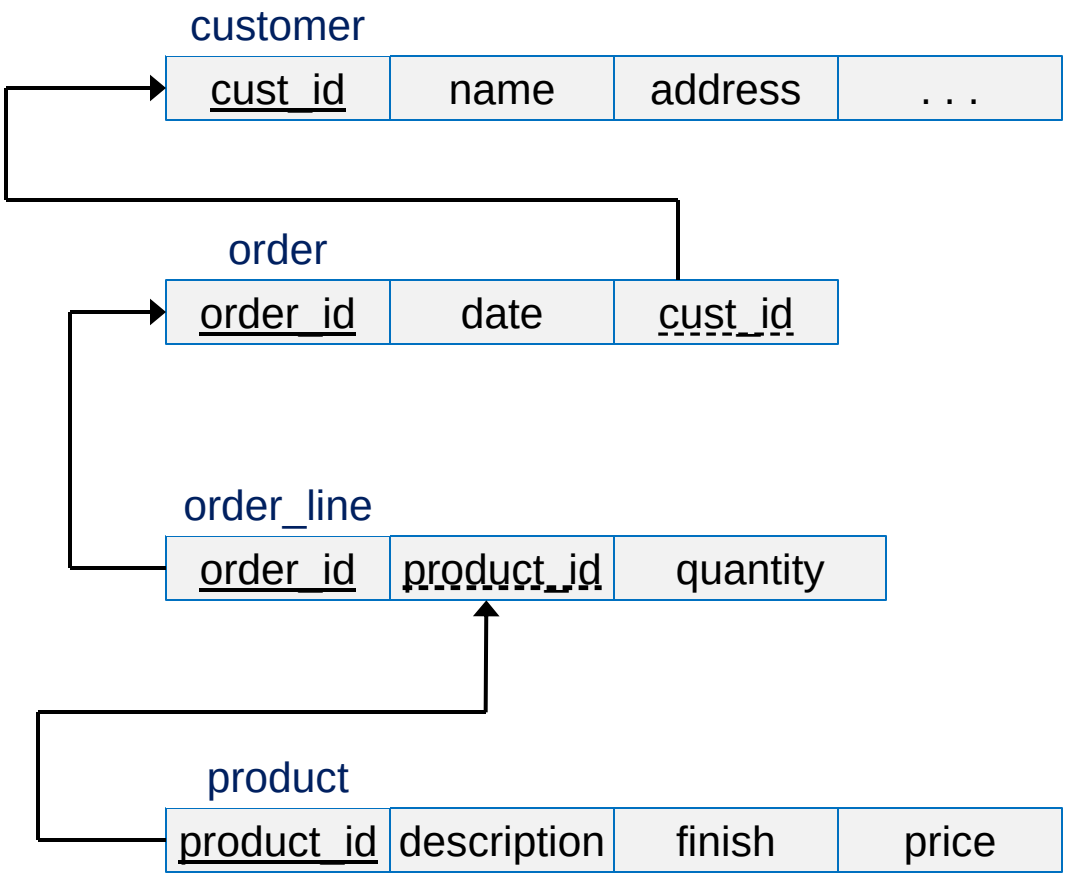
- Use the following database scheme for problems 10- in this exercise.



- Develop SQL expressions for each of the following queries:

SQL In Class Exercises

- The schema version of the database.



10. List the date of every order placed by customer 5.

Solutions

```
SELECT date
FROM order
WHERE cust_id = 5;
```

- or -

```
SELECT DISTINCT date
FROM order
WHERE cust_id = 5;
```


11. List all the cities from which a customer placed an order on March 29th.

Solutions

```
SELECT DISTINCT city
FROM customer NATURAL JOIN order
WHERE date = “March 29”;
```

- or -

```
SELECT DISTINCT city
FROM customer
WHERE cust_id  IN (SELECT cust_id
                   FROM order
                   WHERE date = “March 29”);
```


12. List the dates for every order placed that included part number 6.

Solutions

```
SELECT DISTINCT date
FROM order NATURAL JOIN order_line
WHERE product_id = 6;
```

- or -

```
SELECT DISTINCT date
FROM order
WHERE order_id  IN (SELECT order_id
                    FROM order_line
                    WHERE product_id = 6);
```


13. List the names of those customers who have not placed any orders.

Solution

```
SELECT name
FROM customer
WHERE cust_id NOT IN (SELECT cust_id
                      FROM order);
```


14. List the names of those customers who have never ordered part number 6.

Solution

```
SELECT DISTINCT name
FROM customer
WHERE cust_id NOT IN (SELECT cust_id
                      FROM order
                      WHERE order_id IN (SELECT order_id
                                         FROM order_line
                                         WHERE product_id = 6)
                      );
```


15. List the names of those customers who have ordered both part number 5 and part number 6.

Solution

```
SELECT DISTINCT name
FROM customer
WHERE  (cust_id IN (SELECT cust_id
                    FROM order
                     WHERE order_id IN (SELECT order_id
                                        FROM order_line
                                        WHERE product_id = 5)  )
)
AND
(cust_id IN (SELECT cust_id
                    FROM order
                     WHERE order_id IN (SELECT order_id
                                        FROM order_line
                                        WHERE product_id = 6)  )
);
```


16. List the names of those customers who have ordered part number 5 and not ordered part number 6.

Solution

```
SELECT DISTINCT name
FROM customer
WHERE  (cust_id IN (SELECT cust_id
                    FROM order
                     WHERE order_id IN (SELECT order_id
                                        FROM order_line
                                        WHERE product_id = 5)  )
                )
                AND
               (cust_id  NOT IN (SELECT cust_id
                    FROM order
                     WHERE order_id IN (SELECT order_id
                                         FROM order_line
                                          WHERE product_id = 6)  )
                );
```


17. List the names of those customers who have ordered either part number 5 or part number 6.

Solution

```
SELECT DISTINCT name
FROM customer
WHERE  cust_id IN (SELECT cust_id
                   FROM order
                   WHERE order_id IN (SELECT order_id
                                      FROM order_line
                                      WHERE product_id = 5
                                         OR product_id = 6)  );
```


18. List the names of those customers who have ordered only part number 6.

Solution

```
SELECT DISTINCT name
FROM customer
WHERE  (cust_id IN (SELECT cust_id
                    FROM order
                    WHERE order_id IN (SELECT order_id
                                       FROM order_line
                                       WHERE product_id = 6)  )
)
AND
(cust_id  NOT IN (SELECT cust_id
                  FROM order
                  WHERE order_id IN (SELECT order_id
                                     FROM order_line
                                     WHERE product_id <> 6)  )
);
```