Nested queries

Subqueries in SELECT

SELECT DISTINCT C.cname, (SELECT count(*)
FROM Product P
WHERE P.cid=C.cid)
FROM Company C

Subqueries in FROM

SELECT X.pname
FROM (SELECT * FROM Product AS Y WHERE price > 20) as X
WHERE X.price < 500

Subqueries in WHERE

SELECT DISTINCT C.cname
FROM Company C
WHERE EXISTS (SELECT *
FROM Product P
WHERE C.cid = P.cid and P.price < 200)
subqueries in WHERE

- SELECT ............ WHERE EXISTS (sub);
- SELECT ............ WHERE NOT EXISTS (sub);
- SELECT ............ WHERE attribute IN (sub);
- SELECT ............ WHERE attribute NOT IN (sub);
- SELECT ............ WHERE attribute > ANY (sub);
- SELECT ............ WHERE attribute > ALL (sub);
Find drinkers that frequent some bar that serves only beer they like.

\[ \exists y. \text{Frequents}(x,y) \land \forall z. (\text{Serves}(y,z) \Rightarrow \text{Likes}(x,z)) \]

Find drinkers that frequent only bars that serve only beer they like.

\[ \forall y. \text{Frequents}(x,y) \Rightarrow \forall z. (\text{Serves}(y,z) \Rightarrow \text{Likes}(x,z)) \]

\[ \exists u \text{ Freqeunts}(x,u) \land \text{not} (\exists y \exists z \text{ Freqeunts}(x,y) \land \text{Serves}(y,z) \land \text{not Likes}(x,z)) \]
Likes(drinker, beer)
Frequents(drinker, bar)
Servers(bar, beer)

Find drinkers that frequent some bar that serves only beer they like.

$$\exists y. \text{Frequents}(x,y) \land \forall z. (\text{Serves}(y,z) \implies \text{Likes}(x,z))$$

Find drinkers that frequent only bars that serve only beer they like.

$$\forall y. \text{Frequents}(x,y) \implies \forall z. (\text{Serves}(y,z) \implies \text{Likes}(x,z))$$

$$\exists u \text{Frequents}(x,u) \land \neg (\exists y \exists z \text{Frequents}(x,y) \land \text{Serves}(y,z) \land \neg \text{Likes}(x,z))$$

```sql
SELECT F.drinker
FROM Frequents F
WHERE NOT EXISTS (SELECT * FROM Serves S
WHERE S.bar = F.bar AND
NOT EXISTS (SELECT * FROM Likes L
WHERE L.beer = S.beer AND L.drinker = F.drinker));
```

```sql
SELECT F2.drinker
FROM Frequents F2
WHERE NOT EXISTS (SELECT * FROM Serves S, Frequents F
WHERE S.bar = F.bar AND F.drinker = F2.drinker AND
NOT EXISTS (SELECT * FROM Likes L
WHERE L.beer = S.beer AND L.drinker = F.drinker));
```