

LIEF(LName, LAdr, Ware, Preis)

Welche Lieferanten liefern (mindestens) alle Waren die 'Grau' liefert?

```
SELECT r.LName
FROM   LIEF r
WHERE  NOT EXISTS ( SELECT g.Ware
                    FROM   LIEF g
                    WHERE  g.LName='Grau' AND
                           NOT g.Ware IN ( SELECT l.Ware
                                           FROM   LIEF l
                                           WHERE  l.LName=r.LName ) )
```

NOT EXISTS c <==> FORALL NOT c

```
SELECT r.LName
FROM   LIEF r
WHERE  FORALL ( SELECT g.Ware
                FROM   LIEF g
                WHERE  NOT ( g.LName='Grau' AND
                             NOT g.Ware IN ( SELECT l.Ware
                                             FROM   LIEF l
                                             WHERE  l.LName=r.LName ) ) )
```

NOT (c1 AND c2) <==> (NOT c1) OR (NOT c2)

```
SELECT r.LName
FROM   LIEF r
WHERE  FORALL ( SELECT g.Ware
                FROM   LIEF g
                WHERE  NOT g.LName='Grau' OR
                       NOT NOT g.Ware IN ( SELECT l.Ware
                                           FROM   LIEF l
                                           WHERE  l.LName=r.LName ) )
```

NOT NOT c <==> c

```
SELECT r.LName
FROM   LIEF r
WHERE  FORALL ( SELECT g.Ware
                FROM   LIEF g
                WHERE  NOT g.LName='Grau' OR
                       g.Ware IN ( SELECT l.Ware
                                   FROM   LIEF l
                                   WHERE  l.LName=r.LName ) )
```

NOT c1 OR c2 <==> c1 IMPLIES c2

```
SELECT r.LName
FROM   LIEF r
WHERE  FORALL ( SELECT g.Ware
                FROM   LIEF g
                WHERE  g.LName='Grau' IMPLIES
                       g.Ware IN ( SELECT l.Ware
                                   FROM   LIEF l
                                   WHERE  l.LName=r.LName ) )
```

Alternativ mit GROUP BY und HAVING

```
SELECT  LName
FROM    LIEF
WHERE   Ware IN ( SELECT Ware FROM LIEF WHERE LName='Grau' )
GROUP BY LName
HAVING COUNT(*) = ( SELECT COUNT(*) FROM LIEF WHERE LName='Grau' )
```

Relationale Algebra

```
 $\Pi_{LName, Ware}(LIEF) : \Pi_{Ware}(\sigma_{LName='Grau'}(LIEF))$ 
```