

## Aggregation and Grouping in SQL

COUNT

AVG

MAX

MIN

SELECT (DISTINCT) list of attributes

FROM relational variables

WHERE condition

GROUP BY (list of attributes)

HAVING conditions

## Queries

1. How many suppliers are there?
2. How many suppliers supply part 'p1'?
3. What is the average weight of the parts?
4. What is the average weight of the parts supplied by supplier 'S1'?
5. How many suppliers are there that do not supply any part?
6. Give for each supplier, its S# and number of parts supplied.
7. Give the supplier number of each supplier supplying at least 2 parts.
8. Give the S# of each supplier that supplies **exactly** one part.
9. For each S# and color, determine the number of parts of that color supplied by the supplier.
10. Find the S# of supplier(s) that supply the most parts.

## Solutions

1. How many suppliers are there?

```
SELECT    COUNT(Supplier.S#)
FROM      S Supplier
```

Abbreviated:

```
SELECT    COUNT(S#)
FROM      S
```

Alternative formulation (but not correct SQL)

```
SELECT    COUNT( SELECT SupplierA.S#
                  FROM    S SupplierA
                  WHERE   Supplier() = SupplierA() )
FROM      S Supplier
GROUP BY  ()
```

2. How many suppliers supply part 'p1'?

```
SELECT    COUNT(SupplierPart.S#)
FROM      SP SupplierPart
WHERE     SupplierPart.P# = 'P1'
```

Abbreviated:

```
SELECT    COUNT(S#)
FROM      SP
WHERE     P# = 'P1'
```

3. What is the average weight of the parts?

```
SELECT  AVG(Part.WEIGHT)
FROM    P Part
```

Abbreviated:

```
SELECT  AVG(WEIGHT)
FROM    P
```

4. What is the average weight of the parts supplied by supplier 'S1'?

```
SELECT  AVG(Part.WEIGHT)
FROM    P Part, SP SupplierPart
WHERE   Part.P# = SupplierPart.P#  AND
        SupplierPart.S# = 'S1'
```

5. How many suppliers are there that do not supply any part?

```
SELECT    COUNT(Supplier.S#)
FROM      S Supplier
WHERE     Supplier.S# NOT IN (SELECT SupplierPart.S#
                              FROM    SP SupplierPart)
```

6. Give for each supplier, its S# and number of parts supplied.

```
SELECT  SupplierPart.S#, COUNT( SupplierPart.P# )
FROM    SP SupplierPart
GROUP BY (SupplierPart.S#)
```

Abbreviated:

```
SELECT  S#, COUNT(P#)
FROM    SP
GROUP BY (S#)
```

Alternative solution:

```
SELECT  SupplierPart.S#, COUNT( SELECT SupplierPartA.P#
                                FROM   SP SupplierPartA
                                WHERE  SupplierPartA.S# = SupplierPart.S# )
FROM    SP SupplierPart
```

7. Give the supplier number of each supplier supplying at least 2 parts.

```
SELECT    SupplierPart.S#  
FROM      SP SupplierPart  
GROUP BY (SupplierPart.S#)  
HAVING    COUNT(SupplierPart.P#) >= 2
```

8. Give the S# of each supplier that supplies **exactly** one part.

```
SELECT  SupplierPart.S#
FROM    SP SupplierPart
GROUP BY (SupplierPart.S#)
HAVING  COUNT(SupplierPart.P#) = 1
```

9. For each S# and color, determine the number of parts of that color supplied by the supplier.

```
SELECT    SupplierPart.S#, Part.Color, COUNT(Part.P#)
FROM      SP SupplierPart, Part P
WHERE     SupplierPart.P# = Part.P#
GROUP BY (SupplierPart.S#, Part.Color)
```

10. Find the S# of supplier(s) that supply the most parts.

```
CREATE VIEW SUPPLIER_PARTSCOUNT
AS
  SELECT S#, COUNT(Part#) AS PARTSCOUNT
  FROM SP
  GROUP BY (S#)
```

```
CREATE VIEW MAX_SUPPLIER_PARTSCOUNT
AS
  SELECT MAX(PARTSCOUNT) AS MAXCOUNT
  FROM SUPPLIER_PARTSCOUNT
```

```
SELECT S#
FROM SUPPLIER_PARTSCOUNT,
      MAX_SUPPLIER_PARTSCOUNT
WHERE PARTSCOUNT = MAXCOUNT
```