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?

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

Abbreviated:

```sql
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?

```sql
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.

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

Abbreviated:

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

Alternative solution:

```sql
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.

```sql
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