Database Programming with SQL
8-1: Group Functions
Practice Activities

Objectives

- Define and give an example of the seven group functions: SUM, AVG, COUNT, MIN, MAX, STDDEV, VARIANCE
- Construct and execute a SQL query using group functions
- Construct and execute group functions that operate only with numeric data types

Vocabulary

Identify the vocabulary word for each definition below.

AVG	Calculates average value excluding nulls
COUNT	Returns the number of rows with non-null values for the expression
STDDEV	For two sets of data with approximately the same mean, the greater the spread, the greater the standard deviation.
Group Functions	Operate on sets of rows to give one result per group
MIN	Returns minimum value ignoring nulls
VARIANCE	Used with columns that store numeric data to calculate the spread of data around the mean
SUM	Calculates the sum ignoring null values
MAX	Returns the maximum value ignoring nulls
SUM	To gather into a sum or whole

Try It / Solve It

```
AVG: Calculates the average of a column. Ex: SELECT AVG(salary) FROM employees;
COUNT: Returns the count of non-null values in a column. Ex: SELECT COUNT(employee_id) FROM employees;
MAX: Returns the highest value in a column. Ex: SELECT MAX(salary) FROM employees;
MIN: Returns the lowest value in a column. Ex: SELECT MIN(salary) FROM employees;
STDDEV: Returns the standard deviation of numeric data. Ex: SELECT STDDEV(salary) FROM employees;
SUM: Returns the total sum of a numeric column. Ex: SELECT SUM(salary) FROM employees;
VARIANCE: Returns the variance of numeric data. Ex: SELECT VARIANCE(salary) FROM employees;
```

1. Define and give an example of the seven group functions: AVG, COUNT, MAX, MIN, STDDEV, SUM, and VARIANCE.

2. Create a query that will show the average cost of the DJs on Demand events. Round to two decimal places.

```
SELECT ROUND(AVG(cost), 2) AS average_cost
FROM D_EVENTS;
```

3. Find the average salary for Global Fast Foods staff members whose manager ID is 19.

```
SELECT AVG(salary)
FROM F_STAFFS
WHERE manager_id = 19;
```

4. Find the sum of the salaries for Global Fast Foods staff members whose IDs are 12 and 9.

```
SELECT SUM(salary)
FROM F_STAFFS
WHERE ID IN (12, 9);
```

5. Using the Oracle database, select the lowest salary, the most recent hire date, the last name of the person who is at the top of an alphabetical list of employees, and the last name of the person who is at the bottom of an alphabetical list of employees. Select only employees who are in departments 50 or 60.

```
SELECT MIN(salary), MAX(hire_date),
       MIN(last_name) AS first_alpha_name,
       MAX(last_name) AS last_alpha_name
FROM EMPLOYEES
WHERE department_id IN (50, 60);
```

6. Your new Internet business has had a good year financially. You have had 1,289 orders this year. Your customer order table has a column named total_sales. If you submit the following query, how many rows will be returned?

SELECT sum(total_sales)
FROM orders;

The query will return 1 row since SUM(total_sales) returns the sum of all total_sales values, not individual rows.

7. You were asked to create a report of the average salaries for all employees in each division of the company. Some employees in your company are paid hourly instead of by salary. When you ran the report, it seemed as though the averages were not what you expected—they were much higher than you thought! What could have been the cause?

The cause could be that hourly employees were incorrectly included, skewing the salary data. If hourly pay is mixed with salary, the result might be inflated.

8. Employees of Global Fast Foods have birth dates of July 1, 1980, March 19, 1979, and March 30, 1969. If you select MIN(birthdate), which date will be returned?

MIN(birthdate) would return the earliest date: March 30, 1969.

9. Create a query that will return the average order total for all Global Fast Foods orders from January 1, 2002, to December 21, 2002.

```
SELECT AVG(order_total)
FROM F_ORDERS
WHERE order_date BETWEEN '01/01/2002' AND '12/21/2002';
```

10. What was the hire date of the last Oracle employee hired?

```
SELECT MAX(hire_date)
FROM EMPLOYEES;
```

11. In the following SELECT clause, which value returned by the SELECT statement will be larger?

SELECT SUM(operating_cost), AVG(operating_cost)

12. Refer to the DJs on Demand database D_EVENTS table:

Which code is valid as part of an SQL query?

_____a. FROM event_date
__X__b. SELECT SUM(cost)
_____c. SELECT SUM(event_date)
__X__d. SELECT AVG(cost) AS "Expense"
_____e. WHERE MIN(id) = 100
_____f. SELECT MAX(AVG(cost))
__X__g. SELECT MIN(event_date)

Database Programming with SQL
8-2: Count, Distinct, NVL
Practice Activities

Objectives

- Construct and execute a SQL query using the COUNT group function
- Use DISTINCT and the NVL function with group functions

Vocabulary

Identify the vocabulary word for each definition below.

COUNT	Returns the number of non-null values in the expression column
DISTINCT	The keyword used to return only non-duplicate values or combinations of non-duplicate values in a query.
COUNT(DISTINCT)	Returns the number of unique non-null values in the expression column.

Try It / Solve It

1. How many songs are listed in the DJs on Demand D_SONGS table?

```
SELECT COUNT(*) FROM D_SONGS;
```

2. In how many different location types has DJs on Demand had venues?

```
SELECT COUNT(DISTINCT loc_type) FROM D_VENUES;
```

3. The d_track_listings table in the DJs on Demand database has a song_id column and a cd_number column. How many song IDs are in the table and how many different CD numbers are in the table?

```
SELECT COUNT(song_id), COUNT(DISTINCT cd_number)
FROM D_TRACK_LISTINGS;
```

4. How many of the DJs on Demand customers have email addresses?

```
SELECT COUNT(EMAIL)
FROM D_CLIENTS
WHERE EMAIL IS NOT NULL;
```

5. Some of the partners in DJs on Demand do not have authorized expense amounts (auth_expense_amt). How many partners do have this privilege?

```
SELECT COUNT(auth_expense_amt)
FROM D_PARTNERS
WHERE auth_expense_amt IS NOT NULL;
```

6. What values will be returned when the statement below is issued?

ID	type	shoe_color
456	oxford	brown
463	sandal	tan
262	heel	black
433	slipper	tan

The first COUNT will return the total number of rows with non-null shoe_color.
The second COUNT(DISTINCT) will return the number of unique non-null shoe_color values.

```
SELECT COUNT(shoe_color), COUNT(DISTINCT shoe_color)
FROM shoes;
```

7. Create a query that will convert any null values in the auth_expense_amt column on the DJs on Demand D_PARTNERS table to 100000 and find the average of the values in this column. Round the result to two decimal places.

```
SELECT ROUND(AVG(NVL(auth_expense_amt, 100000)), 2)
FROM D_PARTNERS;
```

8. Which statement(s) is/are True about the following SQL statement:

```
SELECT AVG(NVL(selling_bonus, 0.10))
FROM bonuses;
```

_____ a. The datatypes of the values in the NVL clause can be any datatype except date data.
__X__ b. If the selling_bonus column has a null value, 0.10 will be substituted.

__X__ c. There will be no null values in the selling_bonus column when the average is calculated.
_____ d. This statement will cause an error. There cannot be two functions in the SELECT statement.

9. Which of the following statements is/are TRUE about the following query?

```
SELECT DISTINCT colors, sizes
FROM items;
```

_____ a. Each color will appear only once in the result set.
_____ b. Each size will appear only once in the result set.
__X__ c. Unique combinations of color and size will appear only once in the result set.
_____ d. Each color and size combination will appear more than once in the result set.