EXERCISE-8

Aggregating Data Using Group Functions

Objectives
After the completion of this exercise, the students be will be able to do the following:
- Identify the available group functions
- Describe the use of group functions
- Group data by using the GROUP BY clause
- Include or exclude grouped rows by using the HAVING clause

What Are Group Functions?
Group functions operate on sets of rows to give one result per group

Types of Group Functions
- AVG
- COUNT
- MAX
- MIN
- STDDEV
- SUM
- VARIANCE

Each of the functions accepts an argument. The following table identifies the options that you can use in the syntax:

Function	Description
AVG ([DISTINCT|ALL] n)	Average value of n, ignoring null values
COUNT ({*| [DISTINCT|ALL] expr })	Number of rows, where expr evaluates to something other than null (count all selected rows using *, including duplicates and rows with nulls)
MAX ([DISTINCT|ALL] expr)	Maximum value of expr, ignoring null values
MIN ([DISTINCT|ALL] expr)	Minimum value of expr, ignoring null values
STDDEV ([DISTINCT|ALL] x)	Standard deviation of n, ignoring null values
SUM ([DISTINCT|ALL] n)	Sum values of n, ignoring null values
VARIANCE ([DISTINCT|ALL] x)	Variance of n, ignoring null values

Group Functions: Syntax

SELECT [column,] group_function(column), ...
FROM table
[WHERE condition]
[GROUP BY column]
[ORDER BY column];

Guidelines for Using Group Functions

- DISTINCT makes the function consider only nonduplicate values; ALL makes it consider every value, including duplicates. The default is ALL and therefore does not need to be specified.

```
SELECT department_id, AVG(salary) FROM employees GROUP BY department_id
HAVING max(salary)>10000;
```

Example displays the job ID and total monthly salary for each job that has a total payroll exceeding
$13,000. The example excludes sales representatives and sorts the list by the total monthly salary.

```
SELECT job_id, SUM(salary) PAYROLL FROM employees WHERE job_id NOT LIKE
'%REP%'
GROUP BY job_id HAVING SUM(salary) > 13000 ORDER BY SUM(salary);
```

Nesting Group Functions

Display the maximum average salary:
Group functions can be nested to a depth of two. The slide example displays the maximum average
salary.

```
SELECT MAX(AVG(salary)) FROM employees GROUP BY department_id;
```
Summary
In this exercise, students should have learned how to:
• Use the group functions COUNT, MAX, MIN, and AVG
• Write queries that use the GROUP BY clause
• Write queries that use the HAVING clause

```
SELECT column, group_function
FROM table
[WHERE condition]
[GROUP BY group_by_expression]
[HAVING group_condition]
[ORDER BY column];
```
Find the Solution for the following:

Determine the validity of the following three statements. Circle either True or False.

1. Group functions work across many rows to produce one result per group.
True/False

2. Group functions include nulls in calculations.
True/False

3. The WHERE clause restricts rows prior to inclusion in a group calculation.
True/False

The HR department needs the following reports:

4. Find the highest, lowest, sum, and average salary of all employees. Label the columns
Maximum, Minimum, Sum, and Average, respectively. Round your results to the nearest
whole number

*Select round (max (salary)) as Maximum, round(min (
salary)) as Minimum, round (sum(salary)) as Sum,
round (AVG (salary)) as average from employees;*

5. Modify the above query to display the minimum, maximum, sum, and average salary for each job type.

Select job-id, round (MIN (salary)) as minimum, round
MAX (salary) as maximum, round (AVG salary) as
average from employees group by job-id;

6. Write a query to display the number of people with the same job. Generalize the query so that the user in the HR department is prompted for a job title.

Select count (*) as 'Number of people' from
employees where job-id = '& job title';

7. Determine the number of managers without listing them. Label the column Number of Managers. *Hint: Use the MANAGER_ID column to determine the number of managers.*

select count (Distinct manager-id) as 'Number of
manager' from employees where manager id is NOT
NULL;

8. Find the difference between the highest and lowest salaries. Label the column DIFFERENCE.

select (Max (salary) - MIN (salary)) as difference
from employees;

9. Create a report to display the manager number and the salary of the lowest-paid employee for that manager. Exclude anyone whose manager is not known. Exclude any groups where the minimum salary is $6,000 or less. Sort the output in descending order of salary.

Select manager_id min (salary) as min-salary
from employee where manager is not null
group by manager id having min (salary) > 6000
order by min salary desc;

10. Create a query to display the total number of employees and, of that total, the number of employees hired in 1995, 1996, 1997, and 1998. Create appropriate column headings.

11. Create a matrix query to display the job, the salary for that job based on department
number, and the total salary for that job, for departments 20, 50, 80, and 90, giving each
column an appropriate heading.

Select job-id sum(case when department-Id = 20 then salary
END) as 'Dept 20' sume (case when department-id = 50
then salary END)as 'DeptSo', sum (case WHEN department-8
then salary END) as Dept 'so', sum (case whe d-id=90
then salary END) as 'Dept 90', sum(Salary) as Total for
employees when dept-id in (20 50, 80, 90) group by job-id;

12. Write a query to display each department's name, location, number of employees, and the
average salary for all the employees in that department. Label the column name-Location, Number
of people, and salary respectively. Round the average salary to two decimal places.

select d. department name || '-' || l. city as ' name-location,
count (e. employee-id) as 'No. of people', round (avg(
e. Salary ,2) as ' Salary' from departments d JOIN
locations l ON d. location. Id = l. location Id LEFT
JOIN Employees e on d. dept-id = l. dept. id group
by d. department-name, l. city;

Evaluation Procedure	Marks awarded
Query(5)	5
Execution (5)	5
Viva(5)	5
Total (15)	15
Faculty Signature	Rpl 8/9/25

Practice Questions

Date Functions

1. For DJs on Demand, display the number of months between the event_date of the Vigil wedding and today's date. Round to the nearest month.

Select ROUND (MONTHS - BETWEEN (SYSDATE, EVENT_date))
as months-between from d_events where
event-name = 'Vigil wedding';

2. Display the days between the start of last summer's school vacation break and the day school started this year. Assume 30.5 days per month. Name the output "Days."

Select round ((School_start_date - vacation-start-day))
+ 30.5,0) as days from school_calendar;

3. Display the days between January 1 and December 31.

Select (TO-DATE (31-DEC-2024,'DD-MON-YYYY') -TO-DATE
('01-JAN-2024','DD-MON-YYYY)) as days from dual;

4. Using one statement, round today's date to the nearest month and nearest year and truncate it to the nearest month and nearest year. Use an alias for each column.

Select round (SYSDATE 'MONTH') as rounded-month,
round (SYSDATE,'YEAR) AS rounded-year, TRUNC(
SYSDATE,'MONTH') as truncated month, TRUNC(SYSDATE
'YEAR') AS truncated-year from dual;

5. What is the last day of the month for June 2005? Use an alias for the output.

Select last-day (TO-DATE ('01-JUN-2005','DD-MON-YYYY))
as last-day from dual;

6.Display the number of years between the Global Fast Foods employee Bob Miller's birthday and

today. Round to the nearest year.

Select round (MONTHS-BETWEEN (SYSTEM date, birth date)/12)
as years between from employees where last name =
'Miller' and first-name = 'Bob';

7.Your next appointment with the dentist is six months from today. On what day will you go to the dentist? Name the output, "Appointment."

Select ADD-MONTHS (SYSDATE, 6) as Appointment
from dual;

8.The teacher said you have until the last day of this month to turn in your research paper. What day will this be? Name the output, "Deadline."

Select LAST-DAY (SYSDATE) as deadline from dual;

9.How many months between your birthday this year and January 1 next year?

Select months-between (TO_DATE ('01 -JAN-2023',
'DD-MON-YYYY') TO_DATE (' 15-SEP-2024', 'DD-MON-YYYY)
as Months-between from dual;

10.What's the date of the next Friday after your birthday this year? Name the output, "First Friday."

select next-day (TO_DATE ('5-SEP-2024', 'DD-MON-YYYY')
'FRIDAY') as first friday from dual;

11.   Name a date function that will return a number.

Months-between(), round (SYS-DATE - SYSDATE) TO_NUMBER
();

12.Name a date function that will return a date.

Sysdate, add-months(), next day(), cast-day(),

13.Give one example of why it is important for businesses to be able to manipulate date data?

Business need-to: calculate salaries, billing cycles,
promotions, employee service years, due-dates,
interest calculations etc. Ex: Banks calculate loan
due dates and interest based on date functions

Conversion Functions

In each of the following exercises, feel free to use labels for the converted column to make the output more readable.

1. List the last names and birthdays of Global Fast Food Employees. Convert the birth dates to character data in the Month DD, YYYY format. Suppress any leading zeros.

Select last-name, TO CHAR (birth-date, 'Month DD YYYY') as birthday from employees;

2. Convert January 3, 04, to the default date format 03-Jan-2004.

select TO-DATE ('03-JAN-2004', 'DD-MON-YYYY) as converted-date from dual);

3. Format a query from the Global Fast Foods f_promotional_menus table to print out the start_date of promotional code 110 as: The promotion began on the tenth of February 2004.
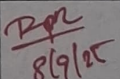
Select 'The promotion began on the' || TO CHAR (start-date 'fm DD th' of ' Month YYYY) as promotion from f-promotion menus where promo code = 110;

4. Convert today's date to a format such as: "Today is the Twentieth of March, Two Thousand Four"

Select 'Today is the' || TO -CHAR (Sys date, 'fm DD th of " Month 'YYYY') as formatted-date from dual;

5. List the ID, name and salary for all Global Fast Foods employees. Display salary with a $ sign and two decimal places.

select employee id, last name, TO-CHAR (salary '$99.99 '$999,999.99') as salary from employees;

Evaluation Procedure	Marks awarded
Practice Evaluation (5)	5
Viva(5)	5
Total (10)	10
Faculty Signature	RPR 8/9/25

70