Practice 8

Practice name	Restricting and Sorting Data
Academic Program	Software Engineering
Subject name	Laboratory of Database Systems II
Unit	I. SQL.
Professor	Aldonso Becerra Sánchez
Due date	**October 6, 2021**
Due date with penalty	**October 7, 2021**
Elaboration date	**October 4, 2021**

Practice objective	Use SQL SELECT statements for retrieving data from database by means of different contexts where data are filtered using the WHERE clause and ordered using the ORDER clause.
Estimated time of completion	5 hours
Introduction	SQL language allows the realization of projection and selection of data to satisfy the needs of reports that may be required for a programmer, developer or end user.

Reference 1:

1. Oracle Database 11g: SQL Fundamentals.

Reference 2:

2. Oracle Database SQL Language Reference 11g.

Reference 3:

Initial Activity:

Read the whole practice before start it.

Write the corresponding report, starting with the **Introduction** section.

Activity 1:

Write the section that describes the **work developed** in the following activities.

Read all the choices carefully because there might be more than one correct answer. Choose all the correct answers for each question.

Explain the reason for your answer.

LIMIT THE ROWS RETRIEVED BY A QUERY

1. Which two clauses of the SELECT statement facilitate selection and projection?

A. SELECT, FROM

B. ORDER BY, WHERE

C. SELECT, WHERE

D. SELECT, ORDER BY

2. Choose the query that extracts the LAST_NAME, JOB_ID, and SALARY values from the EMPLOYEES table for records having JOB_ID values of either SA_REP or MK_MAN and having SALARY values in the range of $1000 to $4000. The SELECT and FROM clauses are

SELECT LAST_NAME, JOB_ID, SALARY FROM EMPLOYEES:

A. WHERE JOB_ID IN ('SA_REP','MK_MAN') AND SALARY > 1000 AND SALARY < 4000;

B. WHERE JOB_ID IN ('SA_REP','MK_MAN') AND SALARY BETWEEN 1000 AND 4000;

C. WHERE JOB_ID LIKE 'SA_REP%' AND 'MK_MAN%' AND SALARY > 1000 AND SALARY < 4000;

D. WHERE JOB_ID = 'SA_REP' AND SALARY BETWEEN 1000 AND 4000

OR JOB_ID='MK_MAN';

3. Which of the following WHERE clauses contains an error? The SELECT and FROM clauses are SELECT * FROM EMPLOYEES:

A. WHERE HIRE_DATE IN ('02-JUN-2004');

B. WHERE SALARY IN ('1000','4000','2000');

C. WHERE JOB_ID IN (SA_REP,MK_MAN);

D. WHERE COMMISSION_PCT BETWEEN 0.1 AND 0.5;

4. Choose the WHERE clause that extracts the DEPARTMENT_NAME values containing the character literal "er" from the DEPARTMENTS table. The SELECT and FROM clauses are

SELECT DEPARTMENT_NAME FROM DEPARTMENTS:

A. WHERE DEPARTMENT_NAME IN ('%e%r');

B. WHERE DEPARTMENT_NAME LIKE '%er%';

C. WHERE DEPARTMENT_NAME BETWEEN 'e' AND 'r';

D. WHERE DEPARTMENT_NAME CONTAINS 'e%r';

5. Which two of the following conditions are equivalent to each other?

A. WHERE COMMISSION_PCT IS NULL

B. WHERE COMMISSION_PCT = NULL

C. WHERE COMMISSION_PCT IN (NULL)

D. WHERE NOT(COMMISSION_PCT IS NOT NULL)

6. Which three of the following conditions are equivalent to each other?

A. WHERE SALARY <=5000 AND SALARY >=2000

B. WHERE SALARY IN (2000,3000,4000,5000)

C. WHERE SALARY BETWEEN 2000 AND 5000

D. WHERE SALARY > 1999 AND SALARY < 5001

E. WHERE SALARY >=2000 AND <=5000

SORT THE ROWS RETRIEVED BY A QUERY

7. Choose one false statement about the ORDER BY clause.

A. When using the ORDER BY clause, it always appears as the last clause in a SELECT statement.

B. The ORDER BY clause may appear in a SELECT statement that does not contain a WHERE clause.

C. The ORDER BY clause specifies one or more terms by which the retrieved rows are sorted. These terms can only be column names.

D. Positional sorting is accomplished by specifying the numeric position of a column as it appears in the SELECT list, in the ORDER BY clause.

8. The following query retrieves the LAST_NAME, SALARY, and COMMISSION_PCT values for employees whose LAST_NAME begins with the letter R. Based on the following query, choose the ORDER BY clause that first sorts the results by the COMMISSION_PCT column, listing highest commission earners first, and then sorts the results in ascending order by the SALARY column. Any records with NULL COMMISSION_PCT must appear last:

SELECT LAST_NAME, SALARY, COMMISSION_PCT

FROM EMPLOYEES

WHERE LAST_NAME LIKE 'R%'

A. ORDER BY COMMISSION_PCT DESC, 2;

B. ORDER BY 3 DESC, 2 ASC NULLS LAST;

C. ORDER BY 3 DESC NULLS LAST, 2 ASC;

D. ORDER BY COMMISSION_PCT DESC, SALARY ASC;

AMPERSAND SUBSTITUTION

9. The DEFINE command explicitly declares a session-persistent substitution variable with a specific value. How is this variable referenced in an SQL statement? Consider an expression that calculates tax on an employee's SALARY based on the current tax rate. For the following session-persistent substitution variable, which statement correctly references the TAX_RATE variable?

DEFINE TAX_RATE=0.14

A. SELECT SALARY * :TAX_RATE TAX FROM EMPLOYEES;

B. SELECT SALARY * &TAX_RATE TAX FROM EMPLOYEES;

C. SELECT SALARY * :&&TAX TAX FROM EMPLOYEES;

D. SELECT SALARY * TAX_RATE TAX FROM EMPLOYEES;

10. When using ampersand substitution variables in the following query, how many times will you be prompted to input a value for the variable called JOB the first time this query is executed?

```
SELECT FIRST_NAME, '&JOB'
FROM EMPLOYEES
WHERE JOB_ID LIKE '%'||&JOB||'%'
AND '&&JOB' BETWEEN 'A' AND 'Z';
```

A. 0

B. 1

C. 2

D. 3

Activity 2:

Propose an answer to the following issues:

a) The SELECT list of a query contains a single column. Is it possible to sort the results retrieved by this query by another column?

b) Ampersand substitution variables support reusability of repetitively executed SQL statements. If a substituted value is to be used multiple times at different parts of the same statement, is it possible to be prompted to submit a substitution value just once and for that value to automatically be substituted during subsequent references to the same variable?

c) You have been tasked to retrieve the LAST_NAME and DEPARTMENT_ID values for all rows in the EMPLOYEES table. The output must be sorted by the nullable DEPARTMENT_ID column, and all rows with NULL DEPARTMENT_ID values must be listed last. Is it possible to provide the results as requested?

d) You have a complex query with multiple conditions. Is there a restriction on the number of conditions you can specify in the WHERE clause? Is there a limit to the number of comparison operators you can use in a single query?

e) You have been tasked to locate rows in the EMPLOYEES table where the SALARY values contain the numbers 8 and 0 adjacent to each other. The SALARY column has a NUMBER data type. Is it possible to use the LIKE comparison operator with numeric data?

f) By restricting the rows returned from the JOBS table to those which contain the value SA_REP in the JOB_ID column, is a projection, selection or join performed?

Activity 3:

Connect to the OE schema and complete the following tasks.

A customer requires a hard disk drive and a graphics card for her personal computer. She is willing to spend between $500 and $800 on the disk drive but is unsure about the cost of a graphics card. Her only requirement is that the resolution supported by the graphics card should be either 1024×768 or 1280×1024. As the sales representative, you have been tasked to write one query that searches the PRODUCT_INFORMATION table where the PRODUCT_NAME value begins with HD (hard disk) or GP (graphics processor) and their list prices. Remember the hard disk list prices must be between $500 and $800 and the graphics processors need to support either 1024×768 or 1280×1024. Sort the results in descending LIST_PRICE order.

NOTE: Capture an image for each statement output.

Activity 4:

This exercise must be performed using HR schema.

- Retrieve a list of DEPARTMENT_NAME values that end with the three letters "ing" from the DEPARTMENTS table.

- The JOBS table contains descriptions of different types of jobs an employee in the organization may occupy. It contains the JOB_ID, JOB_TITLE, MIN_SALARY, and MAX_SALARY columns. You are required to write a query that extracts the JOB_TITLE, MIN_SALARY, and MAX_SALARY columns, as well as an expression called VARIANCE, which is the difference between the MAX_SALARY and MIN_SALARY values, for each row. The results must include only JOB_TITLE values that contain either the word "President" or "Manager." Sort the list in descending order based on the VARIANCE expression. If more than one row has the same VARIANCE value, then, in addition, sort these rows by JOB_TITLE in reverse alphabetic order.

- A common calculation performed by the Human Resources department relates to the calculation of taxes levied upon an employee. Although, this is done for all employees, there are always a few staff members who dispute the tax deducted from their income. The tax deducted per employee is calculated by obtaining the annual salary for the employee and multiplying this by the current tax rate, which may vary from year to year. You are required to write a reusable query using the current tax rate and the EMPLOYEE_ID number as inputs and return the EMPLOYEE_ID, FIRST_NAME, SALARY, ANNUAL SALARY (SALARY * 12), TAX_RATE, and TAX (TAX_RATE * ANNUAL SALARY) information.

NOTE: Capture an image for each statement output.

Activity 5:

In this practice, you build more reports, including statements that use the WHERE clause and the ORDER BY clause. You make the SQL statements more reusable and generic by including the ampersand substitution.

The HR department needs your assistance in creating some queries.

1. Because of budget issues, the HR department needs a report that displays the last name and salary of employees who earn more than $12,000. Save your SQL statement as a file named lab_8_01.sql. Run your query.

	LAST_NAME	SALARY
1	King	24000
2	Kochhar	17000
3	De Haan	17000
4	Hartstein	13000

2. Open a new SQL Worksheet. Create a report that displays the last name and department number for employee number 176. Run the query.

	LAST_NAME	DEPARTMENT_ID
1	Taylor	80

3. The HR department needs to find high-salary and low-salary employees. Modify lab_8_01.sql to display the last name and salary for any employee whose salary is not in the range of $5,000 to $12,000. Save your SQL statement as lab_8_03.sql.

	LAST_NAME	SALARY
1	King	24000
2	Kochhar	17000
3	De Haan	17000
4	Lorentz	4200
5	Rajs	3500
6	Davies	3100
7	Matos	2600
8	Vargas	2500
9	Whalen	4400
10	Hartstein	13000

4. Create a report to display the last name, job ID, and hire date for employees with the last names of Matos and Taylor. Order the query in ascending order by the hire date.

	LAST_NAME	JOB_ID	HIRE_DATE
1	Matos	ST_CLERK	15-MAR-98
2	Taylor	SA_REP	24-MAR-98

5. Display the last name and department ID of all employees in departments 20 or 50 in ascending alphabetical order by name.

	LAST_NAME	DEPARTMENT_ID
1	Davies	50
2	Fay	20
3	Hartstein	20
4	Matos	50
5	Mourgos	50
6	Rajs	50
7	Vargas	50

6. Modify lab_13_03.sqlto display the last name and salary of employees who earn between $5,000 and $12,000, and are in department 20 or 50. Label the columns Employee and Monthly Salary, respectively. Resave lab_13_03.sql as lab_13_06.sql.

	Employee	Monthly Salary
1	Fay	6000
2	Mourgos	5800

Run the statement in lab_8_06.sql.

7. The HR department needs a report that displays the last name and hire date for all employees who were hired in 1994.

	LAST_NAME	HIRE_DATE
1	Higgins	07-JUN-94
2	Gietz	07-JUN-94

8. Create a report to display the last name and job title of all employees who do not have manager.

	LAST_NAME	JOB_ID
1	King	AD_PRES

9. Create a report to display the last name, salary, and commission of all employees who earn commissions. Sort data in descending order of salary and commissions.

Use the column's numeric position in the ORDERBYclause.

	LAST_NAME	SALARY	COMMISSION_PCT
1	Abel	11000	0.3
2	Zlotkey	10500	0.2
3	Taylor	8600	0.2
4	Grant	7000	0.15

10. Members of the HR department want to have more flexibility with the queries that you are writing. They would like a report that displays the last name and salary of employees who earn more than an amount that the user specifies after a prompt. Save this query to a file named lab_8_10.sql. If you enter 12000 when prompted, the report displays the following results:

	LAST_NAME	SALARY
1	King	24000
2	Kochhar	17000
3	De Haan	17000
4	Hartstein	13000

11. The HR department wants to run reports based on a manager. Create a query that prompts the user for a manager ID and generates the employee ID, last name, salary, and department for that manager's employees. The HR department wants the ability to sort the report on a selected column. You can test the data with the following values:

manager_id = 103, sorted by last_name:

	EMPLOYEE_ID	LAST_NAME	SALARY	DEPARTMENT_ID
1	104	Ernst	6000	60
2	107	Lorentz	4200	60

manager_id = 201, sorted by salary:

	EMPLOYEE_ID	LAST_NAME	SALARY	DEPARTMENT_ID
1	202	Fay	6000	20

manager_id = 124, sorted by employee_id:

	EMPLOYEE_ID	LAST_NAME	SALARY	DEPARTMENT_ID
1	141	Rajs	3500	50
2	142	Davies	3100	50
3	143	Matos	2600	50
4	144	Vargas	2500	50

12. Display all employee last names in which the third letter of the name is "a."

	LAST_NAME
1	Grant
2	Whalen

13. Display the last names of all employees who have both an "a" and an "e" in their last name.

	LAST_NAME
1	Davies
2	De Haan
3	Hartstein
4	Whalen

14. Display the last name, job, and salary for all employees whose jobs are either those of a sales representative or of a stock clerk, and whose salaries are not equal to $2,500, $3,500, or $7,000.

	LAST_NAME	JOB_ID	SALARY
1	Abel	SA_REP	11000
2	Taylor	SA_REP	8600
3	Davies	ST_CLERK	3100
4	Matos	ST_CLERK	2600

15. Modify lab_8_06.sql to display the last name, salary, and commission for all employees whose commission is 20%. Resave lab_8_06.sql as lab_8_15.sql. Rerun the statement in lab_8_15.sql.

	Employee	Monthly Salary	COMMISSION_PCT
1	Zlotkey	10500	0.2
2	Taylor	8600	0.2

Activity 6:

Pre-assessment section.

Final activity:

Write the **Conclusion** section.

Attached file that is required for this task (optional):

e-mail: a7donso@gmail.com