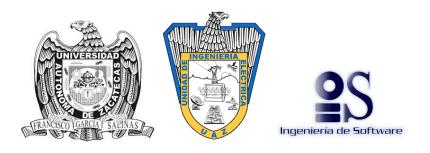# Autonomous University of Zacatecas

ACADEMIC UNIT OF ELECTRICAL ENGINEERING

ACADEMIC PROGRAM OF SOFTWARE ENGINEERING

DATABASE SYSTEMS LABORATORY II PRACTICE 7 -
DATA RETRIEVAL USING THE SQL SELECT
STATEMENT

PROFESSOR:
ALDONSO BECERRA SÁNCHEZ

STUDENT:
DANIEL ALEJANDRO MORALES CASTILLO

1   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.

The SQL SELECT statement is fundamental to the retrieving of data from a database, in this practice we going to review important theory points analysing situations of the SELECT statement in different contexts.

2 Development

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.

LIST THE CAPABILITIES OF SQL SELECT STATEMENTS

1. Which query creates a projection of the DEPARTMENT-NAME and LOCATIONID columns from the DEPARTMENTS table? (Choose the best answer.)

A. SELECT DISTINCT DEPARTMENTNAME, LOCATIONID FROM DEPARTMENTS;
B. SELECT DEPARTMENTNAME AS "LOCATIONID" FROM DEPARTMENTS;
C. SELECT DEPTNAME, LOCID FROM DEPT;
D. SELECT DEPARTMENTNAME, LOCATIONID FROM DEPARTMENTS;

Answer: A , D
The projection is for retrieving columns data from a table, the letter B only use one table and we need two, the letter C statement is not using the correct names, and the letters A and D are retrieving the columns, the only one difference is that letter A is retrieving no repeated data.

2. After describing the EMPLOYEES table, you discover that the SALARY column has a data type of NUMBER(8,2). Which SALARY value(s) will not be permitted in this column?
A. SALARY=12345678
B. SALARY=12.34
C. SALARY=12345.678
D. SALARY=123456
E. SALARY=123456.78

Answer: A , C
The salary column has a data type NUMBER(8,2) that means that it can contain a number with 6 digits that represent an integer and 2 digits for the decimals, the maximum value is 999999.99 and the minimum value is -999999.99 a number out of this parameters is not permitted

3. After describing the JOBHISTORY table, you discover that the STARTDATE and ENDDATE columns have a data type of DATE. Consider the expression ENDDATESTARTDATE. (Choose two correct statements.))

A. A value of DATE data type is returned.

B. The expression represents the days between the ENDDATE and START-DATE less one day.

C. A value of type VARCHAR2 is returned.

D. The expression is invalid since arithmetic cannot be performed on columns with DATE data types.

E. A value of type NUMBER is returned.

Answer: B , E

The select statement returns the difference of days, and that is a number because it is the result of an arithmetic expression.

4. The DEPARTMENTS table contains a DEPARTMENTNAME column with data type VARCHAR2(30). (Choose two true statements about this column.)

A. This column can store character data up to a maximum of 30 characters.

B. This column can store data in a column with data type VARCHAR2(50) provided that the contents are at most 30 characters long.

C. The VARCHAR2 data type is replaced by the CHAR data type.

D. This column must store character data that is at least 30 characters long.

Answer:A , B

A data type VARCHAR2(30) means that the column can content a string with a maximum length of 30 characters, that means i can store a VAR-CHAR2(30) value in a VARCHAR2(50) because 30¡50 and the VARCHAR2(50) can contain a maximum of 50 characters.

EXECUTE A BASIC SELECT STATEMENT

5. Which statement reports on unique JOBID values from the EMPLOYEES table? (Choose all that apply.)

A. SELECT JOB$_I$$DFROMEMPLOYEES$;
B. SELECT DISTINCT JOBID FROM EMPLOYEES;
C. SELECT DISTINCT JOBID, EMPLOYEEID FROM EMPLOYEES;
D. SELECT UNIQUE JOBID FROM EMPLOYEES;

Answer: B, D

The SELECT DISTINCT returns all the values but without repeated values, and the UNIQUE do practically the same because it returns only unique values.

6. Choose the two illegal statements. The two correct statements produce identical results. The two illegal statements will cause an error to be raised:

A. select department id —— ' represents the '—— department name —— ' Department' "Department Info" from departments;
B. SELECT DEPARTMENT ID—— ' represents the —— DEPARTMENT NAME —— 'Department' as "Department Info" FROM DEPARTMENTS;
C. SELECT DEPARTMENT ID—— ' represents the ' —— DEPARTMENT NAME —— 'Department' as "Department Info" FROM DEPARTMENTS;
D. SELECT DEPARTMENT ID represents the DEPARTMENT NAME Department as "Department Info" FROM DEPARTMENTS;

Answer: B , D

The letter B statement is not respecting the use of (' ') and that cause an error, and the letter D statements do not use (' ') with the literal values and that cause an error.

7. Which expressions do not return NULL values? (Choose all that apply.)

A. select ((12 + 90) * 55) + null from dual;
B. select null——'test'——null as "Test" from dual;
C. select null/0 from dual;
D. select 'this is a '——null——'test with nulls' from dual;

Answer: B , D

All the arithmetic expressions that use null values always return null, the letter B returns an error because it is an incorrect form to do a SELECT, and the letter D returns a literal value.

8. Choose the correct syntax to return all columns and rows of data from the EMPLOYEES table.

A. select * from employees;
B. select employee id, first name, last name, first name, department id from employees;
C. select
D. select all from employees;
E. select *.* from employees

Answer: A

SELECT * FROM TABLE NAME; is the basic syntax to return all of a table.

DELETE ROWS FROM A TABLE

9. The following character literal expression is selected from the DUAL table: SELECT 'Coda''s favorite fetch toy is his orange ring' FROM DUAL; (Choose the result that is returned.)

A. An error would be returned due to the presence of two adjacent quotes
B. 'Coda''s favorite fetch toy is his orange ring'
C. Coda''s favorite fetch toy is his orange ring
D. Coda's favorite fetch toy is his orange ring

Answer:D
That statement returns a correct literal value, that is because there are not quotes without its pair and that represents an only one literal value.

10. There are four rows of data in the REGIONS table. Consider the following SQL statement:

SELECT '6 * 6' "Area" FROM REGIONS; How many rows of results are returned and what value is returned by the Area column? (Choose the best answer.)
A. 4 rows returned, Area column contains value 6 * 6 for all 4 rows
B. 4 rows returned, Area column contains value 36 for all 4 rows
C. 1 row returned, Area column contains value 6 * 6
D. 1 row returned, Area column contains value 36
E. A syntax error is returned

Answer: E
When you use the SELECT statement to retrieving data from a table you need to specify which data with columns values and this statement do not specify it.

Activity 2:

Propose an answer to the following issues:

a) You want to construct and execute queries against tables stored in an Oracle database. Are you confined to using SQL Developer? I think use the

SQL Developer is the most comfortable option but you can use SQL plus, or you can create a program with a programming language that connects and interacts with the data base, i think there are more options but depends of the situation.

b) To explore your database environment further, you would like a list of tables, owned by your current schema, available for you to query. How do you interrogate the database dictionary to provide this metadata?

I don not know how to interact with the database dictionary but i think that these problems can be solved using views, or watching the structures of the schemes with the SQL DEVELOPER

c) When querying the JOBS table for every row containing just the JOBID and MAXSALARY columns, is a projection, selection, or join being performed?

It is a PROJECTION because you are retrieving all the values of those columns, when you are looking for records you are using SELECTION, and when there are 2 tables or more you are using a JOIN.

d) An alias provides a mechanism to rename a column or an expression. Under what conditions should you enclose an alias in double quotes?

It is a PROJECTION because you are retrieving all the values of those columns, when you are looking for records you are using SELECTION, and when there are 2 tables or more you are using a JOIN.
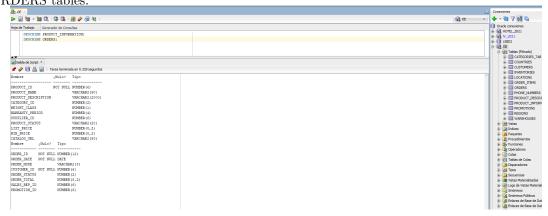
e) When working with character literal values that include single quotation marks, how should you specify these literals in the SELECT clause without raising an error?

You can use the alternative quote (q) operator to use the single quotation marks without problem, or you can make sure of use the quotes correctly to do not get an error
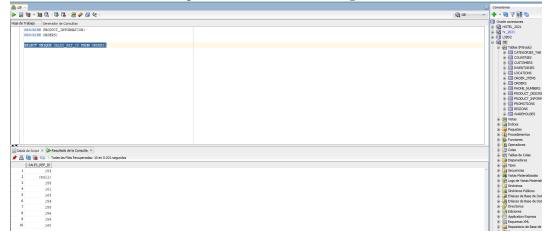
Activity 3:

Connect to the OE schema and complete the following tasks.

1. Obtain structural information for the PRODUCT INFORMATION and ORDERS tables.

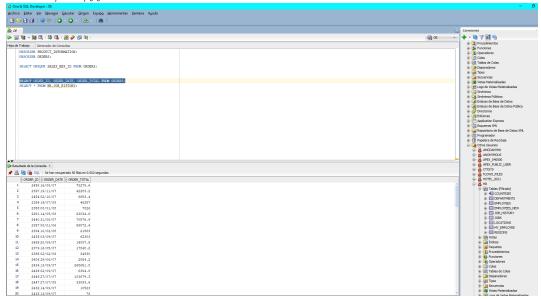2. Select the unique SALES REP ID values from the ORDERS table. How many different sales representatives have been assigned to orders in the OR-DERS table? 10 Different sales representatives have been assigned
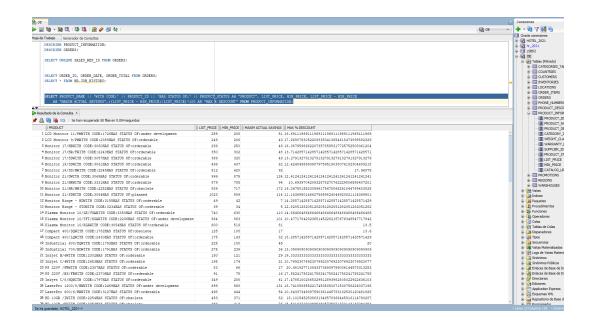

3. Create a results set based on the ORDERS table that includes the OR-DER ID, ORDER DATE, and ORDER TOTAL columns. Notice how the OR-DER DATE output is formatted differently from the START DATE and END

DATE columns in the HR.JOB ID table. I did not see difference in the format both are dd/mm/yy

4. The PRODUCT INFORMATION table stores data regarding the products available for sale in a fictitious IT hardware store. Produce a set of results that will be useful for a sales person. Extract product information in the format PRODUCT NAME with code: PRODUCT ID has status of: PRODUCT STATUS. Alias the expression as "Product." The results should provide the LIST PRICE, the MIN PRICE, the difference between LIST PRICE, and MIN PRICE aliased as "Max Actual Savings," along with an additional expression that takes the difference between LIST PRICE and MIN PRICE and divides it by the LIST PRICE and then multiplies the total by 100. This last expression should be aliased as "Max Discount

5. Calculate the surface area of the Earth using the DUAL table. Alias this expression as "Earth's Area." The formula for calculating the area of a sphere is: 4PIr2. Assume, for this example, that the earth is a simple sphere with a radius of 3,958.759 miles and that PI is 22/7. This calculation approximates that planet Earth's surface area is 197016572.595304 square miles.

Activity 4:

In this step-by-step activity a connection is made using SQL Developer as the HR user. Use expressions and operators to answer three questions related to the SELECT statement:

Using Select Statement

Question 1: How many unique departments have employees currently working in them? 1. Start SQL*Plus and connect to the HR schema.

2. You may initially be tempted to find the answer in the DEPARTMENTS table. A careful examination reveals that the question asks for information about employees. This information is contained in the EMPLOYEES table.

3. The word "unique" should guide you to use the DISTINCT keyword.

4. Combining steps 2 and 3, you can construct the following SQL statement:

5. As shown in the following illustration, this query returns 12 rows. Notice that the third row is empty. This is a null value in the DEPARTMENTID column.

6. The answer to the first question is therefore: Eleven unique departments have employees working in them, but at least one employee has not been assigned to a department.

Question 2: How many countries are there in the Europe region?

1. This question comprises two parts. Consider the REGIONS table, which contains four regions each uniquely identified by a REGIONID value, and the COUNTRIES table, which has a REGIONID column indicating which region a country belongs to.

2. The first query needs to identify the REGIONID of the Europe region. This is accomplished by the SQL statement:

3. The following illustration shows that the Europe region has a REGIONID value of 1:

4. To identify which countries have 1 as their REGIONID, you need to execute the following SQL query

5. Manually counting the country rows with a REGIONID of 1 in the following illustration helps answer the second question:

6. The answer to the second question is therefore: There are eight countries in the Europe region as far as the HR data model is concerned.

Question3:

The HR schema contains seven tables representing a data model of a fictitious Human Resources department. The EMPLOYEES table, which stores details of the staff, and the DEPARTMENTS table, which contains the details of the departments in the organization, have been described. In this step-by-step exercise, a connection is made using SQL Developer as the HR user and the remaining five sample tables are described. They are the JOBS table, which keeps track of the different job types available in the organization, and the JOB-HISTORY table, which keeps track of the job details of employees who changed jobs but remained in the organization. To understand the data model further, the LOCATIONS, COUNTRIES, and REGIONS tables, which keep track of the geographical information pertaining to departments in the organization, will be described.

1. Launch SQL Developer and choose New from the File menu. Choose Database Connection. If this is the first time you are connecting to the database from SQL Developer, you are required to create a connection. Provide a descriptive connection name and input HR as the username. The remaining connection details should be obtained from your database administrator. Once the connection is saved, choose the Connect button.

2. Navigate to the SQL Editor, which is the section titled Enter SQL State-

ment.

3. Type in the command: DESCRIBE JOBS. Terminating this command with a semicolon is optional.

4. Execute the DESCRIBE command, either by pressing the F5 key or by clicking the solid green triangular arrow icon located on the toolbar above the SQL Editor.

5. The JOBS table description appears in the Results frame as shown in the following illustration.

6. Steps 3 to 5 can be repeated to describe the remaining JOBHISTORY, LOCATIONS, COUNTRIES, and REGIONS tables.

7. SQL Developer provides an alternative to the DESCRIBE command when it comes to obtaining the structural information of tables.

```
DESCRIBE JOBS;
DESCRIBE JOB_HISTORY;
DESCRIBE LOCATIONS;
DESCRIBE COUNTRIES;
DESCRIBE REGIONS;
```

Resultado de la Consulta × | Salida de Script ×

Tarea terminada en 0.624 segundos

```
Nombre      ¿Nulo?    Tipo
----------- -------- ------------
JOB_ID      NOT NULL VARCHAR2(10)
JOB_TITLE   NOT NULL VARCHAR2(35)
MIN_SALARY           NUMBER(6)
MAX_SALARY           NUMBER(6)
Nombre        ¿Nulo?    Tipo
------------- -------- ------------
EMPLOYEE_ID   NOT NULL NUMBER(6)
START_DATE    NOT NULL DATE
END_DATE      NOT NULL DATE
JOB_ID        NOT NULL VARCHAR2(10)
DEPARTMENT_ID          NUMBER(4)
Nombre         ¿Nulo?    Tipo
-------------- --------- ------------
LOCATION_ID    NOT NULL NUMBER(4)
STREET_ADDRESS          VARCHAR2(40)
POSTAL_CODE             VARCHAR2(12)
CITY           NOT NULL VARCHAR2(30)
STATE_PROVINCE          VARCHAR2(25)
COUNTRY_ID              CHAR(2)
Nombre        ¿Nulo?    Tipo
------------- -------- ------------
COUNTRY_ID    NOT NULL CHAR(2)
COUNTRY_NAME           VARCHAR2(40)
REGION_ID              NUMBER
Nombre      ¿Nulo?    Tipo
----------- -------- ------------
REGION_ID   NOT NULL NUMBER
REGION_NAME          VARCHAR2(25)
```
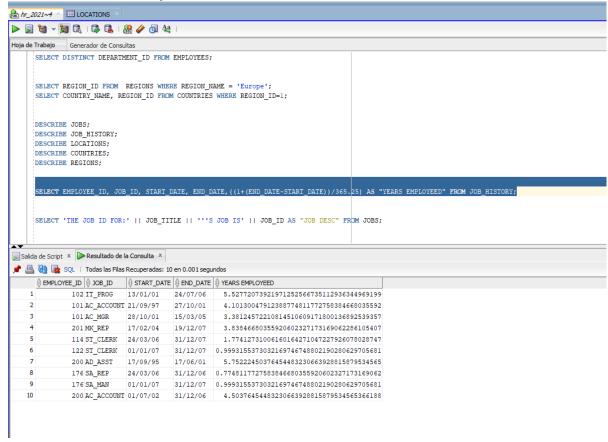
8. Navigate to the LOCATIONS table using the Tree navigator located on the left frame underneath the connection name.

9. SQL Developer describes the table automatically on the right side of the tool as shown in the following illustration

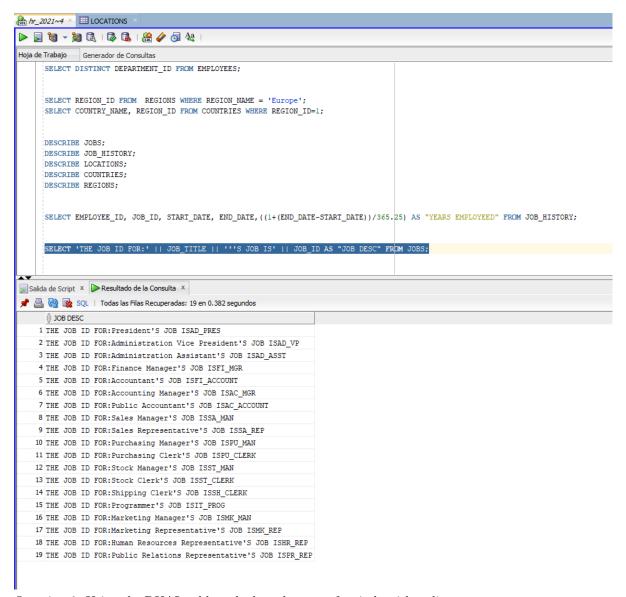|	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	LOCATION_ID	NUMBER(4,0)	No	(null)	1	Primary key of locations table
2	STREET_ADDRESS	VARCHAR2(40 BYTE)	Yes	(null)	2	Street address of an office, warehouse, or production site of a company.Contains building number and street name
3	POSTAL_CODE	VARCHAR2(12 BYTE)	Yes	(null)	3	Postal code of the location of an office, warehouse, or production siteof a company.
4	CITY	VARCHAR2(30 BYTE)	No	(null)	4	A not null column that shows city where an office, warehouse, orproduction site of a company is located.
5	STATE_PROVINCE	VARCHAR2(25 BYTE)	Yes	(null)	5	State or Province where an office, warehouse, or production site of acompany is located.
6	COUNTRY_ID	CHAR(2 BYTE)	Yes	(null)	6	Country where an office, warehouse, or production site of a company islocated. Foreign key to country_id column of the countries table.

Question 4: It was demonstrated earlier how the number of days for which staff were employed in a job could be calculated. For how many years were staff employed while fulfilling these job roles and what were their EMPLOYEEID, JOBID, STARTDATE, and ENDDATE values? Alias the expression column in your query with the alias Years Employed. Assume that a year consists of 365.25 days.

1. Start SQL Developer and connect to the HR schema.

2. The projection of columns required includes EMPLOYEEID, JOBID, STARTDATE, ENDDATE, and an expression called "Years Employed" from the $JOB_H ISTORY$ $table$.

3. The expression can be calculated by dividing one plus the difference between ENDDATE and STARTDATE by 365.25 days, as shown next:

4. Execute the statement y show the results

Question 5: Query the JOBS table and return a single expression of the form The Job Id for the ¡jobtitle's¿ job is: ¡jobid¿. Take note that the jobtitle should have an apostrophe and an "s" appended to it to read more naturally. A sample of this output for the organization president is: "The Job Id for the President's job is: ADPRES." Alias this column expression as "Job Description" using the AS keyword.
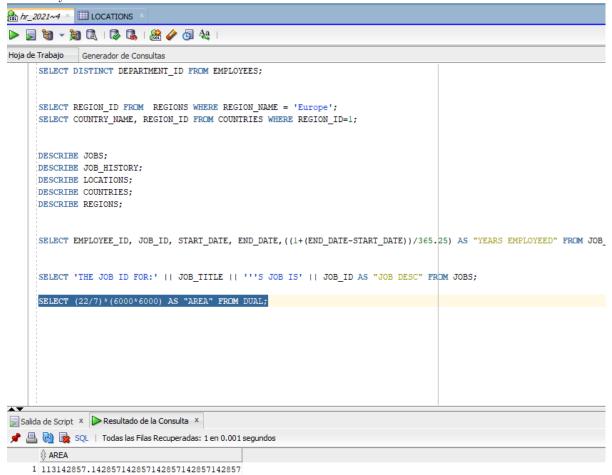
1. There are multiple solutions to this problem. The approach chosen here is to handle the naturally occurring single quotation marks with an additional single quote.

2. A single expression aliased as "Job Description" is required and may be constructed by dissecting the requirement into the literal "The Job Id for the" being concatenated to the JOBTITLE column. This string is then concatenated to the literal "'s job is:," which is further concatenated to the JOBID column. An additional single quotation mark is added to yield the SELECT statement that follows:

3. Execute the statement y show the results.

Question 6: Using the DUAL table, calculate the area of a circle with radius 6000 units, with pi being approximately 22/7. Use the formula: Area = pi × radius × radius. Alias the result as "Area."

1. Working with the DUAL table may initially seem curious. You get used to it as its functionality becomes more apparent. This question involves selecting a literal arithmetic expression from the DUAL table to yield a single row calculated answer that is not based on the column values in any table. Name the result column "Area".

2. The expression may be calculated using the following SQL statement:

3. The results returned show the approximate area of the circle as 113142857.14 square units.

4. Show your own results.

Activity 5:

In this practice, you write simple SELECT queries. The queries cover most of the SELECTclauses and operations that you learned in this lesson.

Part 1 Test your knowledge:
1. The following SELECT statement executes successfully:
SELECT lastname, jobid, salary AS Sal FROM employees;

True/False Explain the reason.
Answer: True
you can use that alias also without the double quotes, it is just as valid

2. The following SELECT statement executes successfully: SELECT * FROM jobgrades;

True/False Explain the reason.
Answer: False
By not putting the instruction that any field in the table has that alias, we will get an error because that table does not exist
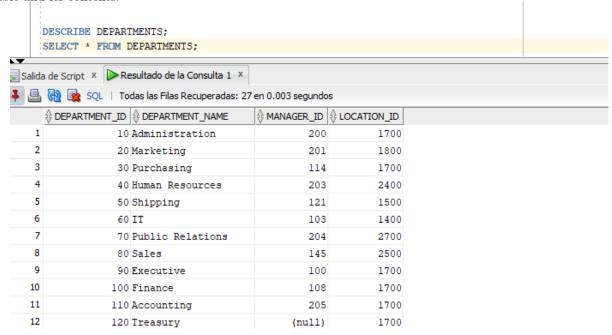
3. There are four coding errors in the following statement. Can you identify them? Explain the reason.

SELECT employeeid, lastname sal x 12 ANNUAL SALARY FROM employees;
Yes, there is no parenthesis for the operation, the multiply symbol is a * and there is no "as" word to use aliases and the name variable has no underscore
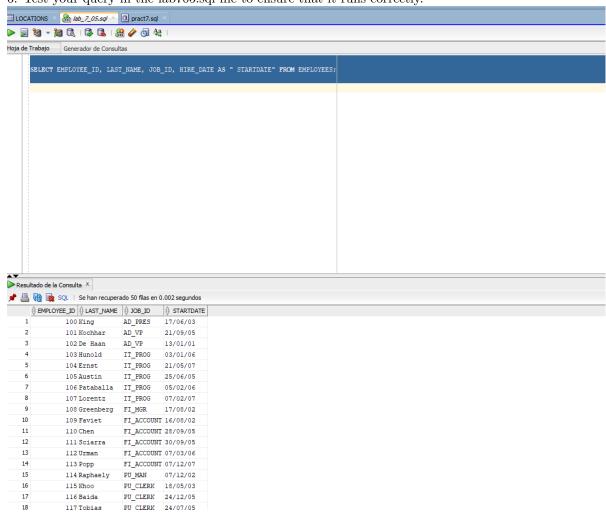
Part 2 You have been hired as a SQL programmer for Antiguo Maestro Corporation. Your first task is to create some reports based on data from the Human Resources tables.

4. Your first task is to determine the structure of the DEPARTMENTS table and its contents.
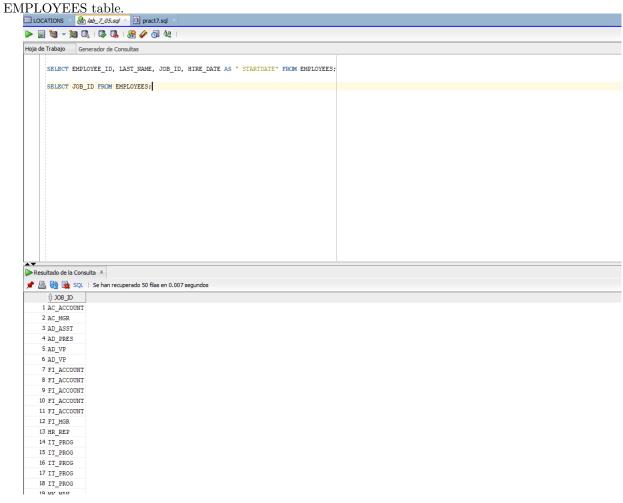
```
DESCRIBE DEPARTMENTS;
SELECT * FROM DEPARTMENTS;
```

Salida de Script ×   Resultado de la Consulta 1 ×

SQL | Todas las Filas Recuperadas: 27 en 0.003 segundos

	DEPARTMENT_ID	DEPARTMENT_NAME	MANAGER_ID	LOCATION_ID
1	10	Administration	200	1700
2	20	Marketing	201	1800
3	30	Purchasing	114	1700
4	40	Human Resources	203	2400
5	50	Shipping	121	1500
6	60	IT	103	1400
7	70	Public Relations	204	2700
8	80	Sales	145	2500
9	90	Executive	100	1700
10	100	Finance	108	1700
11	110	Accounting	205	1700
12	120	Treasury	(null)	1700

5. Determine the structure of the EMPLOYEES table

```
DESCRIBE EMPLOYEES;
```

Salida de Script ×

| Tarea terminada en 0.042 segundos

```
Nombre          ¿Nulo?    Tipo
--------------- --------- ------------
EMPLOYEE_ID     NOT NULL  NUMBER(6)
FIRST_NAME                VARCHAR2(20)
LAST_NAME       NOT NULL  VARCHAR2(25)
EMAIL           NOT NULL  VARCHAR2(25)
PHONE_NUMBER              VARCHAR2(20)
HIRE_DATE       NOT NULL  DATE
JOB_ID          NOT NULL  VARCHAR2(10)
SALARY                    NUMBER(8,2)
COMMISSION_PCT            NUMBER(2,2)
MANAGER_ID                NUMBER(6)
DEPARTMENT_ID             NUMBER(4)
```

The HR department wants a query to display the last name, job ID, hire date, and employee ID for each employee, with the employee ID appearing first. Provide an alias STARTDATE for the HIREDATE column. Save your SQL statement to a file named lab705.sqlso that you can dispatch this file to the HR department.
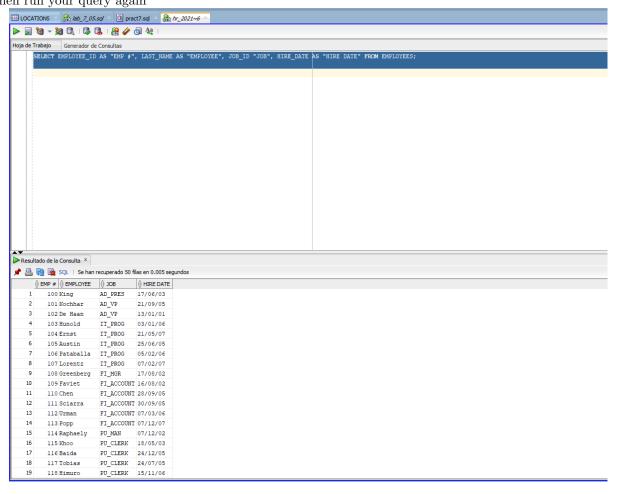
6. Test your query in the lab705.sql file to ensure that it runs correctly.
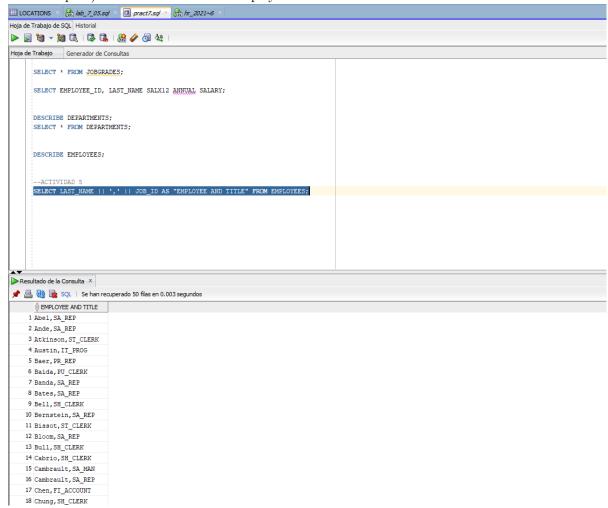
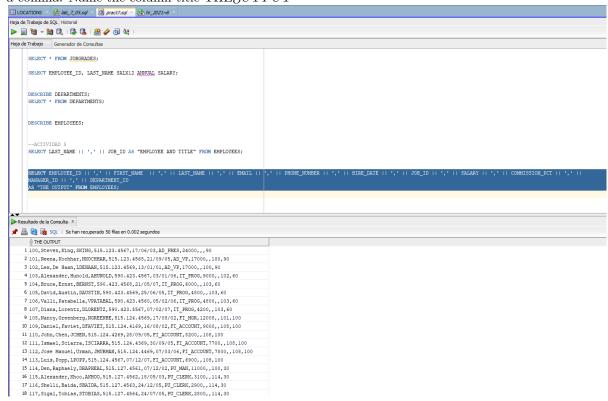7. The HR department wants a query to display all unique job IDs from the EMPLOYEES table.

8. The HR department wants more descriptive column headings for its report on employees. Copy the statement from lab705.sql to a new SQL Worksheet. Name the column headings Emp , Employee, Job, and Hire Date, respectively. Then run your query again

9. The HR department has requested a report of all employees and their job IDs. Display the last name concatenated with the job ID (separated by a comma and space) and name the column Employee and Title

10. To familiarize yourself with the data in the EMPLOYEES table, create a query to display all the data from that table. Separate each column output by a comma. Name the column title THE$_O UTPUT$

3 PRE-EVALUATION

Practices pre-Assessment for Database Systems Laboratory II Pre-Assessment
PRACTICE 7 carried out by student

1 COMPLIES WITH THE REQUESTED FUNCTIONALITY
YES

4 HAS THE CORRECT INDENTATION
YES

6 HAS AN EASY WAY TO ACCESS THE PROVIDED FILES
YES

7 HAS A REPORT WITH IDC FORMAT
YES

8 REPORT INFORMATION IS FREE OF SPELLING ERRORS
YES

9 DELIVERED IN TIME AND FORM
YES

10 IS FULLY COMPLETED (SPECIFY THE PERCENTAGE COMPLETED)
YES,100 percent

4　Conclusion

In this practice, you will go over the topics seen in the theory class about table queries with the SELECT statement and others using aliases.

It was very helpful for me to continue understanding the topics and begin to master them.

I liked doing the practice because custom queries are something very interesting and at a certain point I like to play with it a bit, I learned much more by reviewing and I think that now I can dominate this topic.