

Database Concepts

Assignment 2, Semester 2, 2020

Student Information

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The screenshot displays the Oracle SQL Developer application window. At the top, the browser address bar shows the URL: <https://mitmydesktop.cloud.com/Citrix/StoreWeb/clients/HTML5Client/src/SessionWindow.html?launchid=1600164283181>. The application title bar reads "Oracle SQL Developer".

The main interface is divided into several panes:

- Connections:** A list of database connections, with "Vahid's3811521" selected.
- Tables:** A tree view showing the database schema, including tables like ABILITY, ACADEMIC, AUTHOR, CHARACTER, CLASS, COUNTRIES, DEPARTMENT, DEPARTMENT1, EMPLOYEE, EMPLOYEES, ENROL, FIELD, INTEREST, ITEM, JOBHISTORY, JOBS, LEAGUE, LOCATIONS, PAPER, PLAYER, STAFF, and STUDENT.
- Query Editor:** The central area for writing SQL queries. It shows a "Query Result" tab with a table of 27 rows. The table has three columns: "NAME", "TABLETYPE", and "CLUSTERED". The rows list various database tables and their types (e.g., TABLE, VIEW) and whether they are clustered.
- Reports:** A pane on the bottom left showing a list of reports, including "All Reports", "Data Dictionary Reports", "Data Modeler Reports", "OLAP Reports", "TimesTen Reports", and "User Defined Reports".

The "Query Result" table contains the following data:

NAME	TABTYPE	CLUSTERED
1 ABILITY	TABLE	(null)
2 ACADEMIC	TABLE	(null)
3 AUTHOR	TABLE	(null)
4 B3H8e1h0G103K93y0ACdgrfaw=40	TABLE	(null)
5 B3H8e1h0G103K93y0ACdgrfaw=40	TABLE	(null)
6 B3H8e1h0G103K93y0ACdgrfaw=40	TABLE	(null)
7 B3H8e1h0G103K93y0ACdgrfaw=40	TABLE	(null)
8 B3H8e1h0G103K93y0ACdgrfaw=40	TABLE	(null)
9 CHARACTER	TABLE	(null)
10 CLASS	TABLE	(null)
11 COUNTRIES	TABLE	(null)
12 DEPARTMENT	TABLE	(null)
13 DEPARTMENT1	TABLE	(null)
14 EMPLOYEE	TABLE	(null)
15 EMPLOYEES	TABLE	(null)
16 ENROL	TABLE	(null)
17 FIELD	TABLE	(null)
18 INTEREST	TABLE	(null)
19 ITEM	TABLE	(null)
20 JOBHISTORY	TABLE	(null)
21 JOBS	TABLE	(null)
22 LEAGUE	TABLE	(null)
23 LOCATIONS	TABLE	(null)
24 PAPER	TABLE	(null)
25 PLAYER	TABLE	(null)
26 STAFF	TABLE	(null)
27 STUDENT	TABLE	(null)

The screenshot displays the Oracle SQL Developer interface. The top menu bar includes File, Edit, View, Navigate, Run, Tools, Window, and Help. The toolbar contains icons for file operations, execution, and navigation. The left-hand pane shows the 'Connections' tree with a selected connection to 'Vahid@3811521'. Below this, the 'Tables (Filtered)' list shows the 'EMPLOYEES' table selected. The right-hand pane displays the 'SQL History' tab, showing a list of executed SQL queries. The first query is a SELECT statement that filters the 'EMPLOYEES' table based on the 'JOB_ID' column, specifically selecting rows where 'JOB_ID' is 'ACADEMIC'. The query is executed, and the results are displayed in a table view. The table has columns: EMPLOYEE_ID, LAST_NAME, FIRST_NAME, EMAIL, PHONE_NUMBER, HIRE_DATE, JOB_ID, REPORT_TO_MGR_ID, and REPORT_TO_ORG_ID. The data is sorted by EMPLOYEE_ID. The table contains 10 rows of data, including employees like 'ABILEY', 'ACADEMIC', 'AUTHOR', 'CHARACTER', 'CLARK', 'COURTESY', 'DEPARTMENT', 'DEPARTMENT1', 'EMPLOYEES', and 'EMPLOYEES1'.

EMPLOYEE_ID	LAST_NAME	FIRST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE	JOB_ID	REPORT_TO_MGR_ID	REPORT_TO_ORG_ID
1	ABILEY					ACADEMIC		
2	ACADEMIC					ACADEMIC		
3	AUTHOR					ACADEMIC		
4	CHARACTER					ACADEMIC		
5	CLARK					ACADEMIC		
6	COURTESY					ACADEMIC		
7	DEPARTMENT					ACADEMIC		
8	DEPARTMENT1					ACADEMIC		
9	EMPLOYEES					ACADEMIC		
10	EMPLOYEES1					ACADEMIC		

Question 1

Reference number	QC1-14
Text of Your Question	List the famname, givename of all academics in the database, in alphabetical order.

The answer is as follows.

```
SELECT FAMNAME, GIVENAME
FROM ACADEMIC
ORDER BY FAMNAME, GIVENAME ASC;
```

Question 2

Reference number	QC1-12
Text of Your Question	<p>The query below is meant to list the panum, title and author acnum of papers and the academic title of each author, but it has errors. Give the correct SQL query.</p> <pre>Select panum, title From author. academic, paper Where author.acnum= academic.acnum;</pre>

The answer is as follows.

```
Select PAPER.PANUM, PAPER.TITLE, AUTHOR.ACNUM, ACADEMIC.TITLE
From AUTHOR, ACADEMIC, PAPER
Where AUTHOR.PANUM = PAPER.PANUM and AUTHOR.ACNUM = ACADEMIC.ACNUM;
```

Question 3

Reference number	QC1-17
Text of Your Question	List the fieldnum, title and academic acnum of each field.

The answer is as follows.

```
Select FIELD.FIELDNUM, FIELD.TITLE, INTEREST.ACNUM as ACADEMIC_ACNUM
From FIELD join INTEREST on FIELD.FIELDNUM = INTEREST.FIELDNUM
Where INTEREST.ACNUM in (
Select ACADEMIC.ACNUM
From ACADEMIC join INTEREST ON ACADEMIC.ACNUM = INTEREST.ACNUM);
```

-- (OR)

```
Select FIELD.FIELDNUM, FIELD.TITLE, ACADEMIC.ACNUM
From ACADEMIC, FIELD, INTEREST
Where FIELD.FIELDNUM = INTEREST.FIELDNUM
and ACADEMIC.ACNUM = INTEREST.ACNUM;
```

Question 4

Reference number	QC1-16
Text of Your Question	Find academics who have a title (title) available in the database. Write a query to return all details of these academics.

The answer is as follows.

```
Select *
From ACADEMIC
Where TITLE is NOT NULL;
```

Question 5

Reference number	QC2-16
Text of Your Question	Output in alphabetical order the acnum, famname, givename of academics whose family name starts with “C” and whose interested field number is larger than 3.

The answer is as follows.

```

Select distinct ACADEMIC.ACNUM, ACADEMIC.FAMNAME, ACADEMIC.GIVENAME
From ACADEMIC join INTEREST on ACADEMIC.ACNUM = INTEREST.ACNUM
Where ACADEMIC.FAMNAME like 'C%'
and INTEREST.FIELDNUM > 3
Order By ACADEMIC.ACNUM, ACADEMIC.FAMNAME, ACADEMIC.GIVENAME;
    
```

Question 6

Reference number	QC2-13
Text of Your Question	List the field number and title of fields interested by the academic whose acnum is 100.

The answer is as follows.

```
Select distinct FIELD.FIELDNUM, FIELD.TITLE
From ACADEMIC, FIELD, INTEREST
Where FIELD.FIELDNUM = INTEREST.FIELDNUM
and ACADEMIC.ACNUM = INTEREST.ACNUM
and FIELD.FIELDNUM = 100;
```

-- (OR)

```
Select distinct FIELD.FIELDNUM, FIELD.TITLE
From FIELD join INTEREST on FIELD.FIELDNUM = INTEREST.FIELDNUM
Where INTEREST.ACNUM in (
Select ACADEMIC.ACNUM
From ACADEMIC join INTEREST ON ACADEMIC.ACNUM = INTEREST.ACNUM)
and FIELD.FIELDNUM = 100;
```


Question 7

Reference number	QC2-20
Text of Your Question	List the deptnum and deptname of departments whose academics have never written any papers. You must use a subquery.

The answer is as follows.

```

Select DEPARTMENT.DEPTNUM, DEPARTMENT.DEPTNAME
From DEPARTMENT, ACADEMIC
Where DEPARTMENT. DEPTNUM = ACADEMIC.DEPTNUM and ACADEMIC.ACNUM not in (
Select ACNUM
From AUTHOR);
    
```

Question 8

Reference number	QC2-18
Text of Your Question	Find the departments that have covered at least ten fields (that is, those departments where the sum of fields interested by their academics is at least ten). Output their deptnum and deptname in ascending order.

The answer is as follows.

```

Select DEPARTMENT.DEPTNUM, DEPARTMENT.DEPTNAME
From DEPARTMENT, ACADEMIC, INTEREST
Where DEPARTMENT.DEPTNUM = ACADEMIC.DEPTNUM
and ACADEMIC.ACNUM = INTEREST.ACNUM
Group by DEPARTMENT.DEPTNUM, DEPARTMENT.DEPTNAME
Having count (distinct INTEREST.FIELDNUM) >= 10
Order By DEPARTMENT.DEPTNUM, DEPARTMENT.DEPTNAME;

```

Question 9

Reference number	QC3-13
Text of Your Question	Find the academics that have the largest number of interested fields. Output the details of these academics, including acnum, givename, famname, and the number of his/her interested fields.

The answer is as follows.

```

Select distinct ACADEMIC.ACNUM, ACADEMIC.FAMNAME, ACADEMIC.GIVENAME,
COUNT(INTEREST.FIELDNUM)
From ACADEMIC join INTEREST on ACADEMIC.ACNUM = INTEREST.ACNUM
Group By ACADEMIC.ACNUM, ACADEMIC.FAMNAME, ACADEMIC.GIVENAME
HAVING COUNT(FIELDNUM)>= all (
Select COUNT(INTEREST.FIELDNUM)
From ACADEMIC
Group By ACNUM)
ORDER BY COUNT(INTEREST.FIELDNUM) DESC;

```

Question 10

Reference number	QC3-14
Text of Your Question	Find the academics who have not authored any paper with “Steve Bruce”. List their details (acnum, famname, givenname, deptname, instname).

The answer is as follows.

```
Select ACADEMIC.ACNUM, ACADEMIC.FAMNAME, ACADEMIC.GIVENAME,
DEPARTMENT.DEPTNUM, DEPARTMENT.INSTNAME
From ACADEMIC join DEPARTMENT on ACADEMIC.DEPTNUM = DEPARTMENT.DEPTNUM
Where ACADEMIC.ACNUM not in
(Select ACADEMIC.ACNUM
From ACADEMIC join AUTHOR ON ACADEMIC.ACNUM = AUTHOR.ACNUM
Where ACADEMIC.FAMNAME = 'Bruce' and ACADEMIC.GIVENAME = 'Steve')
```

Question 11

Reference number	QC3-19
Text of Your Question	<p>Explain the following query in English. A literal explanation will receive 0 marks.</p> <pre> select givename, famname, deptname from academic natural join department where acnum not in (select acnum from academic natural join interest) and deptNum in (select deptNum from academic natural join author group by deptNum having count(panum)>100); </pre>

The answer is as follows.

This query selects and returns the Academic details (GIVENAME, FAMNAME) and the name of the department (DEPTNAME) that the academic belongs to and authored or co-authored more than 100 papers but have no interest in any field.

Question 12

Reference number	QC3-16
Text of Your Question	The productivity of an academic is measured by the total number of paper s/he has written. Find the papers that have the most productive author/s or the least productive author/s. Output the acnum, title, and the givenname, famname of the most productive author/s or the least productive author/s together with the number of their papers.

The answer is as follows.

```

Select distinct ACADEMIC.ACNUM, ACADEMIC.FAMNAME, ACADEMIC.GIVENAME,
COUNT(AUTHOR.PANUM) as PRODUCTIVITY
From ACADEMIC join AUTHOR on ACADEMIC.ACNUM = AUTHOR.ACNUM
Group By ACADEMIC.ACNUM, ACADEMIC.FAMNAME, ACADEMIC.GIVENAME
HAVING COUNT(AUTHOR.PANUM) >= all (
Select COUNT(AUTHOR.PANUM)
From ACADEMIC
Group By ACNUM)
ORDER BY COUNT(AUTHOR.PANUM) DESC;

```