

Chapter 1: What Is Structured Query Language?

Exercise 1.1: Using SQL Developer

For this exercise, we will become familiar with SQL Developer.

1. Locate the SQL Developer executable on the desktop.
2. Double-click to see that it starts properly.
3. Right-click the `HR` connection and select Properties from the menu. Examine the parameters. Where is the Oracle database server running?
4. Make the following configuration changes in the Tools | Preferences Menu:
 - a. In the Code Editor Line Gutter section, choose the option to **Show Line Numbers**.

Tools / Preferences / Code Editor / Line Gutter

- b. In the Database NLS Parameters section, modify the Date Format to display **DD-MON-YYYY**.

Tools / Preferences / Database / NLS Parameters

5. Open the `HR` connection.

You can do this either by clicking the + (plus sign) to the left of the Connection Name or by right-clicking the Connection icon and selecting Connect.

6. Expand the Tables branch to show all of the tables from `HR`.

Click the + (plus sign) or double-click the name.

7. How many tables are owned by `HR`?

-
8. Open SQL Worksheet for `HR`.

Use the SQL Worksheet icon in the toolbar.

9. Enter the following statement into the SQL Worksheet window and execute it:

```
SELECT * FROM locations;
```

Click the Run Statement icon or the <F9> key to run the statement.

10. Execute the same statement as a script and note the difference.

Click the Run Script icon or the <F5> key to run the script.

11. Save the SQL script for later use as a file called loc.sql
12. Enter the following statement underneath the existing statement.

```
SELECT * FROM countries;
```
13. Execute both statements by clicking the <F9> key and note the result.
14. Now, execute both statements together as a script (<F5>). Note that the results of both statements are displayed in the Script Output.
15. Clear the contents of the SQL Worksheet.
16. Open the loc.sql file.

Click the Open File icon, or use the File menu and select Open.
17. Run the SQL statement.



Congratulations!
You have finished
this lab exercise!

Chapter 2: SQL Query Syntax

Exercise 2.1: Selecting Data

Connect to the SCOTT account

Unless the order is specified, the order of your results may differ.

1. Write a query to display the dname and deptno of all rows in the dept table.

DNAME	DEPTNO
-----	-----
ACCOUNTING	10
RESEARCH	20
SALES	30
OPERATIONS	40

2. Write a query to display ALL of the columns and rows in the dept table.

DEPTNO	DNAME	LOC
-----	-----	-----
10	ACCOUNTING	NEW YORK
20	RESEARCH	DALLAS
30	SALES	CHICAGO
40	OPERATIONS	BOSTON

3. Write a query to display the dname, deptno, and location of all rows in the dept table labeling them Name, DEPT# and Dept Location, respectively.

Name	DEPT#	Dept Location
-----	-----	-----
ACCOUNTING	10	NEW YORK
RESEARCH	20	DALLAS
SALES	30	CHICAGO
OPERATIONS	40	BOSTON

4. Write a query to display the deptno of each row in the emp table.

DEPTNO

20
30
30
20
30
30
10
20
10
30
20
30
20
30
20
10

5. Write a query to display each deptno in the emp table only once.

```
DEPTNO
-----
      30
      10
      20
```

6. Write a query to display the deptno and job of each row in the emp table.

```
DEPTNO  JOB
-----  -
      20  CLERK
      30  SALESMAN
      30  SALESMAN
      20  MANAGER
      30  SALESMAN
      30  MANAGER
      10  MANAGER
      20  ANALYST
      10  PRESIDENT
      30  SALESMAN
      20  CLERK
      30  CLERK
      20  ANALYST
      10  CLERK
```

7. Write a query to display each unique combination of deptno and job in the emp table.

```
DEPTNO  JOB
-----  -
      20  MANAGER
      20  ANALYST
      10  PRESIDENT
      10  CLERK
      30  SALESMAN
      10  MANAGER
      20  CLERK
      30  MANAGER
      30  CLERK
```

8. Write a query to display the names of the employees who work for dept 30 in the emp table.

```
ENAME
-----
ALLEN
WARD
MARTIN
BLAKE
TURNER
JAMES
```

9. Write a query to display the names of the employees who were hired on Dec. 17, 1981. Specify the date in a safe format.

```
no rows selected
```

10. Write a query to display the names of the employees who were hired on or after Dec. 17, 1981.

```
ENAME
-----
SCOTT
ADAMS
MILLER
```

11. Write a query to display the names of the employees who have the job of clerk.

```
no rows selected
```

12. Write a query to display the names of the employees who have the job of CLERK.

```
ENAME
-----
SMITH
ADAMS
JAMES
MILLER
```

13. Write a query to display the names of the employees whose salary is greater than 2500.

```
ENAME
-----
JONES
BLAKE
SCOTT
KING
FORD
```

14. Write a query to display the names of the employees whose salary is in the range (inclusive) of 1000 and 1600.

```
NAME
-----
ALLEN
WARD
MARTIN
TURNER
ADAMS
MILLER
```

15. Write a query to display the names of the employees whose names contain "ER".

```
ENAME
-----
TURNER
MILLER
```

16. Write a query to display the names and employee numbers of the employees whose commission is undefined.

```
EMPNO  ENAME
-----
7369 SMITH
7566 JONES
7698 BLAKE
7782 CLARK
7788 SCOTT
7839 KING
7876 ADAMS
7900 JAMES
7902 FORD
7934 MILLER
```

17. Write a query to display the names, employee numbers, and commissions of the employees, sequencing the data in commission ascending order.

```
EMPNO  ENAME  COMM
-----
7844 TURNER      0
7499 ALLEN     300
7521 WARD      500
7654 MARTIN   1400
7788 SCOTT
7839 KING
7876 ADAMS
7900 JAMES
7902 FORD
7934 MILLER
7698 BLAKE
7566 JONES
7369 SMITH
7782 CLARK
```

18. Write a query to display the names, employee numbers, and commissions of the employees sequencing the data in commission descending order.

EMPNO	ENAME	COMM
7369	SMITH	
7782	CLARK	
7902	FORD	
7900	JAMES	
7876	ADAMS	
7566	JONES	
7698	BLAKE	
7934	MILLER	
7788	SCOTT	
7839	KING	
7654	MARTIN	1400
7521	WARD	500
7499	ALLEN	300
7844	TURNER	0

19. Write a query to display the names and employee numbers of the employees sequencing the data in commission descending order, forcing those with unknown commissions to the bottom of the list.

EMPNO	ENAME	COMM
7654	MARTIN	1400
7521	WARD	500
7499	ALLEN	300
7844	TURNER	0
7788	SCOTT	
7839	KING	
7876	ADAMS	
7900	JAMES	
7902	FORD	
7934	MILLER	
7698	BLAKE	
7566	JONES	
7369	SMITH	
7782	CLARK	

Chapter 3: SQL Joins

Exercise 3.1: Working with INNER JOINS

Save your queries for later use.

Connect to the HR account.

20. Joining the locations and departments tables, display the city, location ID, and department name.

CITY	LOCATION_ID	DEPARTMENT_NAME
Southlake	1400	IT
South San Francisco	1500	Shipping
Seattle	1700	Administration
Seattle	1700	Purchasing
Seattle	1700	Executive
Seattle	1700	Finance
Seattle	1700	Accounting
Seattle	1700	Treasury
Seattle	1700	Corporate Tax
Seattle	1700	Control And Credit
Seattle	1700	Shareholder Services
Seattle	1700	Benefits
Seattle	1700	Manufacturing
Seattle	1700	Construction
Seattle	1700	Contracting
Seattle	1700	Operations
Seattle	1700	IT Support
Seattle	1700	NOC
Seattle	1700	IT Helpdesk
Seattle	1700	Government Sales
Seattle	1700	Retail Sales
Seattle	1700	Recruiting
Seattle	1700	Payroll
Toronto	1800	Marketing
London	2400	Human Resources
Oxford	2500	Sales
Munich	2700	Public Relations

21. Joining the locations and countries tables, display the country name and city.

COUNTRY_NAME	CITY
Australia	Sydney
Brazil	Sao Paulo
Canada	Toronto
Canada	Whitehorse
Switzerland	Geneva
Switzerland	Bern
China	Beijing
Germany	Munich
India	Bombay
Italy	Roma
Italy	Venice
Japan	Tokyo
Japan	Hiroshima
Mexico	Mexico City
Netherlands	Utrecht
Singapore	Singapore
United Kingdom	London
United Kingdom	Oxford
United Kingdom	Stretford
United States of America	Southlake
United States of America	South San Francisco
United States of America	South Brunswick
United States of America	Seattle

22. Joining the locations, countries, and departments tables, display the country name, city, and department name.

COUNTRY_NAME	CITY	DEPARTMENT_NAME
United States of America	Southlake	IT
United States of America	South San Francisco	Shipping
United States of America	Seattle	Administration
United States of America	Seattle	Purchasing
United States of America	Seattle	Executive
United States of America	Seattle	Finance
United States of America	Seattle	Accounting
United States of America	Seattle	Treasury
United States of America	Seattle	Corporate Tax
United States of America	Seattle	Control And Credit
United States of America	Seattle	Shareholder Services
United States of America	Seattle	Benefits
United States of America	Seattle	Manufacturing
United States of America	Seattle	Construction
United States of America	Seattle	Contracting
United States of America	Seattle	Operations
United States of America	Seattle	IT Support
United States of America	Seattle	NOC
United States of America	Seattle	IT Helpdesk
United States of America	Seattle	Government Sales
United States of America	Seattle	Retail Sales
United States of America	Seattle	Recruiting
United States of America	Seattle	Payroll
Canada	Toronto	Marketing
United Kingdom	London	Human Resources
United Kingdom	Oxford	Sales
Germany	Munich	Public Relations

23. Joining the employees and job_history tables, display the employee ID, first and last name, and the job ID. Display the output in sequence by employee_id.

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	JOB_ID
101	Neena	Kochhar	AC_MGR
101	Neena	Kochhar	AC_ACCOUNT
102	Lex	De Haan	IT_PROG
114	Den	Raphaely	ST_CLERK
122	Payam	Kaufling	ST_CLERK
176	Jonathon	Taylor	SA_REP
176	Jonathon	Taylor	SA_MAN
200	Jennifer	Whalen	AD_ASST
200	Jennifer	Whalen	AC_ACCOUNT
201	Michael	Hartstein	MK_REP

24. Joining the `jobs` and `job_history` tables, display the job title, employee ID, and starting date for all employees who started in that job after Jan. 1, 1998.

JOB_TITLE	EMPLOYEE_ID	START_DATE
Public Accountant	200	01-JUL-2002
Accounting Manager	101	28-OCT-2001
Programmer	102	13-JAN-2001
Marketing Representative	201	17-FEB-2004
Sales Manager	176	01-JAN-2007
Sales Representative	176	24-MAR-2006
Stock Clerk	114	24-MAR-2006
Stock Clerk	122	01-JAN-2007

25. Modify the above query: remove the start date restriction and also include the employees' first and last names.

JOB_TITLE	EMPLOYEE_ID	START_DATE	FIRST_NAME	LAST_NAME
Accounting Manager	101	28-OCT-2001	Neena	Kochhar
Public Accountant	101	21-SEP-1997	Neena	Kochhar
Programmer	102	13-JAN-2001	Lex	De Haan
Stock Clerk	114	24-MAR-2006	Den	Raphaely
Stock Clerk	122	01-JAN-2007	Payam	Kaufling
Sales Representative	176	24-MAR-2006	Jonathon	Taylor
Sales Manager	176	01-JAN-2007	Jonathon	Taylor
Administration Assistant	200	17-SEP-1995	Jennifer	Whalen
Public Accountant	200	01-JUL-2002	Jennifer	Whalen
Marketing Representative	201	17-FEB-2004	Michael	Hartstein



Congratulations!
You have finished
this lab exercise!

Exercise 3.2: Using OUTER JOINS

Connect to the HR account.

Using the standard outer join syntax, write queries to display the following information:

26. Joining the employees and job_history tables, display the employee ID, first and last name, and the job ID. Include all employees, whether or not they have any job history. Display in employee ID order. Modify your solution to Step 4 of the previous exercise.

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	JOB_ID
100	Steven	King	
101	Neena	Kochhar	AC_ACCOUNT
101	Neena	Kochhar	AC_MGR
102	Lex	De Haan	IT_PROG
103	Alexander	Hunold	
104	Bruce	Ernst	
105	David	Austin	
106	Valli	Pataballa	
107	Diana	Lorentz	
108	Nancy	Greenberg	
109	Daniel	Faviet	
110	John	Chen	
111	Ismael	Sciarra	
112	Jose Manuel	Urman	
113	Luis	Popp	
114	Den	Raphaely	ST_CLERK
115	Alexander	Khoo	
116	Shelli	Baida	
117	Sigal	Tobias	
118	Guy	Himuro	
119	Karen	Colmenares	
120	Matthew	Weiss	
121	Adam	Fripp	
122	Payam	Kaufling	ST_CLERK
123	Shanta	Vollman	
124	Kevin	Mourgos	
125	Julia	Nayer	
126	Irene	Mikkilineni	
127	James	Landry	
128	Steven	Markle	
129	Laura	Bissot	
130	Mozhe	Atkinson	
131	James	Marlow	
132	TJ	Olson	
133	Jason	Mallin	
134	Michael	Rogers	
135	Ki	Gee	
136	Hazel	Philtanker	
137	Renske	Ladwig	
138	Stephen	Stiles	
139	John	Seo	
140	Joshua	Patel	
141	Trenna	Rajs	
142	Curtis	Davies	
143	Randall	Matos	
144	Peter	Vargas	
145	John	Russell	
146	Karen	Partners	
147	Alberto	Errazuriz	
148	Gerald	Cambrault	
149	Eleni	Zlotkey	

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150	Peter	Tucker	
151	David	Bernstein	
152	Peter	Hall	
153	Christopher	Olsen	
154	Nanette	Cambrault	
155	Oliver	Tuvault	
156	Janette	King	
157	Patrick	Sully	
158	Allan	McEwen	
159	Lindsey	Smith	
160	Louise	Doran	
161	Sarath	Sewall	
162	Clara	Vishney	
163	Danielle	Greene	
164	Mattea	Marvins	
165	David	Lee	
166	Sundar	Ande	
167	Amit	Banda	
168	Lisa	Ozer	
169	Harrison	Bloom	
170	Tayler	Fox	
171	William	Smith	
172	Elizabeth	Bates	
173	Sundita	Kumar	
174	Ellen	Abel	
175	Alyssa	Hutton	
176	Jonathon	Taylor	SA_MAN
176	Jonathon	Taylor	SA_REP
177	Jack	Livingston	
178	Kimberely	Grant	
179	Charles	Johnson	
180	Winston	Taylor	
181	Jean	Fleaur	
182	Martha	Sullivan	
183	Girard	Geoni	
184	Nandita	Sarchand	
185	Alexis	Bull	
186	Julia	Dellinger	
187	Anthony	Cabrio	
188	Kelly	Chung	
189	Jennifer	Dilly	
190	Timothy	Gates	
191	Randall	Perkins	
192	Sarah	Bell	
193	Britney	Everett	
194	Samuel	McCain	
195	Vance	Jones	
196	Alana	Walsh	
197	Kevin	Feeney	
198	Donald	OConnell	
199	Douglas	Grant	
200	Jennifer	Whalen	AC_ACCOUNT
200	Jennifer	Whalen	AD_ASST
201	Michael	Hartstein	MK_REP
202	Pat	Fay	
203	Susan	Mavris	
204	Hermann	Baer	
205	Shelley	Higgins	
206	William	Gietz	

110 rows selected.

27. Joining the `jobs` and `job_history` tables, display the job title and employee ID for all jobs, whether or not they have job history.

JOB_TITLE	EMPLOYEE_ID
Public Accountant	101
Public Accountant	200
Accounting Manager	101
Administration Assistant	200
President	
Administration Vice President	
Accountant	
Finance Manager	
Human Resources Representative	
Programmer	102
Marketing Manager	
Marketing Representative	201
Public Relations Representative	
Purchasing Clerk	
Purchasing Manager	
Sales Manager	176
Sales Representative	176
Shipping Clerk	
Stock Clerk	114
Stock Clerk	122
Stock Manager	

28. Modify the above query to restrict the result set to jobs whose minimum salary exceeds 9000.

JOB_TITLE	EMPLOYEE_ID
President	
Administration Vice President	
Sales Manager	176

29. Joining the `jobs` and `job_history` tables, display the job title, employee ID, and starting date for all employees who started in that job after Jan. 1, 1998. Include jobs **even if** they do not have any history.

JOB_TITLE	EMPLOYEE_ID	START_DATE
Public Accountant	200	01-JUL-2002
Accounting Manager	101	28-OCT-2001
Administration Assistant		
President		
Administration Vice President		
Accountant		
Finance Manager		
Human Resources Representative		
Programmer	102	13-JAN-2001
Marketing Manager		
Marketing Representative	201	17-FEB-2004
Public Relations Representative		
Purchasing Clerk		
Purchasing Manager		
Sales Manager	176	01-JAN-2007
Sales Representative	176	24-MAR-2006
Shipping Clerk		
Stock Clerk	114	24-MAR-2006
Stock Clerk	122	01-JAN-2007
Stock Manager		

30. Modify the above query: remove the start date restriction and also include the employee's first and last names.

JOB_TITLE	EMPLOYEE_ID	START_DATE	FIRST_NAME	LAST_NAME
Accounting Manager	101	28-OCT-2001	Neena	Kochhar
Public Accountant	101	21-SEP-1997	Neena	Kochhar
Programmer	102	13-JAN-2001	Lex	De Haan
Stock Clerk	114	24-MAR-2006	Den	Raphaely
Stock Clerk	122	01-JAN-2007	Payam	Kaufling
Sales Representative	176	24-MAR-2006	Jonathon	Taylor
Sales Manager	176	01-JAN-2007	Jonathon	Taylor
Administration Assistant	200	17-SEP-1995	Jennifer	Whalen
Public Accountant	200	01-JUL-2002	Jennifer	Whalen
Marketing Representative	201	17-FEB-2004	Michael	Hartstein
Stock Manager				
Shipping Clerk				
Purchasing Manager				
Purchasing Clerk				
Public Relations Representative				
Marketing Manager				
Human Resources Representative				
Finance Manager				
Accountant				
Administration Vice President				
President				



Bonus Section
Do IF you
have time...

31. Joining the employees, job_history, and jobs tables, display the job title, employee ID, start date, and employee first and last names for ALL employees, whether or not they have any job history.

Hint: You will need to change the most important table.

JOB_TITLE	EMPLOYEE_ID	START_DATE	FIRST_NAME	LAST_NAME
Administration Assistant	200	17-SEP-1995	Jennifer	Whalen
Accounting Manager	101	28-OCT-2001	Neena	Kochhar
Public Accountant	200	01-JUL-2002	Jennifer	Whalen
Public Accountant	101	21-SEP-1997	Neena	Kochhar
Sales Manager	176	01-JAN-2007	Jonathon	Taylor
Sales Representative	176	24-MAR-2006	Jonathon	Taylor
Stock Clerk	122	01-JAN-2007	Payam	Kaufling
Stock Clerk	114	24-MAR-2006	Den	Raphaely
Programmer	102	13-JAN-2001	Lex	De Haan
Marketing Representative	201	17-FEB-2004	Michael	Hartstein
			Douglas	Grant
			Allan	McEwen
			Alberto	Errazuriz
			Steven	King
			Mozhe	Atkinson
			Amit	Banda
			James	Landry
			William	Smith
			Luis	Popp
			Sarah	Bell
			TJ	Olson
			Ismael	Sciarra
			Guy	Himuro
			John	Russell
			Valli	Pataballa
			Eleni	Zlotkey
			Donald	OConnell
			Jack	Livingston
			Daniel	Faviet
			Julia	Dellinger
			Sarath	Sewall
			Christopher	Olsen
			John	Chen
			Jennifer	Dilly
			Jose Manuel	Urman
			Pat	Fay
			Mattea	Marvins
			Kevin	Mourgos
			William	Gietz
			Sundita	Kumar
			Stephen	Stiles
			Gerald	Cambrault
			David	Lee
			Jean	Fleaur
			Trenna	Rajs
			Kimberely	Grant
			Lisa	Ozer
			Joshua	Patel
			Michael	Rogers

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Steven	Markle
Alexis	Bull
Diana	Lorentz
Oliver	Tuvault
Louise	Doran
Susan	Mavris
Hermann	Baer
David	Bernstein
Sundar	Ande
Harrison	Bloom
Timothy	Gates
James	Marlow
Lindsey	Smith
Ki	Gee
Charles	Johnson
Sigal	Tobias
Anthony	Cabrio
Britney	Everett
Matthew	Weiss
Samuel	McCain
Nancy	Greenberg
Janette	King
Martha	Sullivan
Patrick	Sully
Ellen	Abel
Vance	Jones
Peter	Vargas
Alexander	Khoo
Shelli	Baida
Kelly	Chung
David	Austin
Danielle	Greene
Laura	Bissot
Shanta	Vollman
Alyssa	Hutton
Tayler	Fox
Julia	Nayer
Irene	Mikkilineni
John	Seo
Renske	Ladwig
Peter	Hall
Winston	Taylor
Girard	Geoni
Karen	Colmenares
Randall	Perkins
Alexander	Hunold
Randall	Matos
Shelley	Higgins
Curtis	Davies
Peter	Tucker
Kevin	Feeney
Elizabeth	Bates
Nandita	Sarchand
Bruce	Ernst
Karen	Partners
Alana	Walsh
Nanette	Cambrault
Hazel	Philtanker
Jason	Mallin
Adam	Fripp
Clara	Vishney

110 rows selected.