Tables Used in the Course
EMPLOYEES,
DEPARTMENTS,
JOB_GRADES

The following main tables are used in this course:
• EMPLOYEES table, which gives details of all the employees
• DEPARTMENTS table, which gives details of all the departments
• JOB_GRADES table, which gives details of salaries for various grades

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	HIRE_DATE	JOB_ID	SALARY	COMMISSION_PCT
100	Steven	King	SKING	17-JUN-87	AD_PRES	24000	
101	Neena	Kochhar	NKOCHHAR	21-SEP-89	AD_VP	17000	
102	Lex	De Haan	LDEHAAN	13-JAN-93	AD_VP	17000	
103	Alexander	Hunold	AHUNOLD	03-JAN-90	IT_PROG	9000	
104	Bruce	Ernst	BERNST	21-MAY-91	IT_PROG	6000	
107	Diana	Lorentz	DLORENTZ	07-FEB-99	IT_PROG	4200	
124	Kevin	Mourgos	KMOURGOS	16-NOV-99	ST_MAN	5800	
141	Trenna	Rajs	TRAJS	17-OCT-95	ST_CLERK	3500	
142	Curtis	Davies	CDAVIES	29-JAN-97	ST_CLERK	3100	
143	Randall	Matos	RMATOS	15-MAR-98	ST_CLERK	2600	
144	Peter	Vargas	PVARGAS	09-JUL-98	ST_CLERK	2500	
149	Eleni	Zlotkey	EZLOTKEY	29-JAN-00	SA_MAN	10500	2
174	Ellen	Abel	EABEL	11-MAY-96	SA_REP	11000	3
176	Jonathon	Taylor	JTAYLOR	24-MAR-98	SA_REP	8600	2
178	Kimberely	Grant	KGRANT	24-MAY-99	SA_REP	7000	15
200	Jennifer	Whalen	JWHALEN	17-SEP-87	AD_ASST	4400	
201	Michael	Hartstein	MHARTSTE	17-FEB-96	MK_MAN	13000	
202	Pat	Fay	PFAY	17-AUG-97	MK_REP	6000	
205	Shelley	Higgins	SHIGGINS	07-JUN-94	AC_MGR	12000	
206	William	Gietz	WGIETZ	07-JUN-94	AC_ACCOUNT	8300	

DEPARTMENT_ID	DEPARTMENT_NAME	MANAGER_ID	LOCATION_ID
10	Administration	200	1700
20	Marketing	201	1800
50	Shipping	124	1500
60	IT	103	1400
80	Sales	149	2500
90	Executive	100	1700
110	Accounting	205	1700
190	Contracting		1700

GRA	LOWEST_SAL	HIGHEST_SAL
A	1000	2999
B	3000	5999
C	6000	9999
D	10000	14999
E	15000	24999
F	25000	40000

1-Writing Basic SQL SELECT Statements

Objectives

After completing this lesson, you should be able to
do the following:
• List the capabilities of SQL SELECT statements
• Execute a basic SELECT statement
• Differentiate between SQL statements and iSQL*Plus commands

Capabilities of SQL SELECT Statements
Projection   Selection   Join

A SELECT statement retrieves information from the database. Using a
SELECT statement, you can do the following:
• Projection: You can use the projection capability in SQL to choose the columns in a table that you want returned by your query. You can choose as few or as many co lumns of the table as you require.
• Selection: You can use the selection capability in SQL to choose the rows in a table that you wantreturned by a query. You can use various criteria to restrict the rows that you see.
• Joining: You can use the join capability in SQL to bring together data that is stored in different tables by creating a link between them. You learn more about joins in a later lesson.

Basic SELECTStatement

SELECT *|{[DISTINCT] column | expression [alias],...} FROM
table;
•SELECT identifies what columns
• FROM identifies which table
Selecting All Columns
SELECT * FROM   departments;

SELECT   department_id,   department_name,   manager_id,   location_   id   FROM
departments;

DEPARTMENT_ID	LOCATION_ID
10	1700
20	1800
50	1500
60	1400
80	2500
90	1700
110	1700
190	1700

8 rows selected.

LOCATION_ID	DEPARTMENT_ID
1700	10
1800	20
1500	50

8 rows selected.

Selecting Specific Columns
SELECT department_id, location_id FROM departments;
Arithmetic Expressions
Create expressions with number and date data by
using arithmetic operators.

Operator	Description
+	Add
-	Subtract
*	Multiply
/	Divide

Using Arithmetic Operators
SELECT last_name, salary, salary + 300 FROM employees;

Operator Precedence

/ *+ _•

Multiplication and division take priority over addition and subtraction.
•Operators of the same priority are evaluated from
left to right.
•Parentheses are used to force prioritized evaluation and to clarify statements.

Operator Precedence
SELECT last_name, salary, 12*salary+100 FROM employees;

LAST_NAME	SALARY	12*(SALARY+100)
King	24000	289200
Kochhar	17000	205200
De Haan	17000	205200
Hunold	9000	109200
Ernst	6000	73200
Lorentz	4200	51600
Gietz	8300	100800

20 rows selected.

Using Parentheses
SELECT last_name, salary, 12*(salary+100) FROM   employees;

LAST_NAME	JOB_ID	SALARY	COMMISSION_PCT
King	AD_PRES	24000	
Kochhar	AD_VP	17000	
Zlotkey	SA_MAN	10500	.2
Abel	SA_REP	11000	.3
Taylor	SA_REP	8600	.2
Higgins	AC_MGR	12000	
Gietz	AC_ACCOUNT	8300	

20 rows selected.

Defining a Null Value
• A null is a value that is unavailable, unassigned,
unknown, or inapplicable.
• A null is not the same as zero or a blank space.
SELECT last_name, job_id, salary, commission_pct
FROM   employees;

LAST_NAME	12*SALARY*COMMISSION_PCT
King	
Kochhar	
Zlotkey	25200
Abel	39600
Taylor	20640
Higgins	
Gietz	

20 rows selected.

Null Values in Arithmetic Expressions
Arithmetic expressions containing a null value
evaluate to null.
SELECT last_name, 12*salary*commission_pct FROM   employees;

Defining a Column Alias
A column alias:
•Renames a column heading
• Is useful with calculations
• Immediately follows the column name: there can

also be the optional AS keyword between the column name and alias
• Requires double quotation marks if it contains
spaces or special characters or is case sensitive

NAME	COMM
King	
Kochhar	
Higgins	
Gietz	

20 rows selected

Name	Annual Salary
King	288000
Kochhar	204000
Higgins	144000
Gietz	99600

20 rows selected.

Using Column Aliases
SELECT last_name AS name, commission_pct comm
FROM   employees;
SELECT last_name "Name",salary*12 "Annual Salary"
FROM   employees;
A concatenation operator:
• Concatenates columns or character strings to
other columns
• Is represented by two vertical bars ($\|$)
• Creates a resultant column that is a character
expression

Employees
KingAD_PRES
KochharAD_VP
De HaanAD_VP
HunoldIT_PROG
GietzAC_ACCOUNT

20 rows selected

SELECT last_name||job_id AS "Employees" FROM employees;

Using the Concatenation Operator
Literal Character Strings
• A literal value is a character, a number, or a date
included in the SELECT list.
• Date and character literal values must be enclosed
within single quotation marks.
• Each character string is output once for each
row returned.

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Employee Details
King is a AD_PRES
Kochhar is a AD_VP
De Haan is a AD_VP
Hunold is a IT_PROG
Ernst is a IT_PROG
Gietz is a AC_ACCOUNT

20 rows selected.

MONTHLY
King: 1 Month salary = 24000
Kochhar: 1 Month salary = 17000
De Haan: 1 Month salary = 17000
Hunold: 1 Month salary = 9000
Ernst: 1 Month salary = 6000
Lorentz: 1 Month salary = 4200
Mourgos: 1 Month salary = 5800
Rajs: 1 Month salary = 3500

20 rows selected.

Using Literal Character Strings

SELECT last_name ||' is a '||job_id AS "Employee Details"
FROM   employees;

DEPARTMENT_ID
90
90
90
60
60
60
50
50

20 rows selected.

Duplicate Rows

The default display of queries is all rows, including duplicate rows.

SELECT department_id FROM   employees;

DEPARTMENT_ID
10
20
50
60
80
90
110

8 rows selected.

DEPARTMENT_ID	JOB_ID
10	AD_ASST
20	MK_MAN
20	MK_REP
50	ST_CLERK
50	ST_MAN
60	IT_PROG
80	SA_MAN
80	SA_REP

13 rows selected.

Eliminating Duplicate Rows
Eliminate duplicate rows by using the
DISTINCT keyword in the SELECT clause.
SELECT DISTINCT department_id FROM   employees;

SQL and *i*SQL*Plus Interaction
SQL statements iSQL*Plus Oracle Internet server Browser
Query results iSQL*Plus commands Formatted report Client
SQL and iSQL*Plus SQL is a command language for communication with the Oracle server f rom any tool or application. Oracle SQL contains many extensions.
iSQL*Plus is an Oracle tool that recognizes and submits SQL statements to the Oracle server for execution and contains its own command language.
Features of SQL
• Can be used by a range of users, including those with little or no programming experience
• Is a nonprocedural language
• Reduces the amount of time required for creating and maintaining systems
• Is an English-like language
Features of iSQL*Plus

• Accessed from a browser
• Accepts ad hoc entry of statements
• Provides online editing for modifying SQL statements
• Controls environmental settings
• Formats query results into a basic report
• Accesses local and remote databases

SQL Statements versus *i*SQL*Plus Commands

 SQL iSQL*Plus
• A language
• An environment
• ANSI standard
• Oracle proprietary
• Keyword cannot be
• Keywords can be abbreviated abbreviated
• Statements manipulate
• Commands do not allow data and table definitions manipulation of values in in the database the database
• Runs on a browser
• Centrally loaded, does not have to be implemented on each machine   SQL iSQL*Plus statements commands
SQL and iSQL*Plus (continued)

Paper-Based Questions

For questions 2–4, circle either True or False.

Practice 1

1. Initiate an iSQL*Plus session using the user ID and password provided by the instructor.

2.iSQL*Plus commands access the database.

True/False

3. The following SELECT statement executes successfully:

SELECT last_name, job_id, salary AS Sal FROM   employees;

True/False

4. The following SELECT statement executes successfully:

SELECT * FROM   job_grades;

True/False

5. There are four coding errors in this statement. Can you identif y them?

SELECT   employee_id, last_name sal x 12 ANNUAL SALARY

FROM   employees;

6. Show the structure of the DEPARTMENTS table. Select all data from the table.

7. Show the structure of the

EMPLOYEES table. Create a query to display the last name, job code, hire

date, and employee number for each employee, with employee number appearing first. Save your SQL statement to a file named lab1_7.sql.

8. Run your query in the file lab1_7.sql.

9. Create a query to display unique job codes from the EMPLOYEES table.

If you have time, complete the following exercises:

10. Copy the statement from lab1_7.sql into the iSQL*Plus Edit window. Name the column headings Emp #,Employee,Job, and Hire Date, respectively. Run your query again.

Employee and Title
King, AD_PRES
Kochhar, AD_VP
De Haan, AD_VP
Hunold, IT_PROG
Ernst, IT_PROG
Lorentz, IT_PROG
Mourgos, ST_MAN
Rajs, ST_CLERK
Davies, ST_CLERK

Gietz, AC_ACCOUNT

20 rows selected.

THE_OUTPUT
100,Steven,King,SKING,515.123.4567,AD_PRES,,17-JUN-87,24000,,90
101,Neena,Kochhar,NKOCHHAR,515.123.4568,AD_VP,100,21-SEP-89,17000,,90
102,Lex,De Haan,LDEHAAN,515.123.4569,AD_VP,100,13-JAN-93,17000,,90
103,Alexander,Hunold,AHUNOLD,590.423.4567,IT_PROG,102,03-JAN-90,9000,,60
104,Bruce,Ernst,BERNST,590.423.4568,IT_PROG,103,21-MAY-91,6000,,60
107,Diana,Lorentz,DLORENTZ,590.423.5567,IT_PROG,103,07-FEB-99,4200,,60
124,Kevin,Mourgos,KMOURGOS,650.123.5234,ST_MAN,100,16-NOV-99,5800,,50
141,Trenna,Rajs,TRAJS,650.121.8009,ST_CLERK,124,17-OCT-95,3500,,50
206,William,Gietz,WGIETZ,515.123.8181,AC_ACCOUNT,205,07-JUN-94,8300,,110

20 rows selected.

11. Display the last name concatenated with the job ID, separated by a comma and space, and name the column Employee and Title.

If you want an extra challenge, complete the following exercise:

12. Create a query to display all the data from the EMPLOYEES table. Separate each column by a comma. Name the column THE_OUTPUT.