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Using SQL*Plus

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Objectives

After completing this appendix, you should be able to do the following:

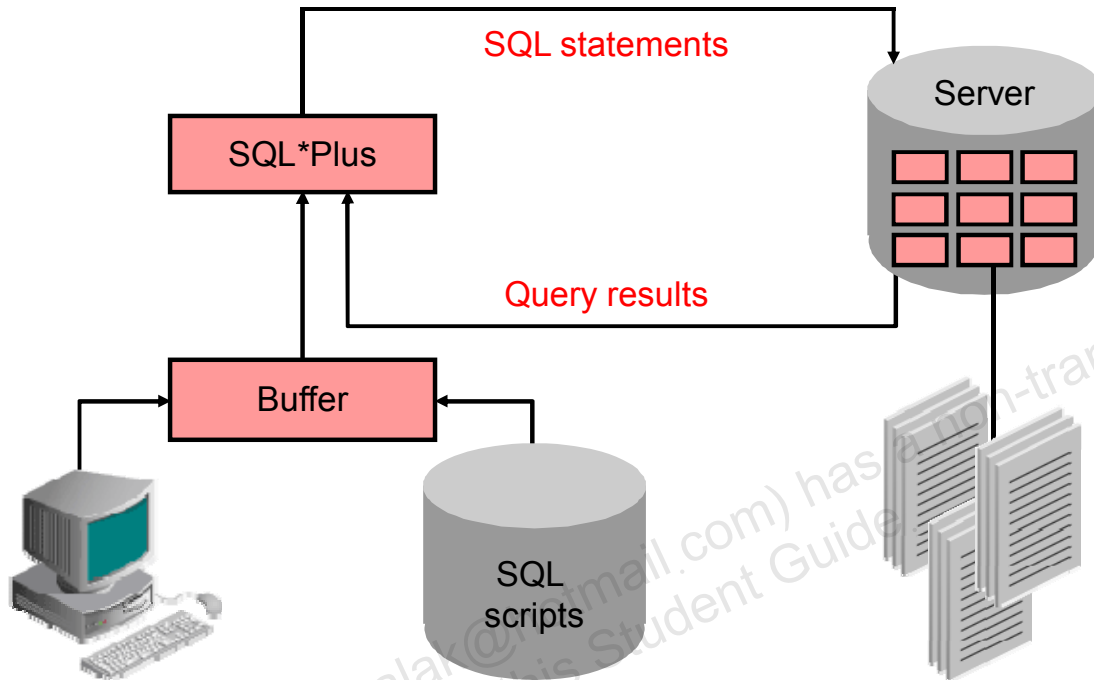
- Log in to SQL*Plus
- Edit SQL commands
- Format the output by using SQL*Plus commands
- Interact with script files

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You might want to create `SELECT` statements that can be used repeatedly. This appendix covers the use of SQL*Plus commands to execute SQL statements. You learn how to format output using SQL*Plus commands, edit SQL commands, and save scripts in SQL*Plus.

SQL and SQL*Plus Interaction



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SQL and SQL*Plus

SQL is a command language that is used for communication with the Oracle server from any tool or application. Oracle SQL contains many extensions. When you enter a SQL statement, it is stored in a part of the memory called the *SQL buffer* and remains there until you enter a new SQL statement. SQL*Plus is an Oracle tool that recognizes and submits SQL statements to the Oracle 9i Server for execution. It 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

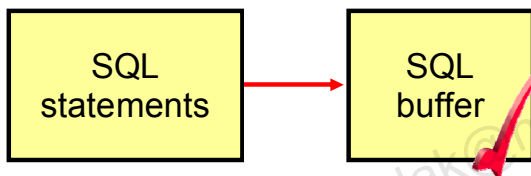
Features of SQL*Plus

- Accepts ad hoc entry of statements
- Accepts SQL input from files
- Provides a line editor for modifying SQL statements
- Controls environmental settings
- Formats query results into basic reports
- Accesses local and remote databases

SQL Statements Versus SQL*Plus Commands

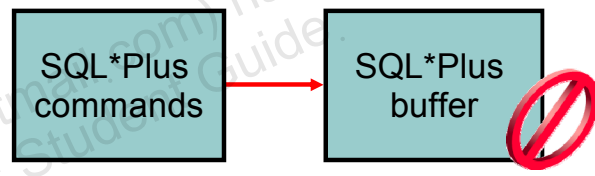
SQL

- A language
- ANSI-standard
- Keywords cannot be abbreviated.
- Statements manipulate data and table definitions in the database.



SQL*Plus

- An environment
- Oracle-proprietary
- Keywords can be abbreviated.
- Commands do not allow manipulation of values in the database.



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The following table compares SQL and SQL*Plus:

SQL	SQL*Plus
Is a language for communicating with the Oracle server to access data	Recognizes SQL statements and sends them to the server
Is based on American National Standards Institute (ANSI)–standard SQL	Is the Oracle-proprietary interface for executing SQL statements
Manipulates data and table definitions in the database	Does not allow manipulation of values in the database
Is entered into the SQL buffer on one or more lines	Is entered one line at a time, not stored in the SQL buffer
Does not have a continuation character	Uses a dash (–) as a continuation character if the command is longer than one line
Cannot be abbreviated	Can be abbreviated
Uses a termination character to execute commands immediately	Does not require termination characters; executes commands immediately
Uses functions to perform some formatting	Uses commands to format data

SQL*Plus: Overview

- Log in to SQL*Plus.
- Describe the table structure.
- Edit your SQL statement.
- Execute SQL from SQL*Plus.
- Save SQL statements to files and append SQL statements to files.
- Execute saved files.
- Load commands from the file to buffer to edit.

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SQL*Plus

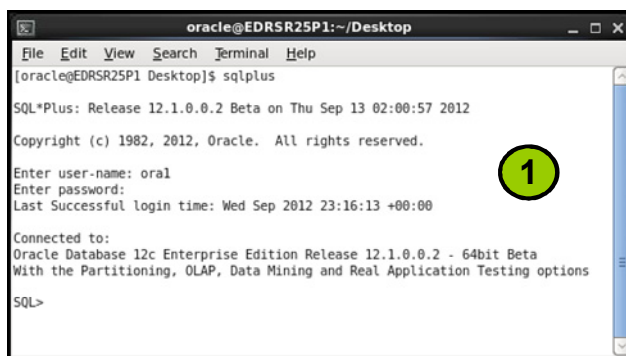
SQL*Plus is an environment in which you can:

- Execute SQL statements to retrieve, modify, add, and remove data from the database
- Format, perform calculations on, store, and print query results in the form of reports
- Create script files to store SQL statements for repeated use in the future

SQL*Plus commands can be divided into the following main categories:

Category	Purpose
Environment	Affect the general behavior of SQL statements for the session
Format	Format query results
File manipulation	Save, load, and run script files
Execution	Send SQL statements from the SQL buffer to the Oracle server
Edit	Modify SQL statements in the buffer
Interaction	Create and pass variables to SQL statements, print variable values, and print messages to the screen
Miscellaneous	Connect to the database, manipulate the SQL*Plus environment, and display column definitions

Logging In to SQL*Plus



```
oracle@EDRSR25P1:~/Desktop
File Edit View Search Terminal Help
[oracle@EDRSR25P1 Desktop]$ sqlplus

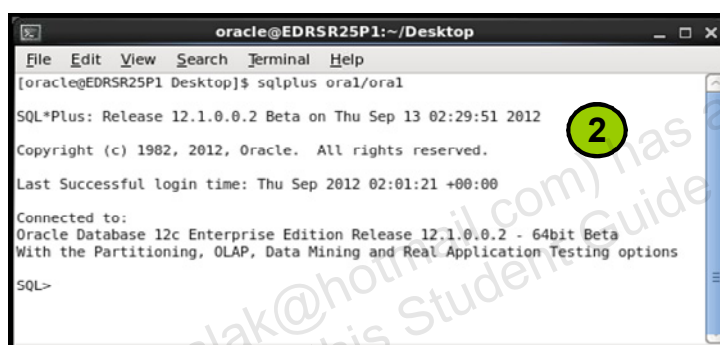
SQL*Plus: Release 12.1.0.0.2 Beta on Thu Sep 13 02:00:57 2012
Copyright (c) 1982, 2012, Oracle. All rights reserved.

Enter user-name: oral
Enter password:
Last Successful login time: Wed Sep 2012 23:16:13 +00:00

Connected to:
Oracle Database 12c Enterprise Edition Release 12.1.0.0.2 - 64bit Beta
With the Partitioning, OLAP, Data Mining and Real Application Testing options

SQL>
```

```
sqlplus [username[/password[@database]]]
```



```
oracle@EDRSR25P1:~/Desktop
File Edit View Search Terminal Help
[oracle@EDRSR25P1 Desktop]$ sqlplus oral/oral

SQL*Plus: Release 12.1.0.0.2 Beta on Thu Sep 13 02:29:51 2012
Copyright (c) 1982, 2012, Oracle. All rights reserved.

Last Successful login time: Thu Sep 2012 02:01:21 +00:00

Connected to:
Oracle Database 12c Enterprise Edition Release 12.1.0.0.2 - 64bit Beta
With the Partitioning, OLAP, Data Mining and Real Application Testing options

SQL>
```

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How you invoke SQL*Plus depends on the type of operating system that you are running Oracle Database on.

To log in from a Linux environment, perform the following steps:

1. Right-click your Linux desktop and select terminal.
2. Enter the `sqlplus` command shown in the slide.
3. Enter the username, password, and database name.

In the syntax:

<i>username</i>	Your database username
<i>password</i>	Your database password (Your password is visible if you enter it here.)
<i>@database</i>	The database connect string

Note: To ensure the integrity of your password, do not enter it at the operating system prompt. Instead, enter only your username. Enter your password at the password prompt.

Displaying the Table Structure

Use the SQL*Plus DESCRIBE command to display the structure of a table:

```
DESC[RIBE] tablename
```

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In SQL*Plus, you can display the structure of a table by using the DESCRIBE command. The result of the command is a display of column names and data types, as well as an indication if a column must contain data.

In the syntax:

tablename The name of any existing table, view, or synonym that is accessible to the user

To describe the DEPARTMENTS table, use the following command:

```
SQL> DESCRIBE DEPARTMENTS
```

Name	Null	Type
-----	-----	-----
DEPARTMENT_ID	NOT NULL	NUMBER(4)
DEPARTMENT_NAME	NOT NULL	VARCHAR2(30)
MANAGER_ID		NUMBER(6)
LOCATION_ID		NUMBER(4)

Displaying the Table Structure

```
DESCRIBE departments
```

Name	Null	Type
DEPARTMENT_ID	NOT NULL	NUMBER (4)
DEPARTMENT_NAME	NOT NULL	VARCHAR2 (30)
MANAGER_ID		NUMBER (6)
LOCATION_ID		NUMBER (4)

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The example in the slide displays information about the structure of the DEPARTMENTS table.
In the result:

- Null: Specifies whether a column must contain data (NOT NULL indicates that a column must contain data.)
- Type: Displays the data type for a column

SQL*Plus Editing Commands

- A[PPEND] *text*
- C[HANGE] / *old* / *new*
- C[HANGE] / *text* /
- CL[EAR] BUFF[ER]
- DEL
- DEL *n*
- DEL *m n*

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SQL*Plus commands are entered one line at a time and are not stored in the SQL buffer.

Command	Description
A[PPEND] <i>text</i>	Adds <i>text</i> to the end of the current line
C[HANGE] / <i>old</i> / <i>new</i>	Changes <i>old</i> text to <i>new</i> in the current line
C[HANGE] / <i>text</i> /	Deletes <i>text</i> from the current line
CL[EAR] BUFF[ER]	Deletes all lines from the SQL buffer
DEL	Deletes current line
DEL <i>n</i>	Deletes line <i>n</i>
DEL <i>m n</i>	Deletes lines <i>m</i> to <i>n</i> inclusive

Guidelines

- If you press Enter before completing a command, SQL*Plus prompts you with a line number.
- You terminate the SQL buffer either by entering one of the terminator characters (semicolon or slash) or by pressing Enter twice. The SQL prompt appears.

SQL*Plus Editing Commands

- I [NPUT]
- I [NPUT] *text*
- L [IST]
- L [IST] *n*
- L [IST] *m n*
- R [UN]
- *n*
- *n text*
- 0 *text*

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Command	Description
I [NPUT]	Inserts an indefinite number of lines
I [NPUT] <i>text</i>	Inserts a line consisting of <i>text</i>
L [IST]	Lists all lines in the SQL buffer
L [IST] <i>n</i>	Lists one line (specified by <i>n</i>)
L [IST] <i>m n</i>	Lists a range of lines (<i>m</i> to <i>n</i>) inclusive
R [UN]	Displays and runs the current SQL statement in the buffer
<i>n</i>	Specifies the line to make the current line
<i>n text</i>	Replaces line <i>n</i> with <i>text</i>
0 <i>text</i>	Inserts a line before line 1

Note: You can enter only one SQL*Plus command for each SQL prompt. SQL*Plus commands are not stored in the buffer. To continue a SQL*Plus command on the next line, end the first line with a hyphen (-).

Using LIST, n, and APPEND

```
LIST
 1  SELECT last_name
 2*  FROM    employees
```

```
1
 1*  SELECT last_name
```

```
A , job_id
 1*  SELECT last_name, job_id
```

```
LIST
 1  SELECT last_name, job_id
 2*  FROM    employees
```

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- Use the `L[IST]` command to display the contents of the SQL buffer. The asterisk (*) beside line 2 in the buffer indicates that line 2 is the current line. Any edits that you made apply to the current line.
- Change the number of the current line by entering the number (n) of the line that you want to edit. The new current line is displayed.
- Use the `A[PPEND]` command to add text to the current line. The newly edited line is displayed. Verify the new contents of the buffer by using the `LIST` command.

Note: Many SQL*Plus commands, including `LIST` and `APPEND`, can be abbreviated to just their first letter. `LIST` can be abbreviated to `L`; `APPEND` can be abbreviated to `A`.

Using the CHANGE Command

```
LIST
1* SELECT * from employees
```

```
c/employees/departments
1* SELECT * from departments
```

```
LIST
1* SELECT * from departments
```

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- Use `L[IST]` to display the contents of the buffer.
- Use the `C[HANGE]` command to alter the contents of the current line in the SQL buffer. In this case, replace the `employees` table with the `departments` table. The new current line is displayed.
- Use the `L[IST]` command to verify the new contents of the buffer.

SQL*Plus File Commands

- `SAVE filename`
- `GET filename`
- `START filename`
- `@ filename`
- `EDIT filename`
- `SPOOL filename`
- `EXIT`

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SQL statements communicate with the Oracle server. SQL*Plus commands control the environment, format query results, and manage files. You can use the commands described in the following table:

Command	Description
<code>SAV[E] filename [.ext]</code> <code>[REP[LACE] APP[END]]</code>	Saves the current contents of the SQL buffer to a file. Use <code>APPEND</code> to add to an existing file; use <code>REPLACE</code> to overwrite an existing file. The default extension is <code>.sql</code> .
<code>GET filename [.ext]</code>	Writes the contents of a previously saved file to the SQL buffer. The default extension for the file name is <code>.sql</code> .
<code>STA[RT] filename [.ext]</code>	Runs a previously saved command file
<code>@ filename</code>	Runs a previously saved command file (same as <code>START</code>)
<code>ED[IT]</code>	Invokes the editor and saves the buffer contents to a file named <code>afiedt.buf</code>
<code>ED[IT] [filename [.ext]]</code>	Invokes the editor to edit the contents of a saved file
<code>SPO[OL] [filename [.ext]]</code> <code>OFF OUT]</code>	Stores query results in a file. <code>OFF</code> closes the spool file. <code>OUT</code> closes the spool file and sends the file results to the printer.
<code>EXIT</code>	Quits SQL*Plus

Using the SAVE and START Commands

```
LIST
1  SELECT last_name, manager_id, department_id
2*  FROM employees
```

```
SAVE my_query
Created file my_query
```

```
START my_query

LAST_NAME                MANAGER_ID DEPARTMENT_ID
-----
King                      90
Kochhar                   100      90
...
107 rows selected.
```

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SAVE

Use the **SAVE** command to store the current contents of the buffer in a file. Thus, you can store frequently used scripts for use in the future.

START

Use the **START** command to run a script in SQL*Plus. You can also, alternatively, use the symbol **@** to run a script.

@my_query

SERVEROUTPUT Command

- Use the `SET SERVEROUT [PUT]` command to control whether to display the output of stored procedures or PL/SQL blocks in SQL*Plus.
- The `DBMS_OUTPUT` line length limit is increased from 255 bytes to 32767 bytes.
- The default size is now unlimited.
- Resources are not pre-allocated when `SERVEROUTPUT` is set.
- Because there is no performance penalty, use `UNLIMITED` unless you want to conserve physical memory.

```
SET SERVEROUT [PUT] {ON | OFF} [SIZE {n | UNL[IMITED]}]  
[FOR [MAT] {WRA[PPED] | WOR[D_WRAPPED] | TRU[NCATED]}]
```

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Most of the PL/SQL programs perform input and output through SQL statements, to store data in database tables or query those tables. All other PL/SQL input/output is done through APIs that interact with other programs. For example, the `DBMS_OUTPUT` package has procedures, such as `PUT_LINE`. To see the result outside of PL/SQL requires another program, such as SQL*Plus, to read and display the data passed to `DBMS_OUTPUT`.

SQL*Plus does not display `DBMS_OUTPUT` data unless you first issue the SQL*Plus command `SET SERVEROUTPUT ON` as follows:

```
SET SERVEROUTPUT ON
```

Notes

- `SIZE` sets the number of bytes of the output that can be buffered within the Oracle Database server. The default is `UNLIMITED`. `n` cannot be less than 2000 or greater than 1,000,000.
- For additional information about `SERVEROUTPUT`, see *Oracle Database PL/SQL User's Guide and Reference 12c*.

Using the SQL*Plus SPOOL Command

```
SPOOL [file_name [.ext] [CRE[ATE] | REP[LACE] |  
APP[END]] | OFF | OUT]
```

Option	Description
file_name [.ext]	Spools output to the specified file name
CRE[ATE]	Creates a new file with the name specified
REP[LACE]	Replaces the contents of an existing file. If the file does not exist, REPLACE creates the file.
APP[END]	Adds the contents of the buffer to the end of the file that you specify
OFF	Stops spooling
OUT	Stops spooling and sends the file to your computer's standard (default) printer

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The SPOOL command stores query results in a file or optionally sends the file to a printer. The SPOOL command has been enhanced. You can now append to, or replace an existing file, where previously you could use SPOOL only to create (and replace) a file. REPLACE is the default.

To spool the output generated by commands in a script without displaying the output on screen, use SET TERMOUT OFF. SET TERMOUT OFF does not affect the output from commands that run interactively.

You must use quotation marks around file names that contain white space. To create a valid HTML file using SPOOL APPEND commands, you must use PROMPT or a similar command to create the HTML page header and footer. The SPOOL APPEND command does not parse HTML tags. SET SQLPLUSCOMPAT[IBILITY] to 9.2 or earlier to disable the CREATE, APPEND, and SAVE parameters.

Using the AUTOTRACE Command

- It displays a report after the successful execution of SQL DML statements such as SELECT, INSERT, UPDATE, or DELETE.
- The report can now include execution statistics and the query execution path.

```
SET AUTOT[RACE] {ON | OFF | TRACE[ONLY]} [EXP[LAIN]]  
[STAT[ISTICS]]
```

```
SET AUTOTRACE ON  
-- The AUTOTRACE report includes both the optimizer  
-- execution path and the SQL statement execution  
-- statistics
```

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EXPLAIN shows the query execution path by performing an EXPLAIN PLAN. STATISTICS displays SQL statement statistics. The formatting of your AUTOTRACE report may vary depending on the version of the server to which you are connected and the configuration of the server. The DBMS_XPLAN package provides an easy way to display the output of the EXPLAIN PLAN command in several predefined formats.

Notes

- For additional information about the package and subprograms, refer to *Oracle Database PL/SQL Packages and Types Reference 12c*.
- For additional information about the EXPLAIN PLAN, refer to *Oracle Database SQL Reference 12c*.
- For additional information about Execution Plans and the statistics, refer to *Oracle Database Performance Tuning Guide 12c*.

Summary

In this appendix, you should have learned how to use SQL*Plus as an environment to do the following:

- Execute SQL statements
- Edit SQL statements
- Format the output
- Interact with script files

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SQL*Plus is an execution environment that you can use to send SQL commands to the database server and to edit and save SQL commands. You can execute commands from the SQL prompt or from a script file.