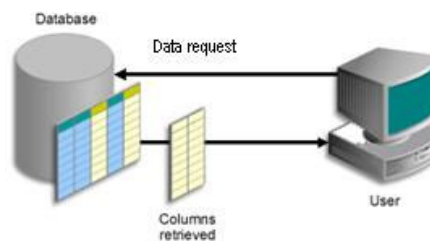


Chapter 2

SQL: The Basics

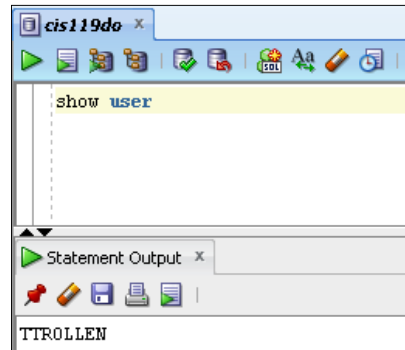
The SQL Execution Environment

- Client/Server Environment
 - Front end
 - presentation of data to user
 - Back end
 - the database
- Oracle Database Server
 - DBMS that runs on a server
 - supported on dozens of OS platforms
- Client software
 - sends SQL statements and other commands to a database and receives/display results
 - SQL Developer
 - SQL*Plus (Lab 2.3, we skipped)
 - many SQL*Plus commands are supported in SQL Developer



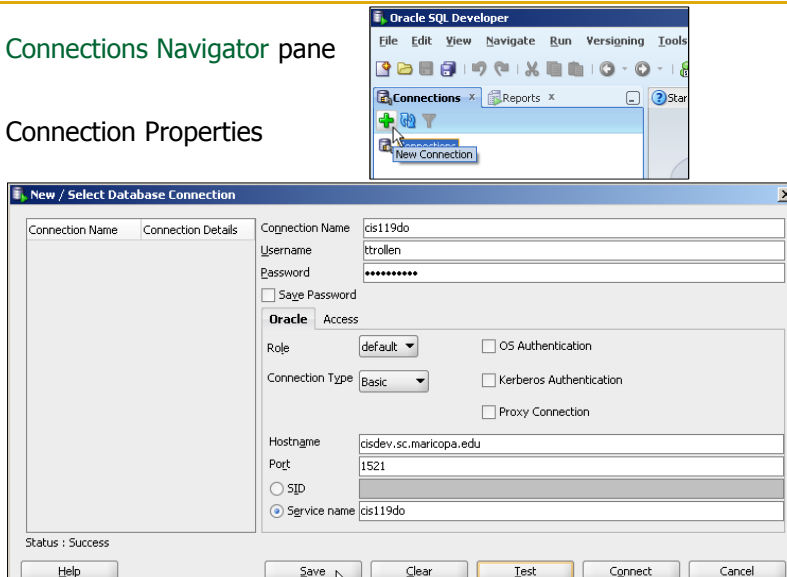
Schema

- A collection of objects owned by a user account
 - when you **connect** to a database, you login to your schema
- SHOW USER
 - SQL*Plus command to verify who the current user is
 - i.e., which schema you're logged into



Creating a Connection for SQL Developer

- Connections Navigator pane
- Connection Properties



Exploring Database Objects

- Database node (cis119do)
 - nodes for each type of object
 - expandable to show user's own objects
 - select a specific object to view **tabs** containing objects details

The screenshot shows the Oracle SQL Developer interface with the 'ARTICLE' table selected in the 'Data' tab. The table structure is displayed as follows:

COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
ARTICLENUM	NUMBER (4,0)	No	(null)	1	(null)
TITLE	VARCHAR2 (50 BYTE)	No	(null)	2	(null)
TYPE	CHAR (3 BYTE)	Yes	(null)	3	(null)
ISSUE	DATE	Yes	(null)	4	(null)
LENGTH	NUMBER (5,0)	Yes	(null)	5	(null)
WRITERID	CHAR (4 BYTE)	No	(null)	6	(null)

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SQL Developer Worksheet

- Enter SQL statements and SQL*Plus commands
- Can have multiple SQL Worksheets
- Run Statement (F9)
 - executes the current statement
 - results and error messages appear in **Results pane**
 - resizable columns
- Run Script (F5)
 - executes all statements in the worksheet as a batch
 - results and error messages appear in **Script Output pane**

The screenshot shows the Oracle SQL Developer interface with a SQL worksheet. The query entered is `select * from type;` and the results are displayed in the 'Query Result' pane:

	TYPE	DESCR
1	ADV	Advertising
2	BUS	Business
3	EXP	Expose
4	FNBK	Financial Market
5	INT	International
6	ITV	Interview
7	LAW	Law
8	MON	Monetary
9	POL	Political
10	STA	Statistical
11	TEC	Technology

Run Statement (F9) vs. Run Script (F5)

The image shows three screenshots of SQL Developer illustrating the difference between running a statement and running a script.

- Left Screenshot (Run Statement):** Shows the 'Run Statement (Ctrl+Enter)' button being clicked. The SQL editor contains three separate SELECT statements. The 'Query Result' window shows a table with 11 rows, each with a 'TYPE' and 'DESCR' column.
- Middle Screenshot (Run Script):** Shows the 'Run Script (F5)' button being clicked. The SQL editor contains the same three SELECT statements. The 'Script Output' window shows the execution of all three statements sequentially, resulting in 30 rows selected.
- Right Screenshot (Error):** Shows the 'Run Script (F5)' button being clicked. The SQL editor contains the same three SELECT statements. The 'Script Output' window shows an error starting at line 2 in the command: 'Error starting at line 2 in command: SELECT * FROM article'. The error message is: 'ORA-00933: SQL command not properly ended 00933. 00000 - "SQL command not properly ended" *Cause:'. This occurs because the 'Run Script' command treats the entire content as a single script, and the first statement is not properly terminated.

Common Data Types (Appendix I)

Datatype	Description
VARCHAR2(<i>size</i>)	Variable-length character data; size required; size must not exceed 4,000
CHAR(<i>size</i>)	Fixed-length character data; size defaults to 1 and cannot exceed 2,000
NUMBER(<i>prec, scale</i>)	Variable-length numeric data; fixed and floating point; precision is total size, scale is digits to right of decimal point
DATE	Date/time values; range from Jan 1, 4712 BC to Dec 31, 9999 AD

Other Data Types (Appendix I)

Datatype	Description
TIMESTAMP	Date/time values with higher precision and timezone information
ROWID	Hexadecimal value representing the unique address of a row in a table
CLOB	Single-byte character data up to 4GB
LONG	Variable-length character data up to 2GB
RAW BLOB BFILE LONG RAW	Binary datatypes

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DESCRIBE Command

- A SQL*Plus command that shows a table's structure
 - results appear in a **Statement Output** pane
- Lists each field's name, nullability, datatype
- Can be abbreviated as DESC

The screenshot shows a SQL*Plus window titled 'cis119do'. The command 'DESCRIBE writer' is entered in the command window. Below it, the 'Statement Output' pane displays the following table structure:

Name	Null	Type
WRITERID	NOT NULL	CHAR(4)
LN	NOT NULL	VARCHAR2(30)
FN	NOT NULL	VARCHAR2(20)
PHONE		VARCHAR2(14)
LASTCONTACT		DATE
FREELANCER		CHAR(1)

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The SELECT Statement

```
SELECT [DISTINCT | UNIQUE] {*, column [alias],...}
FROM   table;
```

- Used to retrieve columns from one or more tables
- **SELECT** identifies which columns
- **FROM** identifies which table to obtain data from
- Backus-Naur Form syntax diagram (lib, pg 134)
 - [brackets]
 - | vertical bar
 - {braces}
 - ... ellipsis
 - CAPS
 - UNDERLINE

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Capabilities of SQL SELECT Statements

Selection

Table 1

Projection

Table 1

Join

Table 1



Table 2

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Writing SQL Statements

- Can be entered on one or more lines
- Are not case sensitive
 - except for string **literals** (eg: `ln = 'Trollen'`)
- Keywords cannot be abbreviated or split across lines
- Are terminated by a semicolon ;
- Enhance readability by
 - capitalizing KEYWORDS
 - lower case for object names
 - placing each **clause** on a separate line
 - using indentation

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Practice Time

- Show the structure of the article table
- Show all fields for each article
- Show each article's title, date published and number of words

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Eliminating Duplicate Rows

```
SELECT [DISTINCT | UNIQUE] {*, column [alias],...}
FROM table;
```

- By default queries return all rows, even those containing duplicate information
- Use **DISTINCT** to suppress entire duplicate rows

```
SELECT writerid FROM article ORDER BY writerid;

SELECT DISTINCT writerid FROM article ORDER BY writerid;

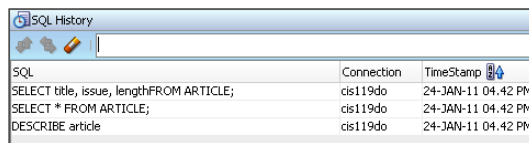
SELECT DISTINCT writerid, title FROM article ORDER BY writerid;
```

- Practice Time
 - Show an unduplicated list of types of articles in the article table

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Using SQL Developer

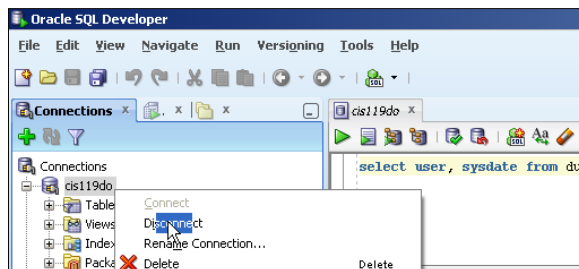
- Statement History (F8)



SQL	Connection	TimeStamp
SELECT title, issue, length FROM ARTICLE;	cis119do	24-JAN-11 04.42 PM
SELECT * FROM ARTICLE;	cis119do	24-JAN-11 04.42 PM
DESCRIBE article	cis119do	24-JAN-11 04.42 PM

- Disconnecting

- closes your session after writing any unsaved data changes to disk



- Exiting SQL Developer

- close the SQL Developer program window, return to Windows

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