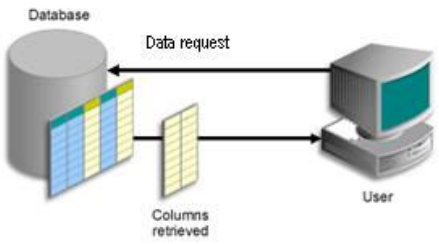
# Chapter 2
# SQL: The Basics

## 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

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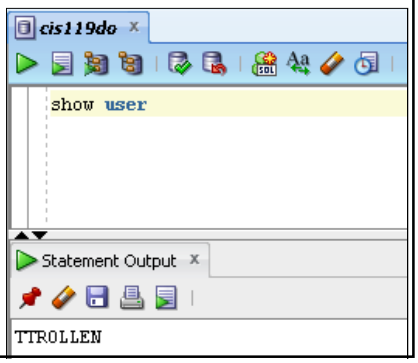
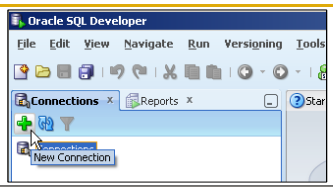
# Schema

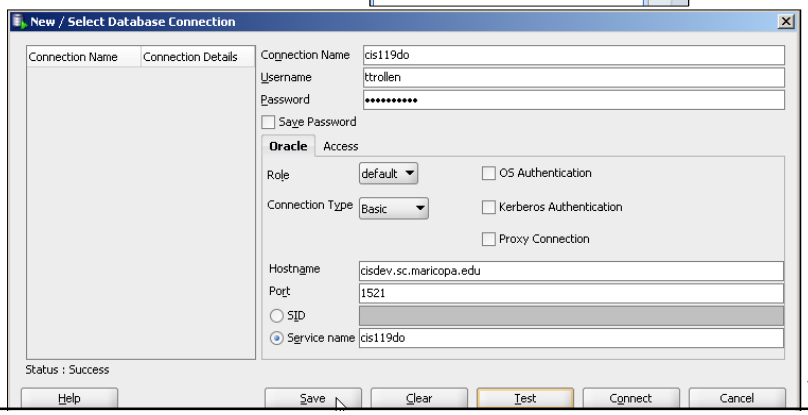
- A collection of objects owned by a user account
  - when you **connect** to a database, you login to your schema
- SHOW USER
  - SQL*Plus command to verify who the current user is
    - i.e., which schema you're logged into




# Creating a Connection for SQL Developer

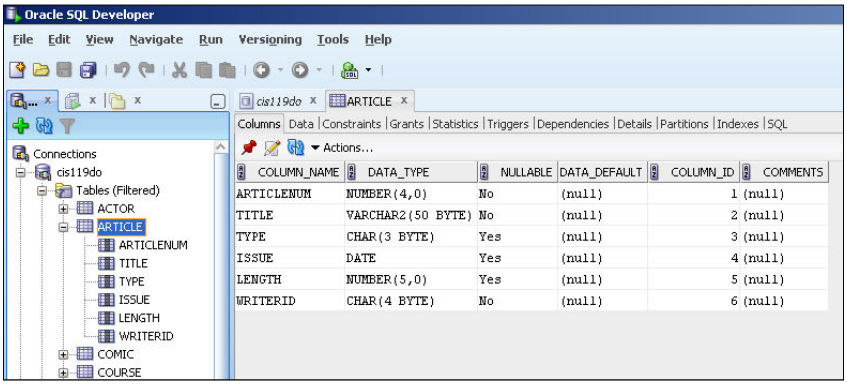
- Connections Navigator pane
- Connection Properties



# 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

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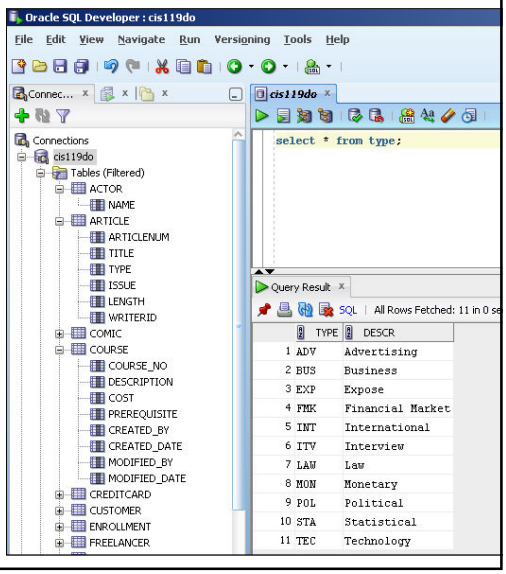
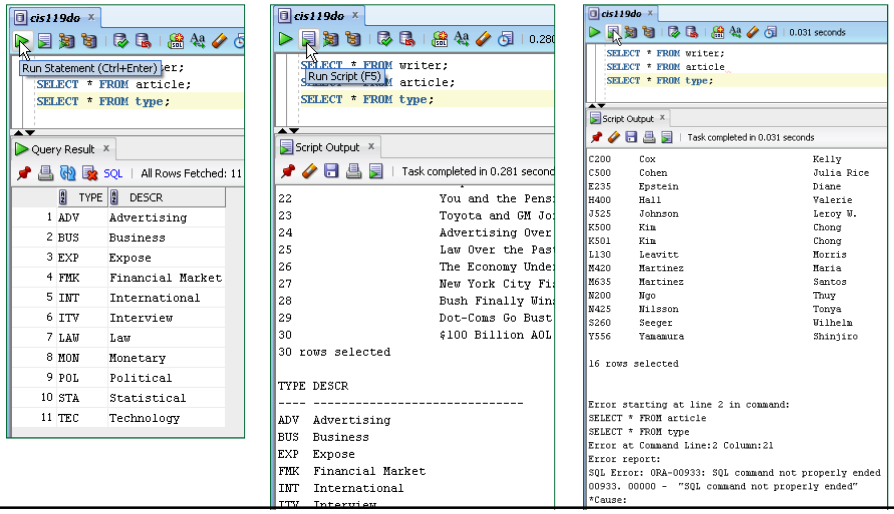
# SQL Developer Worksheet

- 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



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




## Common Data Types (Appendix I)

| Datatype | Description |
|---|---|
| VARCHAR2(*size*) | Variable-length character data; size required; size must not exceed 4,000 |
| CHAR(*size*) | Fixed-length character data; size defaults to 1 and cannot exceed 2,000 |
| NUMBER(*prec,scale)* | 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 |

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## 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<br>BLOB<br>BFILE<br>LONG RAW | Binary datatypes |

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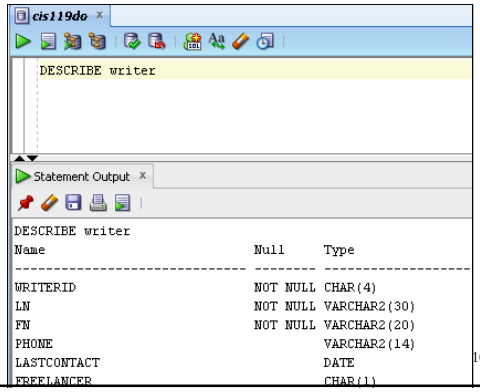
## DESCRIBE Command

- 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

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Lab 2.2

## 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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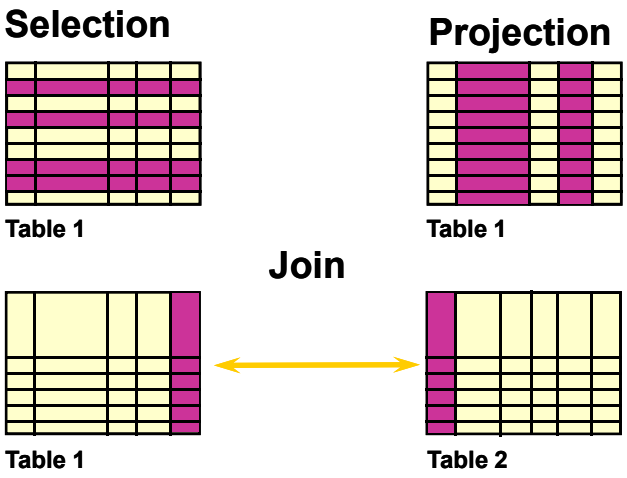
## Capabilities of SQL SELECT Statements

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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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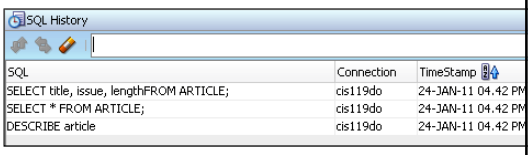
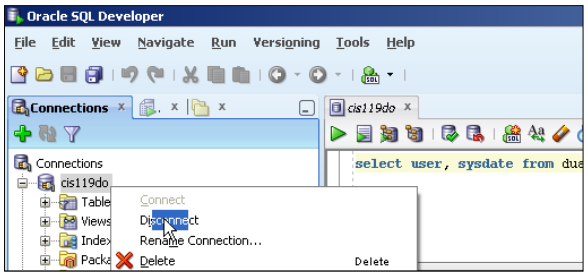
## Using SQL Developer

- Statement History (F8)




- 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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