Structured Query Language (SQL)

- **Data Definition Language (DDL)**
  - CREATE, DROP, ALTER

- **Data Manipulation Language (DML)**
  - SELECT, INSERT, DELETE, UPDATE

- **Data Control Language (DCL)**
  - GRANT, REVOKE
  - COMMIT, ROLLBACK, SAVEPOINT

Oracle SQL Reference


Sample Schema

```sql
products( id, category, description, price )
customers( id, first_name, last_name, address )
orders( id, customer_id, date_ordered, date_shipped )
order_details( order_id, product_id, quantity )
```

- Use descriptive names
- SQL is case-insensitive
  - Use "_" to concatenate multiple words
- Table names use plural form
- Attribute names use singular form
- Foreign key

Constraints

- Column and table constraints
- Constraints w/o names
- Use `ALTER` statement to add or remove constraints

Sequence, Index, and View

- **Sequence**
  - MINVALUE, MAXVALUE
  - nextval, currval
- **Index**
  - UNIQUE
  - Function-based index
- **View**
  - CREATE OR REPLACE VIEW
Simple Selections
- SELECT
  - LIKE
  - REGEXP_LIKE
  - BETWEEN
  - IN
  - IS NULL
- DISTINCT
- ORDER BY
- dual

Joins
- INNER JOIN
- OUTER JOIN
  - LEFT
  - RIGHT
  - FULL
  - (+)

Query Results
- Column alias
  - w/o AS
  - Use double quotes to preserve case and white spaces
- Concatenate columns with ||
- SQL*Plus
  - COLUMN column_name FORMAT
  - column description format a16
  - column price format 9999.9

Date and Time
- Default date format: DD-MMM-YYYY
- TO_DATE( x [, format] )
- TO_CHAR( x [, format] )
- EXTRACT
- INTERVAL

Aggregation Queries
- Aggregation functions
  - COUNT, SUM,
  - MAX, MIN
  - AVG, MEDIAN
  - VARIANCE, STDDEV
- GROUP BY
- HAVING

Set Operations
- UNION, UNION ALL
- INTERSECT
- MINUS

Subqueries
- Subquery that returns
  - Scalar
  - Relation
- Correlated subquery
CASE: switch style

```sql
SELECT product_id,
    CASE category
        WHEN 'MB' THEN 'Motherboard'
        WHEN 'CPU' THEN 'Processor'
        ELSE 'ERROR!' END
FROM products;
```

CASE: if-else style

```sql
SELECT product_id,
    CASE
        WHEN Price > 200 THEN 'Expensive'
        ELSE 'Cheap'
    END
FROM products;
```

Other SQL-Related Topics

- Transactions
- Recursive queries
- Stored procedures and triggers
- Objects and collections
- Analytic functions
- LOB and full text search
- XML data

Exercises

- Read about the Human Resources (HR) sample schema in Oracle Documentation at http://sun.calstatela.edu/~cysun/documentation/oracle/server.101/b10771/toc.htm. You’ll use this schema for Lab 1.