

## CS422 Principles of Database Systems Oracle SQL

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## 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

- ◆ <http://sun.calstatela.edu/~cysun/documentation/oracle/server.101/b10759/toc.htm>

## Sample Schema

```
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
  - n LIKE, REGEXP\_LIKE
  - n BETWEEN
  - n IN
  - n IS NULL
- ◆ DISTINCT
- ◆ ORDER BY
- ◆ dual
- ◆ Joins
  - n INNER JOIN
  - n OUTER JOIN
    - w LEFT
    - w RIGHT
    - w FULL
  - n (+)

## Query Results

- ◆ Column alias
  - n w/o AS
  - n Use *double quotes* to preserve case and white spaces
- ◆ Concatenate columns with ||
- ◆ SQL\*Plus
  - n COLUMN *column\_name* FORMAT
    - w column description format a16
    - w 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
  - n COUNT, SUM,
  - n MAX, MIN
  - n AVG, MEDIAN
  - n VARIANCE, STDDEV
- ◆ GROUP BY
- ◆ HAVING

## Set Operations

- ◆ UNION, UNION ALL
- ◆ INTERSECT
- ◆ MINUS

## Subqueries

- ◆ Subquery that returns
  - n Scalar
  - n Relation
- ◆ Correlated subquery

## CASE: switch style

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

## CASE: if-else style

```
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.