

CS422 Principles of Database Systems Oracle SQL

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Structured Query Language (SQL)

- ◆ Data Definition Language (DDL)
 - n CREATE, DROP, ALTER
- ◆ Data Manipulation Language (DML)
 - n SELECT, INSERT, DELETE, UPDATE
- ◆ Data Control Language (DCL)
 - n GRANT, REVOKE
 - n COMMIT, ROLLBACK, SAVEPOINT

Sample Schema

```
Products( product_id, category, description, price )
Customers( customer_id, first_name, last_name, address )
Order( order_id, customer_id, date_ordered, date_shipped )
Order_Details( order_id, product_id, quantity )
```

Constraints

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

Sequence, Index, and View

- ◆ Sequence
 - n MINVALUE, MAXVALUE
 - n nextval, currval
- ◆ Index
 - n UNIQUE
 - n Function-based index
- ◆ View
 - n 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
 - 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

```
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;
```

Transactions

- ◆ COMMIT
- ◆ ROLLBACK
- ◆ SAVEPOINT and ROLLBACK TO SAVEPOINT

Start and End of A Transaction

- ◆ Start
 - First DML statement after connection or the end of last transaction
- ◆ End
 - First DDL or DCL statement (except SAVEPOINT) after a transaction starts
 - Failed DML statements are automatically rolled back
 - Disconnect

Advanced Topics

- ◆ Transaction Isolation Level
- ◆ 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.