

SQL: The Sequel

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Topics

- Brief review
- Subqueries
- Updating Data
- Conditional Logic
- Multi-table joins
- Reporting

Topics

- **Brief review**
- Subqueries
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Brief Review - Queries

- Basic query:

```
select [column-list]  
from [table]  
where [logical-expression]
```

Brief Review - Queries

- Inner Joins

```
select [column-list]  
from [table1] as a  
      inner join [table2] as b  
where a.key = b.key
```

- Returns data from rows in both tables where keys match

Brief Review - Queries

- Outer Joins

```
select [column-list]
from [table1] as a
      left join [table2] as b
on a.key = b.key
```

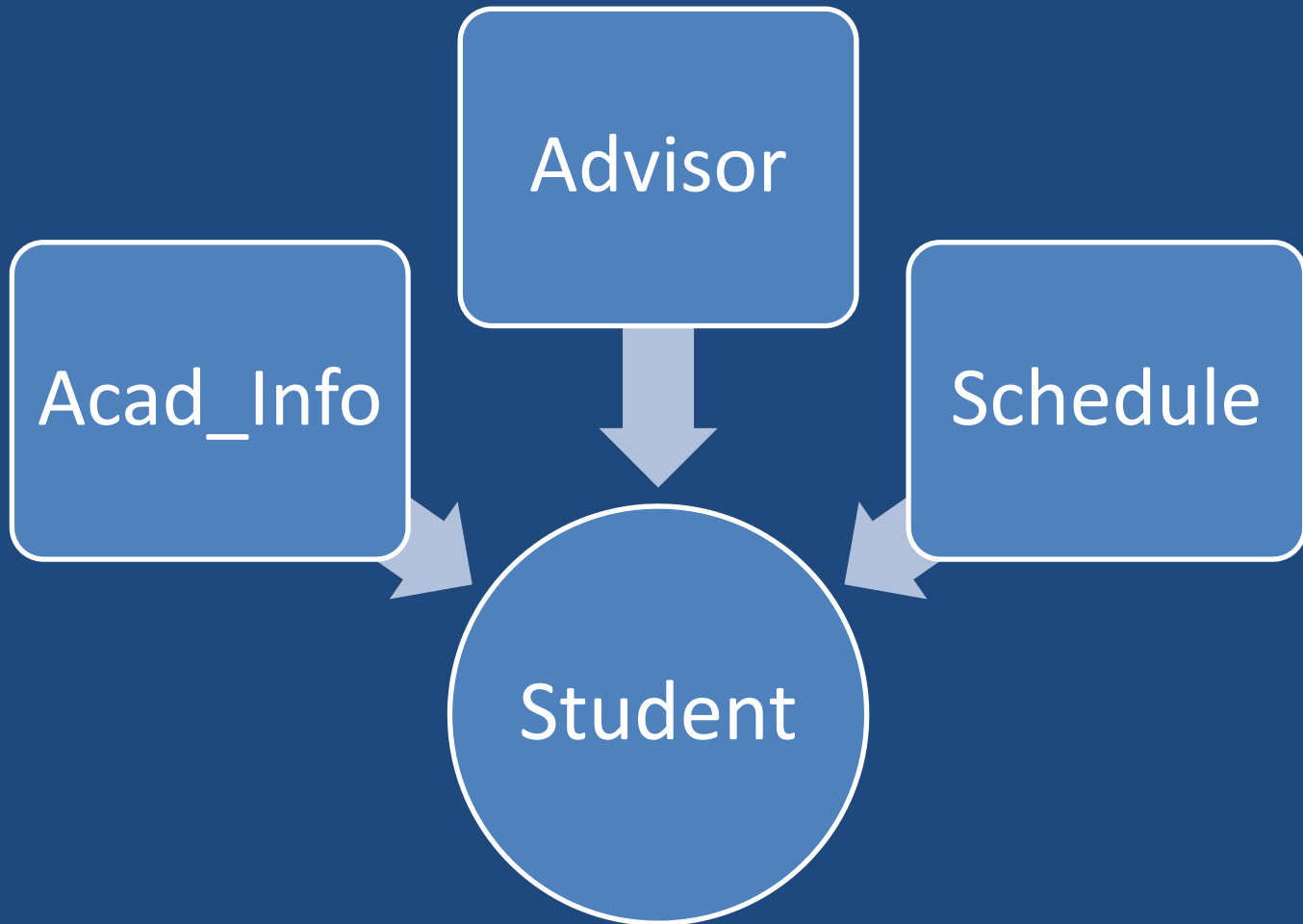
- Returns all rows from table1 plus matching rows in table2

TMTOWTDI

“There’s more than one way
to do it.”

(with apologies to Perl)

Sample Data



Sample Data

- Student table
 - Keys: ID
 - Bio-Demo data
- Acad_info table
 - Keys: ID, TERM
 - College, Degree, Major, Classification
- Schedule table
 - Keys: ID, TERM, CRN
 - Course, Credit Hours
- Advisor Table
 - Keys: ID, ADVISOR_ID
 - Advisor Name, Advisor Type

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Subqueries

- Also called Inline Views
- Embed a query inside the WHERE
- Why?
 - Conceptually easier
 - Cleaner code

Subqueries

- Basic query

```
select [column-list]
from [table]
where [logical-expression]
```

- Subqueries replace all or part of

```
[logical-expression]
```

with another query

Subqueries

Table 1

ID	Gender
1	M
2	F
3	F
4	M

Table 2

ID	Class
1	Freshman
2	Freshman
3	Junior
4	Senior

```
select id, gender
from table1
where id in (select id from table2
             where class = 'Freshman')
```

Subqueries

- Example 1

Subqueries - Issues

- SQL Optimization
 - Usually automatic, invisible
 - May combine the subquery with the main query
- Force subquery to complete first
 - Oracle – include ROWNUM pseudo-column

```
select id, gender
from table1
where id in (select ROWNUM, id
            from table2
            where class = 'Freshman')
```

Questions?

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Updating Data

- Incorrect census data
 - Pre-Nursing → Nursing
 - Athletic Rosters
- Options
 - Rerun census
 - Update by hand
 - Use SQL UPDATE

Updating Data

- UPDATE statement

```
update [table]
```

```
set [column] = [value-expression]
```

```
where [logical-expression]
```

Updating Data

Table 1

ID	Team
1	Golf
2	Track
3	Baseball
4	Baseball

Table 2

ID	Team
1	Baseball
3	Baseball
4	Baseball
8	Baseball

```
update table1  
set team = 'Baseball'  
where id in (select id from table2)
```

Updating Data

Result

ID	Team
1	Baseball
2	Track
3	Baseball
4	Baseball

```
update table1  
set team = 'Baseball'  
where id in (select id from table2)
```

Updating Data

- Example 2

Updating Data

- SAS PROC SQL - limited update capability
- Oracle, SQL Server, DB2

```
update table1 t1
set t1.team = (select t2.team
               from table2 t2
               where t2.id = t1.id)
where exists (select * from
             table2 t2
             where t2.id = t1.id)
```

Updating Data

- SQL Server

```
update t1
set t1.team = t2.team
from table1 t1, table2 t2
where t1.id = t2.id
```


Questions?

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- **Conditional Logic**
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Conditional Logic

- Incorporate IF-ELSE logic into a query
- Create or adjust columns based on the value of another column
- Use a CASE expression

Conditional Logic

- CASE syntax

```
case <column>
  when condition then result
  <when condition then result>
  ...
  <else result>
end
```

Conditional Logic

Table 1

ID	Team
1	Golf
2	
3	
4	Baseball

Result

ID	Type
1	Athlete
2	Non-Athlete
3	Non-Athlete
4	Athlete

```
select id,  
       case team  
         when ' ' then 'Non-Athlete'  
         else 'Athlete'  
       end as type  
from table1
```

Conditional Logic

- Alternate syntax

```
case
  when team = ' ' then 'Non-Athlete'
  else 'Athlete'
end
```

Conditional Logic

- Example 3

Questions?

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- **Multi-table joins**
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Multi-table joins

- Mixing inner and outer joins
- N tables → at least N-1 WHERE conditions
- Order matters
 - Strict left-to-right
 - Parentheses
 - Order of ON/WHERE statements

Multi-table joins

```
select *  
  from table1 t1, table2 t2  
       left join table3 t3  
  on t1.id = t3.id  
 where t1.id = t2.id
```

Multi-table joins

- Example 4

Questions?

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- **Reporting**

Reporting

- SQL can do more than inner/outer joins
- Set operations
 - Union – all unique rows in A and B
 - Intersect – all rows in both A and B
 - Except – rows from A not in B
 - Outer Union – all rows in A and B
 - Concatenate A and B

Reporting

- OUTER UNION
- Shape output into easily readable format
- Overlapping cohorts
- Example 5

Questions?

Resources

- SAS Online Documentation
 - support.sas.com/onlinedoc/913/docMainpage.jsp
 - Base SAS → Base SAS Procedures Guide → SAS SQL Procedure User's Guide
- MS Access SQL Documentation
 - office.microsoft.com/en-us/access-help/CH010072899.aspx
- SQL Tutorial
 - www.sqltutorial.org

Resources

- O'Reilly Books (shop.oreilly.com)
 - Learning SQL, 2nd Edition
 - SQL In a Nutshell, 3rd Edition
 - SQL Cookbook, 1st Edition
- SAS Publishing (support.sas.com/publishing)
 - PROC SQL by Example: Using SQL within SAS
 - PROC SQL: Beyond the Basics Using SAS

Questions?

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