Business School
UNIVERSITY OF COLORADO DENVER

Information Systems Program

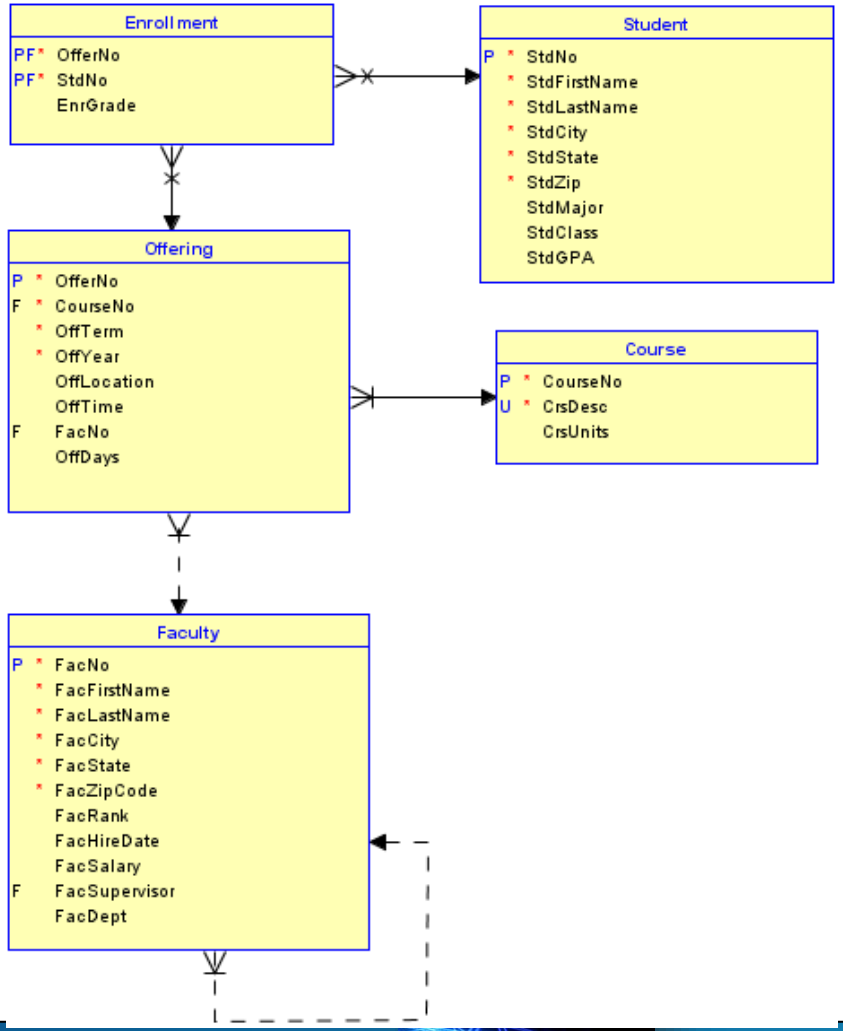
Module 12
Advanced Query Formulation with SQL

Lesson 1 (Part 2): One-Sided Outer Join Problems in SQL

Lesson Objectives

- Use the text pattern to recognize problem statements involving one-sided outer joins
- Apply the statement pattern for combining a one-sided outer join with joins
- Explain positional notation for one-sided outer joins in the SELECT statement
- Write SELECT statements for problems mixing joins and one-sided outer joins

University Database Diagram



LEFT JOIN and RIGHT JOIN Keywords

Example 1

```
SELECT OfferNo, CourseNo, Offering.FacNo,
       FacFirstName, FacLastName
 FROM Offering LEFT JOIN Faculty
      ON Offering.FacNo = Faculty.FacNo
 WHERE CourseNo LIKE 'IS%';
```

Example 2

```
SELECT OfferNo, CourseNo, Offering.FacNo,
       FacFirstName, FacLastName
 FROM Faculty RIGHT JOIN Offering
      ON Offering.FacNo = Faculty.FacNo
 WHERE CourseNo LIKE 'IS%';
```


Full Outer Join Example

Example 3

Retrieve common details of all university people, students, faculty, or both.

```
SELECT FacNo, FacFirstName, FacLastName,
       FacSalary, StdNo, StdFirstName,
       StdLastName, StdGPA
  FROM Faculty FULL JOIN Student
       ON Student.StdNo = Faculty.FacNo;
```


Text Pattern for a One-Sided Outer Join

- Table design with a foreign key allowing null values
- Indication in a problem statement to preserve non-matching rows of a child table
- Inclusive phrases such as “include an entity even if missing or not yet assigned”
- Do not overuse

Statement Pattern for Mixing Joins and a One-Sided Outer Join

```
SELECT <ColumnList>
FROM <OneSidedOuterJoinOperation>
     <JoinOperation1>
     <JoinOperation2>
…    <JoinOperationN-2>
WHERE RowCondition1 … AND RowConditionM
[ AND ( RowConditionM+1 … OR RowConditionM+P ] );
```


Mixing Inner and Outer Joins I

Example 4

Retrieve details of offering, course, and faculty for information systems offerings in 2020. Include an offering in the result even if the offering lacks an assigned instructor.

```
SELECT OfferNo, Offering.CourseNo, OffTerm,
        CrsDesc, Faculty.FacNo, FacLastName
  FROM Faculty RIGHT JOIN Offering
       ON Offering.FacNo = Faculty.FacNo
    INNER JOIN Course
       ON Course.CourseNo = Offering.CourseNo
  WHERE Course.CourseNo LIKE 'IS%'
    AND OffYear = 2020;
```


Mixing Inner and Outer Joins II

Example 5

List the rows of the *Offering* table with at least one student enrolled, in addition to the requirements of Example 4. Remove duplicate rows in the result.

```
SELECT DISTINCT Offering.OfferNo, Offering.CourseNo,
       OffTerm, CrsDesc, Faculty.FacNo, FacFirstName,
       FacLastName
 FROM Faculty RIGHT JOIN Offering
       ON Offering.FacNo = Faculty.FacNo
      INNER JOIN Course
       ON Course.CourseNo = Offering.CourseNo
      INNER JOIN Enrollment
       ON Offering.OfferNo = Enrollment.OfferNo
 WHERE Offering.CourseNo LIKE 'IS%'
   AND OffYear = 2020;
```


Mixing Inner and Outer Joins III

Example 6

Same requirements as example 5 with the one-sided outer join performed last

```
SELECT DISTINCT Offering.OfferNo, Offering.CourseNo,
       OffTerm, CrsDesc, Faculty.FacNo, FacFirstName,
       FacLastName
 FROM Course INNER JOIN Offering
     ON Course.CourseNo = Offering.CourseNo
  INNER JOIN Enrollment
     ON Offering.OfferNo = Enrollment.OfferNo
  LEFT JOIN Faculty
     ON Offering.FacNo = Faculty.FacNo
 WHERE Offering.CourseNo LIKE 'IS%'
   AND OffYear = 2020;
```


Summary

- LEFT JOIN and RIGHT JOIN keywords
- Text pattern involving table design and problem statement
- Statement pattern for mixing joins and a one-sided outer join
- No need for parentheses when following the statement pattern