



Module 5

Extended Query Formulation with SQL

Lesson 3: Problems involving joins and grouping

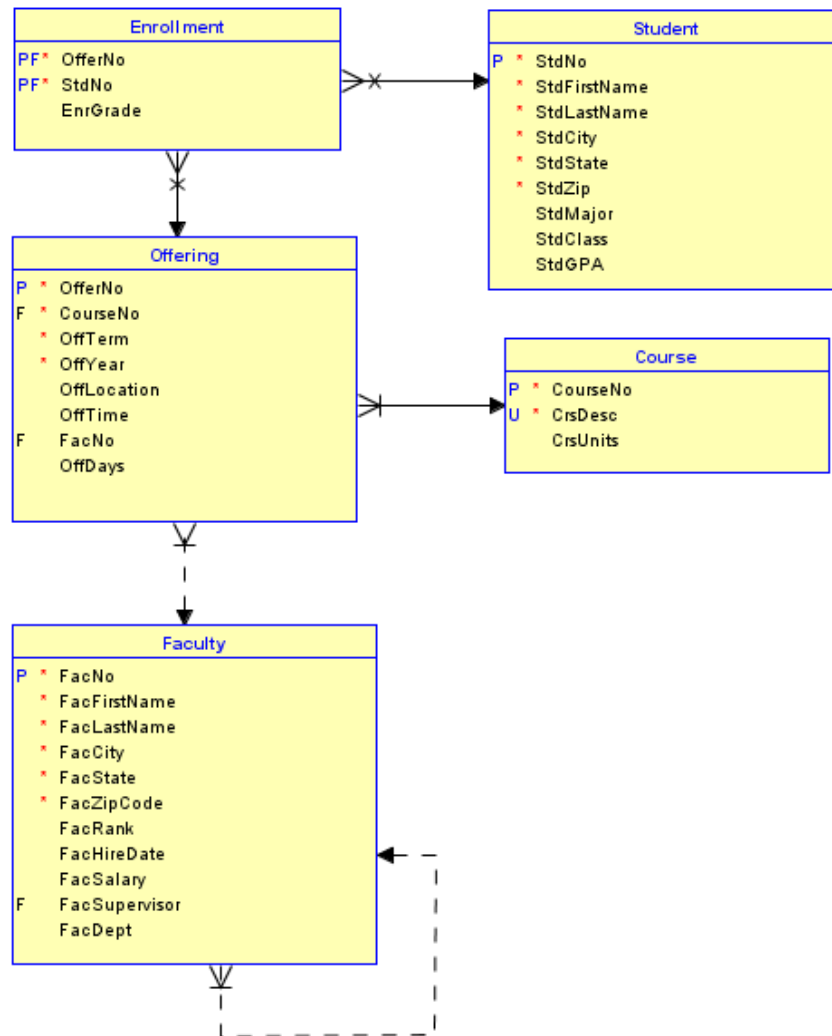


Lesson Objectives

- Use the critical questions to analyze problem statements
- Apply the statement pattern to write SELECT statements involving joins and grouping



University Database



Extended CP Statement Pattern

```
SELECT <ColumnList>, <AggFunctionList>
FROM Table1, Table2, ... TableN
WHERE <JoinCondition1>
    AND <JoinCondition2>
... AND <JoinConditionN-1>
    AND RowCondition1 ... AND RowConditionP
    AND ( RowConditionP+1 ... OR RowConditionP+M )
GROUP BY <ColumnList>
[ HAVING <OptionalGroupConditions> ];
```



Joins and Summarization I

Example 1: List the offering number, count of students enrolled, and the average GPA in each 2020 offering. Only include offerings with an average GPA greater than 3.3.

```
SELECT Offering.OfferNo,  
       COUNT(*) AS NumStudents,  
       AVG(StdGPA) AS AvgGPA  
FROM Enrollment, Offering, Student  
WHERE Offering.OfferNo = Enrollment.OfferNo  
      AND Student.StdNo = Enrollment.StdNo  
      AND OffYear = 2020  
GROUP BY Offering.OfferNo  
HAVING AVG(StdGPA) > 3.3;
```



Multiple Column Grouping

Example 2: List the course number, the offering number, and the count of students enrolled. Only include courses offered in spring 2020.

```
SELECT CourseNo, Enrollment.OfferNo,  
       Count(*) AS NumStudents  
FROM Offering, Enrollment  
WHERE Offering.OfferNo = Enrollment.OfferNo  
      AND OffYear = 2020  
      AND OffTerm = 'SPRING'  
GROUP BY Enrollment.OfferNo, CourseNo;
```



Joins and Summarization II

Example 3: List the offering number, course number, faculty first name, faculty last name, and average GPA. Only include courses offered in fall 2019 in which the average GPA is greater than 3.0.

```
SELECT Enrollment.OfferNo, CourseNo, FacFirstName,  
        FacLastName, AVG(StdGPA) AS AvgGPA  
FROM Offering, Enrollment, Student, Faculty  
WHERE Offering.OfferNo = Enrollment.OfferNo  
      AND Student.StdNo = Enrollment.StdNo  
      AND Faculty.FacNo = Offering.FacNo  
      AND OffYear = 2019  
      AND OffTerm = 'FALL'  
GROUP BY Enrollment.OfferNo, CourseNo,  
        FacFirstName, FacLastName  
HAVING AVG(StdGPA) > 3.0;
```



Summary

- Remember the query formulation process
- Use critical questions to convert a problem statement into a database representation
- Use a database diagram for connections among tables
- Apply an extended statement pattern

