Business School
UNIVERSITY OF COLORADO DENVER

Information Systems Program

Module 5
Extended Query Formulation with SQL

Lesson 6: Query Formulation Errors

Lesson Objectives

- Avoid query formulation errors
- Detect query formulation errors
- Correct query formulation errors
- Write statements with reasonable formatting

Impact of Errors

Syntax

- No execution
- Sometimes confusing messages

Redundancy

- Execution with correct rows
- Excessive resource usage

Semantic

- Execution with incorrect rows
- Sometimes excessive resource usage

Examples of Query Errors

Syntax

- Misspelled keyword
- Missing table
- Unqualified column name

Redundancy

- Extra table
- Unneeded GROUP BY clause

Semantic

- Missing join or row condition
- Missing parentheses

Missing Join Condition

Example 1: List the student name and offering number in which the student earned a grade greater than 3.7 and took the offering in fall 2019.

Statement with a semantic error

```
SELECT StdFirstName, StdLastName, Enrollment.OfferNo
 FROM Student, Enrollment, Offering
 WHERE Student.StdNo = Enrollment.StdNo
   AND OffYear = 2019 AND OffTerm = 'FALL'
   AND EnrGrade >= 3.7;
```

Corrected statement

```
SELECT StdFirstName, StdLastName, Enrollment.OfferNo
 FROM Student, Enrollment, Offering
 WHERE Student.StdNo = Enrollment.StdNo
   AND Enrollment.OfferNo = Offering.OfferNo
   AND OffYear = 2019 AND OffTerm = 'FALL'
   AND EnrGrade >= 3.7;
```

Unnecessary GROUP BY Clause

Example 2: List the student name and offering number in which the student earned a grade greater than 3.7 and took the offering in fall 2019.

Statement with a redundancy error

```
SELECT StdFirstName, StdLastName, Enrollment.OfferNo
 FROM Student, Enrollment, Offering
 WHERE Student.StdNo = Enrollment.StdNo
   AND Offering.OfferNo = Enrollment.OfferNo
   AND OffYear = 2019 AND OffTerm = 'FALL' AND EnrGrade >= 3.7
 GROUP BY StdFirstName, StdLastName, Enrollment.OfferNo;
```

Corrected statement

```
SELECT StdFirstName, StdLastName, Enrollment.OfferNo
 FROM Student, Enrollment, Offering
 WHERE Student.StdNo = Enrollment.StdNo
   AND Offering.OfferNo = Enrollment.OfferNo
   AND OffYear = 2019 AND OffTerm = 'FALL'  AND EnrGrade >= 3.7;
```

Missing Parentheses

Example 3: List the offer number, course number, and faculty number for course offerings scheduled in spring or summer of 2019.

Statement with a semantic error

```
SELECT OfferNo, CourseNo, FacNo, OffYear, OffTerm
 FROM Offering
 WHERE OffTerm = 'SPRING' OR OffTerm = 'SUMMER'
   AND OffYear = 2019;
```

Corrected statements

```
SELECT OfferNo, CourseNo, FacNo, OffYear, OffTerm
 FROM Offering
 WHERE ( OffTerm = 'SPRING' OR OffTerm = 'SUMMER' )
   AND OffYear = 2019;
```

```
SELECT OfferNo, CourseNo, FacNo, OffYear, OffTerm
 FROM Offering
 WHERE OffTerm IN ('SPRING', 'SUMMER')
   AND OffYear = 2019;
```

Poor Coding Practices

- Mixed join styles
- Incompatible constant
- Like operator in a date comparison
- Poor clause alignment
- Like operator without pattern matching characters

Example with Poor Coding Practices

Example 4: List Bob Norbert's course schedule in spring 2020.

Statement with poor coding practices

```
SELECT Offering.OfferNo, Offering.CourseNo, OffDays,
       OffLocation, OffTime, CrsUnits, FacFirstName,
    FacLastName FROM Faculty, Offering, Enrollment,
Student, Course WHERE Faculty.FacNo = Offering.FacNo AND
Offering.OfferNo
  = Enrollment.OfferNo
  AND Student.StdNo = Enrollment.StdNo
AND Offering.CourseNo = Course.CourseNo
   AND OffYear = '2020' AND OffTerm = 'SPRING'
 AND StdFirstName LIKE 'BOB' AND StdLastName = 'NORBERT';
```

Summary

- Reduce frustration by awareness of query formulation errors
- Syntax errors sometimes difficult to fix
- Redundancy errors with excessive resource consumption
- Semantic errors with incorrect results and sometimes excessive resource consumption
- Use good coding practices

Answers to Opening Questions

- Most serious error: missing join condition
- Most subtle error: semantic error that generates anticipated rows in the result
- Example 3: statement contains a semantic error (missing parentheses), but execution generates expected rows until adding rows in spring 2020