



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 2016.

Statement with a semantic error

```
SELECT StdFirstName, StdLastName, Enrollment.OfferNo
FROM Student, Enrollment, Offering
WHERE Student.StdNo = Enrollment.StdNo
      AND OffYear = 2016 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 = 2016 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 2016.

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 = 2016 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 = 2016 AND OffTerm = 'FALL' AND EnrGrade >= 3.7;
```

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Missing Parentheses

Example 3: List the offer number, course number, and faculty number for course offerings scheduled in spring or summer of 2016.

Statement with a semantic error

```
SELECT OfferNo, CourseNo, FacNo, OffYear, OffTerm
FROM Offering
WHERE OffTerm = 'SPRING' OR OffTerm = 'SUMMER'
AND OffYear = 2016;
```

Corrected statements

```
SELECT OfferNo, CourseNo, FacNo, OffYear, OffTerm
FROM Offering
WHERE ( OffTerm = 'SPRING' OR OffTerm = 'SUMMER' )
AND OffYear = 2016;
```

```
SELECT OfferNo, CourseNo, FacNo, OffYear, OffTerm
FROM Offering
WHERE OffTerm IN ('SPRING', 'SUMMER')
AND OffYear = 2016;
```



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 2017.

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 = '2017' 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 2017

