



# 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

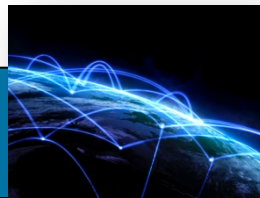
- No execution
- Sometimes confusing messages

## Redundancy

- Execution with correct rows
- Excessive resource usage

## Semantic

- Execution with incorrect rows
- Sometimes excessive resource usage



# Examples of Query Errors

## Syntax

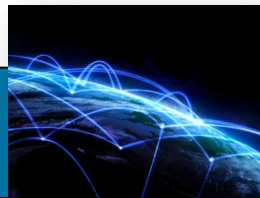
- Misspelled keyword
- Missing table
- Unqualified column name

## 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.

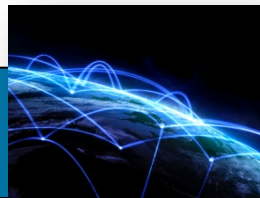
## Statement with a redundancy error

```
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.

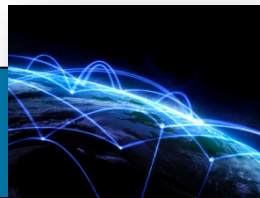
## Statement with a semantic error

```
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



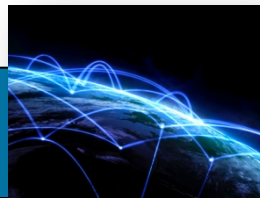
Mixed join styles

Incompatible constant

Like operator in a date comparison

Poor clause alignment

Like operator without pattern matching characters



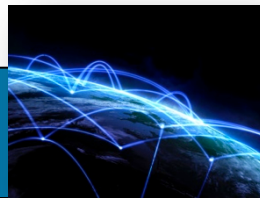


# Example with Poor Coding Practices

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

