Database Programming with SQL

4-2
Number Functions
Objectives

This lesson covers the following objectives:

• Select and apply the single-row number functions ROUND, TRUNC, and MOD in a SQL query

• Distinguish between the results obtained when TRUNC is applied to a numeric value and ROUND is applied to a numeric value

• State the implications for business when applying TRUNC and ROUND to numeric values
Purpose

• One of the reasons we put our money in a bank is to take advantage of the interest it accumulates over time.

• Banks adjust the interest rate with various economic indicators such as inflation and the stock market.

• Typically, interest rates are expressed as a percent such as 3.45%.
Purpose

• If a bank decided to round the percentage rate to 3.5%, would it be to your advantage?
• If it decided to just drop the decimal values and calculate the interest at 3%, would you be happy then?
• Rounding and truncating numbers play an important part in business and in turn with the databases that support these businesses as they store and access numeric data.
Number Functions

• The three number functions are:
  – ROUND
  – TRUNC
  – MOD
ROUND

- ROUND can be used with both numbers and dates.
- It is mainly used to round numbers to a specified number of decimal places, but it can also be used to round numbers to the left of the decimal point.

**Syntax:**

ROUND(column|expression, decimal places)

- Note that if the number of decimal places is not specified or is zero, the number will round to no decimal places.
- \( \text{ROUND}(45.926) \quad 46 \)
- \( \text{ROUND}(45.926, 0) \quad 46 \)
ROUND

- If the number of decimal places is a positive number, the number is rounded to that number of decimal places to the right of the decimal point.
  - ROUND(45.926, 2)  45.93

- If the number of decimal places is a negative number, the number is rounded to that number of decimal places to the left of the decimal point.
  - ROUND(45.926, -1)  50
TRUNC

• The TRUNC function can be used with both numbers and dates. It is mainly used to terminate the column, expression, or value to a specified number of decimal places.

• When TRUNC is used, if the number of decimal places is not specified, then like ROUND, the specified number defaults to zero.

• Syntax:

  \[ \text{TRUNC}(\text{column|expression}, \text{decimal places}) \]

• TRUNC (45.926, 2) \quad 45.92
TRUNC

• As with ROUND, if the TRUNC expression does not specify the number of decimal places or specifies a zero, the number is truncated to zero decimal places.

• TRUNC (45.926, 0)  45
• TRUNC (45.926)  45

• Remember that TRUNC does not round the number.
• It simply terminates the number at a given point.
MOD

• The MOD function finds the remainder after one value is divided by another value.

• For example, the MOD of 5 divided by 2 is 1.

• MOD can be used to determine whether a value is odd or even. If you divide a value by 2 and there is no remainder, the number must be an even number.

• For example, if the MOD of x divided by 2 is 0, then x must be an even number.
MOD

• The "Mod Demo" column will show if number of airports for each country is an odd or even number.

```
SELECT country_name, MOD(airports,2) AS "Mod Demo"
FROM countries;
```

<table>
<thead>
<tr>
<th>COUNTRY_NAME</th>
<th>Mod Demo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>1</td>
</tr>
<tr>
<td>Republic of Costa Rica</td>
<td>0</td>
</tr>
<tr>
<td>Republic of Cape Verde</td>
<td>1</td>
</tr>
<tr>
<td>Greenland</td>
<td>0</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>0</td>
</tr>
<tr>
<td>State of Eritrea</td>
<td>1</td>
</tr>
<tr>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>
Terminology

Key terms used in this lesson included:

• Number functions
• MOD
• ROUND
• TRUNC
Summary

In this lesson, you should have learned how to:

• Select and apply the single-row number functions ROUND, TRUNC, and MOD in a SQL query

• Distinguish between the results obtained when TRUNC is applied to a numeric value and ROUND is applied to a numeric value

• State the implications for business when applying TRUNC and ROUND to numeric values