Lecture-4

SQL Data Types

1. Numeric Data Types

- **INT**
  - Syntax: `column_name INT`
  - Range: -2,147,483,648 to 2,147,483,647
  - Example: `age INT` (e.g., 25)
- **BIGINT**
  - Syntax: `column_name BIGINT`
  - Range: -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807
  - Example: `population BIGINT` (e.g., 789456123456789)
- **SMALLINT**
  - Syntax: `column_name SMALLINT`
  - Range: -32,768 to 32,767
  - Example: `units SMALLINT` (e.g., 120)
- **DECIMAL(p, s)**
  - Syntax: `column_name DECIMAL(p, s)`
  - `p`: Total number of digits; `s`: Digits after the decimal
  - Range: Depends on `p` and `s` values
  - Example: `price DECIMAL(10,2)` (e.g., 12345.67)
- **FLOAT**
  - Syntax: `column_name FLOAT`
  - Range: -3.4E+38 to 3.4E+38
  - Example: `weight FLOAT` (e.g., 67.89)

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2. String Data Types

- **CHAR(n)**
  - Syntax: `column_name CHAR(n)`
  - Range: Fixed-length up to 255 characters
  - Example: `status CHAR(5)` (e.g., `Active`)

- **VARCHAR(n)**
  - Syntax: `column_name VARCHAR(n)`
  - Range: Variable-length up to 255 characters (or more depending on database)
  - Example: `name VARCHAR(50)` (e.g., `John Doe`)
- **TEXT**
  - Syntax: `column_name TEXT`
  - Range: Up to 4GB of text
  - Example: `description TEXT` (e.g., a paragraph of text)

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3. Date and Time Data Types

- **DATE**
  - Syntax: `column_name DATE`
  - Range: 1000-01-01 to 9999-12-31
  - Example: `birthdate DATE` (e.g., `1990-05-15`)
- **TIME**
  - Syntax: `column_name TIME`
  - Range: 00:00:00 to 23:59:59
  - Example: `appointment TIME` (e.g., `14:30:00`)
- **DATETIME**
  - Syntax: `column_name DATETIME`
  - Range: 1000-01-01 00:00:00 to 9999-12-31 23:59:59
  - Example: `order_date DATETIME` (e.g., `2025-01-26 12:45:30`)
- **TIMESTAMP**
  - Syntax: `column_name TIMESTAMP`
  - Range: 1970-01-01 00:00:01 UTC to 2038-01-19 03:14:07 UTC
  - Example: `created_at TIMESTAMP` (e.g., `2025-01-26 10:00:00`)
- **YEAR**
  - Syntax: `column_name YEAR`
  - Range: 1901 to 2155
  - Example: `year YEAR` (e.g., `2025`)

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4. Boolean Data Type

- **BOOLEAN**
  - Syntax: `column_name BOOLEAN`
  - Stored as: `1` for `TRUE`, `0` for `FALSE`
  - Example: `is_active BOOLEAN` (e.g., `is_active = TRUE`)

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5. Binary Data Type

- **BLOB**
  - Syntax: `column_name BLOB`
  - Range: Up to 4GB of binary data
  - Example: `profile_pic BLOB` (e.g., an image file)

Comments in SQL

Comments are used to annotate SQL code for better readability and understanding. SQL supports two types of comments: single-line and multi-line.

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1. Single-Line Comments

- Use `--` to start a single-line comment.
- Everything after `--` on the same line is ignored by the SQL engine.

Syntax:

```
-- This is a single-line comment
SELECT * FROM employees; -- Retrieves all records from the employees table
```

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2. Multi-Line Comments

- Use `/*` to start the comment and `*/` to end it.
- Useful for longer explanations or temporarily disabling blocks of code.

Syntax:

```
/* This is a multi-line comment
   It explains the following query:
   The query retrieves all records from the employees table
*/
SELECT * FROM employees;

/* Temporarily disabling this query
SELECT * FROM departments;
*/
```
