

1. Install MS SQL Server

Done

2. Give the difference between Char and Varchar data type.

Feature	CHAR(n)	VARCHAR(n)
Full Form	Character	Variable Character
Storage Type	Fixed-length	Variable-length
Storage Behavior	Always uses <b>n</b> bytes, padded with spaces if shorter	Uses only the required number of bytes + 1/2 byte overhead
Performance	Slightly faster for fixed-length data	More efficient for varying-length data
Use Case	Best for fixed-length values (e.g., PIN codes, status codes)	Best for variable-length values (e.g., names, emails)
Padding	Pads extra spaces to meet the defined length	Does <b>not</b> pad extra spaces
Storage Size	Always <b>n</b> bytes	Actual length of string + 1/2 byte
Example	CHAR(5) will store "abc" as "abc "	VARCHAR(5) will store "abc" as "abc"

### 3. Explain the types of SQL Commands.

SQL commands are categorized based on their functionality in a database system.

There are five main types of SQL commands:

#### 1. Data Definition Language (DDL):

These commands are used to define and modify the structure of database objects such as tables, schemas, indexes, etc.

##### DDL Commands:

- CREATE – Creates a new database object (e.g., table, view, schema).
- ALTER – Modifies an existing database object. (e.g., add a column)
- DROP – Deletes objects permanently from the database.
- TRUNCATE – Removes all records from a table, but not the structure.

#### 2. Data Manipulation Language (DML):

These commands are used to **manipulate data** within tables (Insert, Update, Delete).

##### DML Commands:

- INSERT – Adds new records of data to a table.
- UPDATE – Modifies existing records in a table.
- DELETE – Removes specific/Selected records from a table based on a given condition.

#### 3. Data Query Language (DQL):

Focused purely on Data retrieval.

##### DQL Commands:

- SELECT – Retrieves data from the database.

#### 4. Data Control Language (DCL):

These commands are used to **control access** to data in the database.

##### DCL Commands:

- GRANT – Gives user access privileges.
- REVOKE – Removes granted access.

#### 5. Transaction Control Language (TCL):

Used to manage transactions / changes made by DML statements.

##### TCL Commands:

- COMMIT – Saves changes made permanently during the transaction.
- ROLLBACK – Undoes changes since the last commit.
- SAVEPOINT – Sets a point within a transaction to rollback to.
- SET TRANSACTION – Sets properties for a transaction (e.g., isolation level).

#### 4. Explain NVarchar and Nchar

- Both NCHAR and NVARCHAR are Unicode character data types, which means they can store characters from multiple languages, including symbols and special characters.
- Each character in NCHAR and NVARCHAR takes 2 bytes (unlike CHAR/VARCHAR which take 1 byte per character in ASCII).
- Use case is when working with internationalization (e.g., Hindi, Chinese, Arabic, etc.).
- Always prefix Unicode string literals with N, e.g., N'भारत'

Feature	NCHAR(n)	NVARCHAR(n)
Full Form	National Character	National Variable Character
Length	Fixed-length	Variable-length
Unicode Support	Yes (stores Unicode using UTF-16)	Yes (stores Unicode using UTF-16)
Padding	Pads with spaces to length n	No padding
Performance	Slightly faster for fixed-size values	More efficient for varying-length text
Use Case	When data length is always the same	When data length varies
Example	NCHAR(10) stores "Shiva" as "Shiva "	NVARCHAR(10) stores "Shiva" as-is