*Microsoft DataBases has 2 representations

1) physical Representation

☐ physical files are divide to

- **Local Database File (LDF)** : which holds the Transaction Log (insertion, updates, deletes), Rollback and Recovery.

- **Master Database File (MDF) (Important)**: it contains the schema and the data of the database.

2) Logical Representation

☐ It contains:

- **File Group (primary File Group)**: It is Just a pointer pointing toward your MDF.

*Column properties

☐ Name, Allow Nulls, Data Type

☐ Computed column specification : used when we have a derived attribute that we will store in the table due to the continuous needed calculate when it is called alot.

- Formula : isnull(col1name,0) + is null(col2name,0)

- is Persisted : If you want to store it on the harddisk or Just be stored during the runtime only

☒ is Sparse: if yes it won't take space on the harddisk for null values of that column

* Relationship ~~properties~~ (Rules)
☐ Both of their default Values is no action

1) Delete Rule
2) Update Rule
☐ Both of the have # couple of shared values.

1) <u>No Action</u>: If you try to update or delete a row in the parent table, and that row has related rows in the child table, SQL server will prevent the update or delete action and will return an error.

2) <u>Cascade</u>: If you update or delete a row in the parent table, SQL Server will update or delete the related rows in the child table

3) <u>SET NULL</u>: If you update or delete a row in the parent table, SQL Server will set the foreign Key columns in the related rows in the child table to NULL

4) <u>SET Default</u>: If you update or delete a row in the parent table, SQL Server will set the foreign Key columns in the related row in the child table to their default value, if they have default values

*Schemas is a group of objects (tables, views, indexes, etc.)

*How to make a user that can connect to the database? (or see certain schemas)

1) Right click on the server → properties → Security → Select (SQL Server and Windows Authentication mode) and (Failed logins only) (Called Mixed Mode Step)

2) Then Right click on the server → Restart

3) Then go to the Security Folder

4) Login Folder Right click → New login.

5) Enter Name, password, select SQL Server Authentication, and don't select "Enforce password policy"

6) Then Select the database that you want to add that new user to → Security → User → Right click on users → New User

7) Add the user_name that you made prevousily in the first two textboxes

8) Create A Schema to include the databases that you want your user to have access To : create schema Schema_Name

9) Add objects to that schema :
  alter schema schema_name transfer object-name

10) Connect that new user to the schema that you made

  10.1) Double click on the schema that you created → permissions → search button → Select the user that you want → OK

  10.2) Change the grant and deny options from the bottom of that page

11) Disconnect and connect as the new user

12) Write the queries that you want on that database that you connected that user to

* *** Synonym or Variables**

▢ Create synonym ▦ Synonyn_Name
  For DataBaseName • Column_Name

- **Isolation**: Transactions don't interfere with each other
- **Durability**: Changes persist even after system failures.

☐ **What Are the Types of Data Entegrity?**

1) Entity Integrity

- **Definition**: Entity integrity ensures that each row (record) in a database table is <u>uniquely identifiable</u>
- **Key Aspect**: It requires that an entity has a unique Key (primary Key)

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2) Referential Integrity:

- **Definition**: It ensures consistency across data relationships in relational databases.
- **Key Aspect**: When there is a relation between two entities, it enforces that foreign keys in one table match primary keys in another tables.

3) Physical Integrity:

- **Definition**: protects data during storage retrieval, and management from physical issues (e.g. hardware failures, environmental factors).
- **Key Aspect**: It ensures that data remains intact despite physical or hardware challenges.
- **Example**: Using redundant storage systems like RAID (redundant array of independent disks) that distributes the data across multiple disks, preventing loss due to disk failure.

4) Domain Integrity:

- **Definition**: It determines what values are accepted within a column and how they are sorted. (This is the Key Aspect not the definition)
- **Key Aspect**: It enforces valid entries for individual columns based on predefined rules or constraints (This is the definition)

5) User Defined Integrity:

- **Definition**: involves custom business rules created by users to meet specific business requirement.
- **Key Aspect**: It allows organizations to define unique rules that are not covered by other types of data entegrity.