Cascade Operations and E/R Diagrams
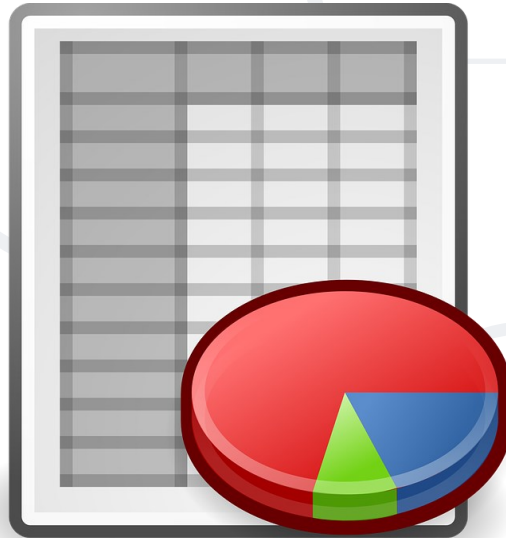
Relational Database Operations

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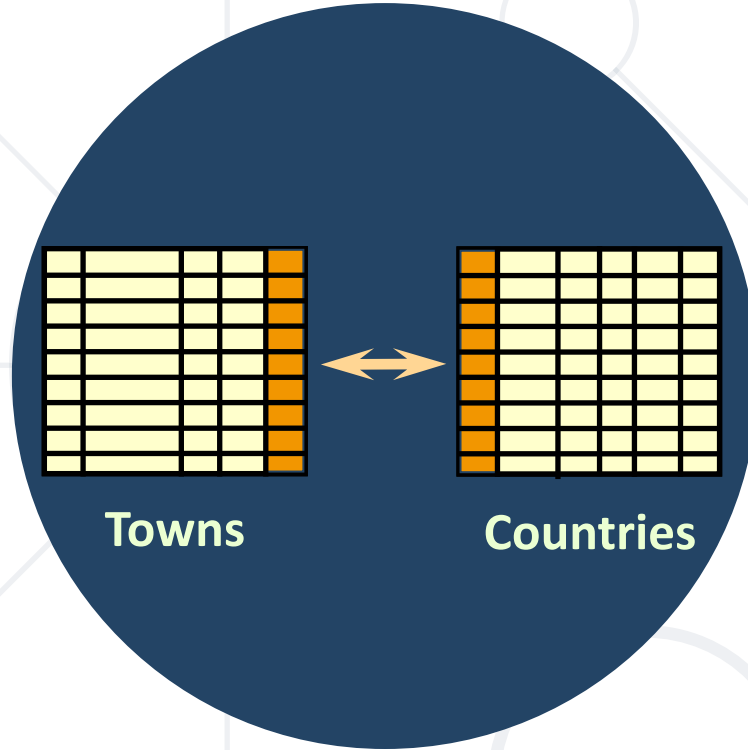Software University

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Retrieving Related Data

Using Simple JOIN Statements

- With a **JOIN** statement, we can get data from two tables **simultaneously**

  - **JOIN**s require at least two tables and a "**join condition**"

```
SELECT * FROM Towns
    JOIN Countries ON
        Countries.Id = Towns.CountryId
```

Join Condition

Problem: Peaks in Rila

- Use database "**Geography**". Report all peaks for "**Rila**" mountain.

    - Report includes mountain's name, peak's name and also peak's elevation

    - Peaks should be **sorted** by elevation descending

	MountainRange	PeakName	Elevation
1	Rila	Musala	2925
2	Rila	Malka Musala	2902
3	Rila	Malyovitsa	2729
4	Rila	Orlovets	2685

Solution: Peaks in Rila

Cross Table Selection

```sql
SELECT m.MountainRange, p.PeakName, p.Elevation
  FROM Mountains AS m
  JOIN Peaks As p ON p.MountainId = m.Id
 WHERE m.MountainRange = 'Rila'
ORDER BY p.Elevation DESC
```
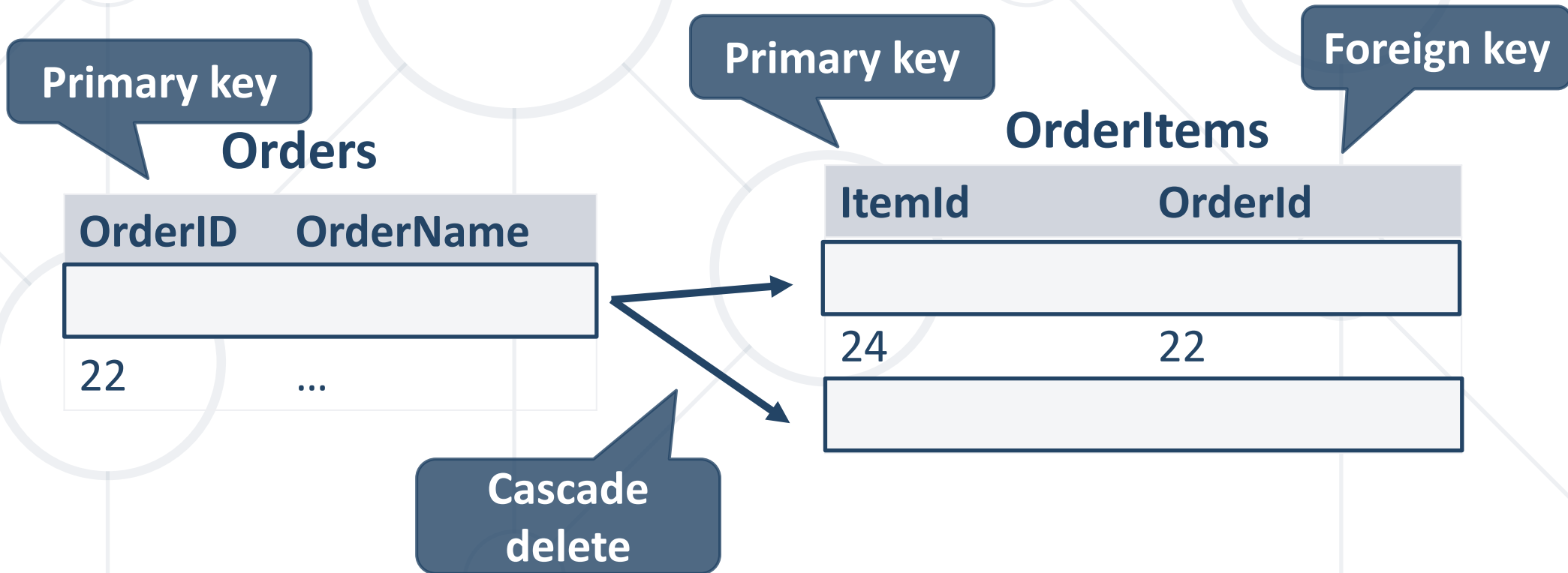
Join Condition
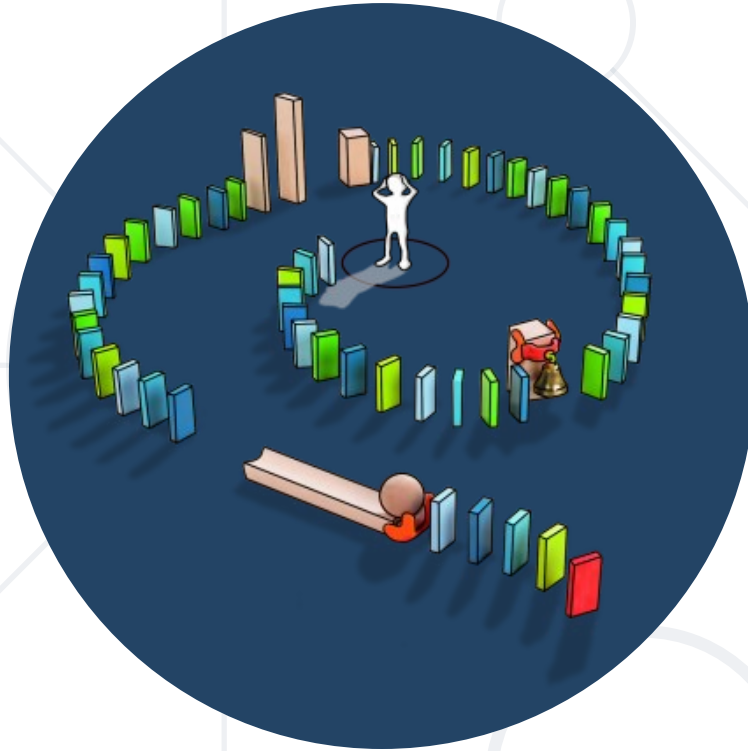
Cascade Operations

Cascade Delete/Update

Definition

- Cascading allows when a change is made to certain entity, this change to apply to all related entities

Primary key

Orders

OrderID	OrderName
22	...

Primary key

OrderItems

ItemId	OrderId
24	22

Foreign key

Cascade delete

Cascade Delete

- **Cascade** can be either **Delete** or **Update**.
- Use **Cascade Delete** when:
  - The related entities are **meaningless** without the "main" one
- Do **not** use **Cascade Delete** when:
  - You perform a "**logical delete**"
    - Entities are **marked** as deleted (but not actually deleted)
  - In more complicated relations, cascade delete won't work with **circular** references

Cascade Update

- Use **Cascade Update** when:

  - The primary key is not identity (not auto-increment) and therefore it **can** be changed

  - Best used with unique constraint

- Do **not** use **Cascade Update** when:

  - The primary is identity (auto-increment)

- Cascading can be avoided using **triggers** or **procedures**.

Cascade Delete: Example

```
CREATE TABLE Drivers(
    DriverID INT PRIMARY KEY,
    DriverName VARCHAR(50)
)

CREATE TABLE Cars(
    CarID INT PRIMARY KEY,
    DriverID INT,
    CONSTRAINT FK_Car_Driver FOREIGN KEY(DriverID)
    REFERENCES Drivers(DriverID) ON DELETE CASCADE
)
```

Foreign Key

Cascade

```
CREATE TABLE Products(
   BarcodeId INT PRIMARY KEY,
   Name VARCHAR(50)
)

CREATE TABLE Stock(
   Id INT PRIMARY KEY,
   Barcode INT,
   CONSTRAINT FK_Stock_Products FOREIGN KEY(BarcodeId)
   REFERENCES Products(BarcodeId) ON UPDATE CASCADE
)
```

Foreign Key

Cascade

E/R Diagrams

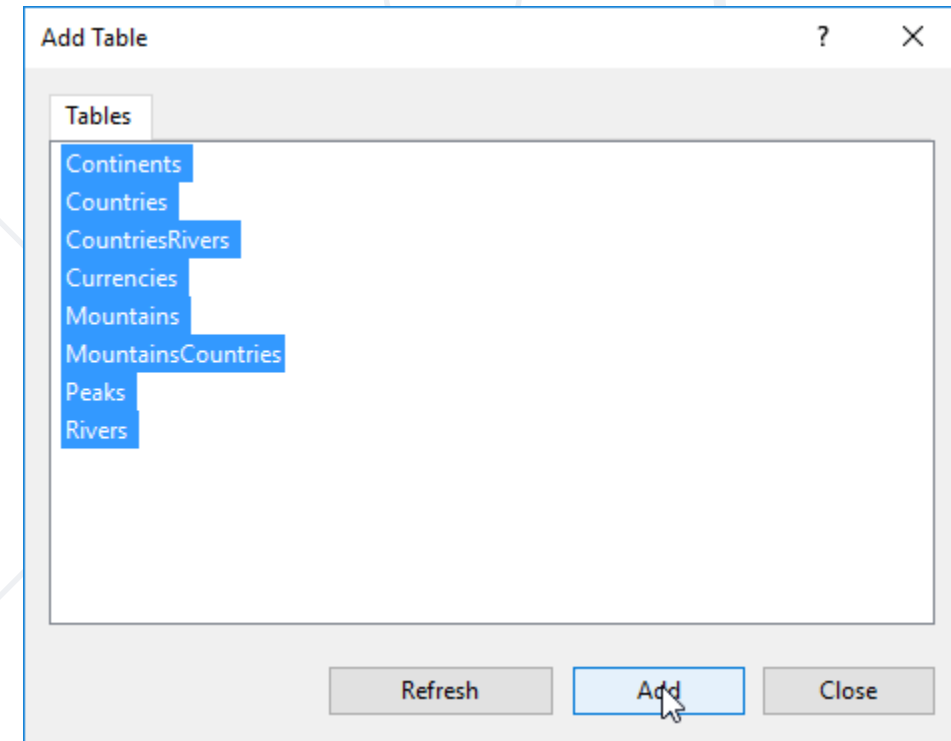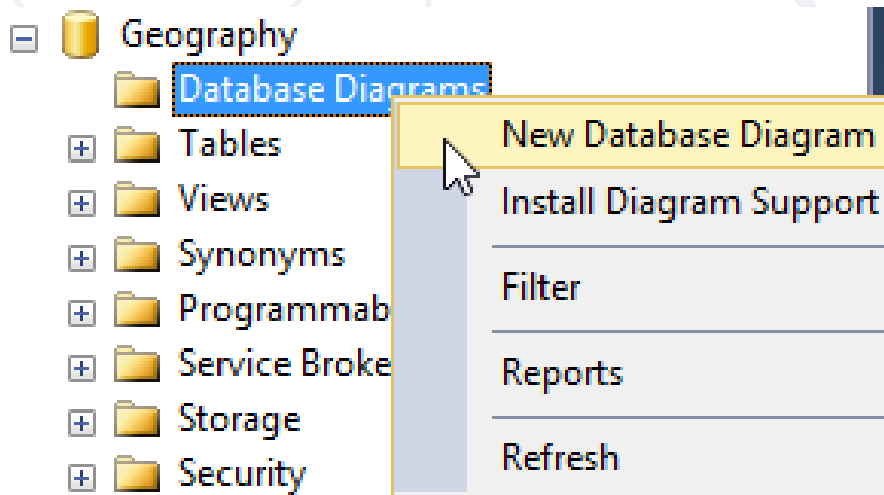Entity / Relationship Diagrams

Relational Schema

- **Relational schema** of a DB is the collection of:
    - The schemas of all tables
    - Relationships between the tables
    - Any other database objects (e.g. constraints)
- The relational schema describes the structure of the database
    - Doesn't contain data, but metadata
- Relational schemas are graphically displayed in Entity / Relationship diagrams (**E/R Diagrams**)
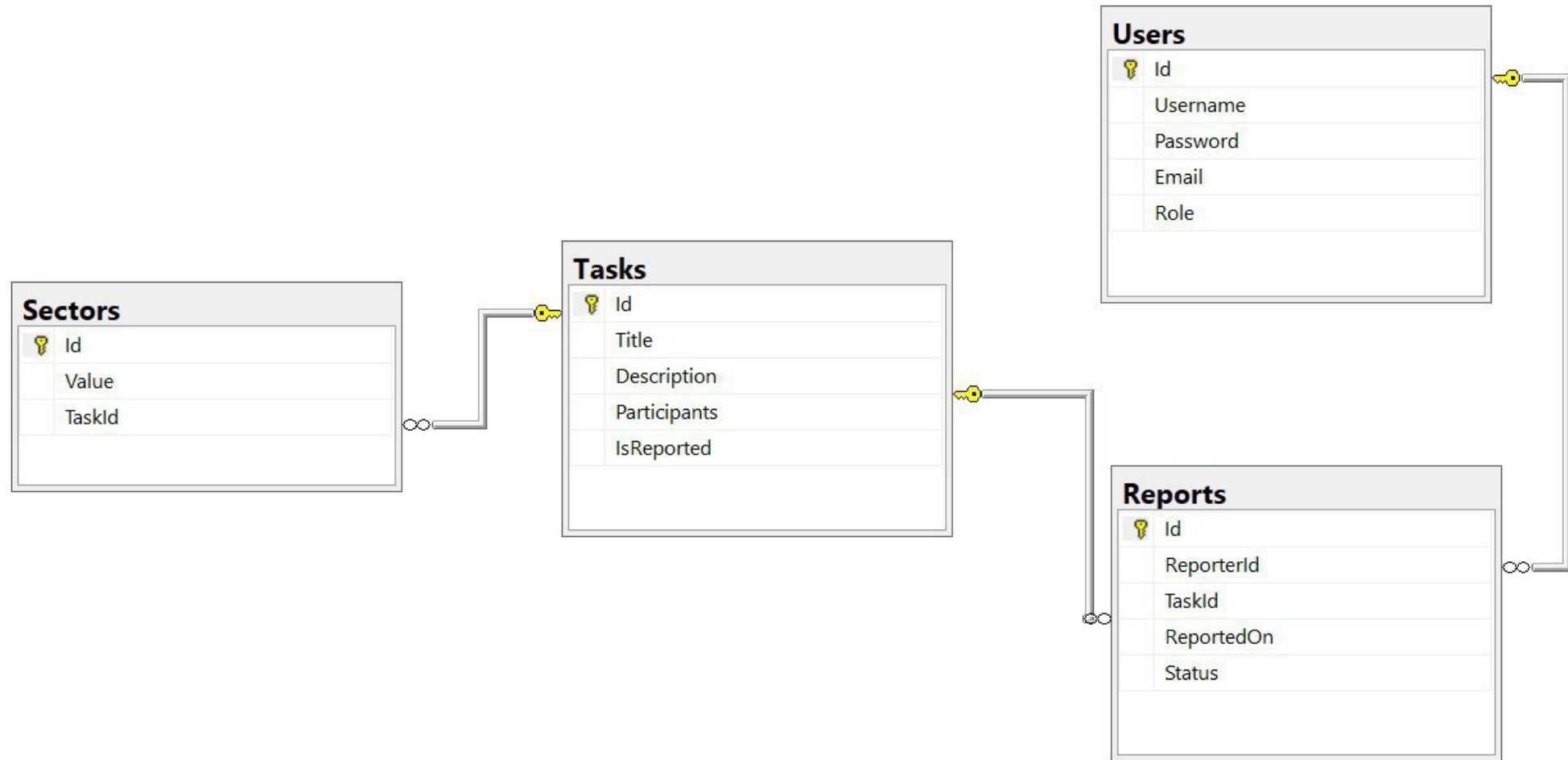
SSMS E/R Diagram: Usage

- Expand a database in **Object Explorer**

  - Right click "**Database Diagrams**" then select "**New Database Diagram**"
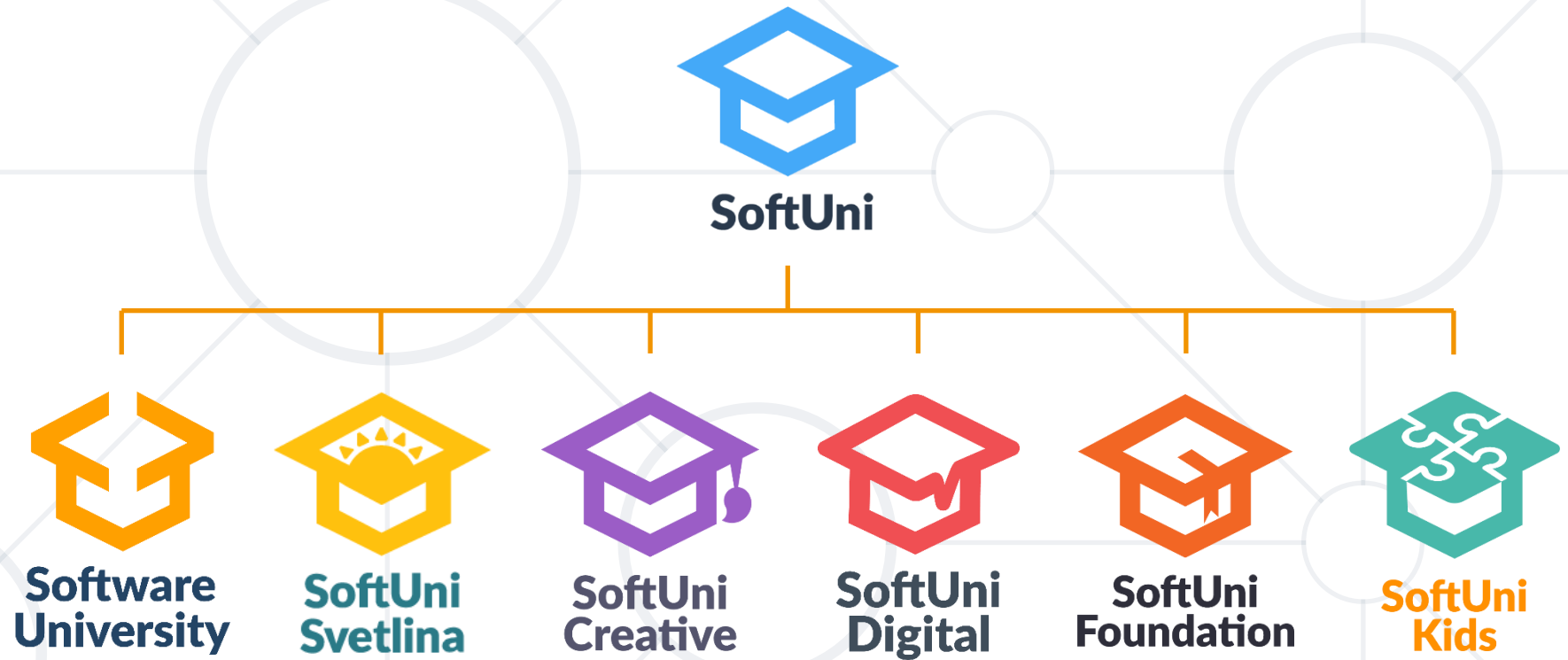
SSMS E/R Diagram

Users
- 🔑 Id
- Username
- Password
- Email
- Role

Sectors
- 🔑 Id
- Value
- TaskId

Tasks
- 🔑 Id
- Title
- Description
- Participants
- IsReported

Reports
- 🔑 Id
- ReporterId
- TaskId
- ReportedOn
- Status

Summary

1. Using **JOIN** statements to get results from multiple tables
2. Pros and cons of **Cascading**
3. Visualizing relations in a database using **E/R Diagrams**

Questions?

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