

Data and Application Project Phase - 3

Team 50 : Systum

2022111025 - Prakhar Singhal

2022101088 - Mohak Somani

2022101039 - Chirag Dhamija

2022115007 - Samagra Bharti

1 Relational Model



Figure 1: Relational Model

Relation Model

The ER Diagram initially depicted composite primary keys, such as Spider Identifier (Real Name + Dimension ID), Villain Identifier (Real Name + Dimension ID), Character Identifier (Name + Dimension ID), and Organisation Identifier (Name + Dimension ID). These composite primary keys have been streamlined into individual primary keys in the relational model: SpiderIdentifier, VillainIdentifier, CharacterIdentifier, and OrganisationIdentifier.

Additionally, a new relation named **Dimension** has been introduced to represent the composite primary keys. The **Dimension** relation encompasses all dimension keys, and each instance is assigned a unique Dimension ID within the **Dimension** relation.

2 First Normal Form

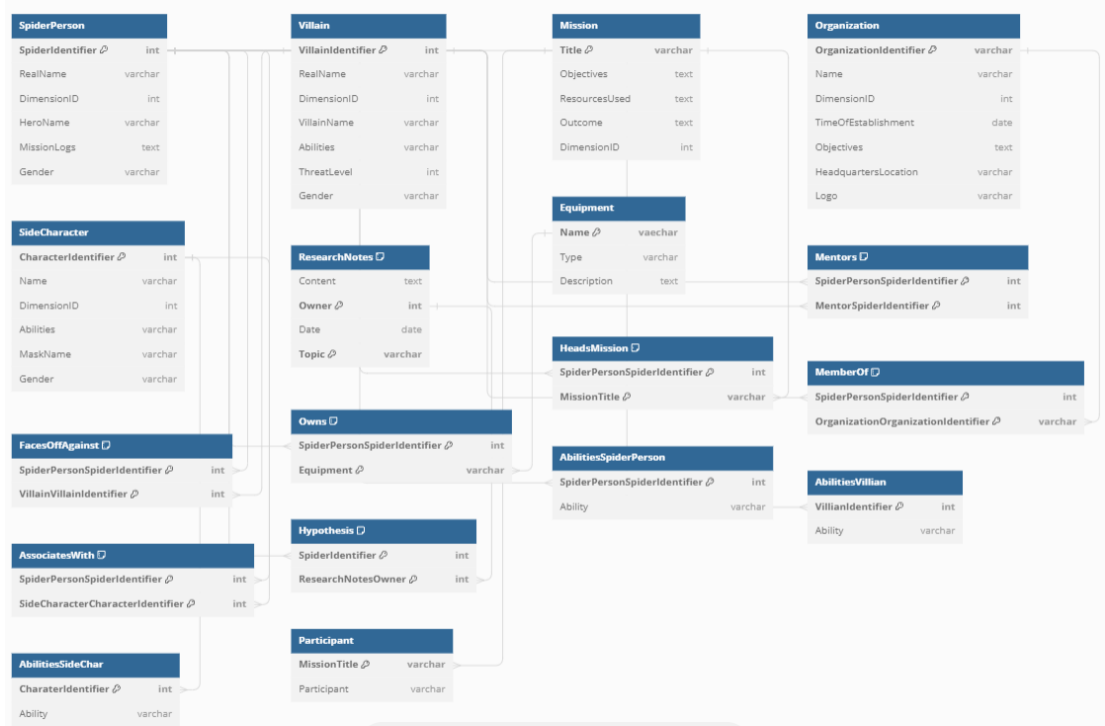


Figure 2: First Normal Form

First Normal Form

1. Deletion of Dimension Table:

- Removed the dimension table and integrated the dimension ID as an attribute for all corresponding tables.

2. Transformation of Multi-Valued Attributes:

- For both abilities and participants, multi-valued attributes have been extracted and organized into new tables to better represent the relationships.

3. Modification in Equipment Ownership:

- Eliminated the owner ID as an attribute for the equipment.
- Updated the "owns" table to reference the equipment name instead of the equipment owner.

4. Introduction of Separate Tables for Abilities:

- Introduced individual tables for Abilities, which were previously represented as multi-valued attributes.
- Created dedicated tables for Abilities related to Spider Person, Villain, and Side Character for improved data structure and clarity.

3 Second Normal Form

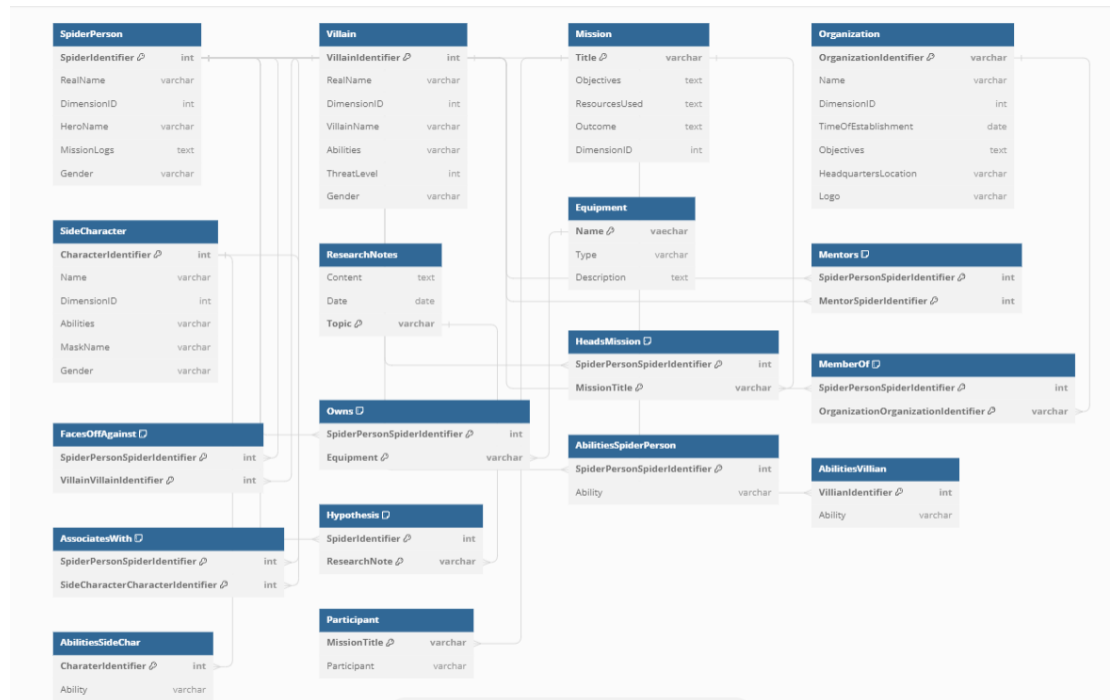


Figure 3: Second Normal Form

Second Normal Form

1. Removal of Partial Dependence on Owner Partial Key:

- Removed the attribute "Owner" from the Research Note table, eliminating the partial dependence on the owner's partial key.
- Updated the Hypothesis table to reference "Research Topic" as the primary key instead of the previous reference to "Owner."

4 Third Normal Form

1. Properties of Third Normal Form (3NF):

- The relation is in second normal form.
- Transitive dependency of non-prime attributes on any super key, should be removed.

2. Normalization Status of Relational Model:

- All tables are currently in compliance with the Third Normal Form (3NF).
- No changes are required as the existing table structures do not violate the principles of 3NF.