

Requirements Document

(Data and Applications HW-1)

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Introduction:

This mini-world represents, stores and analyses the location data and current status of the Avengers and their allies. The design and structure of this database will provide a more efficient data system for the Avengers to communicate and strategize. This mini-world is based on the movie Avengers: Infinity War.

Purpose:

The main purpose of the database is to provide Avengers and their allies with a more efficient way to communicate each other's location, coordinate and strategize accordingly. The database also gives them detailed information about their antagonist.

DB is a much more efficient approach for information retrieval and updation for this purpose compared to the traditional text files or csv approach. Information retrieval in a text file/csv takes a lot of time for a particular search, and if that happens, Avengers will certainly lose to Thanos.

Users:

This database is built primarily for use by Avengers and their allies. Avid Marvel Fans may also use the database to keep track of happenings in the Marvel Cinematic Universe.

Application:

The database is primarily used to retrieve information like the current location of the Avengers, their allies, antagonists, the site of infinity stones, the living/dead status of avengers etc. The Avengers can later use the database to strategize better and improve on their shortcomings.

Database Requirements:

we think that this assumption should more clearly be stated as :
All the events that occurred till the Avengers Infinity War are considered in the database.

Assumptions:

- All the events that occurred prior to Infinity War are assumed for the database.
- There is no concept of time travel, unlike Endgame. Hence, the database only refers to the present instant of time. Time is not an attribute of the database.

Strong Entity Types:

○ *Avengers and their allies:*

- Name (primary key)
- Team [like Star-Lord is a member of Guardians of the Galaxy]
- Weapon/Armor possessed (multivalued attribute)
- Physical features {gender, height, eye_colour, hair, unusual_feature}} (composite attribute)
- Special Abilities (multivalued attribute)
- Living status
- CurrentLocation {Galaxy, Planet, GPS_coordinates} (a composite attribute)
- Race [like Tony Stark is a human, Thor is an Asgardian]

○ *Antagonists (enemy):*

- Name (primary key)
- Physical features {gender, height, eye_colour, hair, unusual_feature}} (Composite attribute)
- Race
- Affiliation [e.g., Ebony Maw belongs to Black Order which was under Thanos]
- Weapon/Item Held (multivalued attribute)
- Special Abilities (multivalued attribute)
- Living status
- CurrentLocation {Galaxy, Planet, GPS_coordinates} (a composite attribute)

○ *Infinity Stone:*

- Name (primary key)
- Special power
- Location {Galaxy, Planet, GPS_coordinates} (a composite attribute)
- Held_by (derived attribute)

Clearly, Held_by is not a derived attribute because we can't get it's value for any of the existing attributes in the entity type Infinity Stone.

Weak Entity Types:

○ *Planets:*

- Name (partial key) mention assumption Assuming different galaxies can have planet with same name
- Galaxy
- Database of the living beings on the planet
- Status of the planet: destroyed/not

○ *Weapon/Armor/Item:*

- Weapon Name (partial key) mention assumption just for generic weapons

- Owner (derived attribute)
- Creator
- Functionality

Clearly, Owner is not a derived attribute because we can't get its value for any of the existing attributes in the entity type Infinity Stone.

Relationships:

- ◇ Relationship name: Infinity stone – “located on” – planet

Participating entities: planets, infinity stones

Degree: 2 (binary relation)

min/max ratio: (1, N) – (1, 1)

(0,N)

There can be a planet with no infinity stone for ex : The planet Titan where thanos lived had no infinity stone initially.

- ◇ Relationship name: Avengers and their allies – “control, own” – Weapon/Armor/Item

Participating entities: Avengers and their allies, Weapon/Armor/Item

Degree: 2 (binary relation)

min/max ratio: (1, N) – (1, 1)

(0,n) e.g. black widow has no weapons

a weapon can be controlled by multiple avengers (1,M)
e.g. even vision was capable of controlling thor's hammer

- ◇ Relationship name: Avengers/Antagonist – “posses” – Infinity Stone

Participating entities: Avengers/Antagonist, Infinity Stone

Degree: 2 (binary relation)

min/max ratio: (1, 6) – (1, 1)

ideally write both of these separately because they are 2 different entity types

A avenger might not have any infinity (0,6)
stone for example captain America had no infinity stones.

(0,1) some infinity stones are not possessed by either for eg: soul stone/power stone was initially not possessed by anyone

- ◇ Relationship name: Antagonist – “kill” – Avengers/allies – “using” - Infinity Stone

Participating entities: Antagonist, Infinity Stone, Avengers and their allies

Degree: 3 (ternary relation)

min/max ratio: (1, 1) – (1, N) – (1,6)

(0,N)

---> here actually we can justify their answer by some assumptions as stated in whatsapp

- ◇ Relationship name: Avengers/allies – “give” – Infinity Stone – “to” - Antagonist

Participating entities: Antagonist, Infinity Stone, Avengers and their allies

Degree: 3 (ternary relation)

min/max ratio: (1, 1) – (1, 1) – (1,6)

(1,1) - (1,1) - (1,1) <-- my opinion verify(reasoning given in whatsapp)

- ◇ Relationship name: Avengers and their allies – “live on” – planet

Participating entities: planets, Avengers and their allies

Degree: 2 (binary relation)

min/max ratio: (1, N) - (1, N)

(1,1) - (0,N) <-- my opinion verify (reasoning given in whatsapp)

Functionality Requirements:

Modifications:

Insert:

- Initially, all the information about an Avenger/allies should be inserted
- New weapons acquired by an Avenger/Antagonist

Update:

- The current Location and living status of an Avenger

- The person who possesses the infinity stones
- Database of people living on a planet

Deletion:

- Armor/Items like Spaceship once they are destroyed

Retrievals:

Aggregate:

- Total number of infinity stones acquired by Thanos – sum

Retrieval

- Retrieving information about avengers like their location, living status etc.
- Retrieving information about infinity stones like their location, possession etc.

Search

- Search for team members heading to a particular planet.

Summary

This database has detailed and structured information restricted to the mini-world of the movie 'Avengers: Infinity War'. The database works as an aid for Avengers to help them to communicate and coordinate with each other and their allies in a structured and well-coordinated manner.