Project Phase - I

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About the Mini World

*The mini world used for our database project is based on the popular e-sports **Dota 2**.*

We will store the data about the professional matches happening in Dota 2 competitions across the world. This includes the details of the match and the professional players participating in it. Based on the data, we will generate statistics regarding the match results and the aggregate performance of a professional team or an individual player.

Entities

Heroes

Heroes are the characters which are controlled by the player. They are divided into three types based on their primary attribute: Strength, Agility and Intelligence.

Unique Key: *Name*

Attributes

- Name *(e.g, Bane)*
- Base stats *(a composite attribute containing the following)*

  Base HP Regen, Base Mana Regen, Sight Range, Attack Range, Missile Speed, Attack Duration, Cast Duration, Base Attack Speed, Base Attack Time, Base Magic Resist, Turn Rate

- Faction *(either Radiant or Dire)*
- Primary Attribute *(amongst Strength, Agility, intelligence)*
- Lore *(the backstory of the hero)*

Players

A Player is a professional gamer who regularly participates in Dota 2.

Unique Key: *Username (Steam Name, Steam ID) a tuple of two key attributes*

Attributes

- Name *(name of the player)*
- Date of Birth
- Status *(e.g., active)*
- Country of Origin
- Roles *(multi-valued attribute)*
- Signature Hero *(multi-valued attribute)*
- Total Time Played
- Steam Name *(e.g. mother_of_dragons)*
- Steam ID *(a 17 digit unique number)*

Matches

2 teams, of 5 players each, fight against each other to destroy the towers. First team to destroy the main tower wins the match.

Unique Key: Match ID

Sub classes

Based on the type of match

- Amateur
- Professional

Attributes

- Duration *(total time taken for the match to finish)*
- Participating Teams *(a composite attribute containing Radiant and Dire)*
- Winner
- Loser *(derived attribute)*

- Tournament
- Most valuable player *(MVP)*

Teams

A Team is a group of Players playing a match. It is **weak** entity.

In the database, we shall include all the major teams that play Dota 2.

Partial Keys: *Players (5)*

Attributes

- Name *(e.g., Alliance)*
- Players *(5)*
- Wins *(total wins of the team)*
- Losses *(total losses of the team)*
- Rating *(a derived attribute based on win-rate)*

Abilities

A **weak** entity containing the details of several moves and abilities of the Heroes of Dota 2.

Partial Key: *Name*

Attributes

- Name *(e.g, Blink)*
- Description *(details of the ability)*
- Mana cost *(threshold of magic that can be performed by a Hero)*
- Cooldown *(duration before you can re-cast a spell)*

Relationships

Players' Characters

Relationship between **Players** and **Heroes**; which represents the matches played by a player with a certain hero and the corresponding win-rate.

Cardinality Ratio

$P : H$ (Player : Heroes)

Participation Constraints

Partial participation from Players and Heroes entity type.

Relationship Type

Binary relation between two Strong entities (Strong - Strong).

Attributes

- Win-rate: *required win-rate of a player with a certain hero*
- Matches played: *total matches the player played with a certain hero*
- Wins: *total wins of the player with a certain hero*

Heroes' Abilities

Every Hero has a certain set of abilities. This relationship connects the **Heroes** to their **Abilities**.

Cardinality Ratio

(4, A) : H (Ability : Hero)

Participation Constraints

Total participation from Abilities and Heroes entity types.

Relationship Type

Binary relation between Strong and Weak entities (Strong - Weak)

Match Description

This relationship portrays the details of a certain Match. It relates a **Match** with the two participating **Teams**, the respective **Players** and the **Heroes** they are playing with.

Cardinality Ratio

$1 : 2 : 10 : 10$ (Match : Team : Player : Hero)

This mapping is for a particular match in consideration.

Participation Constraints

- Total participation from Matches entity.

- Partial participation from Teams, Players and Heroes entity types.

Relationship Type

4 degree relationship (Strong - Weak - Strong - Strong)

Attributes

- Winner: *the winning team of the match*
- Loser: *the team that lost in the match*

Match Performance

For a given **Match**, this relationship represents the performance of the **Player**.

Cardinality Ratio

$M : P$ (Match : Player)

Relationship Type

Partial relationship from Matches and Players entity types, since not all players participate in all the matches.

Attributes:

- Kills: *total kills by a player in a match*
- Deaths: *totals deaths of a player in a match*
- Assist: *total assists by a player in a match*
- Most Valuable Player: *the best player of the match*

Team - Player

This is the identifying relationship for the team, which describes the history of a certain **Player** with the **Team** he/she is in.

Cardinality Ratio

$1 : 5$ (Team : Player)

Participation Constraints

- Total Participation from Players entity type.
- Partial participation from Teams entity type.

Relationship Type

Binary Relation (Weak - Strong)

Attributes

- Date of Joining: *date when the player joined the team*
- Participation: *number of matches played by the player as a part of the team*

Team - Team

This relationship connects a **Team** with **other Teams** that it has competed against.

Cardinality Ratio

$T : T$ (Team : Opponent Team)

Participation Constraints
Total participation from Teams entity type.

Relationship Type

Recursive Relationship

Attribute

Let X and Y be the first and the second team in consideration.

- Matches Played: *total matches played by X against Y*
- Winning Stats: *win-rate of X over Y*

Functional Requirements

The purpose of making the database was to perform operations on it in a convenient manner. The functional requirements of the mini world and the users it will serve are mostly analytical rather than retrieval.

Retrieval

Selection:

- *Getting all matches played by a team.*
- *Getting all matches played by a player.*
- *Getting all matches played between 2 given teams.*

Projection:

- *Getting all Heroes with* $\text{win-rate} \geq x,$ *for a certain player.*

- *Getting all Heroes with* $\text{win-rate} \geq x$.

Aggregate:

- *Total wins by a player for all heroes of a given primary attribute.*
- *Total time played by a player in all the matches.*
- *Total wins by a player in professional matches.*

Search:

- *Partial text match for hero.*
- *Partial text match for player.*

Analysis

Player Report:

Generating a report of all the players based on the wins.

Team Report:

Performance of all the teams based on history are generated.

Tournament Report:

- *Listing the positions and performance team wise.*
- *Listing statistics of the tournament like most played hero, hero with most win-rate*

Hero report

Statistics of all the heroes based on the matches played, wins and its popularity.