

Database Design Decisions for League of Legends Champion Database

Chingyu Chen

December 3, 2024

Introduction

This database is designed to support a comprehensive analysis of League of Legends champions. It stores champion statistics, item builds, counters, summoner spells, and skill orders while ensuring data consistency and making it easy to expand in the future. Below, we detail the table structures and the rationale behind the design decisions.

Database Schema Overview

The database consists of the following tables:

- **champions:** Stores basic information about champions.
- **champion_stats:** Tracks win, pick, and ban rates, along with tier information for champions by position and date.
- **items:** Stores champion-specific item combinations and their associated statistics.
- **counters:** Records champion counters with win rates and detailed comments.
- **summoner_spells:** Tracks summoner spell combinations and their associated statistics.
- **skill_orders:** Stores skill leveling sequences and associated performance statistics.
- **positions:** Defines roles such as Top, Middle, Jungle, Bottom, and Support.
- **spells_1 & spells_2:** Store distinct summoner spells for flexibility in query optimization.

Key Design Choices

- **Normalization:** Tables are normalized to minimize redundancy and improve data integrity, for instance spells_1, spells_2, positions, champions, these tables are all for normalization purpose.
- **Data Types:**
 - **VARCHAR:** Used for data such as champion names, positions, and skill names due to its flexibility in handling variable-length text and its efficient storage compared to CHAR.
 - **DECIMAL:** Used for percentages like win, pick, and ban rates to ensure precision in calculations and avoid floating-point errors, which is critical for accurate statistical analysis.
- **Scalability:** Designed to accommodate future expansions (e.g., new positions, spells, or champion data).
- **Primary table:** Table champions is the primary table that links to five important tables (champion stats, items, counters, summoner spells, skill orders) and also for the normalization purpose.
- **other decisions:** I choose not to include counter type in counters table which I originally add in it, since I already prove the counter relationship between champions in comment field in counters table, and also if I add the counter type, I will still need to normalize it by adding another table and I think it is not necessary.

SQL Implementation

Below is the SQL script for creating the database schema:

Schema Definition

```
1 CREATE TABLE champions (  
2     id INT AUTO_INCREMENT PRIMARY KEY,  
3     name VARCHAR(255)  
4 ) AUTO_INCREMENT = 1;  
5  
6 CREATE TABLE champion_stats (  
7     id INT AUTO_INCREMENT PRIMARY KEY,  
8     champion_id INT NOT NULL,  
9     position_id INT NOT NULL,  
10    win_rate DECIMAL(5, 2),  
11    pick_rate DECIMAL(5, 2),  
12    ban_rate DECIMAL(5, 2),  
13    tier INT,  
14    FOREIGN KEY (champion_id) REFERENCES champions(id) ON DELETE CASCADE,  
15    FOREIGN KEY (position_id) REFERENCES positions(id) ON DELETE CASCADE  
16 );  
17  
18 CREATE TABLE items (  
19     id INT AUTO_INCREMENT PRIMARY KEY,  
20     champion_id INT NOT NULL,  
21     item_combination VARCHAR(255),  
22     pick_rate DECIMAL(5, 2),  
23     game_count INT,  
24     win_rate DECIMAL(5, 2),  
25     FOREIGN KEY (champion_id) REFERENCES champions(id) ON DELETE CASCADE  
26 );  
27  
28 CREATE TABLE counters (  
29     id INT AUTO_INCREMENT PRIMARY KEY,  
30     champion_id INT NOT NULL,  
31     counter_champion_id INT NOT NULL,  
32     win_rate DECIMAL(5, 2),  
33     comments VARCHAR(255),  
34     FOREIGN KEY (champion_id) REFERENCES champions(id) ON DELETE CASCADE,  
35     FOREIGN KEY (counter_champion_id) REFERENCES champions(id) ON DELETE  
36         CASCADE  
37 );  
38  
39 CREATE TABLE summoner_spells (  
40     id INT AUTO_INCREMENT PRIMARY KEY,  
41     champion_id INT NOT NULL,  
42     spell_1_id INT NOT NULL,  
43     spell_2_id INT NOT NULL,  
44     pick_rate DECIMAL(5, 2),  
45     win_rate DECIMAL(5, 2),  
46     games_played INT,  
47     FOREIGN KEY (champion_id) REFERENCES champions(id) ON DELETE CASCADE,  
48     FOREIGN KEY (spell_1_id) REFERENCES spells_1(id) ON DELETE CASCADE,  
49     FOREIGN KEY (spell_2_id) REFERENCES spells_2(id) ON DELETE CASCADE  
50 );  
51  
52 CREATE TABLE skill_orders (  
53     id INT AUTO_INCREMENT PRIMARY KEY,  
54     champion_id INT NOT NULL,  
55     skill_order VARCHAR(50),  
56     pick_rate FLOAT,  
57     win_rate DECIMAL(5, 2),
```

```

57     games_played INT,
58     FOREIGN KEY (champion_id) REFERENCES champions(id) ON DELETE CASCADE
59 );
60
61 CREATE TABLE positions (
62     id INT AUTO_INCREMENT PRIMARY KEY,
63     position VARCHAR(50) NOT NULL
64 );
65
66 INSERT INTO positions (position) VALUES
67 ('Top'),
68 ('Jungle'),
69 ('Middle'),
70 ('Bottom'),
71 ('Support');
72 CREATE TABLE spells_1 (
73     id INT AUTO_INCREMENT PRIMARY KEY,
74     name VARCHAR(50) NOT NULL
75 );
76 INSERT INTO spells_1 (name) VALUES
77 ('Flash'),
78 ('Ignite'),
79 ('Teleport'),
80 ('Smite'),
81 ('Exhaust'),
82 ('Barrier'),
83 ('Heal'),
84 ('Ghost'),
85 ('Clarity'),
86 ('Cleanse');
87 CREATE TABLE spells_2 (
88     id INT AUTO_INCREMENT PRIMARY KEY,
89     name VARCHAR(50) NOT NULL
90 );
91 INSERT INTO spells_2 (name) VALUES
92 ('Flash'),
93 ('Ignite'),
94 ('Teleport'),
95 ('Smite'),
96 ('Exhaust'),
97 ('Barrier'),
98 ('Heal'),
99 ('Ghost'),
100 ('Clarity'),
101 ('Cleanse');

```

Documentation picture & ERD

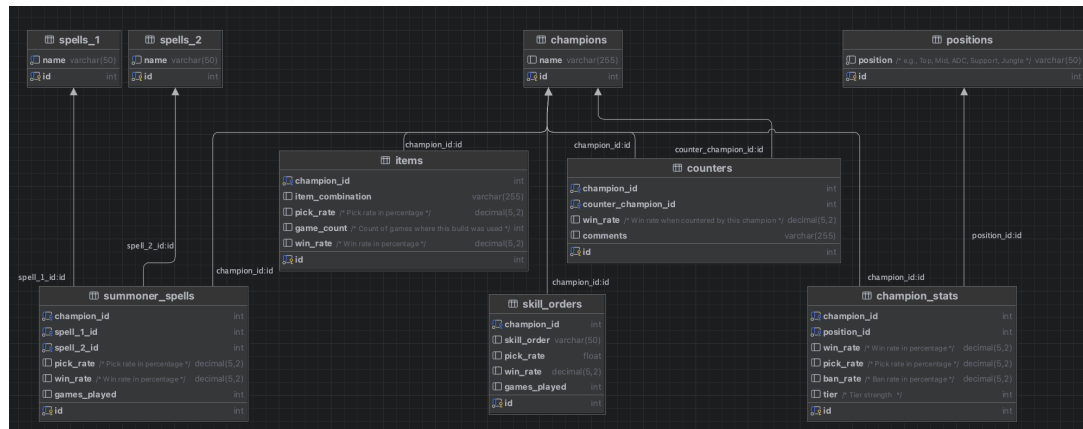


Figure 1: ERD

Document for champions			
Field Name	Data Type	Values Meaning	Notes
id	INT	id for the champion	Primary Key
name	VARCHAR(255)	name of the champion	
Document for champion_stats			
Field Name	Data Type	Values Meaning	Notes
id	INT	id for the champion_stats	Primary Key
champion_id	INT	id for the champion	Foreign Key (references champions.id)
position_id	INT	id for the position	Foreign Key (references positions.id)
win_rate	DECIMAL(5, 2)	overall win rate in percentage	
pick_rate	DECIMAL(5, 2)	overall pick rate in percentage	
ban_rate	DECIMAL(5, 2)	overall ban rate in percentage	
tier	INT	tier strength	1 > 2 > 3 > 4 > 5 (1 is the best)
Document for items			
Field Name	Data Type	Values Meaning	Notes
id	INT	id for the items	Primary Key
champion_id	INT	id for the champion	Foreign Key (references champions.id)
item_combination	VARCHAR(255)	list of items	
pick_rate	DECIMAL(5, 2)	this item list's pick rate in percentage	
game_count	INT	number of games where this build was used	
win_rate	DECIMAL(5, 2)	win rate in percentage when use this item combination	
Document for counters			
Field Name	Data Type	Values Meaning	Notes
id	INT	id for counters	Primary Key
champion_id	INT	id for the champion	Foreign Key (references champions.id)
counter_champion_id	INT	id for the counter champion	Foreign Key (references champions.id)
win_rate	DECIMAL(5, 2)	win rate for champion_id counter counter_champion_id	
comments	VARCHAR(255)	Additional notes or observations	ex: champion_id counter counter_champion_id
Document for summoner_spells			
Field Name	Data Type	Values Meaning	Notes
id	INT	id for summoner_spells	Primary Key
champion_id	INT	id for the champion	Foreign Key (references champions.id)
spell_1_id	INT	id for the spell_1	Foreign Key (references spells_1.id)
spell_2_id	INT	id for the spell_2	Foreign Key (references spells_2.id)
win_rate	DECIMAL(5, 2)	win rate in percentage	
pick_rate	DECIMAL(5, 2)	pick rate in percentage	
game_played	INT	number of games where this build was used	
Document for skill_orders			
Field Name	Data Type	Values Meaning	Notes
id	INT	id for skill_orders	Primary Key
champion_id	INT	id for the champion	Foreign Key (references champions.id)
skill_order	VARCHAR(50)	the order of the skills	
win_rate	DECIMAL(5, 2)	win rate in percentage	
pick_rate	DECIMAL(5, 2)	pick rate in percentage	
game_played	INT	number of games where this build was used	
Document for positions			
Field Name	Data Type	Values Meaning	Notes
id	INT	id for positions	Primary Key
position	VARCHAR(50)	Five different lane in game	ex: Top, Jungle, Middle, ...
Document for spells_1			
Field Name	Data Type	Values Meaning	Notes
id	INT	id for spells_1	Primary Key
name	VARCHAR(50)	The name of the spell	
Document for spells_2			
Field Name	Data Type	Values Meaning	Notes
id	INT	id for spells_2	Primary Key
name	VARCHAR(50)	The name of the spell	

Figure 2: Documentation