Sprawozdanie Projekt 1

Baza danych turniejów League of Legends

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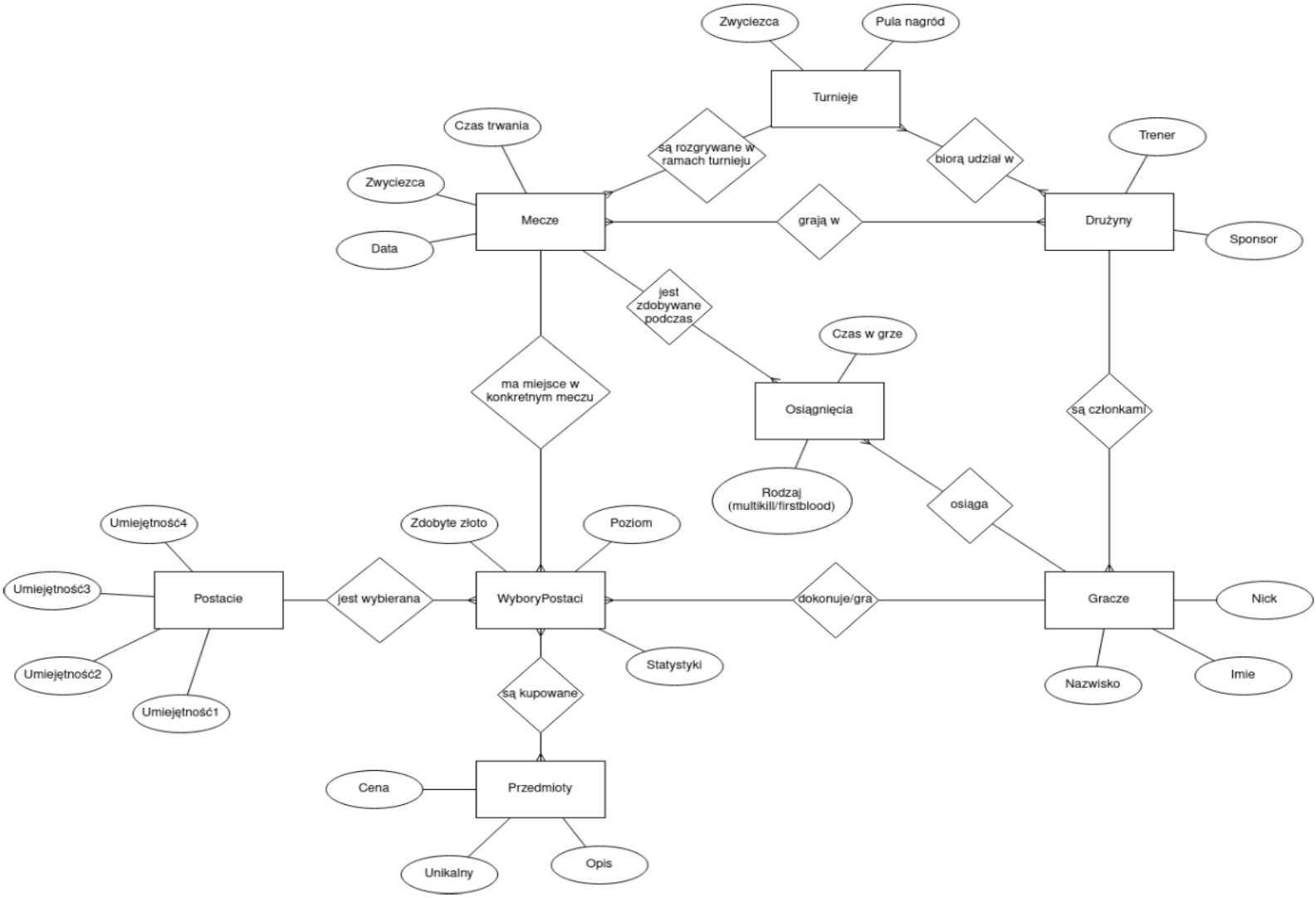
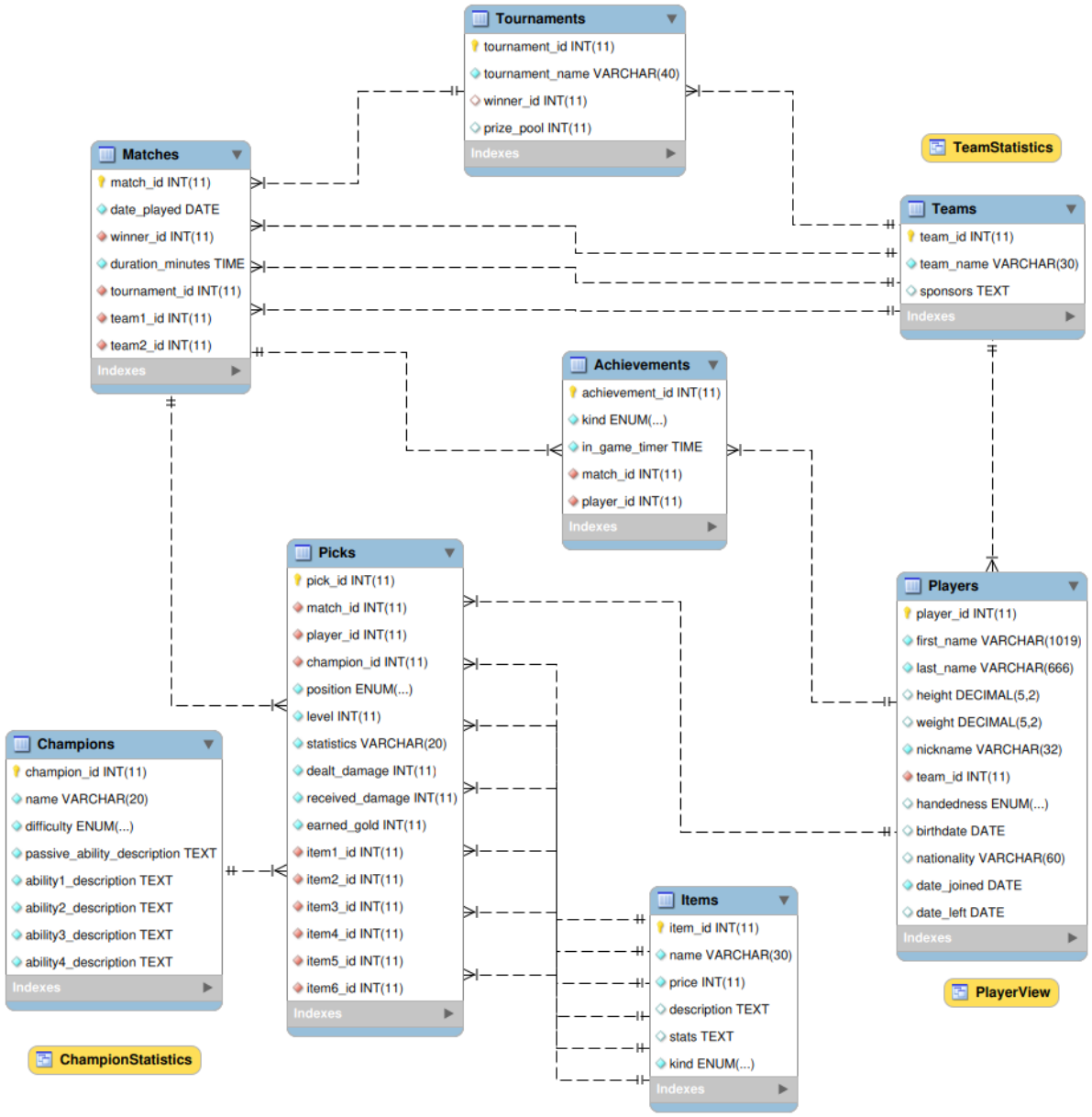
Diagram ERD



Schemat logiczny



Perspektywy

W ramach perspektyw zostały utworzone przykładowe trzy.

```sql
--perspektywy
CREATE VIEW if not exists PlayerView AS
SELECT
    player_id,
    nickname,
    team_id,
    handedness,
    nationality,
    date_joined,
    date_left
FROM Players;

CREATE VIEW if not exists TeamStatistics AS
SELECT
    T.team_id,
    T.team_name,
    COUNT(M.match_id) AS total_matches,
    SUM(CASE WHEN T.team_id = M.winner_id THEN 1 ELSE 0 END) AS total_wins,
    (COUNT(M.match_id) - SUM(CASE WHEN T.team_id = M.winner_id THEN 1 ELSE 0 END)) AS total_losses,
    SEC_TO_TIME(AVG(TIME_TO_SEC(M.duration_minutes))) AS avg_match_duration
FROM Teams T
LEFT JOIN Matches M ON T.team_id = M.team1_id OR T.team_id = M.team2_id
GROUP BY T.team_id, T.team_name;

CREATE VIEW if not exists ChampionStatistics AS
SELECT
    C.champion_id,
    C.name AS champion_name,
    C.difficulty AS champion_difficulty,
    COUNT(P.champion_id) AS total_picks,
    SUM(P.dealt_damage) AS total_dealt_damage,
    AVG(P.dealt_damage) AS average_dealt_damage,
    SUM(P.received_damage) AS total_received_damage,
    AVG(P.received_damage) AS average_received_damage,
    SUM(P.earned_gold) AS total_earned_gold,
    AVG(P.earned_gold) AS average_earned_gold
FROM Champions C
LEFT JOIN Picks P ON C.champion_id = P.champion_id
GROUP BY C.champion_id, champion_name, champion_difficulty;
```

```
MariaDB [(none)]> select * from league.PlayerView;
+-----------+-----------------+---------+------------+-------------+-------------+------------+
| player_id | nickname        | team_id | handedness | nationality | date_joined | date_left  |
+-----------+-----------------+---------+------------+-------------+-------------+------------+
|         1 | Blastmaster     |       1 | Right      | American    | 2022-01-15  | NULL       |
|         2 | ShadowStriker   |       2 | Left       | Canadian    | 2022-03-10  | 2023-04-20 |
|         3 | SteelJuggernaut |       1 | Right      | British     | 2021-12-05  | NULL       |
|         4 | SwiftSerpent    |       3 | Right      | Australian  | 2022-02-20  | NULL       |
|         5 | PhantomBlade    |       2 | Left       | South Korean| 2022-01-05  | NULL       |
|         6 | ViperQueen      |       4 | Right      | Mexican     | 2022-01-30  | NULL       |
|         7 | IronKnight      |       3 | Left       | Spanish     | 2022-04-10  | NULL       |
|         8 | StormPhoenix    |       1 | Right      | Vietnamese  | 2022-03-05  | 2023-05-18 |
|         9 | ShadowSword     |       4 | Right      | South Korean| 2022-02-15  | NULL       |
|        10 | InfernoWielder  |       2 | Right      | Indian      | 2022-01-02  | NULL       |
+-----------+-----------------+---------+------------+-------------+-------------+------------+
10 rows in set (0.001 sec)
```

Pierwsza z nich jest perspektywą ukrywającą wrażliwe dane z tabeli `Players`.

```
MariaDB [(none)]> select * from league.TeamStatistics;
+---------+-------------+---------------+------------+--------------+--------------------+
| team_id | team_name   | total_matches | total_wins | total_losses | avg_match_duration |
+---------+-------------+---------------+------------+--------------+--------------------+
|       1 | DWG KIA     |             2 |          1 |            1 | 23:45:00.0000      |
|       2 | Team Liquid |             2 |          0 |            2 | 26:36:00.0000      |
|       3 | T1          |             2 |          1 |            1 | 26:31:00.0000      |
|       4 | G2          |             2 |          0 |            2 | 29:22:00.0000      |
+---------+-------------+---------------+------------+--------------+--------------------+
4 rows in set (0.003 sec)
```

Druga przedstawia statystyki drużyn takie jak ilość rozegranych meczy, ilość wygranych, przegranych i średni czas meczu dla danej drużyny.

Użytkownicy i uprawnienia

W ramach użytkowników i uprawnień zostali stworzeni dwaj użytkownicy i dwie role. Jedna rola to `table_updater` który jak sama nazwa wskazuje może aktualizować tabele - wprowadzać nowe dane odnośnie meczy itd. Ta rola została nadana użytkownikowi `official_analytic`. Druga rola to `table_viewer` czyli osoba mogąca przeglądać dane z wyłączeniem tabeli `Players` w której znajdują się wrażliwe dane graczy. Zamiast tego została tej roli udostępniona perspektywa umożliwiająca wgląd w tabelę `Players` bez wrażliwych danych.

```sql
create role if not exists table_updater;
grant select, insert, update, delete, create temporary tables, execute
  on league.*
  to table_updater;
create user if not exists 'official_analytic'@'localhost' identified by 'admin';
grant table_updater
  to 'official_analytic'@'localhost';


create role if not exists table_viewer;

GRANT SELECT ON league.Teams TO table_viewer;
GRANT SELECT ON league.Tournaments TO table_viewer;
GRANT SELECT ON league.Matches TO table_viewer;
GRANT SELECT ON league.Achievements TO table_viewer;
GRANT SELECT ON league.Champions TO table_viewer;
GRANT SELECT ON league.Items TO table_viewer;
GRANT SELECT ON league.Picks TO table_viewer;
GRANT SELECT ON league.PlayerView TO table_viewer;
GRANT SELECT ON league.ChampionStatistics TO table_viewer;
GRANT SELECT ON league.TeamStatistics TO table_viewer;

grant table_viewer
  to 'viewer'@'localhost';

SHOW GRANTS FOR 'viewer'@'localhost';
SHOW GRANTS FOR 'official_analytic'@'localhost';

SHOW GRANTS FOR table_viewer;
SHOW GRANTS FOR table_updater;
```

Wynik tego zapytania to:

```
Grants for viewer@localhost
GRANT `table_viewer` TO `viewer`@`localhost`
GRANT USAGE ON *.* TO `viewer`@`localhost` IDENTIFIED BY PASSWORD '*4ACFE3202A5FF5CF467898FC58AAB1D61502
Grants for official_analytic@localhost
GRANT `table_updater` TO `official_analytic`@`localhost`
GRANT USAGE ON *.* TO `official_analytic`@`localhost` IDENTIFIED BY PASSWORD '*4ACFE3202A5FF5CF467898FC5
Grants for table_viewer
GRANT USAGE ON *.* TO `table_viewer`
GRANT SELECT ON `league`.* TO `table_viewer`
GRANT SELECT ON `league`.`TeamStatistics` TO `table_viewer`
GRANT SELECT ON `league`.`Teams` TO `table_viewer`
GRANT SELECT ON `league`.`Achievements` TO `table_viewer`
GRANT SELECT ON `league`.`Champions` TO `table_viewer`
GRANT SELECT ON `league`.`ChampionStatistics` TO `table_viewer`
GRANT SELECT ON `league`.`Picks` TO `table_viewer`
GRANT SELECT ON `league`.`Items` TO `table_viewer`
GRANT SELECT ON `league`.`Matches` TO `table_viewer`
GRANT SELECT ON `league`.`PlayerView` TO `table_viewer`
GRANT SELECT ON `league`.`Tournaments` TO `table_viewer`
Grants for table_updater
GRANT USAGE ON *.* TO `table_updater`
GRANT SELECT, INSERT, UPDATE, DELETE, CREATE TEMPORARY TABLES, EXECUTE ON `league`.* TO `table_updater`
```

Przykładowe testy uprawnień:

```
MariaDB [(none)]> set role table_viewer;
Query OK, 0 rows affected (0.000 sec)

MariaDB [(none)]> select * from league.Achievements;
+----------------+-------------+---------------+----------+-----------+
| achievement_id | kind        | in_game_timer | match_id | player_id |
+----------------+-------------+---------------+----------+-----------+
|              1 | FirstBlood  | 10:05:00      |        1 |         1 |
|              2 | DoubleKill  | 25:30:00      |        2 |         2 |
|              3 | TripleKill  | 30:15:00      |        3 |         3 |
|              4 | QuadraKill  | 45:20:00      |        4 |         4 |
|              5 | PentaKill   | 58:45:00      |        1 |         5 |
|              6 | DragonSteal | 36:40:00      |        1 |         1 |
+----------------+-------------+---------------+----------+-----------+
6 rows in set (0.001 sec)

MariaDB [(none)]> select * from league.Players;
ERROR 1142 (42000): SELECT command denied to user 'viewer'@'localhost' for table `league`.`Players`
MariaDB [(none)]>
```

Przykładowe zapytania

```sql
SELECT
    C.champion_id,
    C.name AS champion_name,
    COUNT(M.match_id) AS total_matches,
    SUM(CASE WHEN M.winner_id = P.champion_id THEN 1 ELSE 0 END) AS matches_won,
    SUM(CASE WHEN M.winner_id = P.champion_id THEN 1 ELSE 0 END) / COUNT(M.match_id) AS winrate
FROM Champions AS C
LEFT JOIN Picks AS P ON C.champion_id = P.champion_id
LEFT JOIN Matches AS M ON P.match_id = M.match_id
GROUP BY C.champion_id
ORDER BY winrate DESC;
```

Pierwsze zapytanie oblicza winrate dla każdego Championa i wypisuje Championy od największego winrate do najmniejszego.

champion_id	champion_name	total_matches	matches_won	winrate
2	Garen	1	1	1.0000
1	Ahri	1	1	1.0000
15	Sett	1	0	0.0000
10	Yasuo	1	0	0.0000
18	Warwick	1	0	0.0000
13	Yone	1	0	0.0000
7	Zed	1	0	0.0000
20	Nautilus	1	0	0.0000
8	Caitlyn	1	0	0.0000
21	Samira	1	0	0.0000
9	Ekko	0	0	NULL
22	Kha'Zix	0	0	NULL
3	Thresh	0	0	NULL
16	Ashe	0	0	NULL
23	Sylas	0	0	NULL
4	Darius	0	0	NULL
17	Nami	0	0	NULL
11	Katarina	0	0	NULL
24	Fiora	0	0	NULL
5	Jinx	0	0	NULL
12	Vi	0	0	NULL
25	Sona	0	0	NULL
6	Lux	0	0	NULL
19	Syndra	0	0	NULL
14	Seraphine	0	0	NULL

25 rows in set, 30 warnings (0.001 sec)

```sql
SELECT
    T.team_id,
    T.team_name,
    COUNT(A.achievement_id) AS total_achievements
FROM Teams AS T
LEFT JOIN Players AS P ON T.team_id = P.team_id
LEFT JOIN Achievements AS A ON P.player_id = A.player_id
GROUP BY T.team_id
ORDER BY total_achievements DESC
LIMIT 1;
```

Drugie zapytanie wypisuje jedną drużynę, której gracze zdobyli najwięcej achievementów w trakcie swoich gier.

```
+---------+-----------+--------------------+
| team_id | team_name | total_achievements |
+---------+-----------+--------------------+
|       1 | DWG KIA   |                  3 |
+---------+-----------+--------------------+
1 row in set (0.001 sec)
```

Indeksy

Zostały stworzone dwa indeksy z myślą o przydatnych funkcjach w przyszłości.

```
CREATE INDEX idx_date_played ON Matches (date_played);
CREATE INDEX idx_team_membership ON Players (team_id, date_joined, date_left);
```

Pierwszy z nich ma umożliwiać szybkie przefiltrowanie listy meczów w poszukiwaniu meczów rozegranych w określonym okresie czasu, np. w ostatnich dwóch tygodniach. Drugi z nich to indeks kompozytowy na tabeli Players obejmujący kolumny `team_id`, `date_joined`, `date_left` aby szybko odpowiadać na pytania typu “Jaki był skład drużyny X w przedziale czasowym od A do B?”.

Napotkane problemy i rozwiązania

Jedyne problemy na jakie natknąłem się podczas realizacji tego projektu miały miejsce podczas ustawiania uprawnień do poszczególnych tabel. Po stworzeniu roli, nadaniu jej odpowiednich uprawnień i nadaniu jej użytkownikowi. Użytkownik nadal nie miał dostępu do tabel, do których powinien mieć dostęp z tytułu nadanej mu roli. Aby rozwiązać ten problem należało “wybrać” tę rolę będąc zalogowanym do szbd jako ten użytkownik np. komendą:

```
MariaDB [(none)]> set role table_viewer;
Query OK, 0 rows affected (0.000 sec)
```