BispOSet: Chess Match and Titled Player Statistic Organized Dataset

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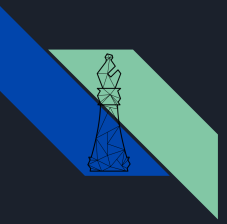
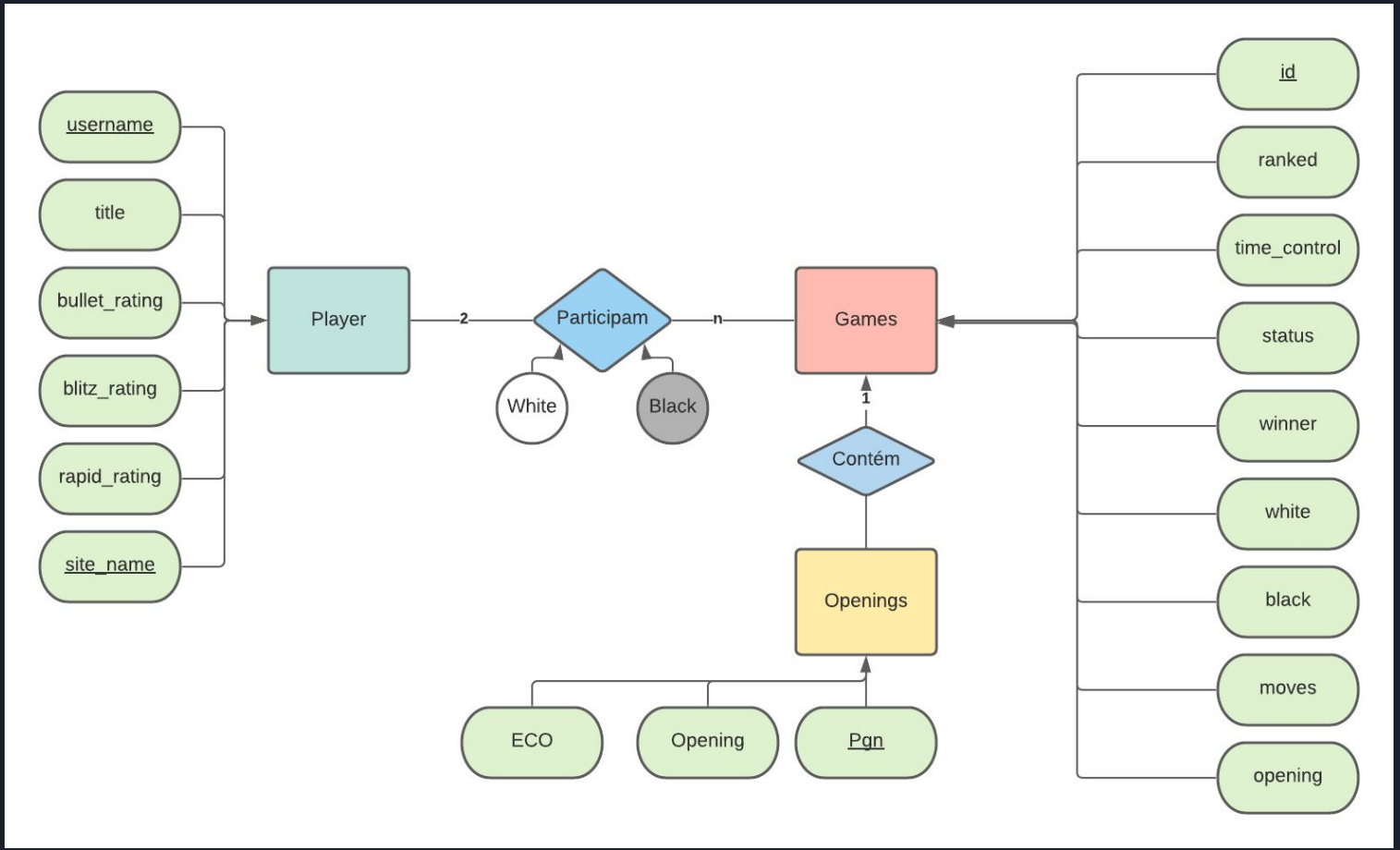


Contexto/Motivação

- O dataset foi criado com a motivação de criar um banco de dados expansivo e unificado que compreende o jogo de xadrez jogado por jogadores com títulos formais.
- O dataset busca reunir informações sobre vários aspectos e facetas do xadrez, como ranks, número de jogos, estatística e informações sobre as partidas jogadas.

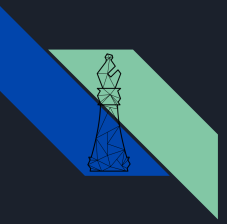
Modelo Conceitual



Modelos Lógicos

- Os dados seriam organizados de uma forma fácil e compreensiva, sendo divididos entre diversos arquivos .csv, com associações sendo feitas a partir dos IDs únicos dos jogadores.
- O modelo lógico utilizado seriam tabelas.

Players



index	USERNAME	TITLE	BULLET	BLITZ	RAPID	SITENAME
0	DrGrekenstein	GM	3172	2901	0	lichess
1	Blazinq	FM	2504	2064	0	lichess
2	Federicov93	GM	2083	2506	2602	lichess
3	EltajSafarli	GM	2635	1565	2533	lichess
4	HouseMartell	FM	2404	1963	1856	lichess
5	Elda64	GM	2512	2381	2437	lichess

Openings

index	ECO	OPENING	PGN
0	A00	Amar Gambit	1. Nh3 d5 2. g3 e5 3. f4 Bxh3 4. Bxh3 exf4
1	A00	Amar Opening	1. Nh3
2	A00	Amar Opening: Gent Gambit	1. Nh3 d5 2. g3 e5 3. f4 Bxh3 4. Bxh3 exf4 5. O-O fxg3 6. hxg3
3	A00	Amar Opening: Paris Gambit	1. Nh3 d5 2. g3 e5 3. f4

Games

index	ID	RANKED	TIME_CONTROL	RESULT	WINNER	WHITE	BLACK	MOVES
0	yE8JgYy7	true	ultraBullet	resigned	OhanyanEminChess	OhanyanEminChess	amirsose97	1. e4 e6 2. Nc3 d6 3. d4 c5 4. dxc5 dxc5 5. Qxd8+ Kxd8 6. Be3 Nc6
1	hRZbHjWW	true	ultraBullet	resigned	OhanyanEminChess	OhanyanEminChess	amirsose97	1. e4 e6 2. Nc3 c5 3. d4 cxd4 4. Qxd4 Nc6 5. Qxg7 Nf6 6. Qxh8 Nx
2	c4rjYaKL	true	blitz	resigned	OhanyanEminChess	UnknownGM2800	OhanyanEminChess	1. e4 e5 2. Nf3 Nc6 3. Bc4 Nf6 4. Ng5 Bc5 5. Nxf7 Bxf2+ 6. Kf1 Qe
3	y4rl9Htq	true	blitz	resigned	OhanyanEminChess	OhanyanEminChess	UnknownGM2800	1. e4 e5 2. Nc3 Nc6 3. Bc4 f5 4. d3 Nf6 5. Nf3 Bb4 6. O-O Bxc3 7. b
4	LOo4GZ0l	true	ultraBullet	resigned	YMOG43	OhanyanEminChess	YMOG43	1. e4 e5 2. Nc3 Nf6 3. f4 Nc6 4. f5 d5 5. d3 d4 6. Nce2 h5 7. Nf3 h4
5	Cv796Mbe	true	bullet	resigned	OhanyanEminChess	OhanyanEminChess	Silouan_Athonita	1. e4 g6 2. Nc3 d6 3. d4 b5 4. Bxb5+ c6 5. Bd3 Nd7 6. f4 Bg7 7. e5

Modelo Relacional

- Games(Id, Ranked, Time_Control, Result, Winner, White, Black, Moves, Openings, SiteName)
    - CHE: Openings para Openings(PGN)
    - CHE: Winner para Players(Username)
    - CHE: White para Players(Username)
    - CHE: Black para Players(Username)
- Players(Username, Title, Bullet, Blitz, Rapid, SiteName)
- Openings(ECO, Opening, PGN)

Evolução do Projeto

- Principais problemas encontrados:
  - Tamanho dos arquivos
    - Limitação de tamanho máximo por arquivo GitHub
  - Notação não uniforme para PGN
    - Sites diferentes utilizam notações diferentes
  - Complexidade da classificação de aberturas
    - Existem diversas aberturas com começos semelhantes

Fontes de dados e ferramentas utilizadas

- https://lichess.org/api - API
- https://lichess.org/blog/X0I7phAAACQAMCfH/titled-arena-announcements - extração de dados de Página Web

```
player_df = pd.DataFrame(columns=['username','title','bullet_rating','blitz_rating','rapid_rating'])
```
[5] Python

```
for curr_tag in titled_tournaments['tag']:
    tour_results = client.tournaments.stream_results(curr_tag)
    tour_json = list(tour_results)
    for i in tour_json:
        try:
            temp_df = pd.DataFrame({'username':[i['username']],'title':[i['title']],'bullet_rating':[0],'blitz_rating':[0],'r
            player_df = pd.concat([player_df,temp_df])
        except:
            test_ratings = 0
```
[6] Python

Lichess player fetcher

```
player_df
```

	username	title	bullet_rating	blitz_rating	rapid_rating
0	alireza2003	GM	3126	2823	1756
1	penguingim1	GM	2856	2828	2555
2	Night-King96	GM	2984	2857	0
3	Leon_Livaic	IM	0	0	0
4	Vladimirovich9000	GM	2960	2900	0
...	...	...	...	...	...
4789	B_nn_t	FM	2280	2422	2130
4790	royalblue04	FM	1977	2307	2426
4791	hAnN18Al	FM	2137	2081	0
4792	Bwert	CM	2122	2188	1675
4793	Pavelkost87	FM	1722	2495	2172

4794 rows × 5 columns

```
start = 27
end = 30
for j in players[start:end]['username']:
    currgames = list(client.games.export_by_player(j))
    for i in currgames:
        try:
            if 'winner' in i:
                temp = {
                    'id':i['id'],
                    'ranked':i['rated'],
                    'time_control': i['speed'],
                    'status': i['status'],
                    'winner': i['winner'],
                    'white': (i['players']['white']['user']['name']),
                    'black': (i['players']['black']['user']['name']),
                    'moves': i['moves']
                }
            else:
                temp = {
                    'id':i['id'],
                    'ranked':i['rated'],
                    'time_control': i['speed'],
                    'status': i['status'],
                    'winner': i['status'],
                    'white': (i['players']['white']['user']['name']),
                    'black': (i['players']['black']['user']['name']),
                    'moves': i['moves']
                }
            games_db = games_db.append(temp,ignore_index=True)
        except:
```

```
,id,ranked,time_control,status,winner,white,black,moves,opening
0,HpP16h6T,True,bullet,resign,white,DrGrekenstein,hitter1999,1. Nf3 Nf6 2. g3 g6 3. Bg2 Bg7 4. O-O O-O 5. d4
1,3GmaSy1u,True,bullet,mate,white,DrGrekenstein,C9C9C9C9C9,1. e4 e6 2. d4 d5 3. e5 Nd7 4. Nf3 c5 5. c3 Ne7 6
2,TWbE2AMW,True,bullet,mate,black,toivok3,DrGrekenstein,1. d4 d5 2. c4 dxc4 3. Nf3 Nf6 4. e3 e6 5. Bxc4 a6 6
3,3pEj9qmK,True,bullet,draw,draw,DrGrekenstein,alireza2003,1. Nf3 d5 2. g3 Nf6 3. Bg2 e6 4. O-O Be7 5. b3 O-
4,URJyg0hU,True,bullet,mate,white,drop_stone,DrGrekenstein,1. e4 c6 2. d4 d5 3. Nc3 dxe4 4. Nxe4 Nf6 5. Nxf6
5,ec8YRTyb,True,bullet,resign,white,DrGrekenstein,junglebook1,1. e4 e5 2. d4 exd4 3. Qxd4 Nc6 4. Qe3 Nf6 5.
6,578lajIo,True,bullet,mate,black,Zhigalko_Sergei,DrGrekenstein,1. e4 e5 2. Nf3 Nc6 3. Bc4 Bc5 4. b4 Bxb4 5.
7,PNub5K23,True,bullet,resign,white,DrGrekenstein,C9C9C9C9C9,1. e4 e6 2. d4 d5 3. Nd2 dxe4 4. Nxe4 Nd7 5. Nf
8,vYMmXuaX,True,bullet,resign,black,junglebook1,DrGrekenstein,1. d4 Nf6 2. c4 c5 3. d5 b5 4. cxb5 a6 5. f3 g
9,0m4epfHk,True,bullet,resign,black,mutdpro,DrGrekenstein,1. d4 Nf6 2. Nf3 c5 3. c3 e6 4. Bf4 b6 5. e3 cxd4
10,Yx3URrr3,True,bullet,resign,white,DrGrekenstein,rasulovvugar,1. e3 Nf6 2. d4 g6 3. c4 Bg7 4. Nc3 O-O 5. N
11,htrkwexF,True,bullet,draw,draw,RebeccaHarris,DrGrekenstein,1. e4 c6 2. d3 d5 3. Nd2 e5 4. Ngf3 Bd6 5. g3
12,YoguzGDY,True,bullet,draw,draw,DrGrekenstein,toivok3,1. e4 e6 2. d4 d5 3. Nd2 c5 4. Ngf3 cxd4 5. exd5 Qxd
13,Wwg9YugR,True,bullet,outoftime,white,DrGrekenstein,junglebook1,1. e4 e5 2. d4 exd4 3. Qxd4 Nc6 4. Qe3 Nf6
```

Lichess game fetcher

Fontes de dados e ferramentas utilizadas

- https://www.chess.com/news/view/published-data-api - API
- https://github.com/sarartur/chess.com - Python Wrapper for chess.com API

```python
# pega o nome dos players e coloca os titulos em duas listas
player_names = []
player_titles = []

titles = ['GM', 'NM', 'FM', 'NM', 'CM', 'WGM']

for i in titles:
    response = chessdotcom.get_titled_players(i)
    player_names = player_names + response.json['players']
    for j in range(len(response.json['players'])):
        player_titles.append(i)
```

players

	username	title	bullet_rating	blitz_rating	rapid_rating
0	123lt	GM	2725	2704	2482
1	124chess	GM	2512	2713	2244
2	1977ivan	GM	2650	2707	2342
3	1stsecond	GM	2851	2655	2496
4	4thd-alpeacefulmoon	GM	0	0	0
...	...	...	...	...	...
8556	yaris9	WGM	2440	2451	2330
8557	yennefer1	WGM	2304	2436	2267
8558	yileai	WGM	0	2314	2167
8559	zefirka	WGM	2443	2463	1980
8560	zombik1	WGM	0	2372	0

8561 rows × 5 columns

Chess.com player fetcher

```python
games_db = pd.read_csv('empty_games.csv')

for k in players_to_db['username']:
    month, year = getDates(k)
    print(k)
    for i in range(len(month)):
        response = chessdotcom.get_player_games_by_month(k,month=month[i],year=year[i]).json
        for j in (response['games']):
            try:
                temp = {
                    'id':j['uuid'],
                    'ranked':j['rated'],
                    'time_control': j['time_class'],
                    'status': checkstatus(j['white']['result'],j['black']['result']),
                    'winner': checkwinner(j['white'],j['black']),
                    'white': (j['white']['username']),
                    'black': (j['black']['username']),
                    'moves': trataPGN(j['pgn'])
                }
                #print((j['white']['result'],j['black']['result']))
                games_db = games_db.append(temp,ignore_index=True)
            except:
                temp = 0
```

[21]

Chess.com game fetcher

```
games_db
```

Python

	id	ranked	time_control	status	winner	white	black	moves
0	e6cd2f50-bb4f-11dd-8000-000000010001	True	blitz	checkmated	Atalik	Atalik	ubahn	1. d4 1... e6 2. c4 2... d6 3. e4 3... c6...
1	a7564b64-bdba-11dd-8000-000000010001	True	bullet	resigned	Atalik	martinZH	Atalik	1. d4 1... Nf6 2. c4 2... e6 3. Nc3 3... ...
2	f603e53c-bdba-11dd-8000-000000010001	True	blitz	timeout	Atalik	Atalik	rock_baby_rock	1. d4 1... Nf6 2. c4 2... e6 3. Nc3 3... ...

Primeiras Consultas - Abertura mais jogada por determinado jogador

```sql
DROP TABLE IF EXISTS MaxOpenings;

CREATE VIEW MaxOpenings AS
SELECT G.Openings, COUNT(*) Aberturas
    FROM Games G, Players P
    WHERE P.Username = 'kirillgenius' AND (P.Username = G.White OR P.Username = G.Black)
    GROUP BY G.Openings
    ORDER BY COUNT(*) DESC;

SELECT * FROM MaxOpenings
```

index	OPENINGS	ABERTURAS
0	Horwitz Defense	1944
1	Sicilian Defense: French Variation	1762
2	Caro-Kann Defense	1692
3	Sicilian Defense: Modern Variations	1654
4	Sicilian Defense: Old Sicilian	1506
5	French Defense: Queen's Knight	1482
6	Pirc Defense	1182
7	French Defense: Tarrasch Variation	986
8	Sicilian Defense: Closed	900
9	Van't Kruijs Opening	882
10	English Opening: Agincourt Defense	764
11	Sicilian Defense: Four Knights Variation	734
12	Vienna Game: Stanley Variation, Three Knights Variation	610
13	Vienna Game: Max Lange Defense	590
14	Zukertort Opening: Queen's Gambit Invitation	590
15	Vienna Game: Stanley Variation	572
16	French Defense: Knight Variation	558
17	Queen's Gambit Declined	524
18	Benoni Defense: Czech Benoni Defense	490

Primeiras Consultas - Abertura mais jogada entre todos os jogadores

```sql
DROP TABLE IF EXISTS MaxOpenings;

CREATE VIEW MaxOpenings AS
SELECT G.Openings, COUNT(*) Aberturas
    FROM Games G
    GROUP BY G.Openings
    ORDER BY COUNT(*) DESC;

SELECT * FROM MaxOpenings
```

index	OPENINGS	ABERTURAS
0	Queen's Pawn Game	26674
1	Modern Defense	24245
2	Benoni Defense: Old Benoni	22307
3	Pirc Defense	18965
4	Caro-Kann Defense	17729
5	Zukertort Opening	17262
6	Mieses Opening	15551
7	Van't Kruijs Opening	14755
8	Indian Defense	14056
9	Horwitz Defense	12832
10	Sicilian Defense: Closed	12450
11	Van Geet Opening	11993
12	Scandinavian Defense	11582
13	Hungarian Opening	10656
14	Indian Defense: Knights Variation	9948
15	Zukertort Opening: Sicilian Invitation	9348
16	Zukertort Opening: Pirc Invitation	9213
17	French Defense: Queen's Knight	9072
18	Nimzo-Larsen Attack: Classical Variation	8322

Primeiras Consultas - Win Rate de um jogador específico

```sql
SELECT P.Username, WW.GanhouDeBrancas, WB.GanhouDePretas, TB.JogosDePretas, TW.JogosDeBrancas,
((CAST(WW.GanhouDeBrancas+WB.GanhouDePretas AS float))/(TB.JogosDePretas+TW.JogosDeBrancas)) AS Winrate
FROM WinnerW WW, WinnerB WB, TotalBlack TB, TotalWhite TW, Players P
WHERE P.Username = 'umutcrazy'
```

```sql
DROP TABLE IF EXISTS WinnerB;

CREATE VIEW WinnerB AS
SELECT P.Username, COUNT(*) GanhouDePretas
    FROM Games G, Players P
    WHERE G.Winner = 'black' AND G.Black = P.Username AND G.SiteName = 'lichess' AND P.Username = 'umutcrazy'
    GROUP BY P.Username
    ORDER BY COUNT(*) DESC;

SELECT WB.GanhouDePretas FROM WinnerB WB
```

✓ 0.8s

27451

index	Key	Value
0	USERNAME	umutcrazy
1	GANHOUDEBRANCAS	28599
2	GANHOUDEPRETAS	27451
3	JOGOSDEPRETAS	38547
4	JOGOSDEBRANCAS	38505
5	WINRATE	0.7274308259357317

Primeiras Consultas - Jogadores com mais vitórias

```
SELECT X.winner, COUNT (*) WINS
FROM (SELECT G.result, G.winner,G.white,G.black
FROM Games G
WHERE G.winner = G.white OR G.winner = G.Black) X
GROUP BY X.winner
ORDER BY WINS DESC;
```

index	WINNER	WINS
0	umutcrazy	56050
1	OhanyanEminChess	33465
2	MeneerMandje	22757
3	Niclox	21084
4	sumsar42	16904
5	toivok3	16431
6	Zhigalko_Sergei	15305
7	Arka50	13930
8	kirillgenius	13809
9	samisahi	13622
10	Bernd_Stromberg	13446
11	nochewycandy	13059
12	Blazinq	11900
13	ChessShop	11763
14	backreg	11279
15	PakMaster	10482
16	JonahWillow	10418
17	defibaugh	10360
18	shnitez	10198
19	chessforthesun	10000
20	HouseMartell	9915

Quantidades e Tipos de Roques em Partidas

```sql
DROP TABLE IF EXISTS RoqueG;
DROP TABLE IF EXISTS RoqueC;
DROP TABLE IF EXISTS AllG;

CREATE VIEW AllG AS
SELECT COUNT(*) Total
FROM GAMES G;

CREATE VIEW RoqueG AS
SELECT COUNT(*) RoqueGrande
FROM GAMES G
WHERE MOVES like '%O-O-O%';

CREATE VIEW RoqueC AS
SELECT COUNT(*) RoqueCurto
FROM GAMES G
WHERE MOVES like '% O-O %' OR MOVES like '% O-O+%' OR MOVES like '% O-O#%';

SELECT G.Total, RG.RoqueGrande, RC.RoqueCurto, (RG.RoqueGrande + RC.RoqueCurto) AS Roques
FROM RoqueG RG, RoqueC RC, AllG G
```

index	Key	Value
0	TOTAL	940528
1	ROQUEGRANDE	177875
2	ROQUECURTO	796854
3	ROQUES	974729

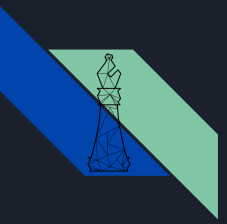
Porcentagem de Tipos de Xeque Mate relacionado ao Total

```sql
CREATE VIEW Mated AS
    SELECT LEFT(RIGHT(G.MOVES,11),7) As MOVES
    FROM GAMES G
    WHERE MOVES like '%#%';

CREATE VIEW Substrings AS
    SELECT SUBSTRING(M.MOVES , CHARINDEX(' ', M.MOVES ) + 1, LENGTH(M.MOVES)) AS Movement
    FROM Mated M;

CREATE VIEW TakesPromotion AS
    SELECT S.Movement
    FROM Substrings S
    WHERE LENGTH(S.Movement) = 7 AND S.Movement like '%=%' AND S.Movement like '%x%';

CREATE VIEW PawnMove AS
    SELECT S.Movement
    FROM Substrings S
    WHERE LENGTH(S.Movement) = 3;

CREATE VIEW PieceMove AS
    SELECT S.Movement
    FROM Substrings S
    WHERE (LENGTH(S.Movement) = 4 AND LEFT(S.Movement,1) NOT like '%O%')
    OR (LENGTH(S.Movement) = 5 AND (SUBSTRING(S.Movement, 1, 2) NOT like '%x%' AND SUBSTRING(S.Movement, 1, 3) NOT like '%=%'))
    OR (LENGTH(S.Movement) = 6 AND (SUBSTRING(S.Movement, 1, 3) NOT like '%x%' AND SUBSTRING(S.Movement, 1, 4) NOT like '%=%'
    AND LEFT(S.Movement, 1) NOT like '%O%'));

CREATE VIEW Promotion AS
    SELECT S.Movement
    FROM Substrings S
    WHERE LENGTH(S.Movement) = 5 AND S.Movement like '%=%';
```

```sql
CREATE VIEW Promotion AS
    SELECT S.Movement
    FROM Substrings S
    WHERE LENGTH(S.Movement) = 5 AND S.Movement like '%=%';

CREATE VIEW PawnTakes AS
    SELECT S.Movement
    FROM Substrings S
    WHERE LENGTH(S.Movement) = 5 AND S.Movement like '%x%'
        AND (UPPER(LEFT(S.Movement,1)) != LEFT(S.Movement,1));

CREATE VIEW Castle AS
    SELECT S.Movement
    FROM Substrings S
    WHERE S.Movement like '%O-O%';

CREATE VIEW Takes AS
    SELECT S.Movement
    FROM Substrings S
    WHERE (LENGTH(S.Movement) = 5 AND S.Movement like '%x%' AND (UPPER(LEFT(S.Movement,1)) = LEFT(S.Movement,1)))
        OR (LENGTH(S.Movement) = 6 AND S.Movement like '%x%' AND (UPPER(LEFT(S.Movement,1)) = LEFT(S.Movement,1)))
        OR (LENGTH(S.Movement) = 7 AND S.Movement like '%x%' AND (UPPER(LEFT(S.Movement,1)) = LEFT(S.Movement,1)));
```

index	TABELA	PORCENTAGEM
0	Piece Move	72.2088743617229
1	Piece Takes	22.77362087265085
2	Promotion	2.550996161096648
3	Pawn Move	1.968560068012482
4	Pawn Takes	0.266663850414781
5	Takes + Promotion	0.223363977674163
6	Roque	0.007920708428161

Com qual peça é mais feita Xeque Mate



```sql
Create View Rookmate AS
SELECT PieceMove.Movement FROM PieceMove WHERE PieceMove.MOVEMENT like '%R%'
UNION ALL SELECT Takes.Movement FROM Takes WHERE Takes.MOVEMENT like '%R%'
UNION ALL SELECT TakesPromotion.Movement FROM TakesPromotion WHERE TakesPromotion.MOVEMENT like '%R%'
UNION ALL SELECT Promotion.Movement FROM Promotion WHERE Promotion.MOVEMENT like '%R%'
UNION ALL SELECT Castle.Movement FROM Castle;

CREATE VIEW KnightMate AS
SELECT PieceMove.Movement FROM PieceMove WHERE PieceMove.MOVEMENT like '%N%'
UNION ALL SELECT Takes.Movement FROM Takes WHERE Takes.MOVEMENT like '%N%'
UNION ALL SELECT TakesPromotion.Movement FROM TakesPromotion WHERE TakesPromotion.MOVEMENT like '%N%'
UNION ALL SELECT Promotion.Movement FROM Promotion WHERE Promotion.MOVEMENT like '%N%';

CREATE VIEW QueenMate AS
SELECT PieceMove.Movement FROM PieceMove WHERE PieceMove.MOVEMENT like '%Q%'
UNION ALL SELECT Takes.Movement FROM Takes WHERE Takes.MOVEMENT like '%Q%'
UNION ALL SELECT TakesPromotion.Movement FROM TakesPromotion WHERE TakesPromotion.MOVEMENT like '%Q%'
UNION ALL SELECT Promotion.Movement FROM Promotion WHERE Promotion.MOVEMENT like '%Q%';

CREATE VIEW BishopMate AS
SELECT PieceMove.Movement FROM PieceMove WHERE PieceMove.MOVEMENT like '%B%'
UNION ALL SELECT Takes.Movement FROM Takes WHERE Takes.MOVEMENT like '%B%'
UNION ALL SELECT TakesPromotion.Movement FROM TakesPromotion WHERE TakesPromotion.MOVEMENT like '%B%'
UNION ALL SELECT Promotion.Movement FROM Promotion WHERE Promotion.MOVEMENT like '%B%';

CREATE VIEW PawnMate AS
SELECT PawnMove.Movement FROM PawnMove
UNION ALL SELECT PawnTakes.Movement FROM PawnTakes;
```

```sql
DROP TABLE IF EXISTS PecasMates;

CREATE VIEW PecasMates AS
    SELECT 'Queen' TABELA,  COUNT(*) Total FROM QueenMate
    UNION SELECT 'Rook' TABELA,  COUNT(*) Total FROM RookMate
    UNION SELECT 'King' TABELA,  COUNT(*) Total FROM KingMate
    UNION SELECT 'Bishop' TABELA,  COUNT(*) Total FROM BishopMate
    UNION SELECT 'Pawn' TABELA,  COUNT(*) Total FROM PawnMate
    UNION SELECT 'Knight' TABELA,  COUNT(*) Total FROM KnightMate
    UNION SELECT 'Total' TABELA,  COUNT(*) Total FROM Mated;

SELECT *
FROM PecasMates
ORDER BY Total DESC;
```

index	TABELA	TOTAL
0	Total	189377
1	Queen	120657
2	Rook	49782
3	Bishop	7463
4	Knight	7142
5	Pawn	4233
6	King	100