Take-Home Challenge: Connect Four

Google Cloud Data Engineer

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Context

First of all, thank you for taking the time to apply at Devoteam G Cloud and be willing to complete the technical take-home challenge. This challenge is constructed to give you the opportunity to showcase your programming abilities and style. Keep that in mind during the challenge. The challenge isn't so much about solving the problem as it is about showing us you know how to write code that follows best practices.

At Devoteam G Cloud we have monthly game nights, which is a nice way to kick back and not talk about work for a few hours. We're all huge fans of the game Connect Four (not really but lets pretend, otherwise this test doesn't make sense). In fact, the competition has gotten a bit out of hand. We've started recording each move of each game, along with anonymized player data. But we haven't had the time to actually use the data and with the yearly "DVTCF" cup coming up, we need to figure out who the best players are.

Connect Four 101

Before we get to your tasks, here is a breakdown of the rules for Connect Four:
In the game, two players take turns placing red and black chips in a 6x7 grid. Each player is assigned to one of the colors and red always goes first. The objective of the game is to be the first to obtain four pieces in a horizontal, vertical, or diagonal line. Here is a gif showing an example game.

We have added one extra twist to the game where we always play until the grid is completely filled up with chips. You are not required to check those moves for additional winners, it's just something I came up with to make the task a bit more challenging.

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Part 1: Parsing the match data

In this part, you need to parse our match data (filename: matchdata.txt) and figure out who won the match. The file is in the following format:

```
Unset
player_0, player_1
R1,B1,R2,B2,R3,B3,R4,B6,...

player_2, player_3
R1,B2,R3,B1,R4,...
```

The first player listed always plays red, the second player always plays black. The moves are denoted as “<color><column>”.

In the first match above, player_0 makes the move “R1” which denotes that they place their chip in the first column. Since there are no chips in that column, it falls to the bottom. player_1 (black) responds by placing their chip in the first column as well. Since there’s already a red chip in that column, the black chip ends up on top of the red chip. This is a pretty short match, after the move “R4” player_0 has achieved four horizontal chips in a row and wins the game.

Each game contains two rows:
Row 1: player names
Row 2: moves played in the game
Followed by a blank line to indicate a new game under it

Keep in mind that the game could be over before the final move recorded in the file has been made. Once you have identified the winning move, you don’t have to continue reading the data. Assume all moves are legal (if a chip is inserted into a column, there is room in the column. No cheating.)

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Part 2: Databases

You now have the data. However, just having the results won't do us much good. So you now have to write the results to a database, with the expectation that we'll be running analytical queries against the data. You are free to structure the base table as you want, but you need to create a view that aggregates all the data so we can see who the best player is.

Read up on, and choose one of, the Google Cloud database options and write the data to it. The view you create should, at a minimum, contain the following columns:

Unset

```
+-------------+-----------+--------------+-----+------+------+
| player_rank | player_id | games_played | won | lost | win% |
+-------------+-----------+--------------+-----+------+------+
```

Final notes

- We have sent you a file called "examples.txt" that contains three examples of games. They *do not* follow the correct format.
- GCP has a free tier you can use: https://cloud.google.com/free
- The main idea behind this assignment is to see how you write code and tackle problems. If there's something you just can't seem to get right, make a note of it and we'll discuss it during the review.
- This is version 1 of the test, so there might still be some bad data that accidentally snuck into the dataset. If you find any, feel free to edit the match data file and please let me know.

Best of luck!