Sure, I can help you design SQL queries that involve CTEs (Common Table Expressions), window functions, and complex queries to showcase your skills in a portfolio project. Here are some ideas:

1. \*\*Top Drivers by Season and Constructor\*\*

- Using a CTE and window functions, find the top 3 drivers by points scored for each season and constructor combination.

- The result should include the season, constructor name, driver name, and their rank within the season and constructor.

2. \*\*Fastest Lap Times on Each Circuit\*\*

- Using a CTE and window functions, find the fastest lap time recorded on each circuit, along with the driver's name, constructor, and race information.

- The result should be ordered by the lap time in ascending order.

3. \*\*Pit Stop Strategy Analysis\*\*

- Using CTEs and window functions, analyze the pit stop strategies employed by different teams and drivers.

- Calculate the average time spent in the pits, the number of pit stops, and the time delta between pit stops for each driver and race.

- Identify patterns or correlations between pit stop strategies and race performance.

4. \*\*Constructor Championship Dominance\*\*

- Using CTEs and window functions, analyze the dominance of constructors in the championship over multiple seasons.

- Calculate the percentage of points scored by the top constructor compared to the total points scored by all constructors in each season.

- Identify the seasons where a single constructor dominated the championship.

5. \*\*Qualifying Performance vs. Race Results\*\*

- Using CTEs and window functions, investigate the relationship between qualifying performance and race results.

- Calculate the position difference between a driver's qualifying position and their final race position.

- Identify drivers who consistently outperform or underperform their qualifying positions in races.

6. \*\*Lap Time Improvements\*\*

- Using CTEs and window functions, analyze the lap time improvements made by drivers throughout a race.

- Calculate the fastest lap time for each driver in each race, and compare it to their average lap time.

- Identify drivers who excel at consistently improving their lap times as the race progresses.

7. \*\*Circuit Characteristics and Performance\*\*

- Using CTEs and window functions, explore the relationship between circuit characteristics (e.g., length, number of turns, elevation changes) and driver/constructor performance.

- Calculate performance metrics such as average lap times, top speeds, and pit stop times for each circuit.

- Identify circuits that favor certain drivers, constructors, or car characteristics.

8. \*\*Streak Analysis\*\*

- Using CTEs and window functions, analyze streaks of consecutive wins, podium finishes, or points scored by drivers or constructors.

- Identify the longest streaks and the drivers/constructors who achieved them.

- Analyze the factors that contributed to these successful streaks.

These SQL queries will require you to use CTEs, window functions (e.g., RANK(), DENSE\_RANK(), PARTITION BY, ROW\_NUMBER()), complex joins, and aggregations. Additionally, you can enhance these queries by incorporating subqueries, derived tables, and other advanced SQL techniques to showcase your skills further.

Remember to document your queries, explain the logic behind them, and include insights or observations based on the results. This will not only demonstrate your SQL proficiency but also your ability to analyze and interpret data effectively.