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Formula 101
Using 2022 Formula One Season Data to Understand the Race Results

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Abstract

The reason why I am interested in Formula One is that my friend showed me what Formula One was all about. It became interesting to see the action of the sport, including the battles the drivers have during the race and how fast they go through a corner. Also, when qualifying comes around, they push their car to the absolute limit to gain a few seconds off their opponents. The drivers only in the top 10 receive points from the winner getting 25 points, the last driver in the top 10 getting 1 point, and those below the top ten end up with no points. The competitiveness that Formula One creates is amazing to see from all the drivers competing to be the best. I collected my data through the Formula One 2022 race result website, which shows the race winners' race data and the whole grid of drivers where they all placed in the race. It also includes the racers that were unable to finish the race due to problems with the car and could crash, resulting in a DNF. The main reason we will use the data is to figure out the averages of each driver where they usually place on the grid. also, we can figure out the averages of points they get for the season. I expect the results to be finding the outcomes of each driver, such as where they place in the race, and also figuring out each team's average points for the 2022 season.

What Is Formula One

What is Formula One? Formula One, or F1, is a motorsport with ten racing teams and 20 drivers. Notable teams in Formula One that you may have heard of are Ferrari, Mercedes, Aston Martin, Alfa Romero, McLaren, and Red Bull, yes, the energy drink. Two historical teams that have been successful in F1 for a very long time are Ferrari and McLaren. Formula One is considered the most prestigious of all motor racing due to the cars being able to reach a top speed of 230 miles per hour; also, drivers have to push the car to their absolute limit to gain speed through the corners, straights, fastest time, and challenge opposing drivers that are ahead of them or behind them. There are iconic tracks in formula one, such as Monaco, Silverstone, Spa, and Monza, and new tracks in the United States of America, such as The Las Vegas Grand Prix and the Miami Grand Prix, two new tracks that got added to the Formula One Calendar. How Formula One works: there are race weekends, and a race weekend consists of 3 free practices. There are two practices on Friday and one on Saturday; What a free practice does is it allows the ten racing teams to test drive their car for each race so their racers and track engineers can study the data that comes from the car's sensors and also their racers lap time; the racers are using practice to get used to the track weather, their car, the track layout, and it allows them to gain track knowledge to prepare for qualifying and for the race. Qualifying is a session on Saturday; It determines the order of the race; whoever qualifies first has a higher chance of getting a better placement at the end of the race. The drivers who only finish in the top 10 get points, the winner of the races gets 25 points, and the 10th-placed racer gets 1 point. Where I got my data to figure out tables of how many points the ten teams had at the end of the season, the top 10 finishes by teams, and the time difference from the winner; I got all my data from the official Formula One 2022 season race results. The method I used to gather all my data used Excel for data entry for all 22 races had to copy and paste the data that was on the formula one data website onto Excel then after all the races, drivers, tracks, and points they received for each race after having pasted all the data into excel I used R Studio to analyze the data that we got in excel with that data me and my professor were able to use boxplots, other sources of code that gives us results for time differences.

Results

Favorite Races of the 2022 F1 Season in Time Difference from winner in Minutes

Round	Mean (CV)	Minimum	Maximum
Silverstone GP	0.330 (58.04)	0.0630	0.6818
SPA GP	1.305 (40.63)	0.2974	1.7861
Monaco GP	0.591 (69.73)	0.0192	1.0134
Japan GP	1.081 (36.78)	0.4511	1.8015
Dutch GP	0.403 (42.68)	0.0679	0.6294

We have another table that shows the time differences from the winner, and in this table, it's my top 5 favorite races of the 22 season; the first one is Silverstone; we see the mean of 0.3297 is where most of the drivers were able to finish, but this table shows us the min of mins that the second placed finished which is 0.0630 and the last person to finish it took them 0.6818 after the winner crossed the finish line. The CV tells us how each races was close, and what I mean by that is let's take the Japan GP; we can tell that the CV is lower compared to Silverstone where the data is more spread out than when the CV for Japan is closer together

Results

Points By Team (order by points) at the end of the 2022 F1 Season

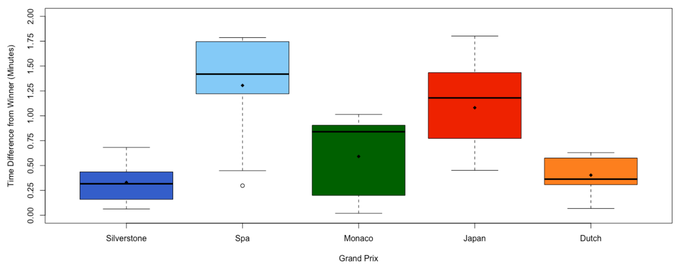
Team Name	Points
RED BULL RACING RBPT	759
FERRARI	554
MERCEDES	521
ALPINE RENAULT	173
MCLAREN MERCEDES	155
ALFA ROMERO FERRARI	55
ASTON MARTIN ARAMCO MERCEDES	55
HAAS FERRARI	37
ALPHATAURI RBPT	35
WILLIAMS MERCEDES	8

The results of what we got, for example, there is this one table where we figure out how many points each team got at the end of the season by using R studio and code that applies to the Excel sheet that we imported into R studio. The results are shocking to find out how many points the top team got compared to the rest, so first in the constructor's championship, Red Bull Racing had 759 points; second in the constructors, Ferrari had 554 points if we compare those two teams, the total difference between them is 205 points this difference shows us how to dominate Red Bull was in the 2022 F1 Season between their two drivers Max Verstappen and Sergio Perez they combined a total of 759 points in an F1 season. Looking at the table, we can safely tell who the dominant team was in the 2022 F1 season.

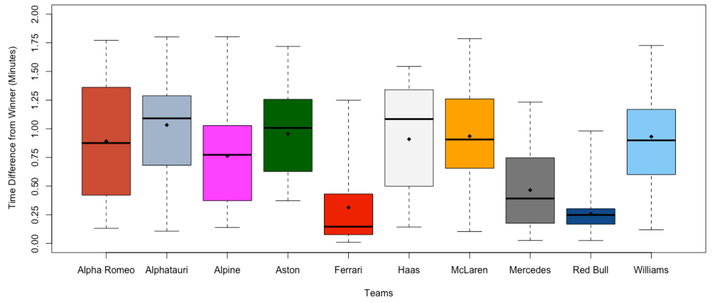
Top 10 Finishes by Team

Team Name	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
ALFA ROMERO FERRARI	0	0	0	0	1	2	2	2	2	3
ALPHATAURI RBPT	0	0	0	0	1	0	1	3	2	3
ALPINE RENAULT	0	0	0	1	4	4	9	5	5	2
ASTON MARTIN ARAMCO MERCEDES	0	0	0	0	0	3	0	5	5	
FERRARI	4	8	8	7	3	4	0	1	0	0
HAAS FERRARI	0	0	0	0	1	1	0	2	3	1
MCLAREN MERCEDES	0	0	1	1	2	5	7	2	5	1
MERCEDES	1	6	10	9	8	1	0	2	1	1
RED BULL RACING RBPT	17	8	3	4	2	2	3	0	0	0
WILLIAMS MERCEDES	0	0	0	0	0	0	0	0	3	2

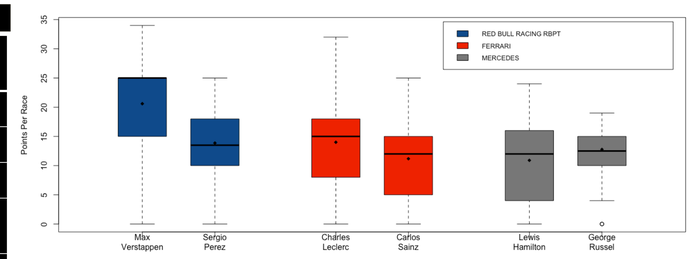
This table shows the top 10 finishes by the teams; what I mean by that out of all the teams, we can see how many of their drivers finished in the top 10 of the races. Red Bull got 17 wins, eight-second places, and three third places in the season, while their rivals, such as Ferrari, only got four race wins, 8-second places, and eight third places, and Mercedes only got one race win, 6-second places and ten third places. For the rest of the teams, there was only one team that was able to get on the podium; (the podium consists of the top 3 race results), and that was McLaren; so out of all of the six other teams, McLaren was the only team to be



The Box Plot that we have is my Top 5 races of the 2022 F1 Season, and now we can see in an image form which races were closer to each term; we can see that the Silverstone and the Dutch Grand Prix are the closer ones compared to Spa and Japan. The box plot can tell us a lot about the five races race because we can see the Silverstone mean of drivers that finished; it also shows us the max, which is the last driver that finished the race below 0.75 mins. We can look at Monaco, where it was spread out evenly, where the average driver's time finished was around 0.75, and the min after the winner crossed was around 0.00 to 0.25 minutes from the winner.



Okay, so what this boxplot is showing us is the time differences from the winner in minutes throughout the whole 2022 season. We can see that Red Bull and Ferrari are the only two teams with very little time difference after their cars cross the line, and with the rest of the other teams, it shows us that they take longer to cross the finish line after the winner already crossed it also the boxplot shows the min and max of each team throughout the season.



This boxplot shows us the mean, median, min, and max of Three Formula One team's Red Bull, Ferrari, and Mercedes. As we can see, Max Verstappen averages about 20 points as we can see on the graph and his teammate Sergio Perez averages around 13 points, Charles Leclerc averages 14 points, his teammate Carlos Sainz averages around 11 points, Lewis Hamilton averages around 10 points, and George Russel averages around 12 points. The boxplot where George Russel's plot is smaller than the rest is due to him being mostly consistent in the races. As we can see, the max points Max Verstappen got was 34, and his minimum is 0 points. The reason is that there are crashes that could happen in a race to any driver, or their car's engine gives up, which causes the driver to DNF (did not finish) and get zero points.

Average Mean Points / Standard Deviation of the F1 2022 Season

Max Verstappen	Red Bull Racing RBT	20.64 (9.48)
Sergio Perez	Red Bull Racing RBT	13.86 (7.03)
Charles Leclerc	FERRARI	4.00 (8.24)
Carlos Sainz	FERRARI	11.18 (7.37)
Lewis Hamilton	MERCEDES	10.91 (7.14)
George Russel	MERCEDES	12.82 (6.91)

The table is just data of the Average Mean Points and the Standard Deviation of the 2022 F1 Season. This table is very similar to the Box Plot above, but we get to see how many points they averaged in the season instead of seeing a graph. In contrast, in the boxplot above, I stated that Max averages about 20 points a race, and the table shows us that he averages 20.64 points. The Standard Deviation is the measure out the driver's points totals over the 2022 season, and the SD for Max Verstappen is 9.48; what that tells us is that an average varies those points throughout the 2022 F1 Season and same goes for the rest of the drivers in the table.

Conclusion

What I Learned about the F1 2022 Season Race Result Data

I was surprised to learn the time difference by mins after the winner crossed the line because I watch the races, but I never really pay attention to the drivers that aren't in the top 10 on how long it took them to finish the race; it's cool to see how data can tell us how long it took them to finish the races. I like how the data can show us how dominant Red Bull was in the 2022 season because we can see the total amount of points each of their drivers was able to get collectively and how many wins, 2nd, and 3rd places they were able to get throughout the season. I am also going to keep track of this year's Formula One season; So far, there's only been three races, and from the first three races, it seems that Red Bull is still the dominant team out of all the teams because in the first race, Max Verstappen won in Bahrain. In the second race, Jeddah Sergio Perez won; in the third, Max Verstappen won in Australia. So far in the season, Red Bull keeps on dominating. Still, tracking the data for each race of the season will be interesting because I can track the average points drivers get after three races, ten races, and so on, and how long it takes other drives to cross the finish line after the winner crosses it. Formula One shows how competitive each race is by watching all the races, looking at the data, and seeing the result of each team is amazing to see at the end of the day.