



# **FORMULA 1 PERFORMANCE:**

WHO'S FASTEST AT THE JAPANESE GRAND PRIX

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DSC 2010 FINAL PROJECT

APRIL, 2025

# DATA INFORMATION

**THE INFORMATION ON  
OVER THE MOST RECENT F1  
EVENT AND GIVEN WITH ITS  
PROVIDED INFORMATION**

**KAGGLE LINK:  
HTTPS://WWW.KAGGLE.CO  
M/DATASETS/UMERHADDII/  
F1-JAPANESE-GRAND-  
PRIX-2025?  
SELECT=LAP\_TIMES\_2025.C  
SV**

TEAM

Driver Name

Pit in

Pit out

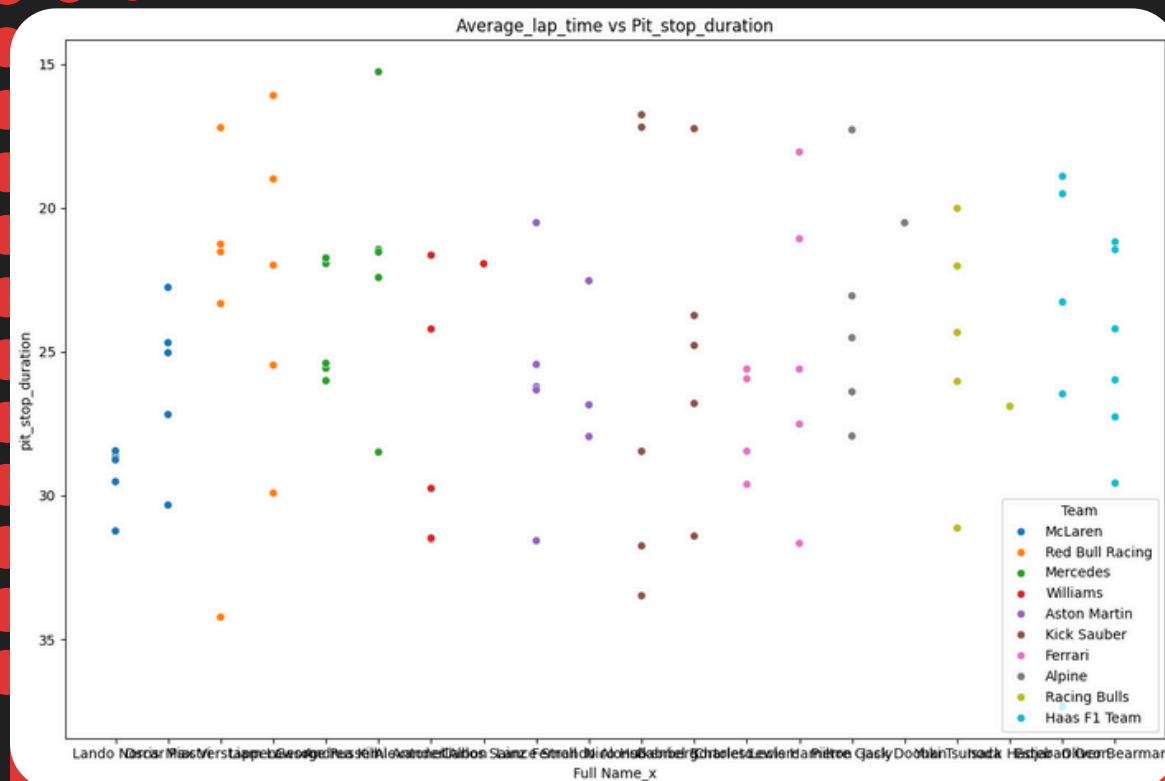
Laps

Sector 1

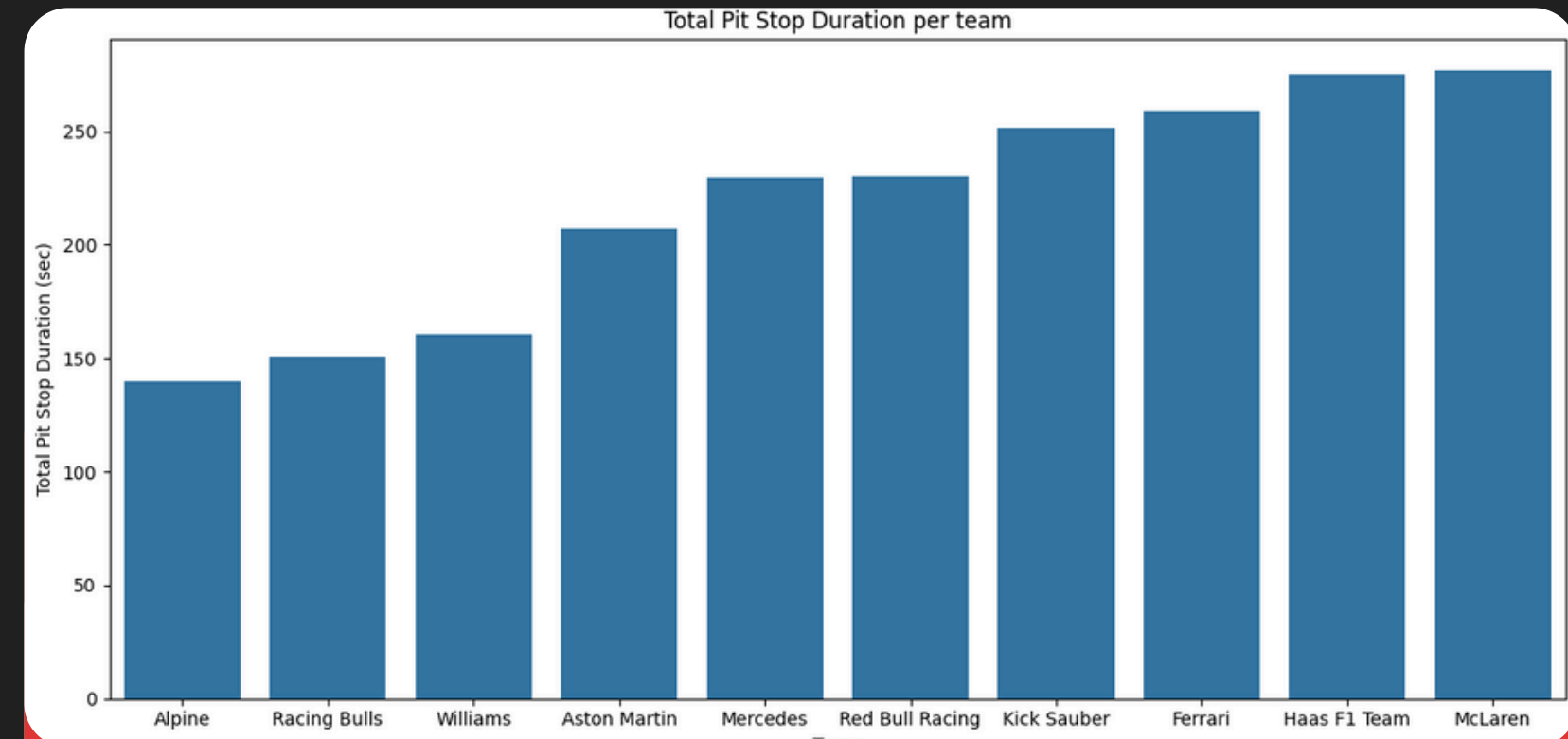
Sector 2

Sector 3

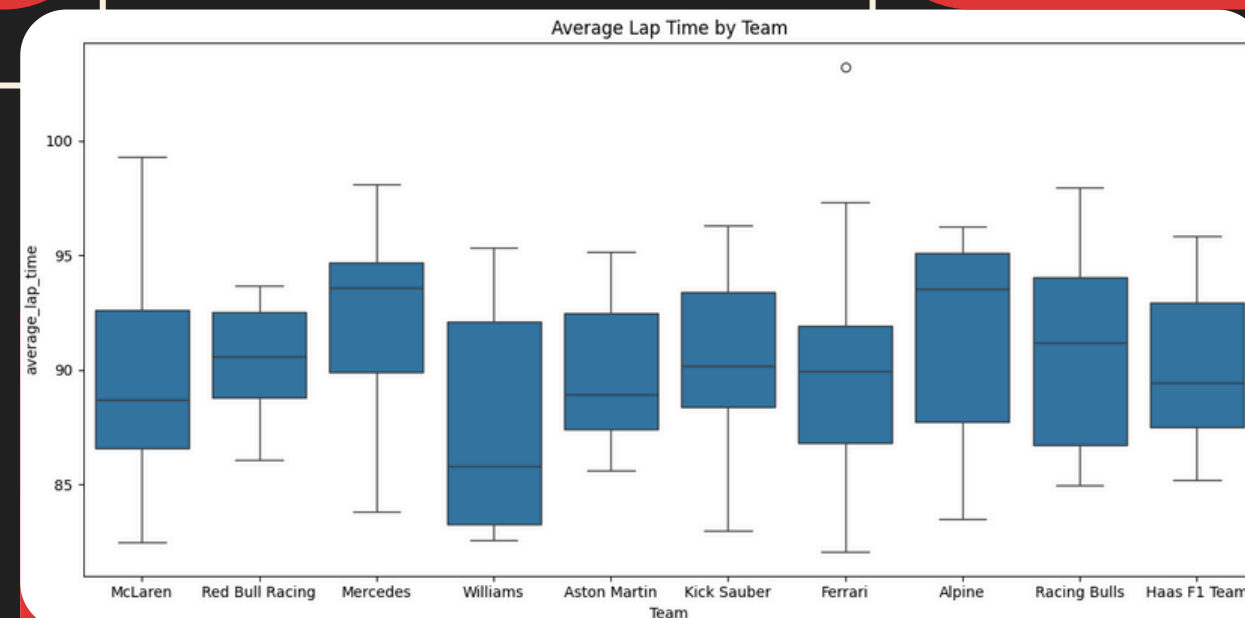
# VISUALIZATION



INDIVIDUAL DRIVER



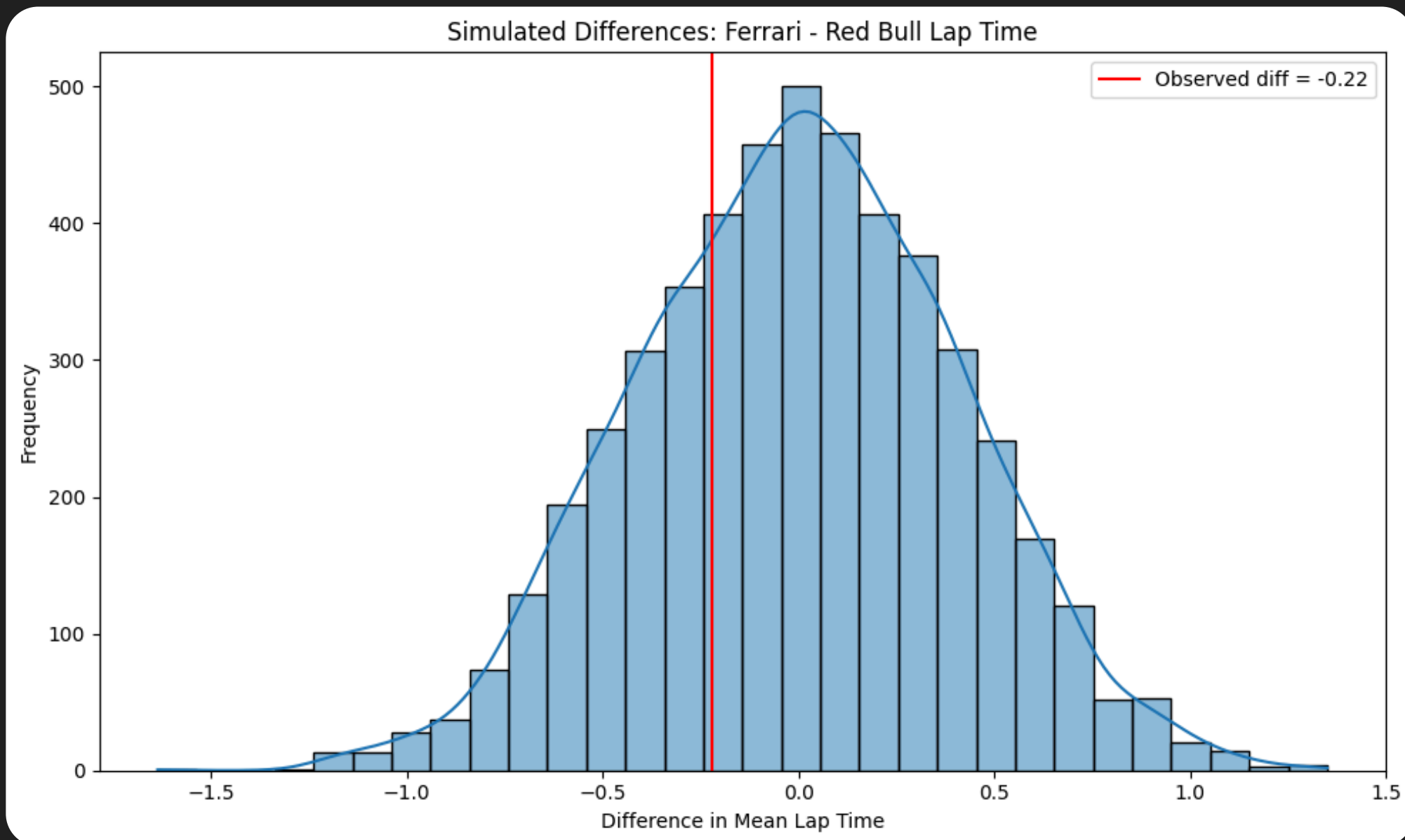
PIT STOP PER TEAM



AVERAGE LAP TIME

# HYPOTHESIS 1

## FERRARI VS RED BULL



### QUESTION???

**DID FERRARI DRIVERS  
HAD FASTER LAP TIMES  
THAN RED BULL  
DRIVERS?**

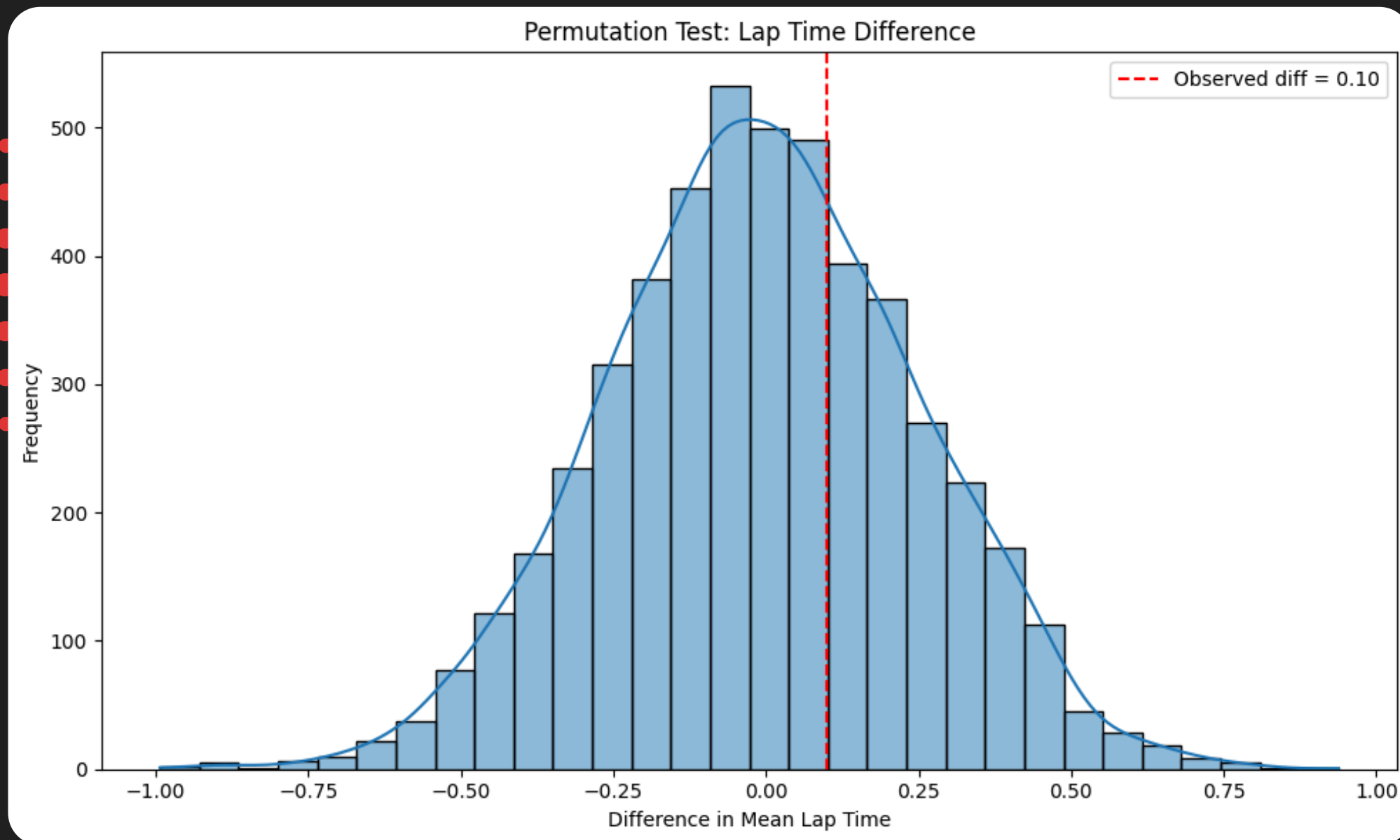
**$H_0$  NULL: NO DIFFERENCE  
BETWEEN TEAMS**

**$H_1$  ALTERNATIVE: FERRARI IS  
FASTER**

**SIMULATING A NULL DISTRIBUTION BY  
SHUFFLING TEAM 5000 TIMES. THE OBSERVED  
DIFFERENCE WAS SLIGHTLY FASTER FOR  
FERRARI, BUT THE P-VALUE WAS AROUND 0.19, SO  
IT FAILED TO REJECT THE NULL.**

# HYPOTHESIS 2

## FASTEST DRIVERS



### QUESTION ???

**DO THE TOP 5 FINISHERS HAVE FASTER LAP TIMES THAN THE REST OF THE COMPETITION?**

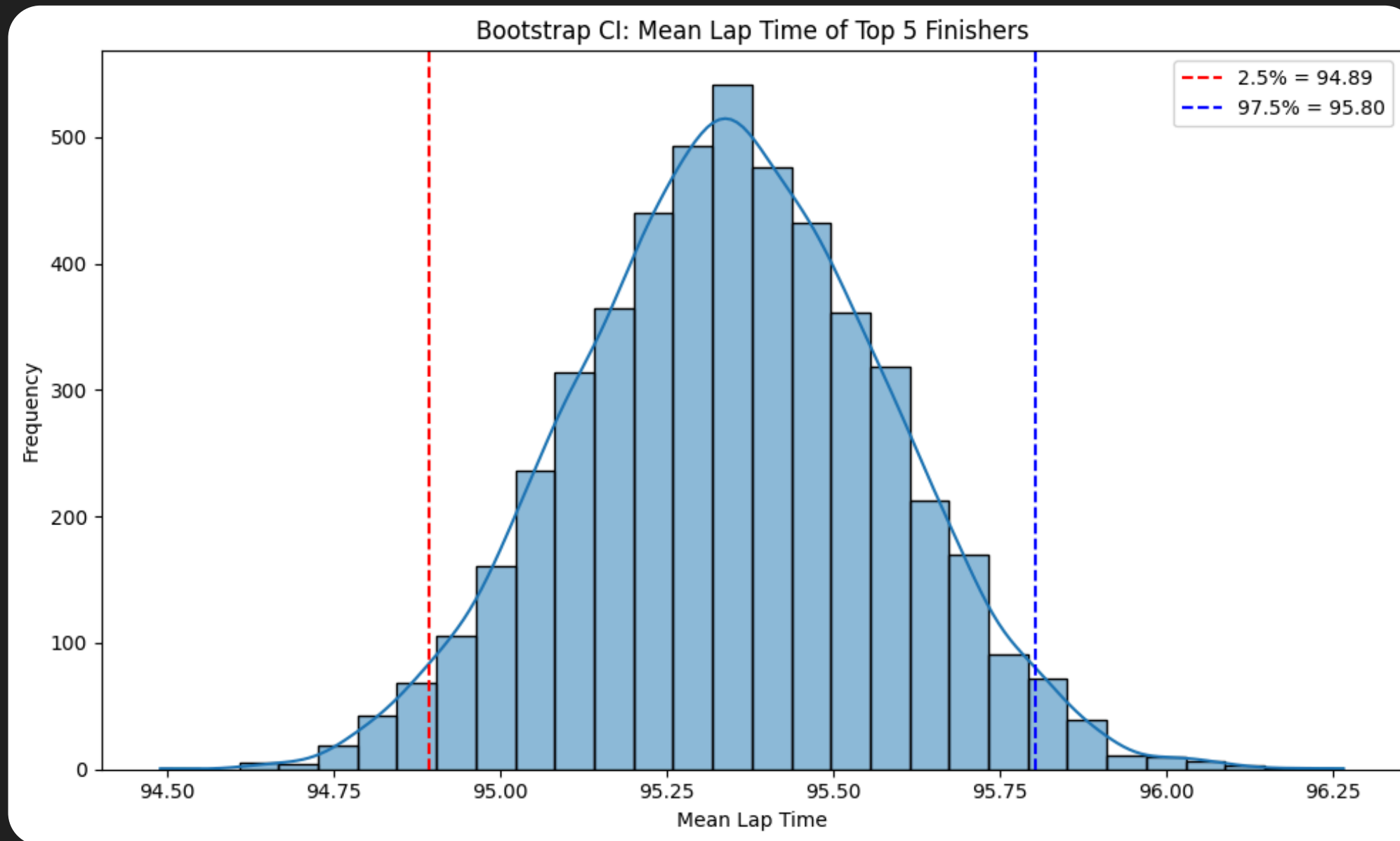
**$H_0$  NULL: NO DIFFERENCE IN AVERAGE LAP TIME BETWEEN COMPETITORS**

**$H_1$  ALTERNATIVE: TOP DRIVERS HAVE FASTER LAP TIMES**

**USING PERMUTATION THE OBSERVED DIFFERENCE IN LAP TIMES WAS STATISTICALLY SIGNIFICANT, WITH A P-VALUE NEAR 0.01, MEANING TOP 10 FINISHERS WERE INDEED FASTER THAN THE REST.**

# HYPOTHESIS 3

## MEAN LAP TIME



### QUESTION ???

**WHAT IS THE ESTIMATE OF THE MEAN LAP TIME OF THE TOP 5 FINISHERS USING BOOTSTRAPPING?**

**$H_0$  NULL: ESTIMATE THE MEAN OF THE TOP 5 FINISERS EQUAL TO 96 SECONDS**

**$H_1$  ALTERNATIVE: THE MEAN LAP TIME OF THE TOP 5 FINISHERS IS NOT EQUAL TO THAT BENCHMARK VALUE**

**RESAMPLED THE TOP 5 DRIVERS' LAP TIMES 5000 TIMES AND CREATED A 95% CONFIDENCE INTERVAL. THE RESULT WAS A TIGHT INTERVAL FROM AROUND 94.4 TO 95.7 SECONDS, SHOWING CONSISTENCY AMONG THE FASTEST DRIVERS.**

# THANK YOU!!!!!!

LINK TO WORK:

[HTTPS://GITHUB.COM/CHRISTOPHERGG1818/DSC-2010-FINAL-PROJECT.GIT](https://github.com/CHRISTOPHERGG1818/DSC-2010-FINAL-PROJECT.GIT)

