Experiment 3

Aim: To apply F-test for hypothesis testing using SAS software.

Dataset:

Omkar Padir

2019130046

TE COMPS

The dataset that I used is inbuilt car dataset available in SAS application. The dataset contains 428 rows with 15 columns.

H0: mean horsepower of all the types of cars is same **Ha**:

mean horsepower of all the types of cars is different

Code:

```
PROC SQL;

CREATE TABLE WORK.query AS

SELECT Make , Model , 'Type'n , Origin , DriveTrain , MSRP ,
Invoice , EngineSize , Cylinders , Horsepower , MPG_City ,
MPG_Highway , Weight , Wheelbase , 'Length'n FROM
SASHELP.CARS;

RUN;

QUIT;
```

```
PROC DATASETS NOLIST NODETAILS;
CONTENTS DATA=WORK.query OUT=WORK.details;
RUN;

PROC ANOVA DATA = WORK.query;
CLASS type;
MODEL Horsepower = type;
RUN;

PROC ANOVA DATA = WORK.query;
CLASS type;
MODEL horsepower = type;
MEANS type / tukey lines;
RUN;
```

Output:

```
PROC PRINT DATA=WORK.details;RUN;
```

The ANOVA Procedure

Class Level Information		
Class	Levels	Values
Type	6	Hybrid SUV Sedan Sports Truck Wagon

Number of Observations Read	428
Number of Observations Used	428

The ANOVA Procedure

Dependent Variable: Horsepower

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	367645.296	73529.059	16.90	<.0001
Error	422	1835852.095	4350.360		
Corrected Total	427	2203497.390			

R-Square	Coeff Var	Root MSE	Horsepower Mean
0.166846	30.55196	65.95726	215.8855

Source	DF	Anova SS	Mean Square	F Value	Pr > F
Type	5	367645.2957	73529.0591	16.90	<.0001

Fig 1

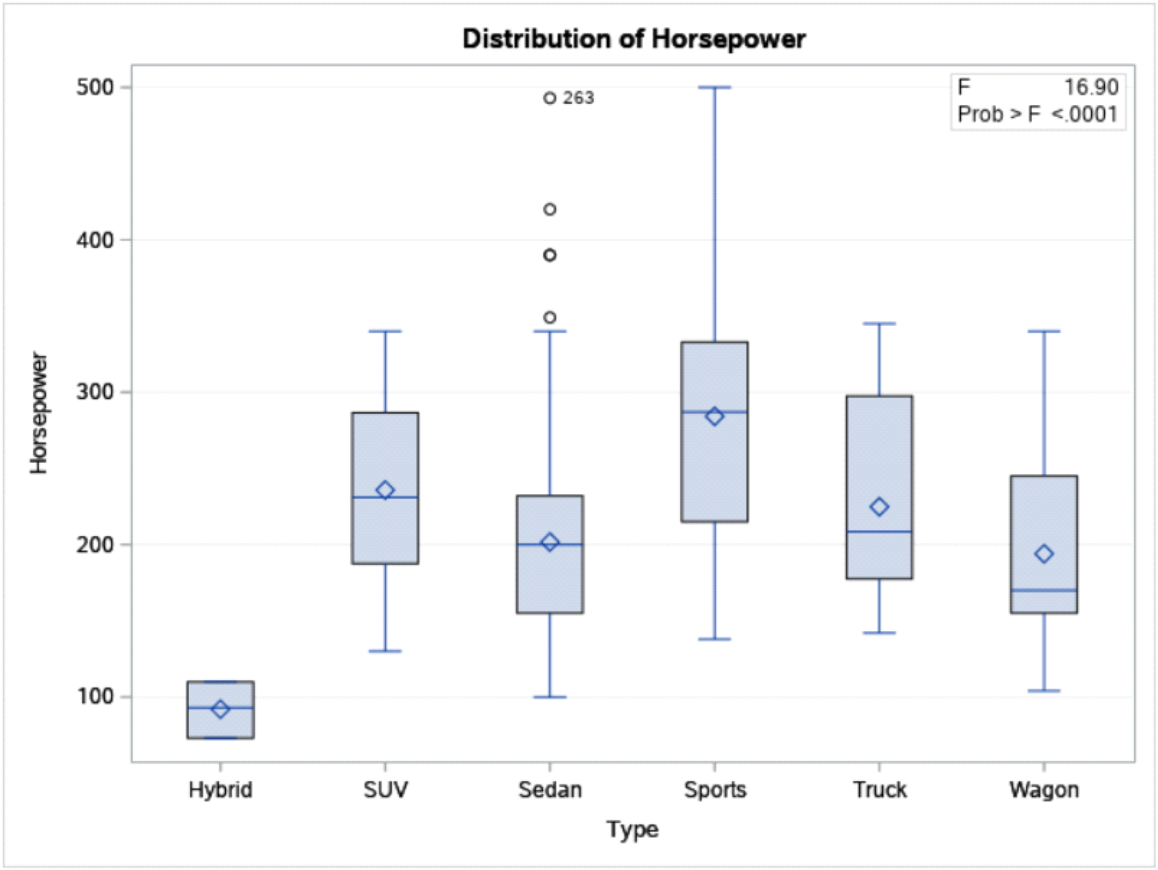
Distribution of Horsepower
F 16.90
Prob > F <.0001
263
500
400
300
200
100
Horsepower
Hybrid
SUV
Sedan
Sports
Truck
Wagon
Type

Fig 2

Alpha	0.05
Error Degrees of Freedom	422
Error Mean Square	4350.36
Critical Value of Studentized Range	4.04870
Minimum Significant Difference	73.069
Harmonic Mean of Cell Sizes	13.35634

Note: Cell sizes are not equal.

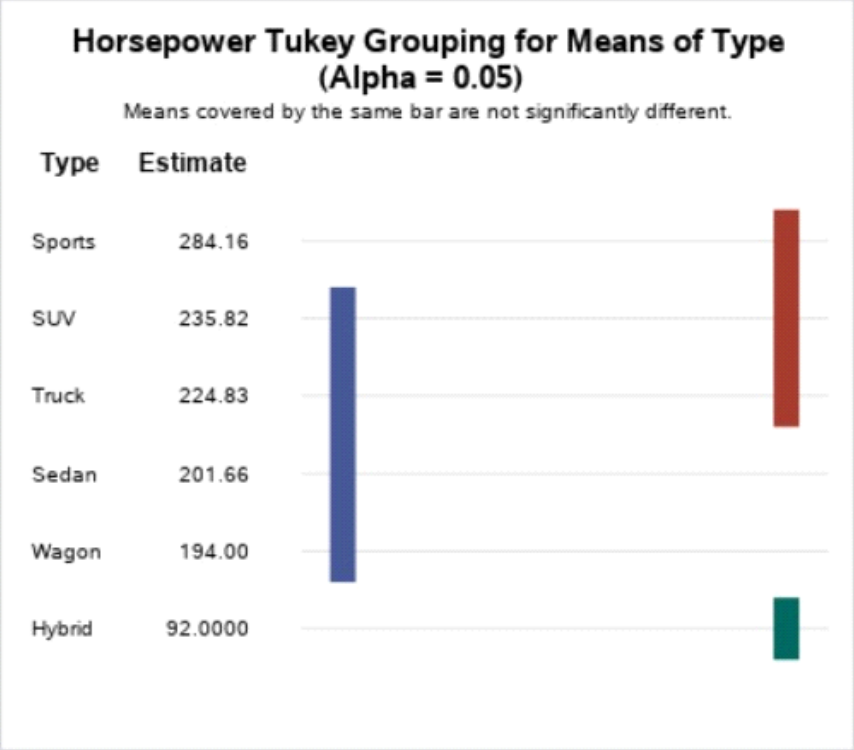

Fig 3

Conclusion:

As shown if the table given in fig 1 above, we have got the p-value from the f-value as < 0.001 i.e. p-value is lesser that 0.01. Hence with this, we can conclude that our null hypothesis is rejected. That means, mean of all the types of cars are different.

To support this inference, we refer to fig. 3 which has the entry called 'Minimum significant difference'. This entry with value 73.069 proves our result to be correct.