

# Lab 1: Motor Trend Cars

## Overview

In this lab, we will examine the Motor Trend Cars data set.

The data was extracted from the 1974 Motor Trend US magazine, and comprises fuel consumption and 10 aspects of automobile design and performance for 32 automobiles (1973–74 models).

Variable	Description
mpg	Miles/(US) Gallon
cyl	Number of Cylinders
disp	Displacement (cu.in.)
hp	Gross horsepower
wt	Weight (lb/1000)
qsec	1/4 mile time
vs	V or Straight Configuration Engine
am	Transmission Type (auto/manual)

## Load the Data in StatCrunch

A Comma Separated File containing the data can be found here:

<http://stat.wvu.edu/~draffle/111/week1/lab1/mtcars2.tsv>

1. In StatCrunch, use the menus **Data** → **Load** → **From File** → **On the web**.
2. Copy and Paste the address given above into **WWW Address**
3. Click **Load File** at the bottom of the page.

## Complete the following problems on a separate piece of paper.

Hand in your answers at the end of lab – make sure to include you name and the lab number. Instructions are included for making graphs and finding the necessary statistics for each problem.

Answer each question with a sentence, a sketch, or both.

- 1.) **List each variable and its type (categorical/quantitative).**
- 2.) **Report the Frequency and Relative Frequency Tables of cyl. Describe the distribution.**
  1. Stat → Tables → Frequency
  2. Select Column(s): cyl
- 3.) **Sketch a Bar Plot of am. Which Transmission type is more common?**
  1. Graph → Bar Plot → With Data
  2. Select Column(s): am

4.) Make a Histogram of hp (you do not need to sketch it). Describe the shape of the distribution.

1. Graph  $\rightarrow$  Histogram  $\rightarrow$  With Data
2. Select Column(s): hp

5.) Which Measures of Center are better for hp? Report them.

1. Stat  $\rightarrow$  Summary Stats  $\rightarrow$  Columns
2. Select Column(s): hp

6.) Sketch a Side-by-Side Boxplot of hp grouped by am. Describe the differences in the distributions.

1. Graph  $\rightarrow$  Boxplot
2. Select Column(s): hp
3. Group By: am
4. Other Options: Check Use Fences to identify outliers

7.) Sketch the QQ Plot of mpg. Is the distribution approximately Normal?

1. Graph  $\rightarrow$  QQ Plot
2. Select Column(s): mpg

8.) If a certain car had a fuel efficiency of 22 MPG, would it be more rare for an automatic or a manual car? Show your work.

1. Stat  $\rightarrow$  Summary Stats  $\rightarrow$  Columns
2. Select Column(s): mpg
3. Group By: am

9.) Assume that  $MPG \sim N(\mu = 20, \sigma = 6)$ . What is the 90% percentile for the MPG of all cars?

I.e., if  $P(MPG \leq x) = 0.9$ , what is  $x$ ?

1. Stat  $\rightarrow$  Calculators  $\rightarrow$  Normal

10.) If quarter mile times follow the Normal Model  $N(\mu = 17.85, \sigma = 1.79)$ , how quickly do the middle 75% of cars complete a quarter mile drag race?

I.e., if  $P(l \leq QSEC \leq u) = 0.75$ , what are  $l$  and  $u$ ?

1. Stat  $\rightarrow$  Calculators  $\rightarrow$  Normal