

## Slides01-Getting Started

# Arithmetic Operations:

```
# Addition and Subtraction
```

```
5+9-3
```

```
# Multiplication and Division (5 + 3) * 7 / 2
```

```
(5+3)*7/2
```

## Arithmetic Operations:

[1] 11

[1] 28

## Arithmetic Operations 3:

```
# Addition and Subtraction
```

```
5+9-3
```

```
[1] 11
```

```
# Multiplication and Division (5 + 3) * 7 / 2
```

```
(5+3)*7/2
```

```
[1] 28
```

# Exponentiation and Logarithms:

[1] 64

[1] 7.389056

[1] 8

## Data:

```
# Load the required libraries, suppressing annoying startup
library(tibble)
suppressPackageStartupMessages(library(dplyr))
# Read the mtcars dataset into a tibble called tb
data(mtcars)
tb <- as_tibble(mtcars)
# Convert relevant columns into factor variables
tb$cyl <- as.factor(tb$cyl) # cyl = {4,6,8}, number of cyls
tb$am <- as.factor(tb$am) # am = {0,1}, 0:automatic, 1: manual
tb$vs <- as.factor(tb$vs) # vs = {0,1}, v-shaped engine, 0: not v-shaped
tb$gear <- as.factor(tb$gear) # gear = {3,4,5}, number of gears
# Directly access the data columns of tb, without tb$mpg
attach(tb)
```

## Data 2:

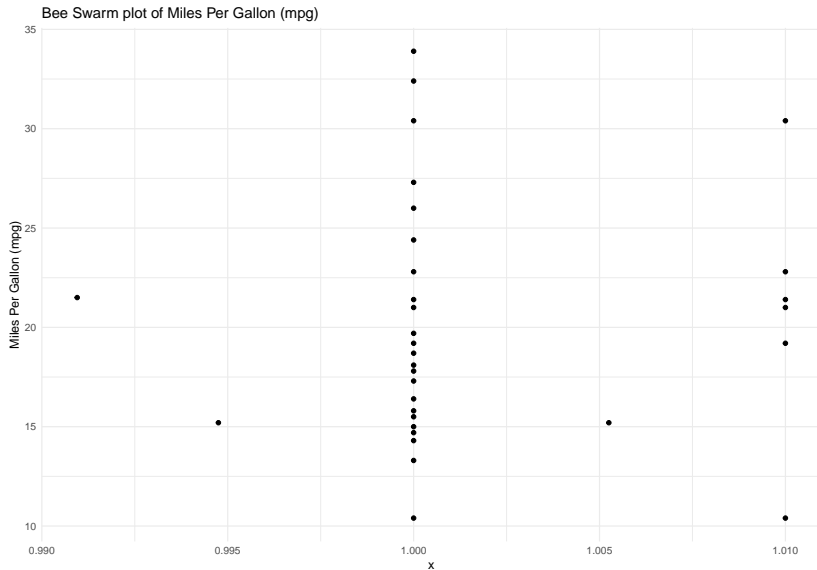
```
library(dplyr)
library(ggthemes)
suppressPackageStartupMessages(library(ggplot2))
```

## Bee Swarm plot using ggbeeswarm

1. The bee swarm plot is an alternative to the box plot, where each point is plotted in a manner that avoids overlap.
2. We use the `ggbeeswarm` package on the `mpg` column of the `tb` tibble.



# Bee Swarm plot (1)



## Bee Swarm plot (2)

```
library(ggplot2)
library(ggbeeswarm) # Necessary for geom_beeswarm()
ggplot(tb,
      aes(x = 1,
          y = mpg)) +
  geom_beeswarm() +
  labs(title = "Bee Swarm plot of Miles Per Gallon (mpg)",
       y = "Miles Per Gallon (mpg)") +
  theme_minimal()
```