# Homework_1

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## Introduction

The `ToothGrowth` dataset is a built-in dataset in R. It examines the effect of Vitamin C on tooth growth in 60 guinea pigs. The experiment compares two supplement types
- **orange juice (OJ)**
- **ascorbic acid (VC)**
administered at three dose levels: 0.5, 1, and 2 mg/day.

This dataset is commonly used for visualizing grouped data and performing basic exploratory data analysis.

## Dataset Description

The dataset contains 3 variables:

- `len`: Tooth length (numeric)
- `supp`: Supplement type – Orange Juice (`OJ`) or Vitamin C (`VC`)
- `dose`: Dose of vitamin C in milligrams per day (numeric: 0.5, 1, 2)

These variables allow us to compare how both the supplement type and dosage level affect tooth growth in guinea pigs.

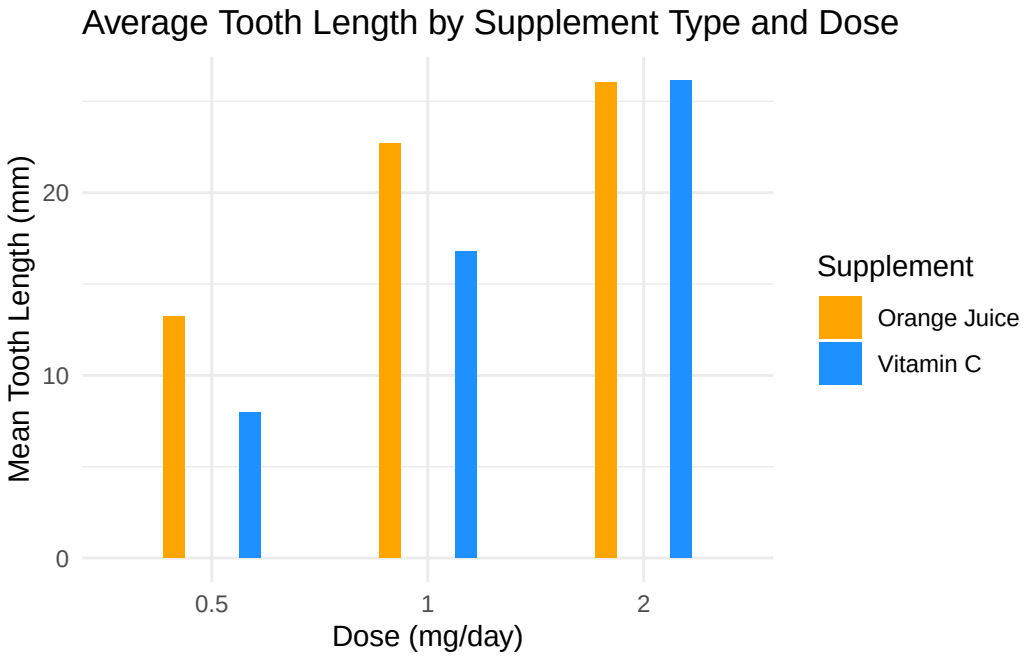
## Summary Statistics

```
      len        supp         dose
 Min.   : 4.20   OJ:30   Min.   :0.500
 1st Qu.:13.07   VC:30   1st Qu.:0.500
 Median :19.25           Median :1.000
 Mean   :18.81           Mean   :1.167
 3rd Qu.:25.27           3rd Qu.:2.000
 Max.   :33.90           Max.   :2.000
```

This summary shows the range and distribution of tooth length values for different doses and supplement types.

## Plot

The bar plot below displays the average tooth length for each combination of supplement type and dose level.




## Explanation

- The bar plot visualizes how tooth growth varies by dose and supplement type.
- Bars are grouped by supplement type for each dose level.
- Custom colors improve clarity: orange for Orange Juice and blue for Vitamin C.

## Interpretation

- Tooth growth increases as the dose increases.
- At lower doses, Orange Juice results in more growth than Vitamin C.
- At the highest dose (2 mg/day), both supplements produce similar growth.

This indicates that dose has a stronger effect on growth than supplement type, especially at high levels.