- Load Library

```
library(readxl)
library(lmtest)
library(ggplot2)
```

Readxl is used to reading the excel file

lmtest is used to test the linier model assumption

ggplot2 is used to data visualization

- Read Excel Data

```
file_path <- "C:/Users/Wisnu Dharma/Documents/Kuliah Undiksha/Semester 1/Statisk
data <- read_excel(file_path)
```

This code is used to read the excel data from path *C:/Users/Wisnu Dharma/Documents/Kuliah Undiksha/Semester 1/Statiska dan Probabilitas/data_anova.xlsx* in my system

- Variable

```
value <- data$value
group <- data$group
```

Assign variable to make easier when want to use it

- Assumption Test : Normality (Shapiro-Wilk)

```
# Assumption Test : Normalitas (Shapiro-Wilk)
shapiro_test <- shapiro.test(value)
print(shapiro_test)
```

```
        Shapiro-Wilk normality test

data:  value
W = 0.99532, p-value = 0.5019
```

The p-value from normality test is > 0.05 so its normally distributed

- Assumption Test : Homogenity (Barlett)

```
# Assumption Test : Homogenity (Bartlett)
bartlett_test <- bartlett.test(value ~ group, data = data)
print(bartlett_test)
```

```
        Bartlett test of homogeneity of variances

data:  value by group
Bartlett's K-squared = 4.9167, df = 2, p-value = 0.08558
```

The p-value from homogeneity test is > 0.05 so the assumption of homogeneity of variances is satisfied

- Assumption Test : Independence (Durbin-Watson)

```
# Assumption Test : Independensi (Durbin-Watson)
model_lm <- lm(value ~ group, data = data)
durbin_watson <- dwtest(model_lm)
print(durbin_watson)
```

```
        Durbin-Watson test

data:  model_lm
DW = 2.1051, p-value = 0.8177
alternative hypothesis: true autocorrelation is greater than 0
```

The DW value is 2.1051, close to 2 so its indicate no autocorrelation

- ANOVA Analysis Test

```
#Analysis Test ANOVA
anova_model <- aov(value ~ group, data = data)
anova_result <- summary(anova_model)
print(anova_result)
```

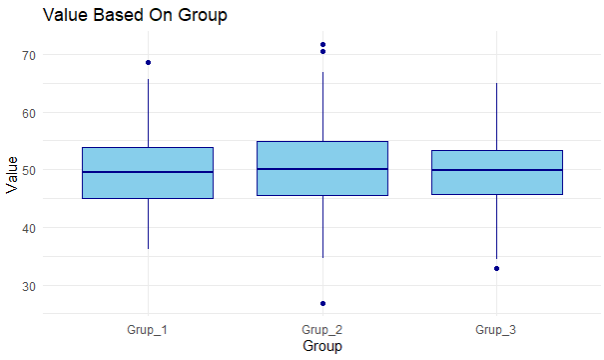
```
             Df Sum Sq Mean Sq F value Pr(>F)
group         2     43   21.46   0.441  0.644
Residuals   297  14463   48.70
```

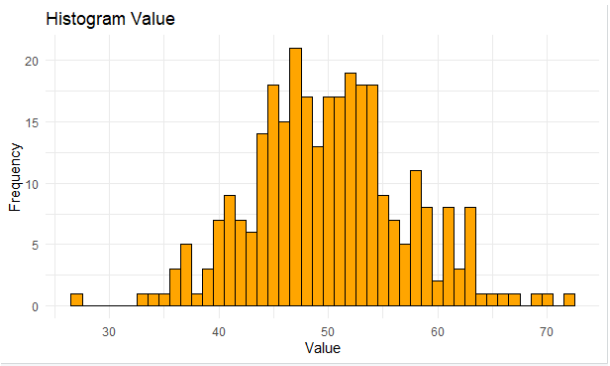
There is no significant difference in the means of value across the groups.

- Data Visualization (Boxplot and Histogram)

```
# Visualization Data
#Boxplot
ggplot(data, aes(x = group, y = value)) +
  geom_boxplot(fill = "skyblue", color = "darkblue") +
  labs(title = "Value Based On Group", x = "Group", y = "Value") +
  theme_minimal()

# Histogram
ggplot(data, aes(x = value)) +
  geom_histogram(binwidth = 1, fill = "orange", color = "black") +
  labs(title = "Histogram Value", x = "Value", y = "Frequency") +
  theme_minimal()
```





This is used to visualize value and group data