HW4 - Question 4

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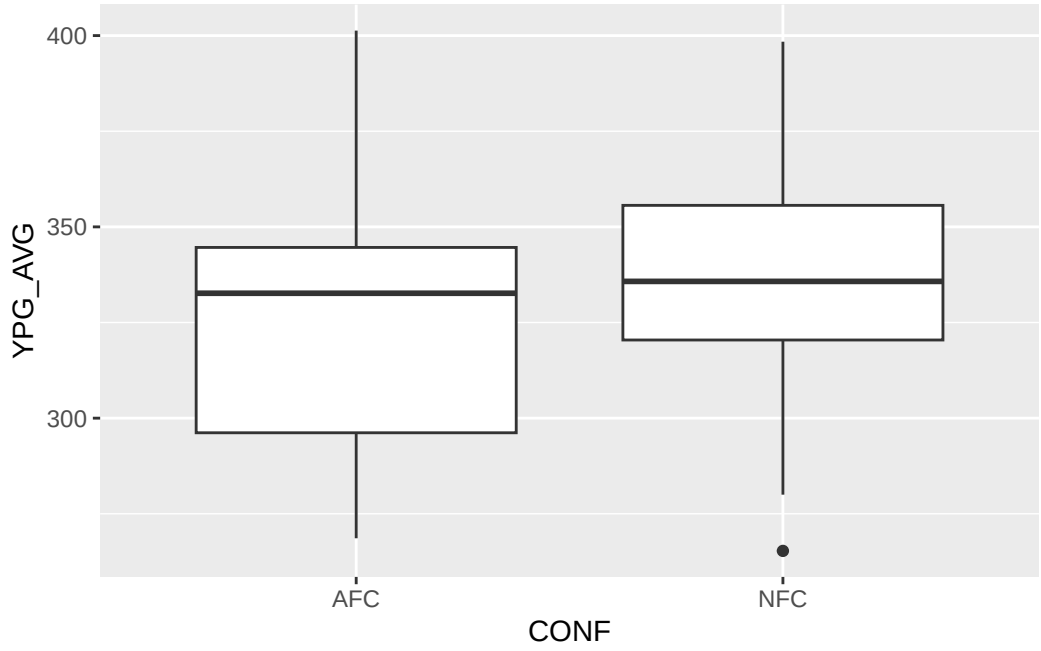
Does NFL Conference help explain yards per game gained by teams? Data retrieved from: https://www.espn.com/nfl/stats/team

```
library(readxl)
nfl_xl <- read_excel("C:\\Users\\Mark\\Desktop\\Stats_Homework\\Homework4\\NFL_Stats.xlsx")
nfl_xl$CONF <- as.factor(nfl_xl$CONF)
nfl_xl
```

```
# A tibble: 32 x 3
   Teams       YPG_AVG CONF
   <chr>         <dbl> <fct>
 1 Miami          401. AFC
 2 San Fran       398. NFC
 3 Detroit        395. NFC
 4 Buffalo        374. AFC
 5 Dallas         372. NFC
 6 Baltimore      370. AFC
 7 LA Rams        359. NFC
 8 Philly         354. NFC
 9 Kansas City    351. AFC
10 Minnesota      348. NFC
# i 22 more rows
```

```
library(ggplot2)
ggplot(nfl_xl, aes(x = CONF, y = YPG_AVG)) + geom_boxplot()
```




```
library(car)
```

```
Loading required package: carData
```

```
nfl_model <- aov(YPG_AVG ~ CONF, data = nfl_xl)
summary(lm(nfl_model))
```

```
Call:
lm(formula = nfl_model)

Residuals:
    Min      1Q  Median      3Q     Max
-71.237 -23.587   1.706  19.087  74.650

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  326.650      9.182  35.574   <2e-16 ***
CONFNFC        9.888     12.986   0.761    0.452
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Residual standard error: 36.73 on 30 degrees of freedom
Multiple R-squared:  0.01896,   Adjusted R-squared:  -0.01374
F-statistic: 0.5797 on 1 and 30 DF,  p-value: 0.4524
```

```r
nfl_fits <- fitted(nfl_model)
nfl_res <- residuals(nfl_model)

shapiro.test(nfl_res)
```

```
    Shapiro-Wilk normality test

data:  nfl_res
W = 0.98658, p-value = 0.9525
```

```r
leveneTest(YPG_AVG ~ CONF, data = nfl_xl)
```

```
Levene's Test for Homogeneity of Variance (center = median)
      Df F value Pr(>F)
group  1  0.1228 0.7285
      30
```

```r
qf(0.95, 1, 30)
```

```
[1] 4.170877
```

Comment:

Normality: The large p-value from the Shapiro test validates normality.

Equal Variance: The large p-value supports the assumption of equal variances.

The p-value is higher than the critical value, so we cannot reject the null hypothesis, so we assume that the NFL conference you are in does not have a significant effect on the YPG averaged of a team. Also, the F-observed value is less than the critical F-value, which also suggests that there is no significant difference in sample averages.