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# Assignment: ASSIGNMENT 7
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## Set the working directory to the root of your DSC 520 directory
setwd("E:/Repos/StatisticsR/DSC520-Statistics")

## Load the `data/r4ds/heights.csv` to
heights_df <- read.csv("data/r4ds/heights.csv")

# Fit a linear model
earn_lm <-  lm(earn ~ ed + race + height + age + sex, data=heights_df)

# View the summary of your model
summary(earn_lm)

predicted_df <- data.frame(
  earn = predict(earn_lm,heights_df),
  ed=16, race="white", height=74.42444,
  age=45, sex="male"
  )

predicted_df

## Compute deviation (i.e. residuals)
mean_earn <- mean(heights_df$earn)
## Corrected Sum of Squares Total
sst <- sum((mean_earn - heights_df$earn)^2)
## Corrected Sum of Squares for Model
ssm <- sum((mean_earn - predicted_df$earn)^2)
## Residuals
residuals <-  heights_df$earn - predicted_df$earn
```

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## Sum of Squares for Error
sse <- sum(residuals^2)
## R Squared
r_squared <- ssm/sst

## Number of observations
n <- nrow(heights_df)
## Number of regression paramaters
p <- 8
## Corrected Degrees of Freedom for Model
dfm <- p-1
## Degrees of Freedom for Error
dfe <- n-p
## Corrected Degrees of Freedom Total:   DFT = n - 1
dft <- n-1

## Mean of Squares for Model:   MSM = SSM / DFM
msm <- ssm/dfm
## Mean of Squares for Error:   MSE = SSE / DFE
mse <- sse/dfe
## Mean of Squares Total:   MST = SST / DFT
mst <- sst/dft
## F Statistic
f_score <- msm/mse

## Adjusted R Squared R2 = 1 - (1 - R2)(n - 1) / (n - p)
adjusted_r_squared <- 1-(1-r_squared)*(n-1)/(n-p)
adjusted_r_squared
```