assignment_06

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```
knitr::opts_chunk$set(echo = FALSE)
knitr::opts_knit$set(root.dir = 'C:/Users/kiran/dsc520')
```

Load the `data/r4ds/heights.csv` to heights_df

```
heights_df <- read.csv("data/r4ds/heights.csv")
```

Load the ggplot2 library

```
library(ggplot2)
```

Fit a linear model using the `age` variable as the predictor and `earn` as the outcome

```
age_lm <-  lm(earn ~ age,data = heights_df)
```

View the summary of your model

```
summary(age_lm)
```

```
##
## Call:
## lm(formula = earn ~ age, data = heights_df)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -25098 -12622  -3667   6883 177579
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 19041.53    1571.26  12.119  < 2e-16 ***
## age            99.41      35.46   2.804  0.00514 **
## ---
```

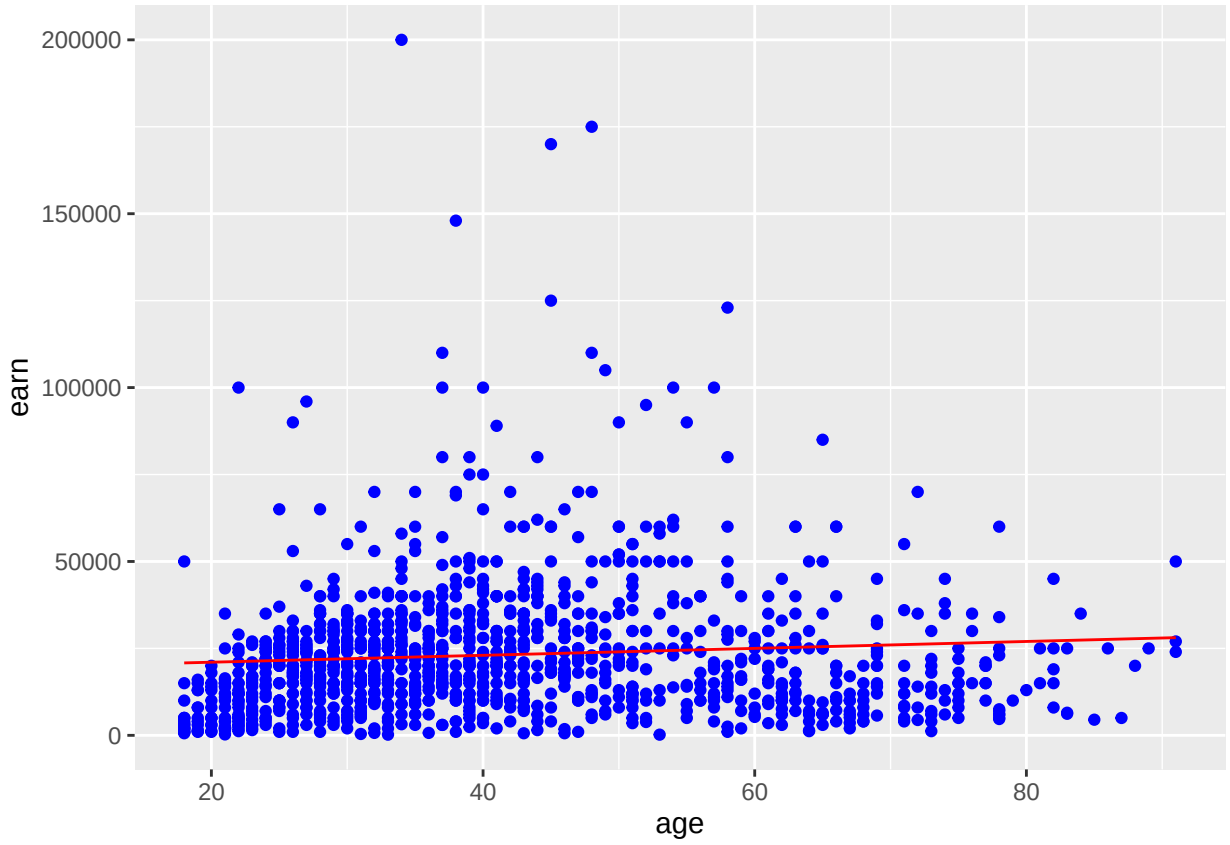
```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 19420 on 1190 degrees of freedom
## Multiple R-squared:  0.006561,   Adjusted R-squared:  0.005727
## F-statistic:  7.86 on 1 and 1190 DF,  p-value: 0.005137
```

Creating predictions using `predict()`

```
age_predict_df <- data.frame(earn = predict(age_lm, newdata = heights_df), age=heights_df$age)
```

Plot the predictions against the original data

```
ggplot(data = heights_df, aes(y = earn, x = age)) +
  geom_point(color='blue') +
  geom_line(color='red',data = age_predict_df, aes(y=earn, x=age))
```



Calculate Mean

```r
mean_earn <- mean(heights_df$earn)
```

Corrected Sum of Squares Total

```r
sst <- sum((mean_earn - heights_df$earn)^2)
```

Corrected Sum of Squares for Model

```r
ssm <- sum((mean_earn - age_predict_df$earn)^2)
```

Residuals

```r
residuals <- heights_df$earn - age_predict_df$earn
```

Sum of Squares for Error

```r
sse <- sum(residuals^2)
```

R Squared

```r
r_squared <- ssm/sst
```

Number of observations

```r
n <- nrow(heights_df)
```

Number of regression paramaters

```r
p <- 2
```

Corrected Degrees of Freedom for Model

```r
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)
```