Exercise6

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```r
data <- read.table("./Geese.txt", header=TRUE)
model <- lm(time~temp, data = data)

summary(model)
```

```
##
## Call:
## lm(formula = time ~ temp, data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -24.9462  -4.8035   0.9442   4.9256  16.2635
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -19.6668     2.6052  -7.549 6.34e-09 ***
## temp          1.6806     0.2325   7.228 1.65e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 9.959 on 36 degrees of freedom
## Multiple R-squared:  0.592,  Adjusted R-squared:  0.5807
## F-statistic: 52.24 on 1 and 36 DF,  p-value: 1.653e-08
```

2. Computing the LM coefficients:

```r
coefs = coefficients(model)
coefs
```

```
## (Intercept)        temp
##   -19.66676     1.68065
```

3. Regression Equation:

Time = coefs[1] + coefs[2] * Temp

Or

Time = -19.66676 + 1.68065 * Temp

4. The confidence interval for β 1:

```r
#?confint
confint(model)
```

```
##                  2.5 %     97.5 %
## (Intercept) -24.950311 -14.383214
## temp          1.209066   2.152233
```

From the above result, we can be 95% confident about the slope of the regression line that it is between 1.209 and 2.153 minutes for increase of temperature per degree.

5. Correlation check

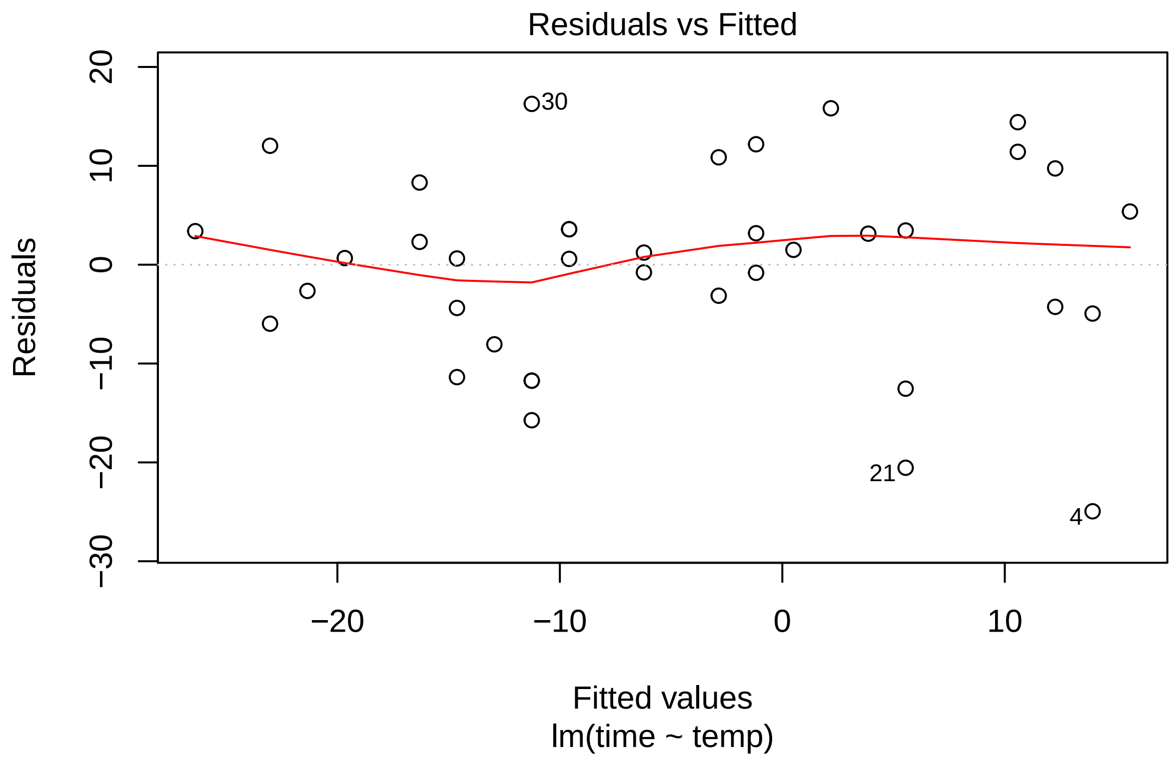
```r
cor.test(data$temp, data$time)
```

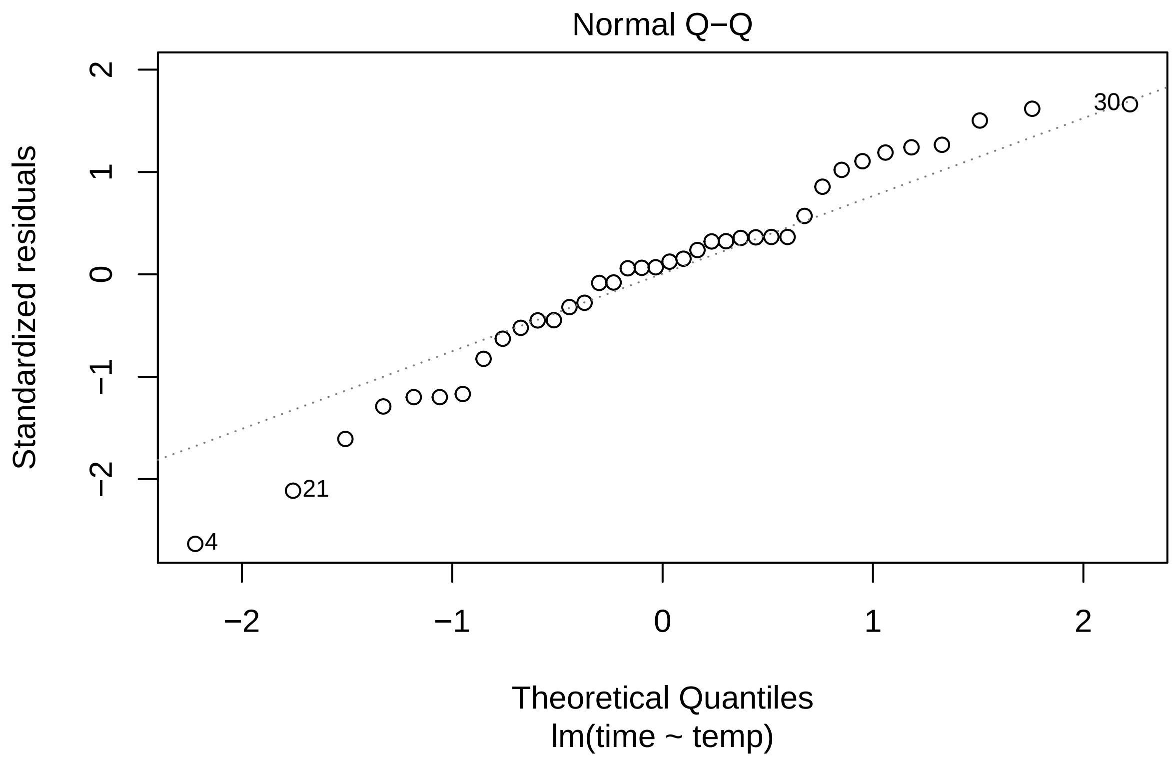
```
##
##  Pearson's product-moment correlation
##
## data:  data$temp and data$time
## t = 7.2278, df = 36, p-value = 1.653e-08
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  0.5964657 0.8741080
## sample estimates:
##       cor
## 0.7694334
```

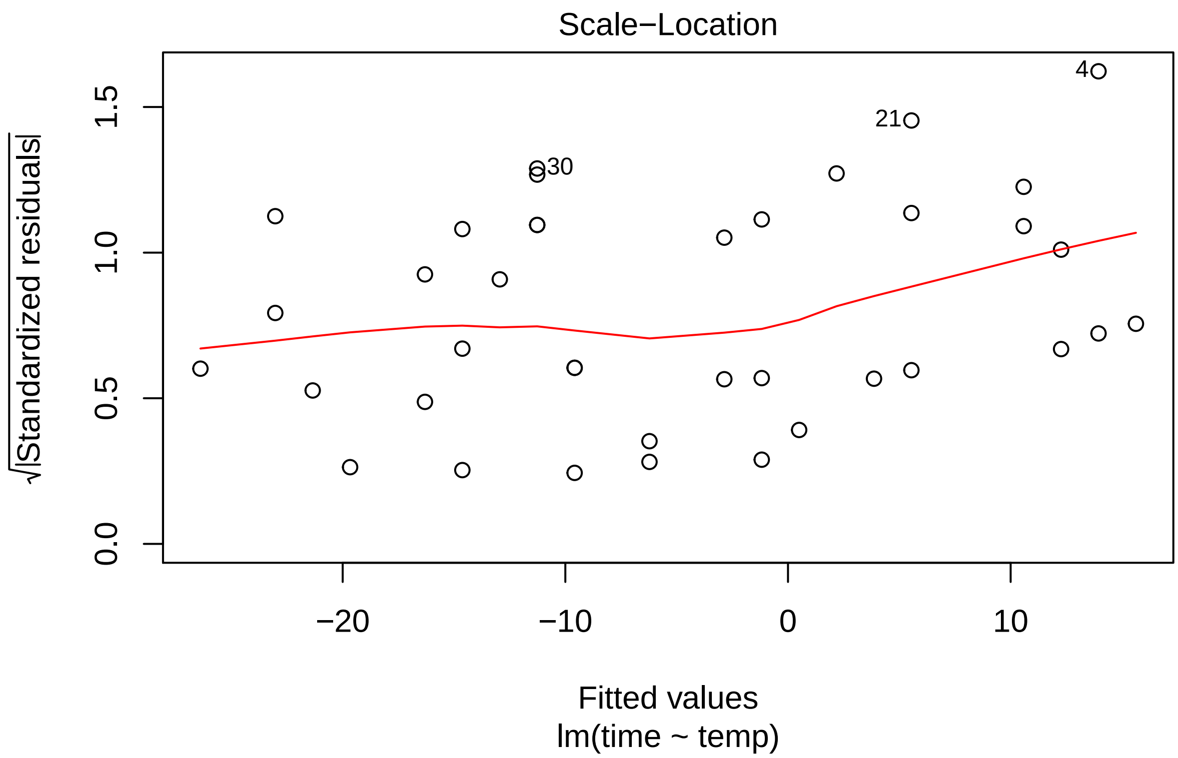
Since p-value(1.653e-08) < 0.05, we can reject the null hypothesis. Hence, there is a significant relationship between the time and temperature.

1. Necessary Plots

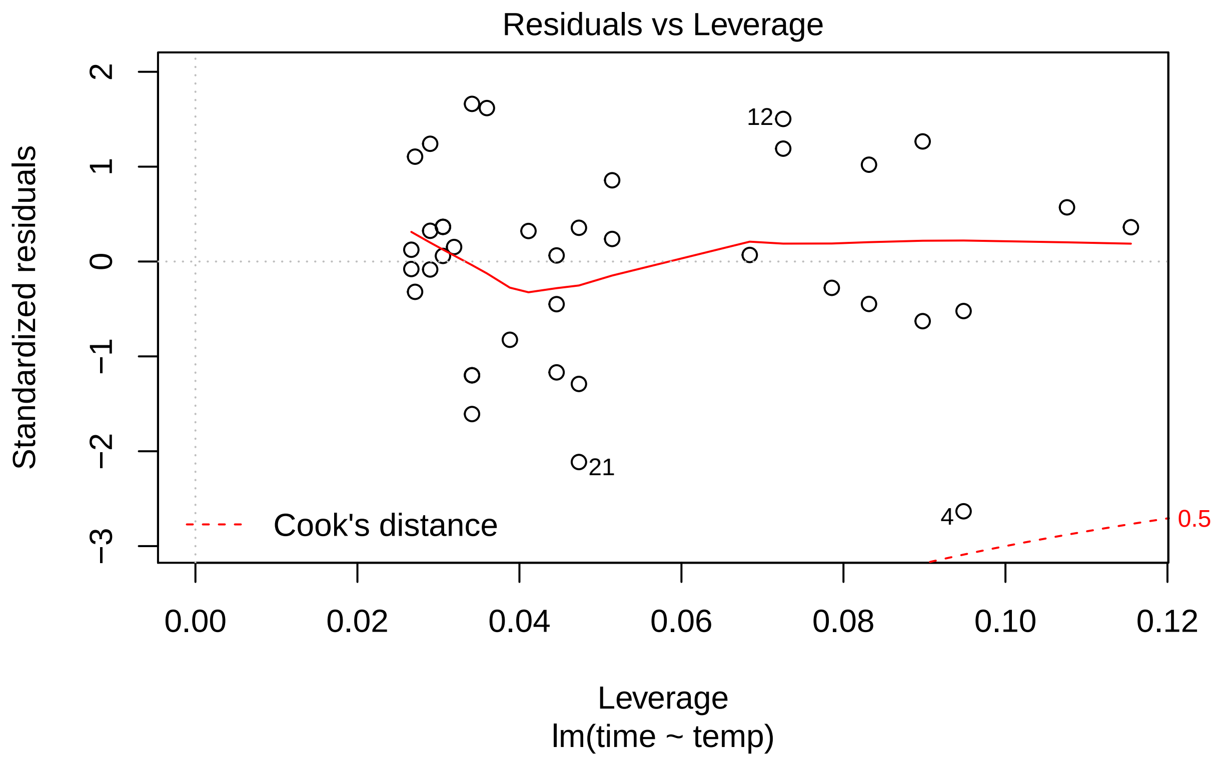
```r
plot(model)
```


Residuals vs Fitted
Residuals
20
10
0
−10
−20
−30
30
21
4
−20
−10
0
10
Fitted values
lm(time ~ temp)


Normal Q−Q
Standardized residuals
Theoretical Quantiles
lm(time ~ temp)
2
1
0
−1
−2
−2
−1
0
1
2
4
21
30



Scale−Location
√|Standardized residuals|
0.0
0.5
1.0
1.5
−20
−10
0
10
Fitted values
lm(time ~ temp)
30
21
4


Residuals vs Leverage
Standardized residuals
Leverage
lm(time ~ temp)
Cook's distance
0.5
12
21
4
0.00
0.02
0.04
0.06
0.08
0.10
0.12
−3
−2
−1
0
1
2