Is Florida getting warmer

1.Is Florida getting warmer?

1)

```
load("../data/KeyWestAnnualMeanTemperature.RData")
class(ats)
```

```
## [1] "data.frame"
```

```
head(ats)
```

```
##   Year     Temp
## 1 1901 23.75000
## 2 1902 24.66667
## 3 1903 24.71667
## 4 1904 24.51667
## 5 1905 24.88333
## 6 1906 24.63333
```

```
plot(ats)
```


```
mycor <- cor(ats$Year, ats$Temp)
mycor
```

```
## [1] 0.5331784
```

2)

```
set.seed(1234)
num_permutations <- 10000
permuted_corrs <- numeric(num_permutations)
for (i in 1:num_permutations) {
  shuffled_temps <- sample(ats$Temp)
  permuted_corr <- cor(ats$Year, shuffled_temps)
  permuted_corrs[i] <- permuted_corr
}
```

3)

```
p_value <- sum(abs(permuted_corrs) >= abs(mycor))/num_permutations
p_value
```

```
## [1] 0
```

```
cat("There is a significant correlation between years and temperatures (p<0.05)!\n")
```

```
## There is a significant correlation between years and temperatures (p<0.05)!
```

4)

Goal

The goal of this analysis was to investigate the correlation between years and temperatures in Florida. We used permutation analysis to assess the significance of the observed correlation coefficient.

Results

- **Observed Correlation Coefficient:** 0.5331784
- **Permutation p-value:** 0

Interpretation

The observed correlation coefficient(0.5331784) represents the relationship between years and temperatures in Florida.

The calculated p-value from the permutation test is 0, it suggests that the observed correlation coefficient (r=0.5331784) is statistically significant and highly unlikely to occur by random chance alone. This means there is strong evidence to support the claim that Florida is getting warmer over the years. The p-value of 0 indicates that the observed correlation coefficient falls far outside the range of correlation coefficients obtained by randomly reshuffling the temperatures, implying a significant and positive correlation between years and temperatures in Florida.