

STAT 443: Lab 2

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Question 1

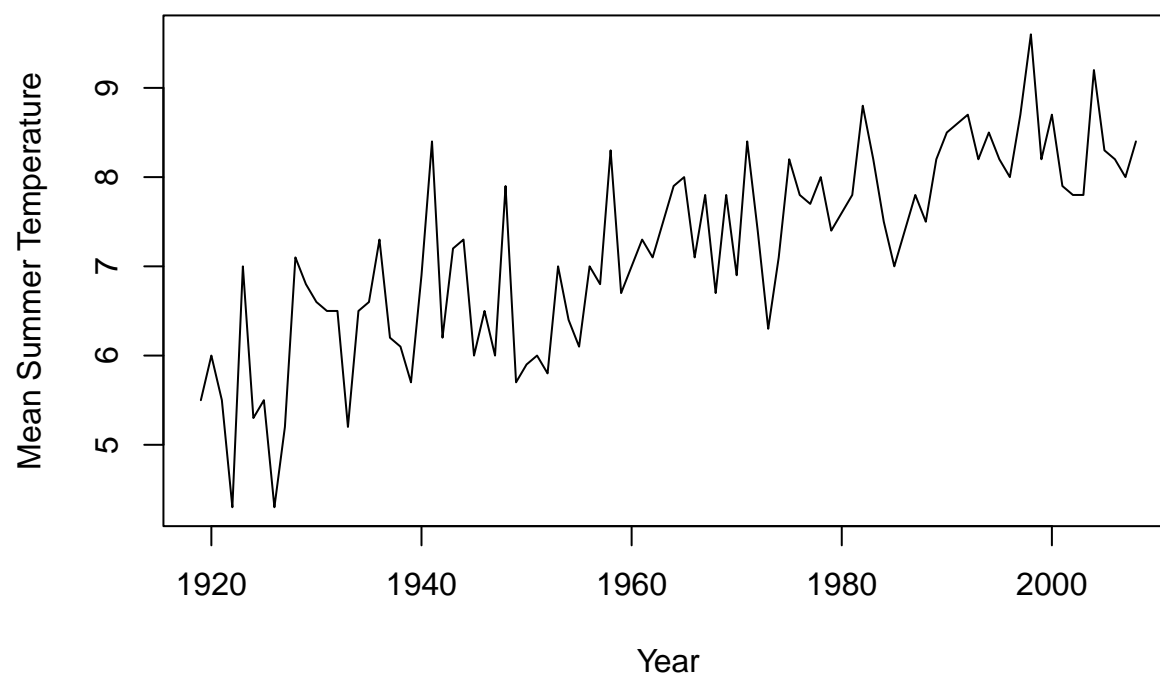
(a)

```
# Read data
dataTemp <- read.csv("dataTempPG.csv")

# Extract data
dataSummer_ts <- ts(dataTemp$Summer, start = 1919)

# Plotting data
plot(dataSummer_ts,
      main = "Mean Summer Temperature at Prince George, BC",
      xlab = "Year",
      ylab = "Mean Summer Temperature")
```

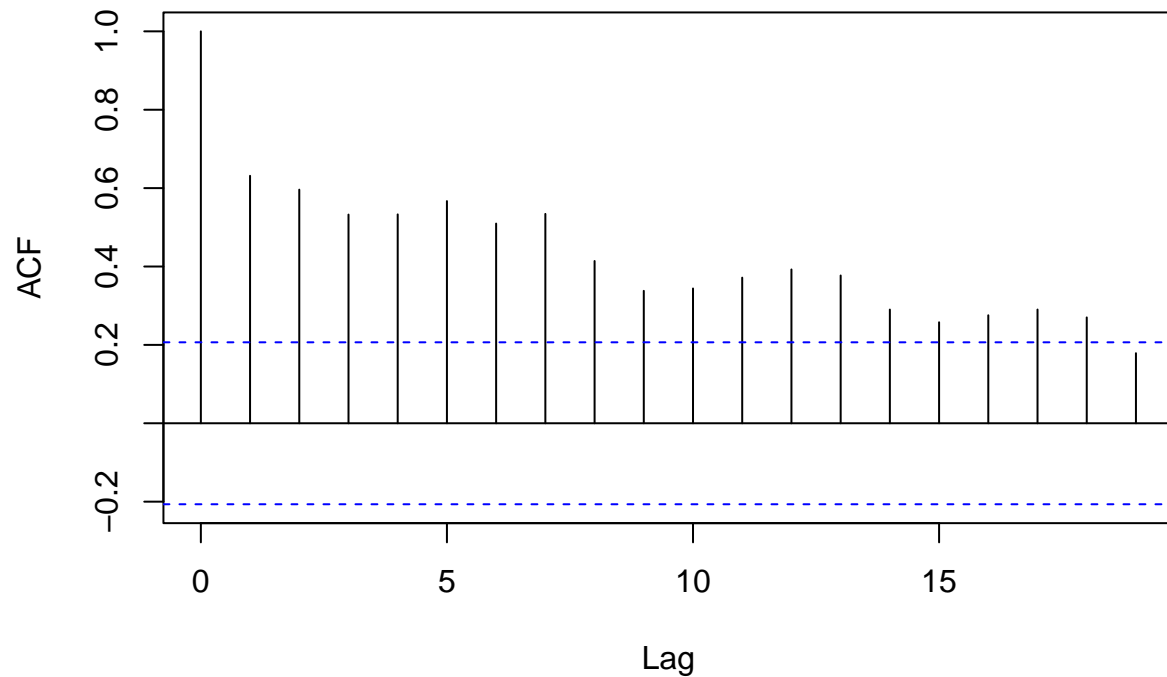
Mean Summer Temperature at Prince George, BC



(b)

```
# this is where your R code goes  
acf(dataSummer_ts)
```

Series dataSummer_ts



All lag features except for the last one are above the boundary line, meaning that we will be rejecting the null hypothesis of no autocorrelation at those lag values except the last one.

(c)

```
library(zoo)
```

```
##
```

```
## Attaching package: 'zoo'
```

```
## The following objects are masked from 'package:base':
```

```
##
```

```
## as.Date, as.Date.numeric
```

```
# this is where your R code goes
```

```
# Extraction (window)
```

```
summerExtract <- window(dataSummer_ts, start = 1968, end = 2008)
```

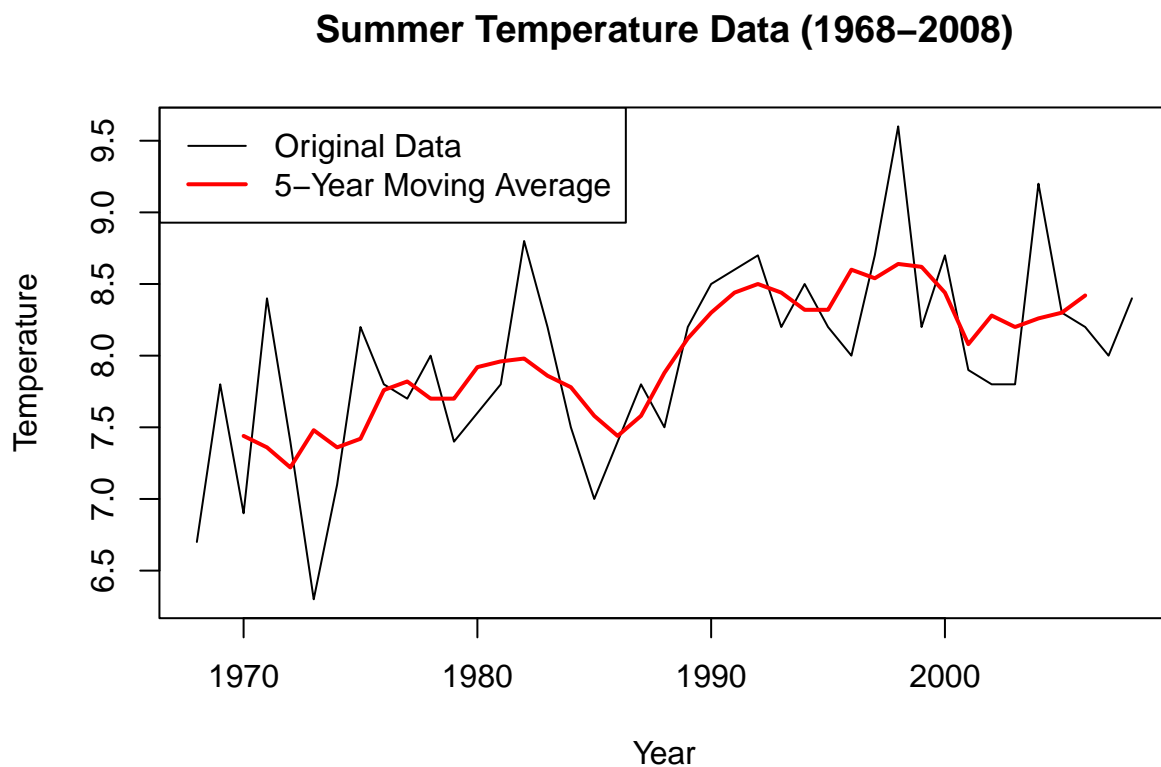
```
# Plot extraction
```

```
plot(summerExtract,  
     main="Summer Temperature Data (1968-2008)",  
     ylab="Temperature",  
     xlab="Year",  
     type="l")
```

```
# rollmean
summer_rm <- rollmean(summerExtract, k = 5)

lines(summer_rm, col="red", lwd=2)

legend("topleft",
      legend=c("Original Data", "5-Year Moving Average"),
      col=c("black", "red"),
      lwd=c(1, 2))
```



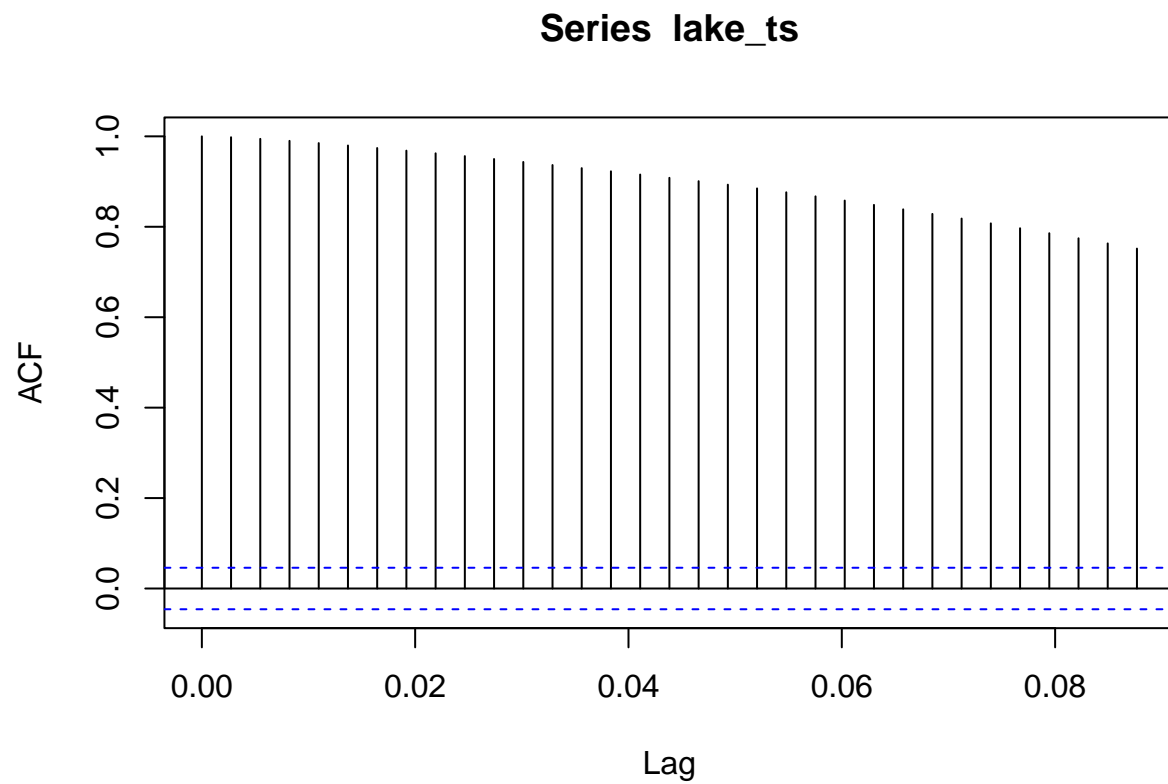
Question 2

(a)

```
# this is where your R code goes
dataLake <- read.csv("LakeLevels.csv")

lake_ts <- ts(dataLake$LakeLevel, start = c(2007, 1), frequency = 365)
lakeExtract <- window(lake_ts, end = 2011)

acf(lake_ts)
```

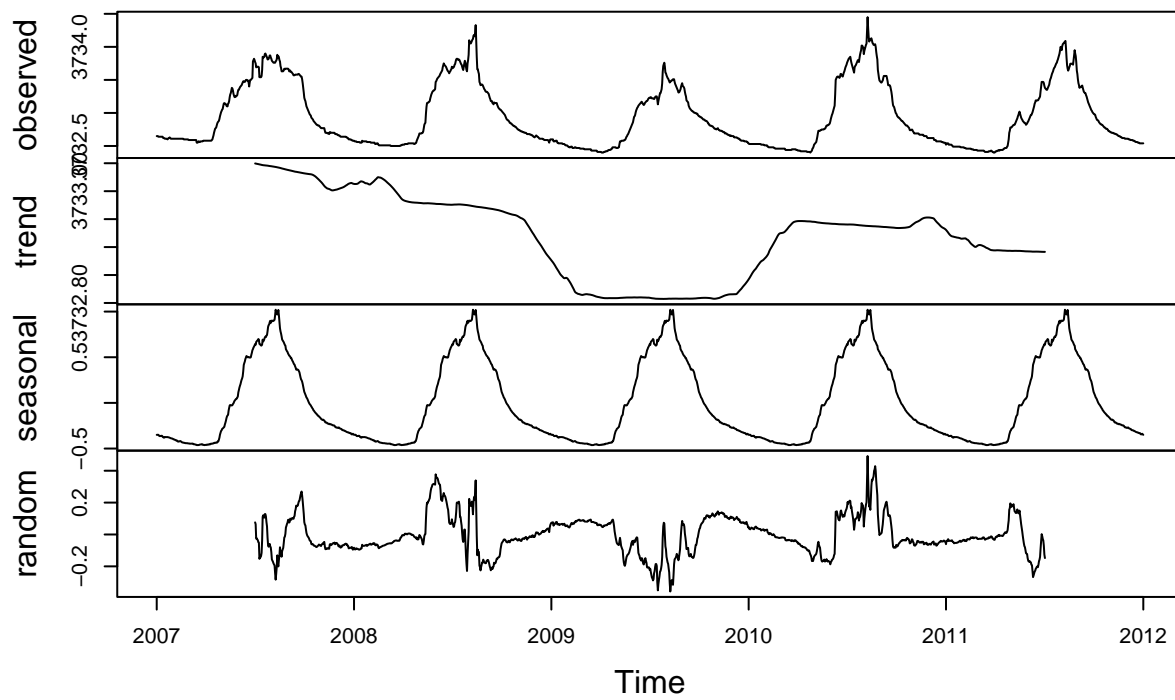


For all the lags, we see that there are very high autocorrelation throughout.

(b)

```
# Decomposition  
lake_decomp <- decompose(lake_ts, type="additive")  
plot(lake_decomp)
```

Decomposition of additive time series



(c)

```
# Periodic Decomposition
lake_stl <- stl(lake_ts, s.window="periodic")
plot(lake_stl, main="Decomposition of Lake Level Data")
```

Decomposition of Lake Level Data

