

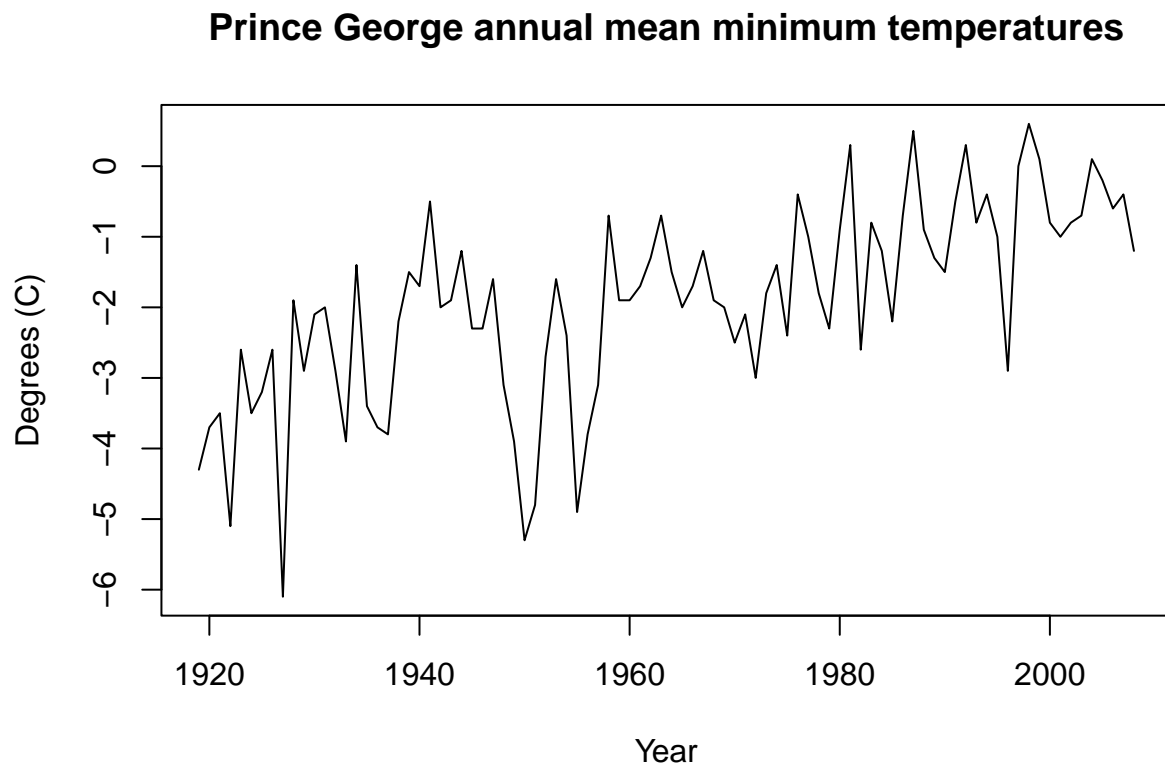
Lab 2

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Question 1

(1a)

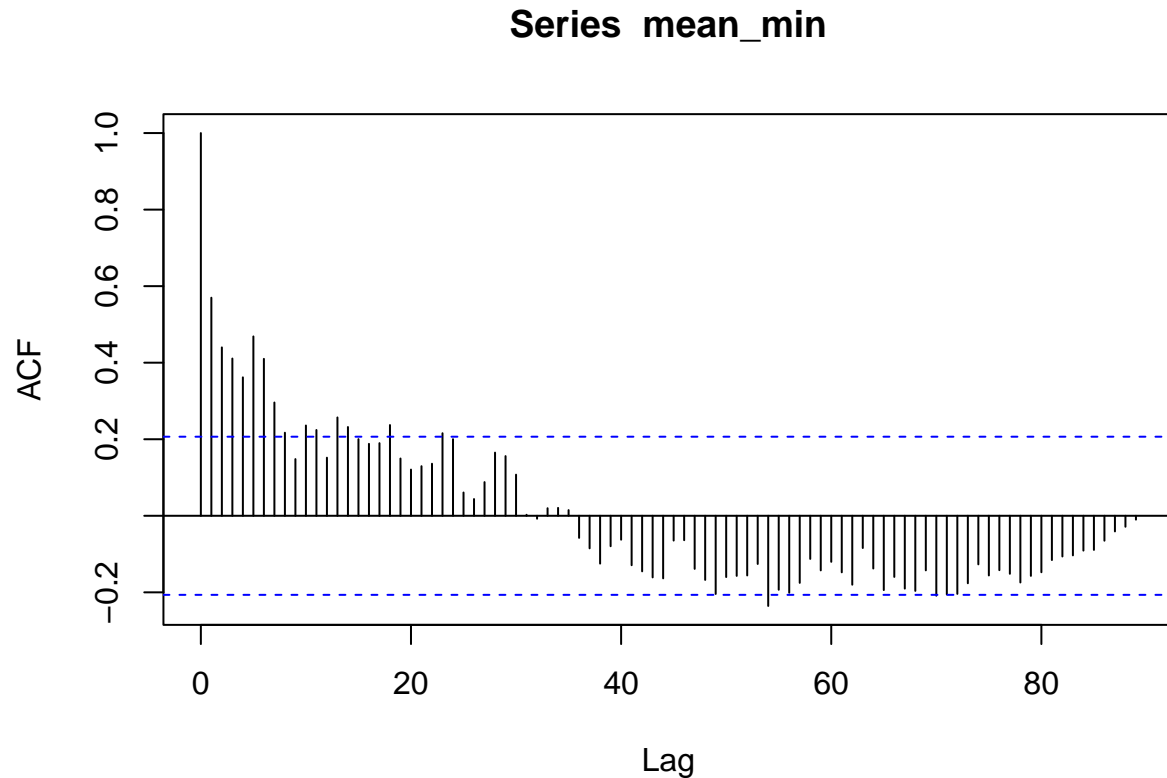
```
# read in and plot the data
temperature_data <- read.csv("dataTempPG.csv", header = TRUE)
mean_min <-
  ts(temperature_data$Annual,
     start = c(1919, 1),
     frequency = 1)
plot(mean_min,
     main = "Prince George annual mean minimum temperatures",
     xlab = "Year",
     ylab = "Degrees (C)")
```



This series trends upwards. While there is evident local variation, a constant seasonal period cannot be easily identified.

(1b)

```
# plot acf function
acf(mean_min, lag.max = 89)
```

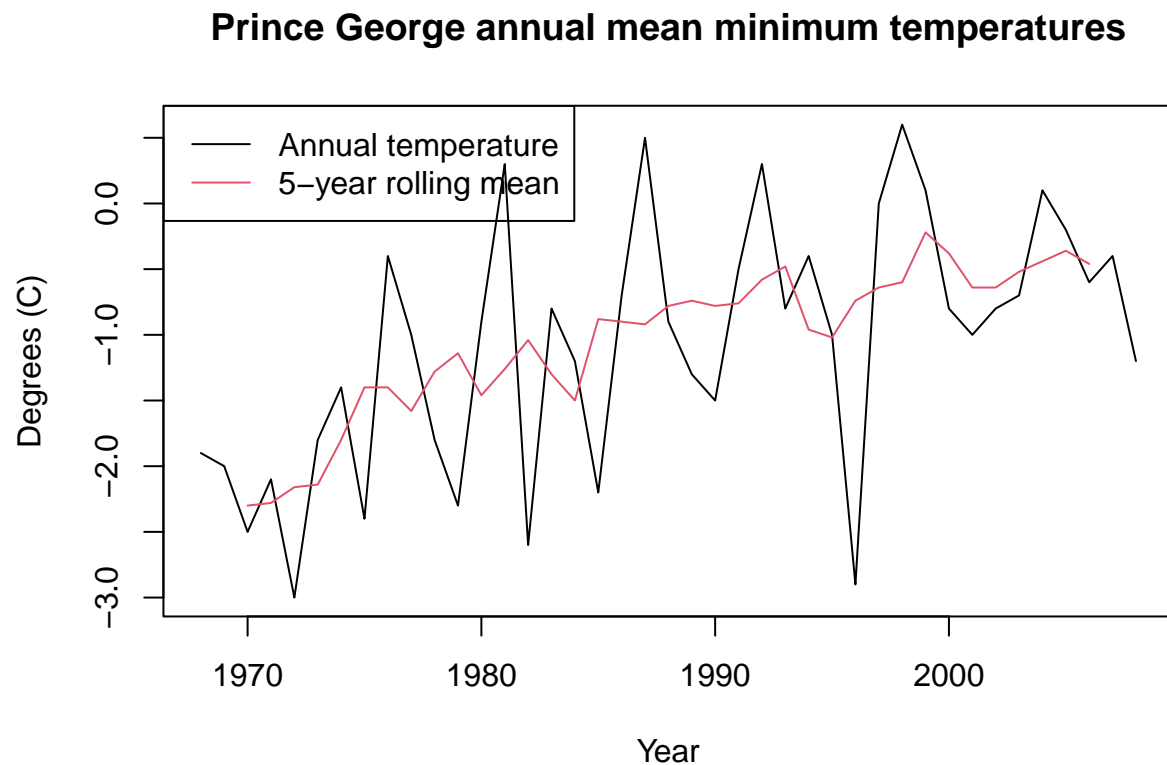


We see that the acf slowly decays to 0 as the lag increases because of the trend. At lag = 36, the acf flips over the x-axis to the negative range.

(1c)

```
# plot 5-year rolling mean on top of 1968 to 2008 window
mean_min_1968_2008 <- window(mean_min, start = 1968, end = 2008)
plot(mean_min_1968_2008,
     main = "Prince George annual mean minimum temperatures",
     xlab = "Year",
     ylab = "Degrees (C)")
lines(rollmean(mean_min_1968_2008, k = 5), col = 2)
legend(
  "topleft",
  legend = c("Annual temperature", "5-year rolling mean"),
```

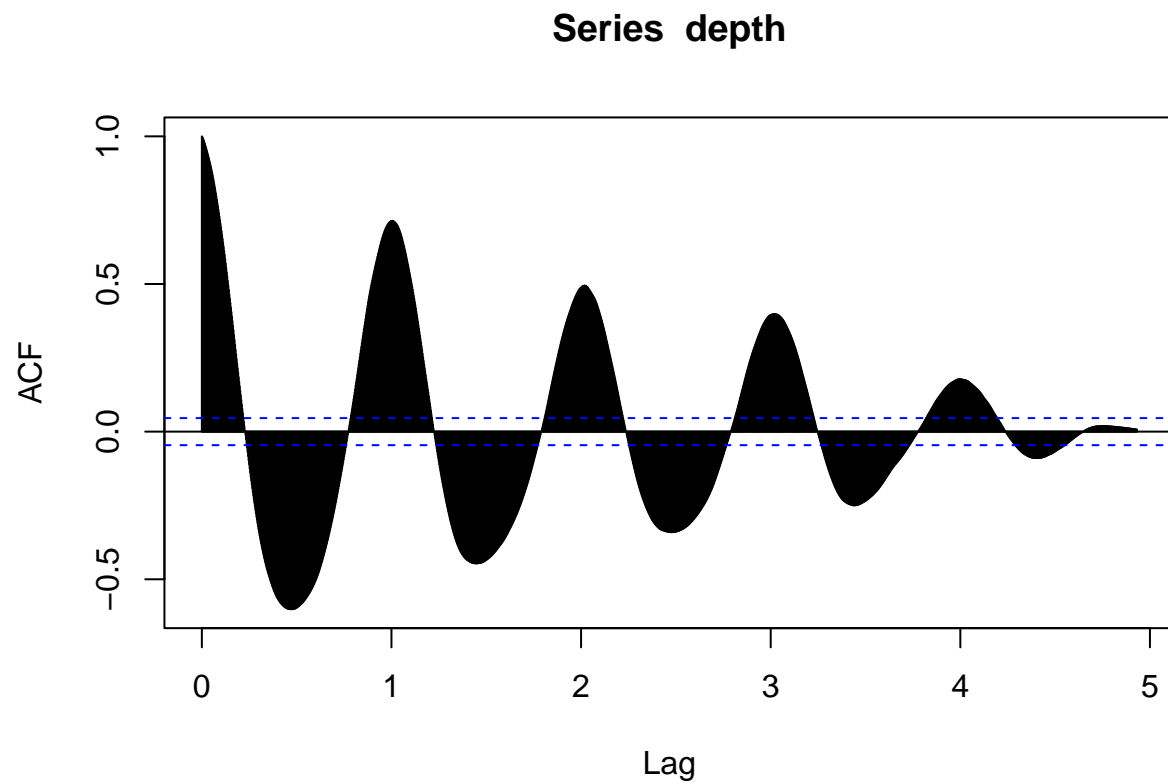
```
lty = 1,
col = c(1, 2)
)
```



Question 2

(2a)

```
# read in data and plot acf
lake_data <- read.csv("LakeLevels.csv", header = TRUE)
depth <-
  ts(lake_data$LakeLevel,
     start = c(2007, 1),
     frequency = 365)
acf(depth, lag.max = 1800)
```

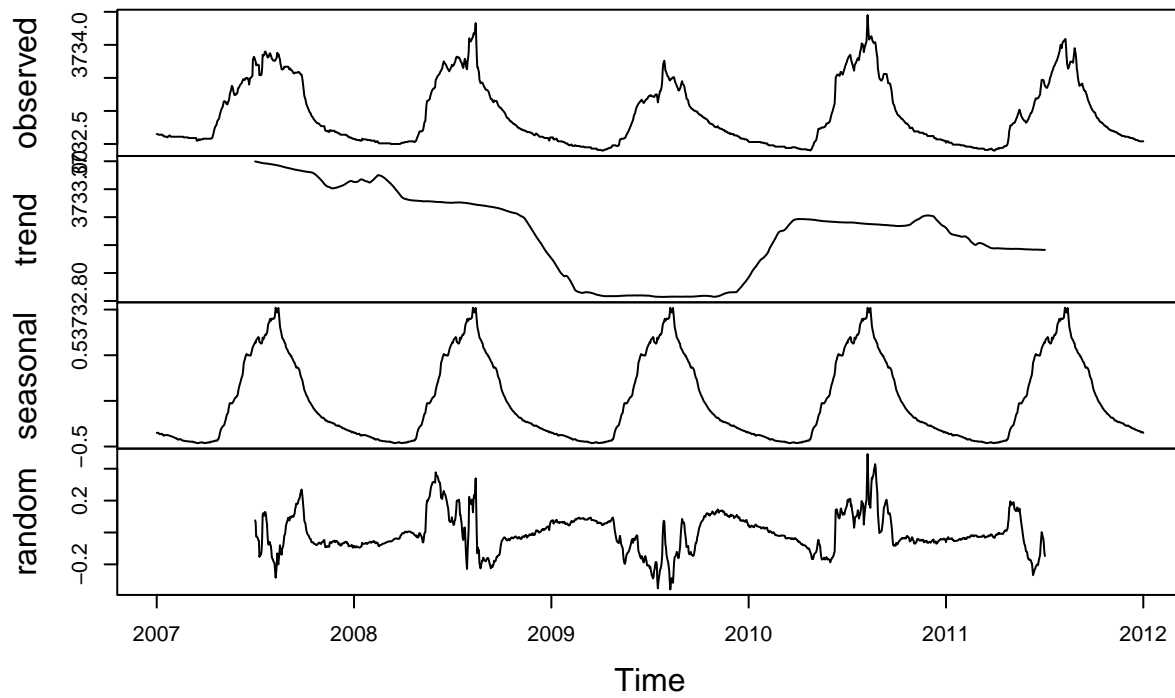


The acf oscillates around 0 since the series oscillates, and approaches 0 as the lag increases.

(2b)

```
# plot moving average decomposition  
depth_decomp <- decompose(depth, type = "additive")  
plot(depth_decomp)
```

Decomposition of additive time series



(2c)

```
# plot loess decomposition
depth_loess <- stl(depth, s.window = "periodic")
plot(depth_loess)
```

