Lab 2: Time Series, Decomposition, and Autocorrelation

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Quarto

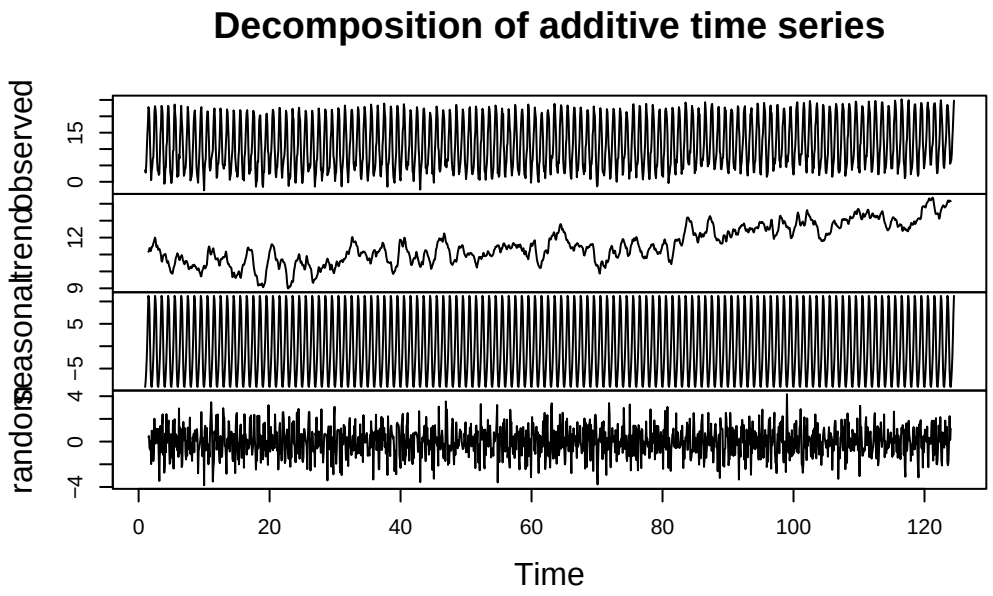
Quarto enables you to weave together content and executable code into a finished document. To learn more about Quarto see https://quarto.org.

```
## loading packages
library(pacman)
pacman::p_load(tidyverse, here, tseries, astsa, forecast, stlplus, fpp)

## reading in csv
prism <- read_csv(here("UNR-EcoForecast-main", "data", "tucson_prism_monthly.csv"))
```

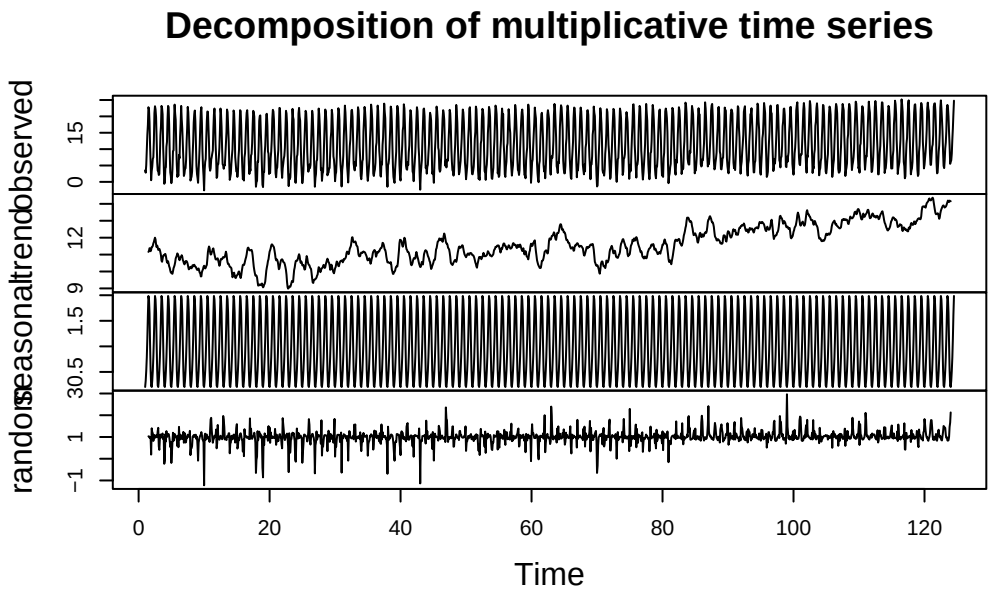
```
Rows: 1483 Columns: 6
-- Column specification --------------------------------------------------------
Delimiter: ","
chr (1): Date
dbl (5): ppt_mm, tmin_C, tmax_C, vpdmin-hPa, vpdmax_hPa

i Use `spec()` to retrieve the full column specification for this data.
i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

Question 1

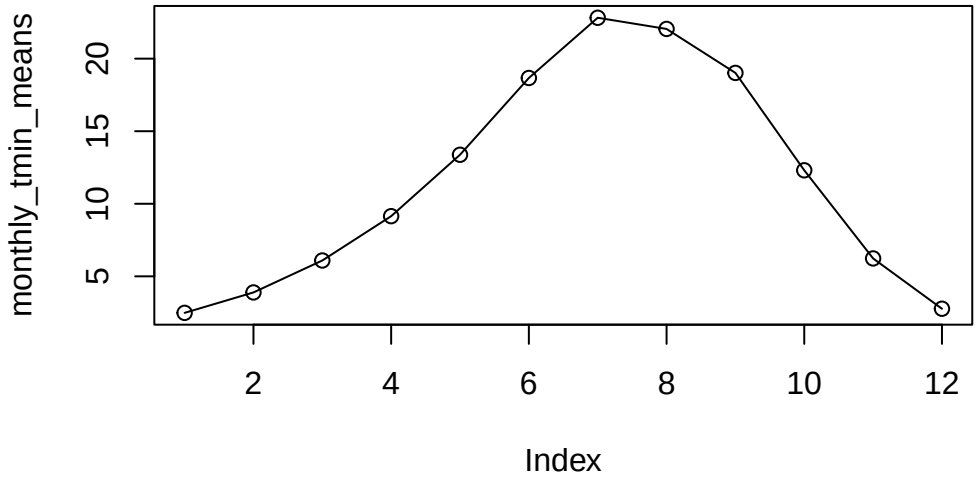
```r
## converting to time series object
tminC_ts <- ts(prism$tmin_C, frequency = 12)

## decomposing time series object
fit_add <- decompose(tminC_ts, type = "additive")
plot(fit_add)
```



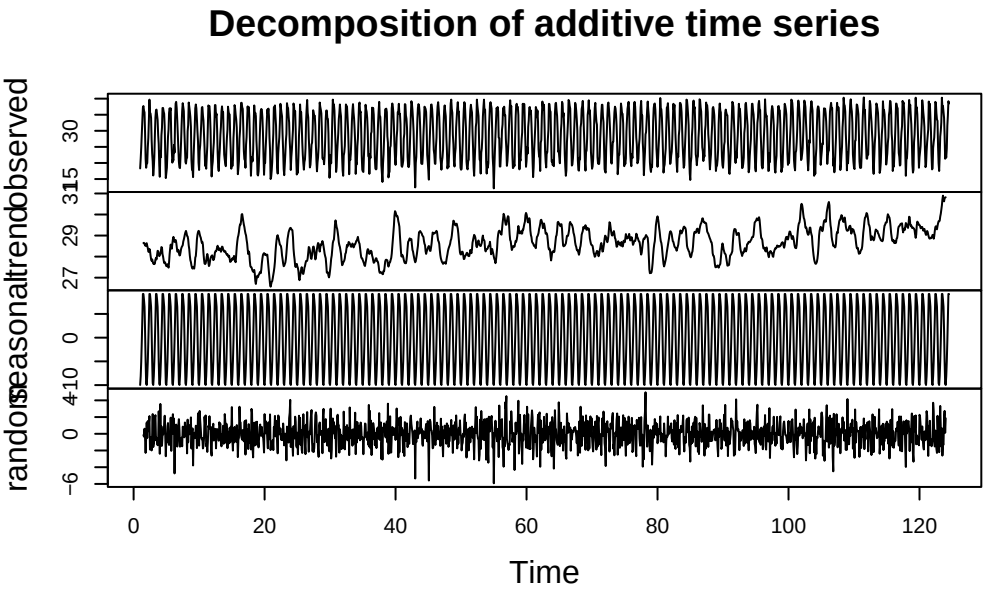

```r
fit_mult <- decompose(tminC_ts, type = "multiplicative")
plot(fit_mult)
```



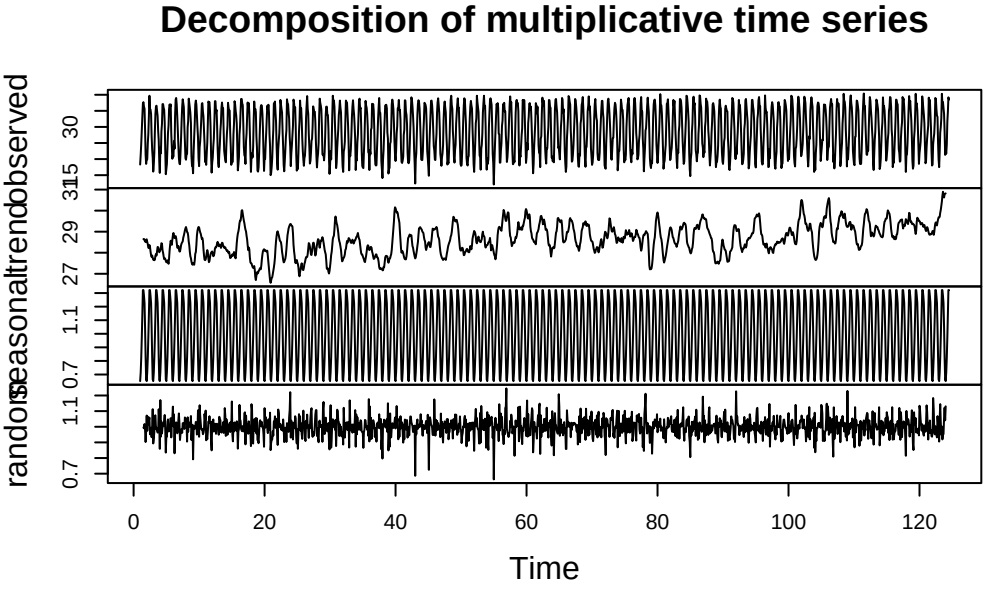

```
## converting ts to monthly means
monthly_tmin_means <- tapply(tminC_ts, cycle(tminC_ts), FUN=mean)
plot(monthly_tmin_means,type="o")
```




```
## converting tmax to time series object
tmaxC_ts <- ts(prism$tmax_C, frequency = 12)

## decomposing tmax time series object
fit_tmax_add <- decompose(tmaxC_ts, type = "additive")
plot(fit_tmax_add)
```

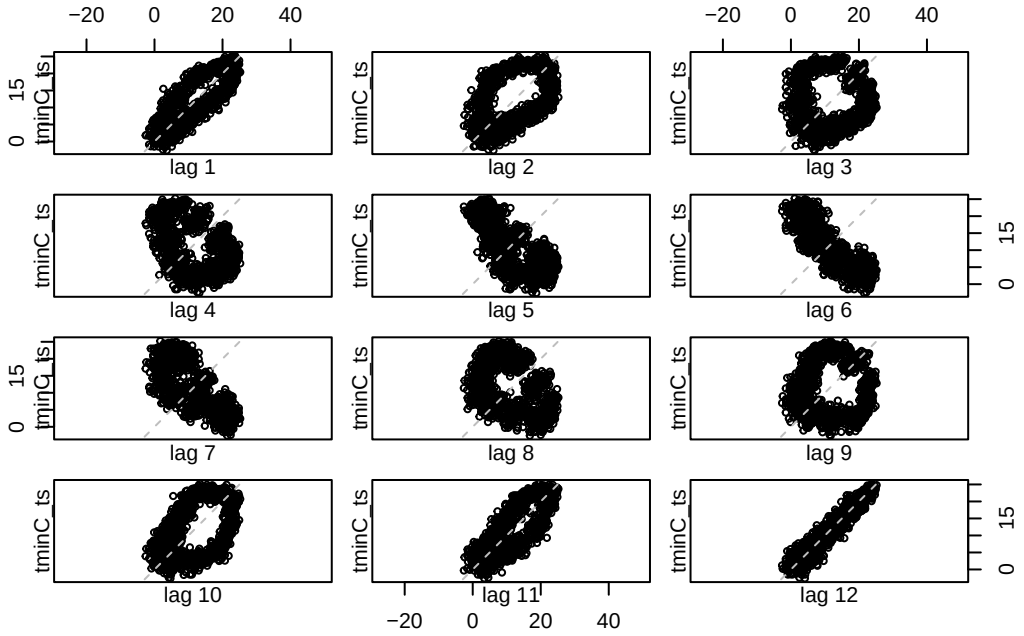



```
fit_tmax_mult <- decompose(tmaxC_ts, type = "multiplicative")
plot(fit_tmax_mult)
```

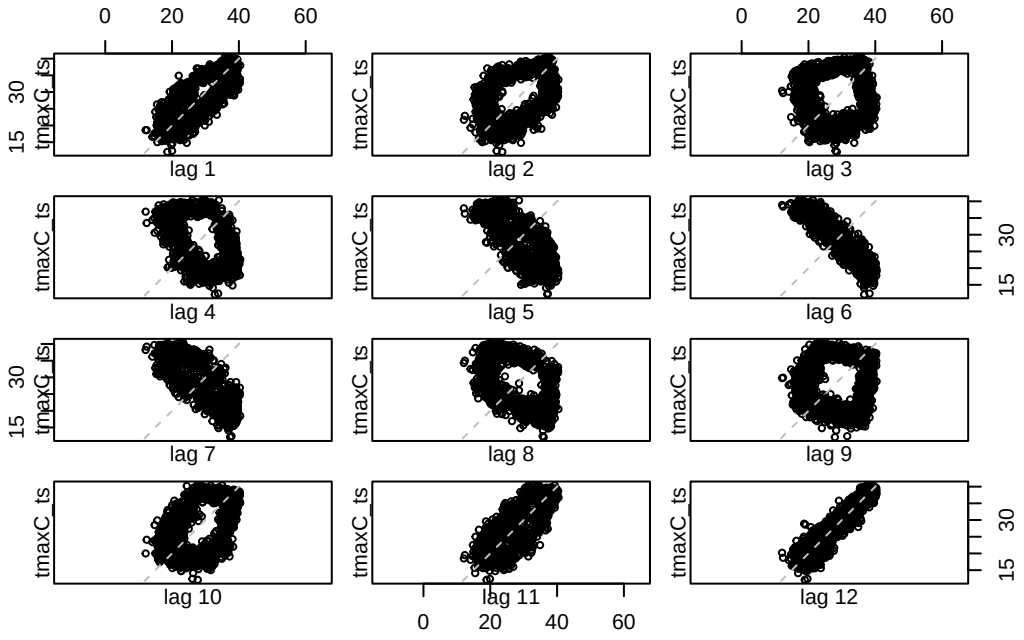


Question 2

```
## creating lag plots
lag.plot(tminC_ts, lags=12, do.lines=FALSE)
```

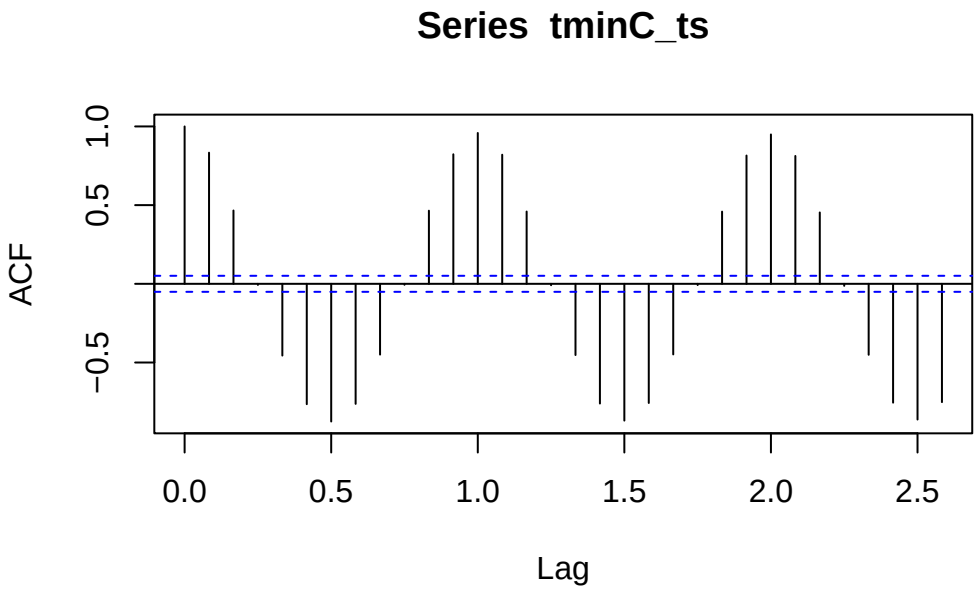



```
lag.plot(tmaxC_ts, lags=12, do.lines=FALSE)
```



Question 3

```
acf(tminC_ts)
```




```
pacf(tminC_ts)
```