STAT4870 Chapter 1 HW

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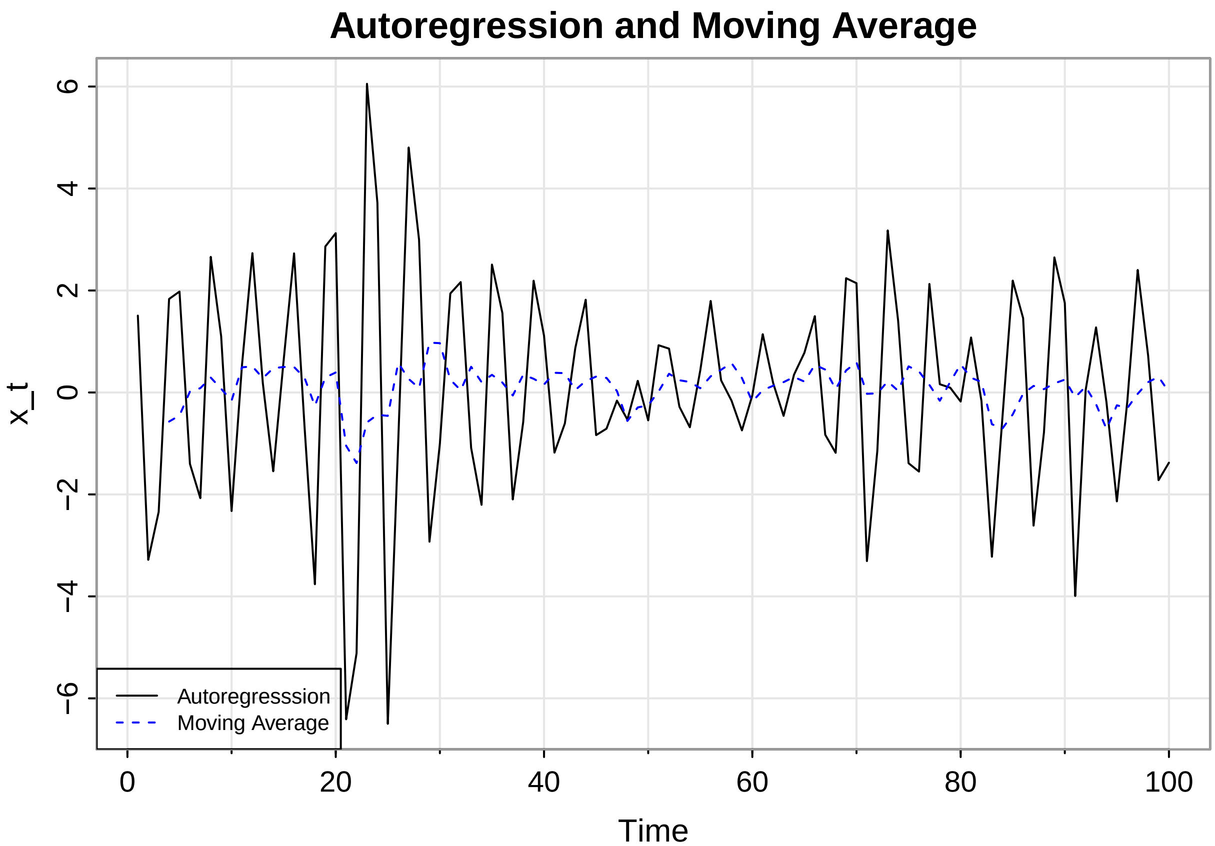
Question 1.1

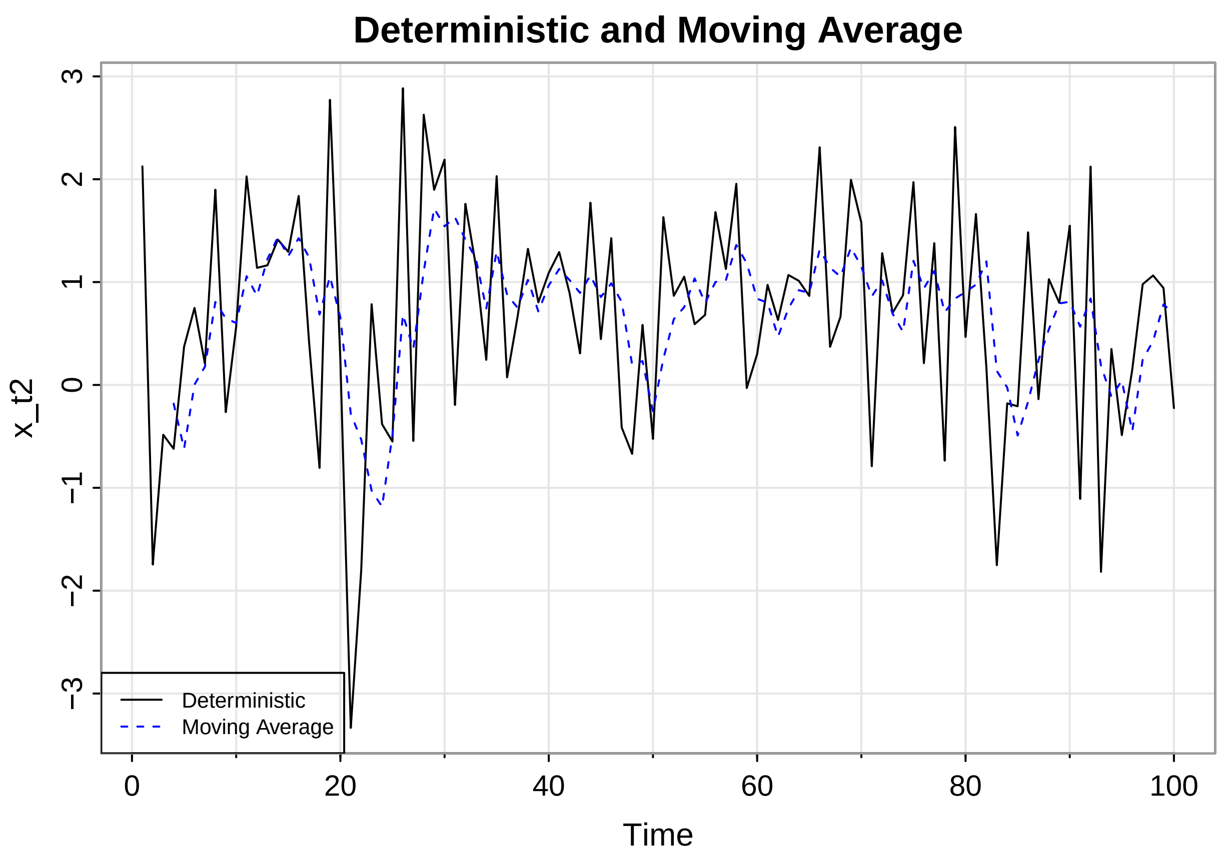
a.)

```
library(astsa)
set.seed(9021)
w = rnorm(100+50)
x_t<-ts(filter(w, filter = c(0,-0.9), method = "recursive")[-(1:50)])
v_t<-ts(filter(x_t, sides = 1, filter = rep(1/4,4)))

par(mfrow=c(1,1))
tsplot(x_t, xlab = "Time", lty = 1, main = "Autoregression and Moving Average")
lines(v_t, pch = 18, col = "blue", lty = 2, lwd = 1)
legend("bottomleft", legend = c("Autoregresssion", "Moving Average"),
       col = c("black", "blue"), lty = 1:2, cex = 0.7)
```



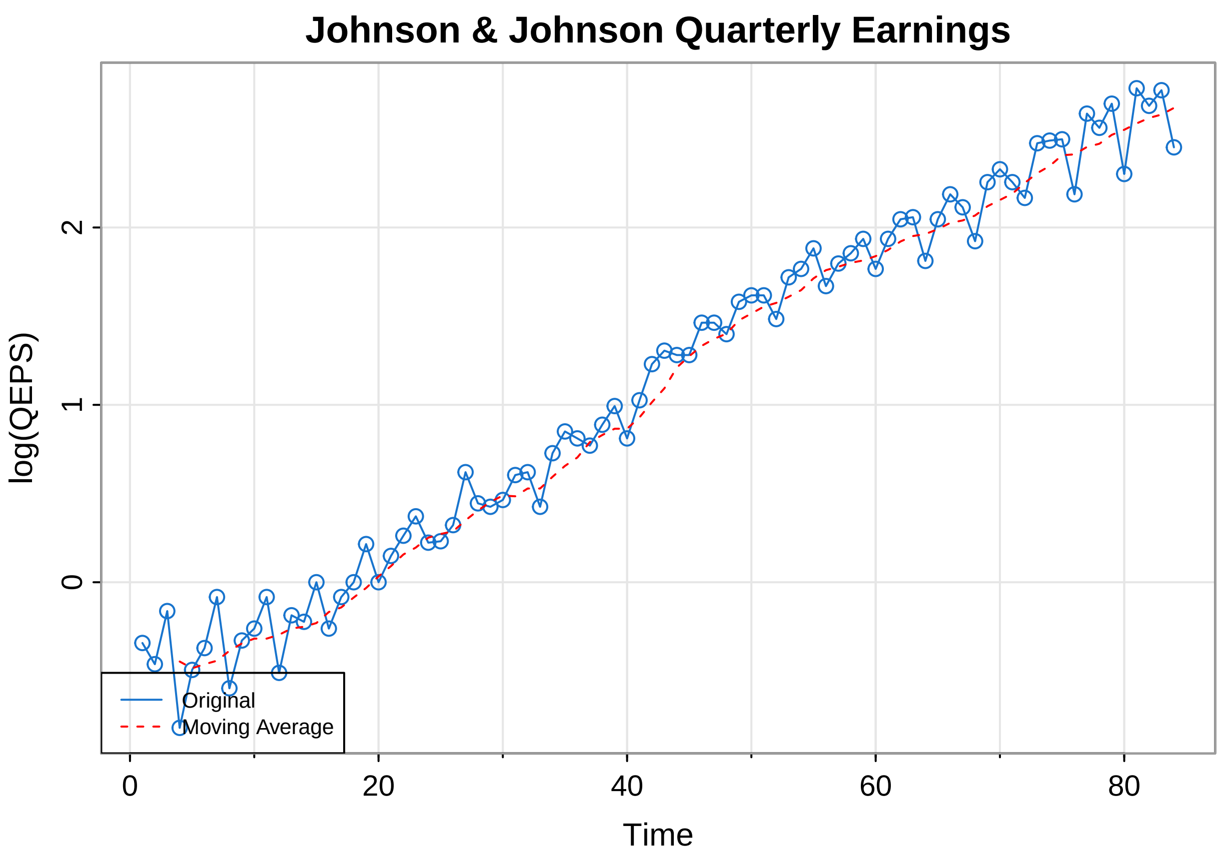
b.)

```
set.seed(9021)
w_t2<-w[-(1:50)]
x_t2<-ts(c(2*cos(2*pi*1:100)/4))+w_t2
v_t2<- ts(filter(x_t2, rep(1/4,4), sides = 1))

par(mfrow = c(1,1))
tsplot(x_t2, xlab = "Time", lty = 1, main = "Deterministic and Moving Average")
lines(v_t2, pch = 18, col = "blue", lty = 2, lwd = 1)
legend("bottomleft", legend = c("Deterministic", "Moving Average"),
       col = c("black", "blue"), lty = 1:2, cex = 0.7)
```



c.)

```
par(mfrow = c(1,1))
x_t3<-ts(log(jj))

v_t3<-ts(filter(x_t3, sides = 1, filter = rep(1/4,4)))

tsplot(x_t3, ylab = "log(QEPS)", type = "o", col = 4, main = "Johnson & Johnson Quarterly Earnings")
lines(v_t3, pch = 18, col = "red", lty = 2, lwd = 1)
legend("bottomleft", legend = c("Original", "Moving Average"),
       col = c(4, "red"), lty = 1:2, cex = 0.7)
```



d.) A seasonal adjustment is a statistical technique designed to even out periodic swings in statistics. It can eliminate misleading seasonal components of a time series data.

e.) I learned more about the coding process of a time series data and learned what does the command filter do in R as I used to not get what exactly does the filter command do. In addition, I learned on what to look for when looking at a time series data like is the data homogeneous, what is the general trend of the data, and what transformation can we do to make the data homogeneous.