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State	Finished
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Time taken	84 days 16 hours
Grade	**0.00** out of 20.00 (**0**%)

Question 1

Not answered

Points out of 20.00

For this problem , you are tasked with building and analyzing the ARIMA model using the core steps for the ARIMA Modeling Process. Write an R code that follows the following steps (include your comments and answers to the questions inside the R code as comments).

1. Plot and examine for any unusual patterns in the electrical equipment orders time series data (elecequip).

2. Decompose this ts using stl() (use s.windows="periodic").

3. If the data is seasonal, create and plot the seasonally adjusted data using seasadj().

4. Apply Box-Cox transformation only if there is there is the need to stabilize the variance of the time series obtained in Step 3.

5. Confirm if the resulting data after Step 4 is stationary.

6. If the data is non-stationary, then take the first difference of the data or run the unit root test to get the proper differencing order and check whether the differencing converted non-stationary ts to a stationarity one.

7. Use auto.arima() on the time series data obtained after Step #6. What are the values of p, d, and q in ARIMA (p, d, q) model that the model has chosen (use summary() on the model)

8. Generate your own ARIMA(4, 0, 0), ARIMA (3, 0,0) and ARIMA (2, 0, 0) models using the following command:

Arima(ts.data, order=c(4,0,0))

Compare the AICs of all the four models. Which model gives a better AICc?

9. Examine the residuals of the model that is the best from Step #8 (verify by Acf and Box.test)? Do they behave like white noise? (residuals(fit))

10. If the model is proper, then plot the forecast with plot(forecast(fit))

```
require(fpp)
1. plot(elecequip)
2. plot(stl(elecequip, s.window="periodic"))
3. plot(seasadj(stl(elecequip, s.window="periodic")))
4. No need for Box-Cox
5. Acf(seasadj(stl(elecequip, s.window="periodic")))
   Non-stationary
```

6. ndiffs(seasadj(stl(elecequip, s.window="periodic")))

Acf (diff(seasadj(stl(elecequip, s.window="periodic"))))

The first order difference will generate Stationary ts

7. ts.data <- diff(seasadj(stl(elecequip, s.window="periodic")))

fit <- auto.arima(ts.data)

summary(fit)

8. Arima(ts.data, order=c(4,0,0))

Arima(ts.data, order=c(3,0,0))

Arima(ts.data, order=c(3,0,0))

auto.arima() gives slightly better AICc

9. Acf (residuals(fit)) shows that the residuals look like white noise; hence the model is proper. Confirm with Portm. test:

Box.test(residuals(fit), lag=24, fitdf=4, type="Ljung")

10. plot(forecast(fit))

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