ica21

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```
library(forecast)
```

```
## Registered S3 method overwritten by 'quantmod':
##   method            from
##   as.zoo.data.frame zoo
```

1. For the beer dataset

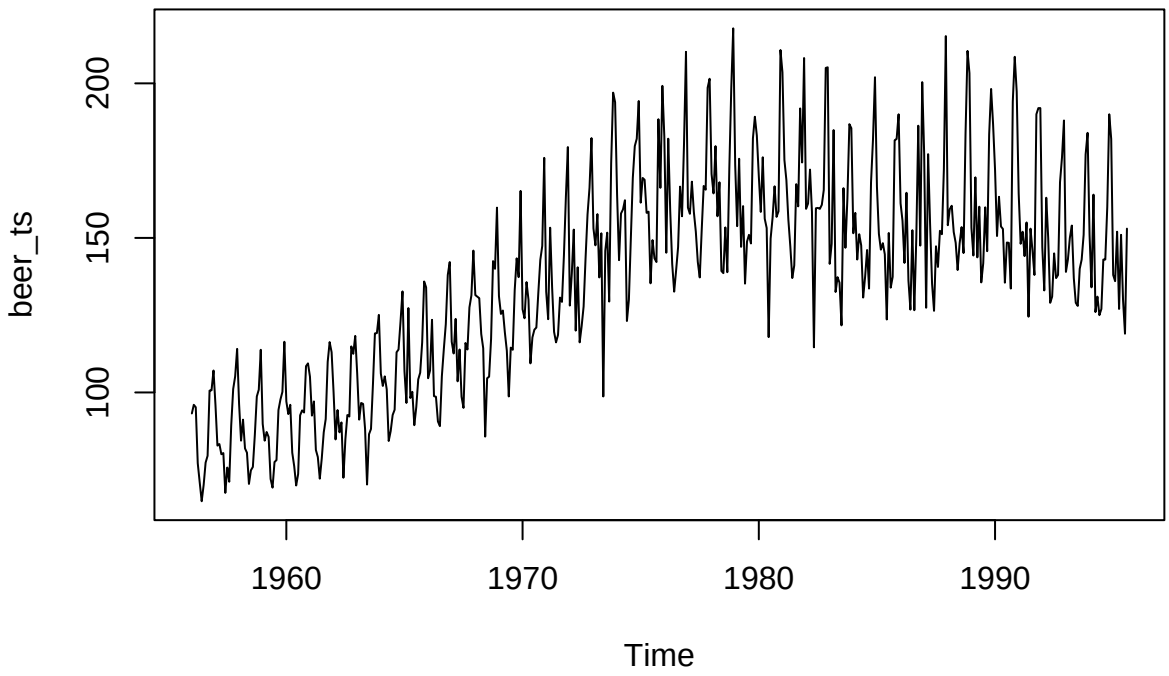
```
beer <- read.csv("/Users/apple/Desktop/STT811_appl_stat_model/data/beer.csv")
tail(beer)
```

```
##       Month Monthly.beer.production
## 471 1995-03                     152
## 472 1995-04                     127
## 473 1995-05                     151
## 474 1995-06                     130
## 475 1995-07                     119
## 476 1995-08                     153
```

```
beer_ts <- ts(beer$Monthly.beer.production, start = c(1956, 1), end = c(1995, 8), frequency =12 )
```

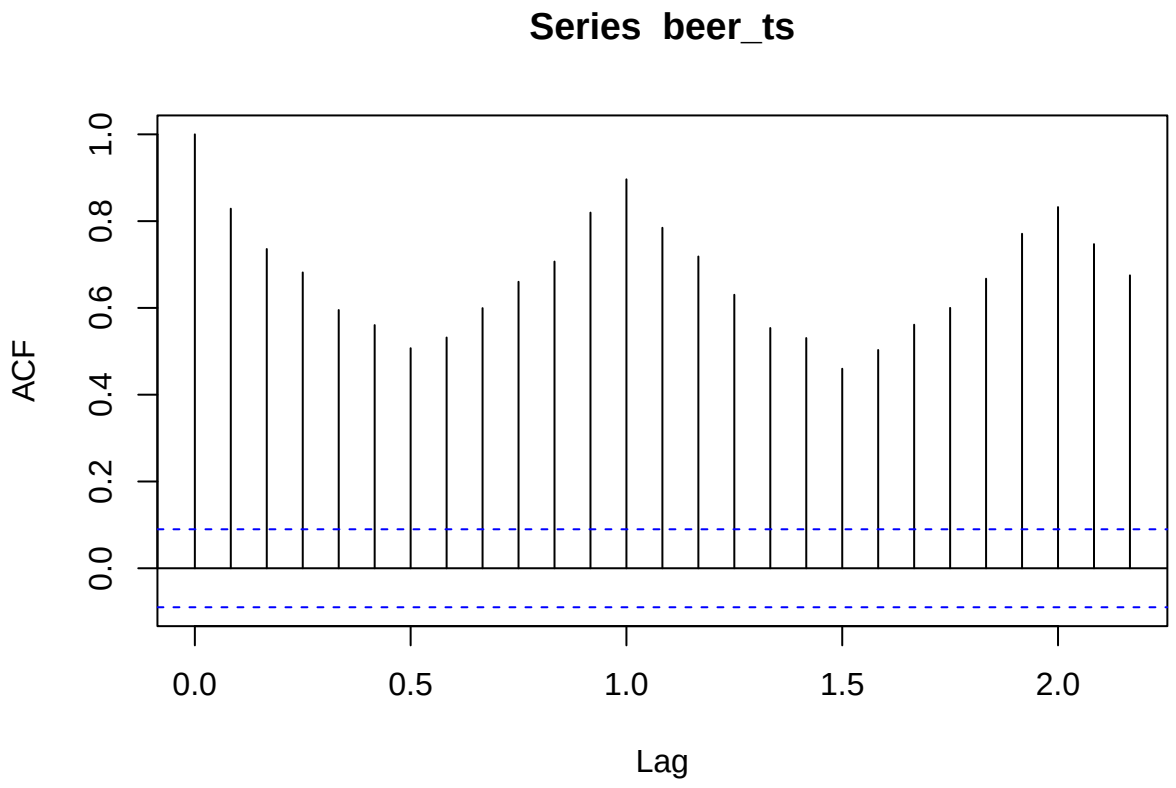
a. Graph the time series. Does it appear that there is seasonality? appear

```
plot(beer_ts)
```

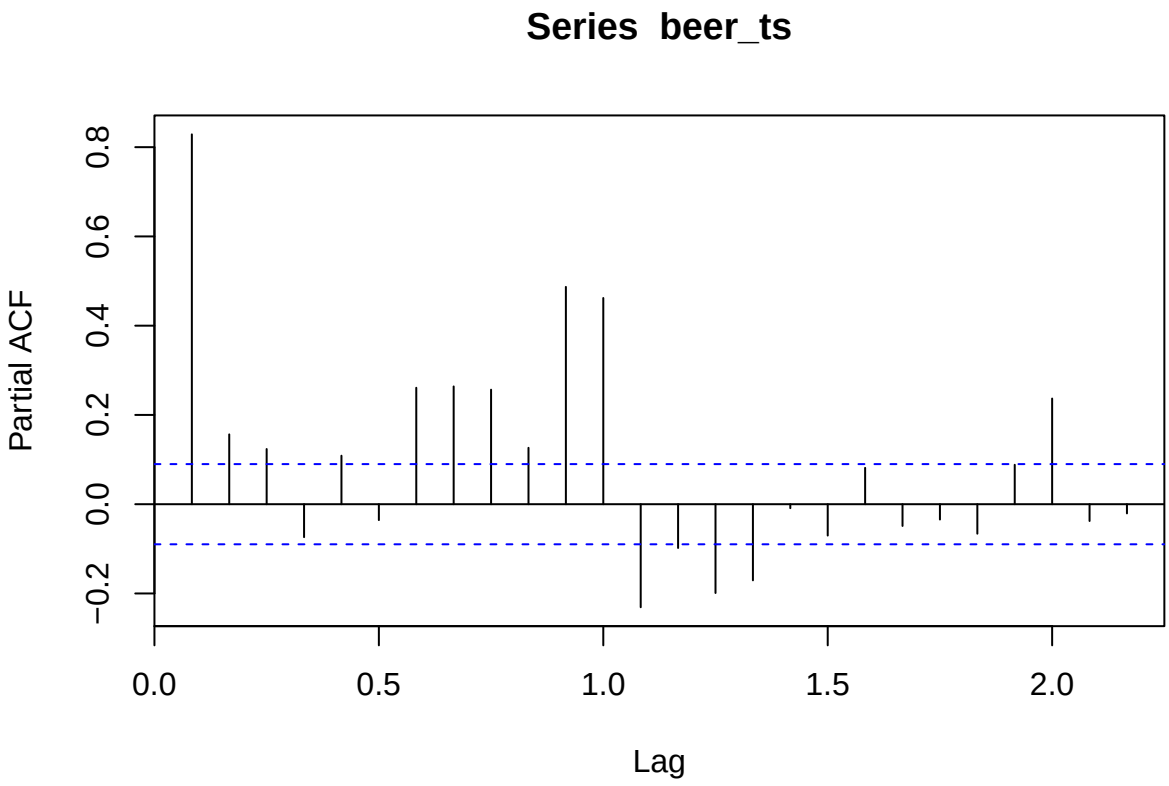


b. Plot the acf and pacf functions.

```
acf(beer_ts)
```

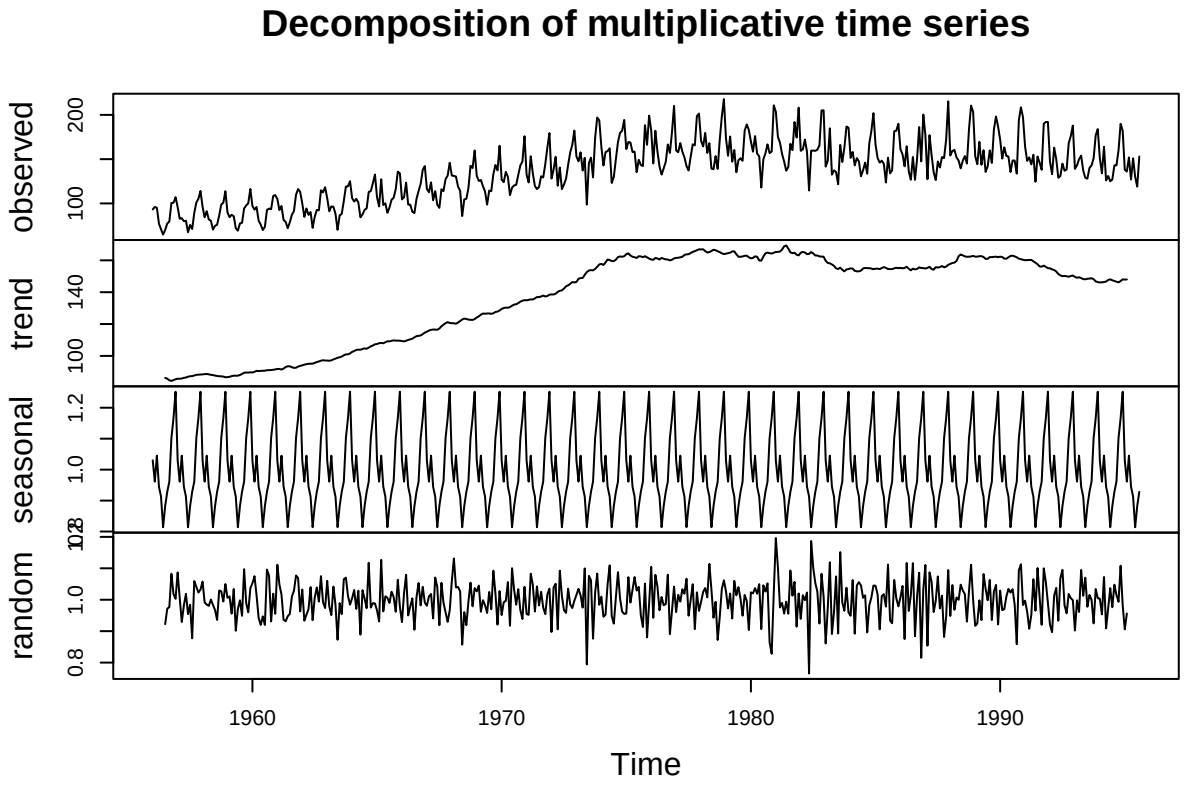



```
pacf(beer_ts)
```



c. Create an ARIMA forecasts auto.arima. Does the forecast have seasonality?

```
beer_dec <- decompose(beer_ts, type = 'multiplicative')
plot(beer_dec)
```




```
rand_beer <- ts(beer_dec$random[7:470], start = c(1956,7), frequency = 12)
beer_aa <- auto.arima(rand_beer)
```

d. Compute the MAPE. How does the MAPE compare to the H-W model from last time?

```
mean(abs(na.omit(beer_aa$residuals))/rand_beer)
```

```
## [1] 0.03916942
```