ts

- :

depart.txt 1984 1 1988 12 . scan() R . scan() R .

```
depart <- scan("https://raw.githubusercontent.com/yjyjpark/TS-with-R/main/Data/depart.txt"
```

depart ts() ts .

```
depart.ts <- ts(depart, start = c(1984, 1), frequency = 12)
depart.ts
##       Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec
## 1984  423  458  607  564  536  536  804  540  488  627  672 1447
## 1985  514  518  699  654  612  612  884  605  547  705  698 1555
## 1986  561  564  773  717  665  667  994  661  616  786  806 1754
## 1987  622  636  874  831  769  779 1142  764  718  930  943 2039
## 1988  736  752 1057  947  868  931 1311  896  867 1073 1069 2333
```

- :

depart.ts Figure 1 .

```
library(fpp2)
autoplot(depart.ts) +
  labs(title = "Monthly sales of a department store",
       x = "Year", y = NULL)
```

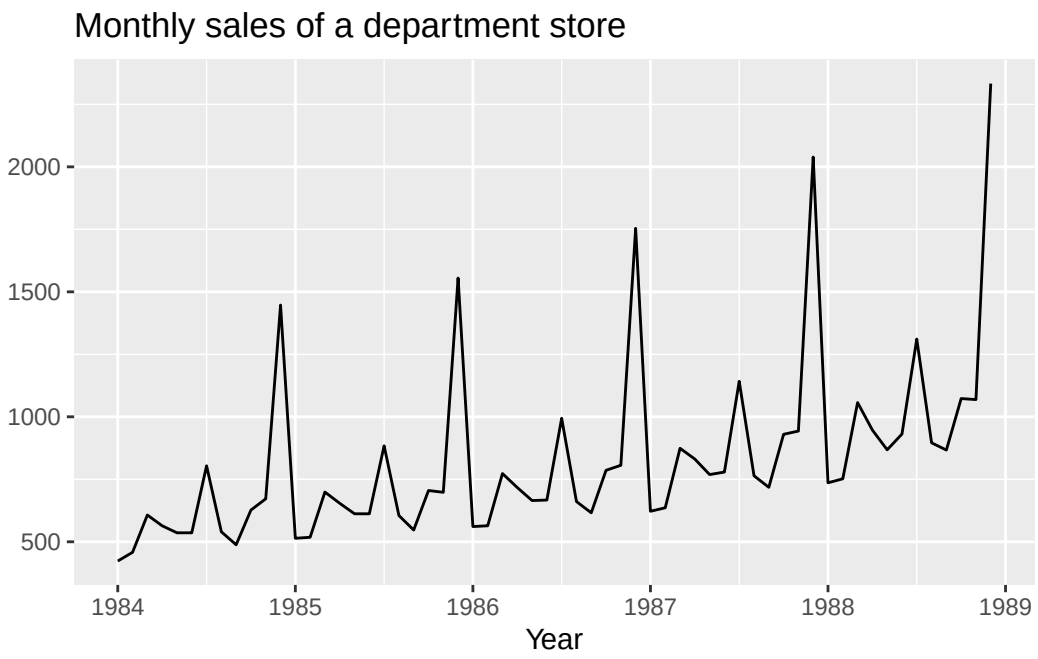


Figure 1:

- :

1856 1 2005 12 `global.txt` . Figure 2 .

```
global <- scan("https://raw.githubusercontent.com/yjyjpark/TS-with-R/main/Data/global.txt"
global.ts <- ts(global, start = c(1856, 1), frequency = 12)
```

```
autoplot(global.ts) +
  labs(title = "Global Temperature 1985 ~ 2005",
       x = "Year", y = NULL)
```

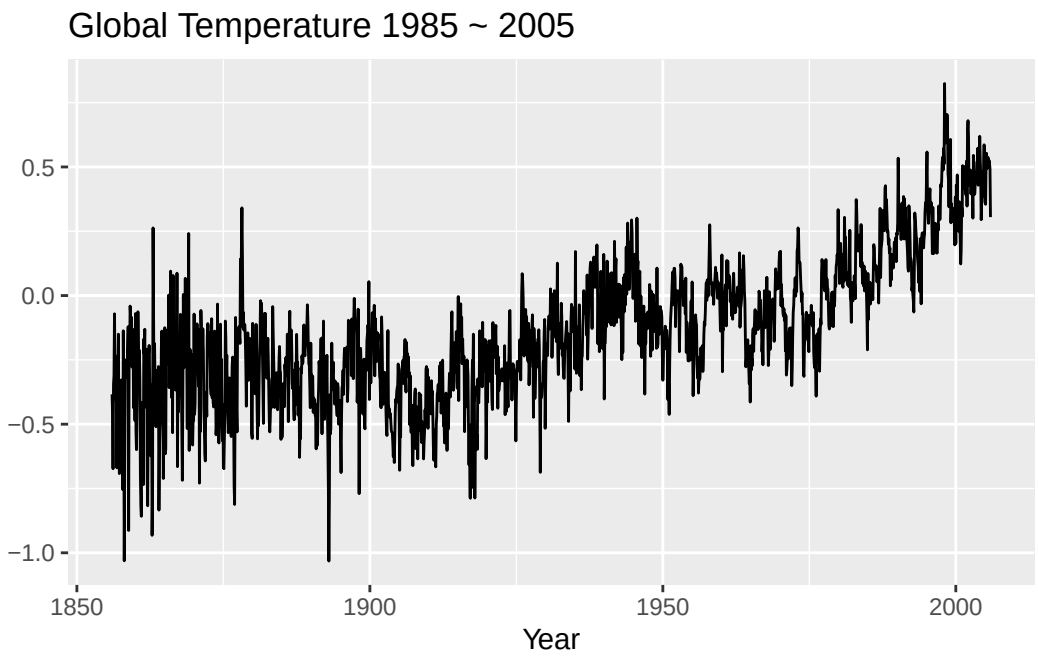


Figure 2: 1856 2005

Figure 2 1970 . 1970 . ts , window() .

```
global.1970 <- window(global.ts, start = 1970)
```

1970 1 Figure 3 .

```
autoplot(global.1970) +
  labs(title = "Global Temperature 1970 ~ 2005",
       x = "Year", y = NULL)
```

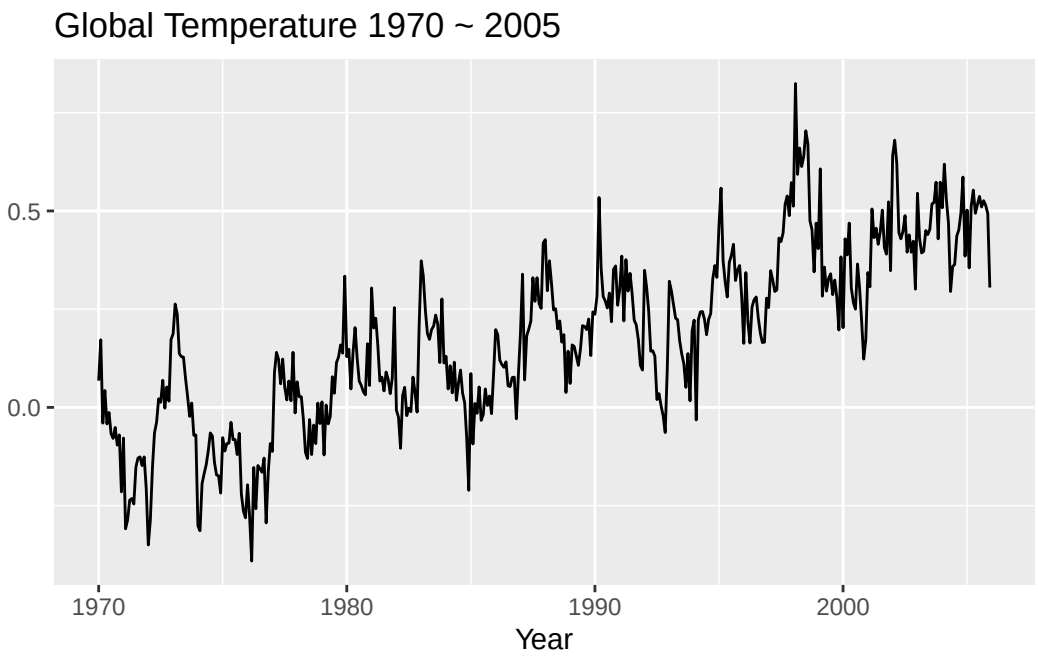


Figure 3: 1970 2005

Figure 3 , . Figure 4 .

```
autoplot(global.1970) +
  geom_smooth(method = "lm", se = FALSE) +
  labs(title = "Global Temperature 1970 ~ 2005",
       x = "Year", y = NULL)
```

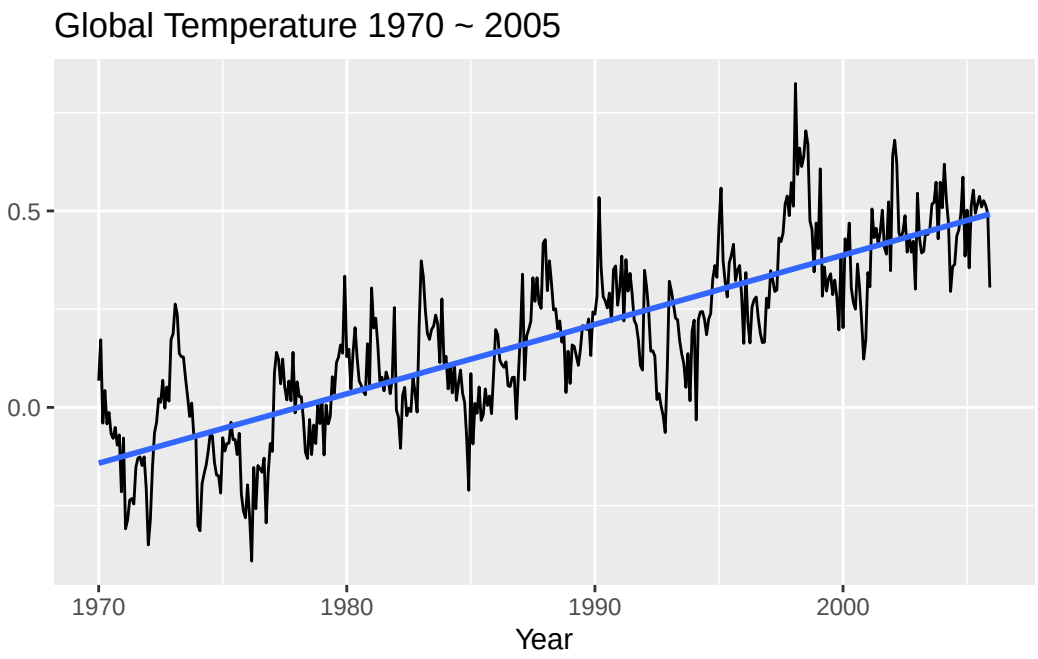


Figure 4:

- :

cbe.txt 1958 , . , .
readr read_table() .

```
library(readr)
CBE <- read_table("https://raw.githubusercontent.com/yjyjpark/TS-with-R/main/Data/cbe.txt"
CBE %>% print(n = 3)
## # A tibble: 396 x 3
##    choc  beer  elec
##   <dbl> <dbl> <dbl>
## 1  1451  96.3  1497
## 2  2037  84.4  1463
## 3  2477  91.2  1648
## # ... with 393 more rows
```

tibble ts . ts() ts .

```
cbe <- ts(CBE, start = 1958, frequency = 12)
head(CBE, n = 3)
## # A tibble: 3 x 3
```

```
##    choc  beer  elec
##   <dbl> <dbl> <dbl>
## 1  1451  96.3  1497
## 2  2037  84.4  1463
## 3  2477  91.2  1648
```

cbe choc, beer elec . autoplot() Figure 5 .

```
autoplot(cbe) + ylab(NULL)
```

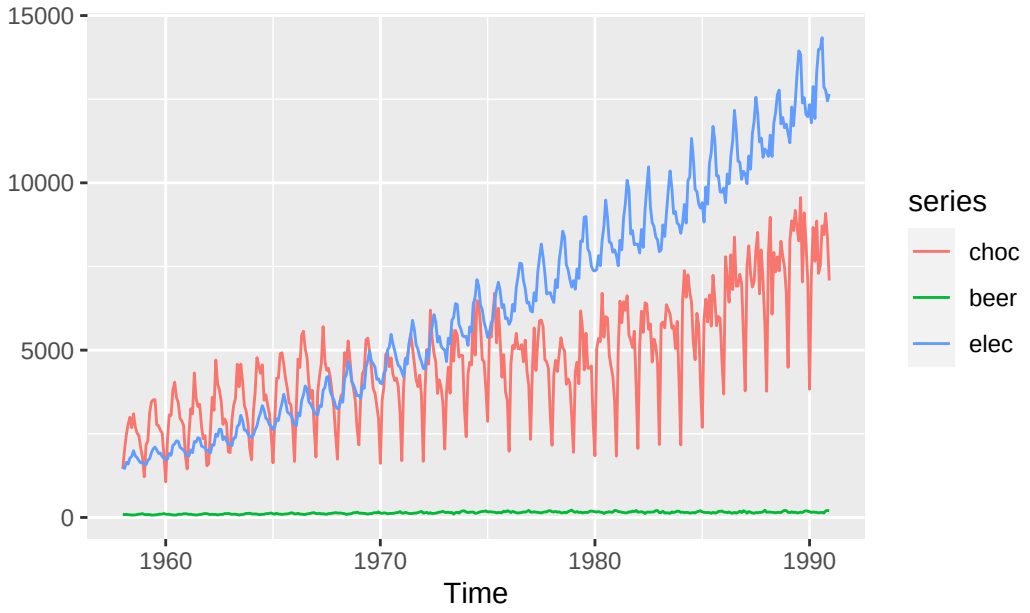


Figure 5:

scale facet . Facet Figure 6 .

```
autoplot(cbe, facets = TRUE) + ylab(NULL)
```

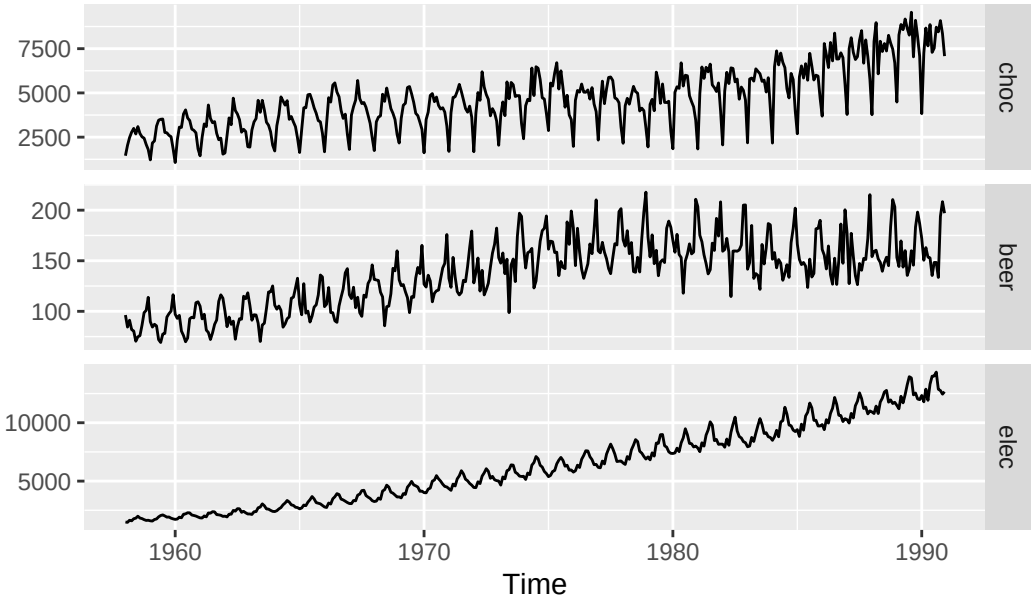


Figure 6:

Seasonal

- : `AirPassengers`

`ggseasonplot()` seasonal Figure 7 .

```
ggseasonplot(AirPassengers)
```

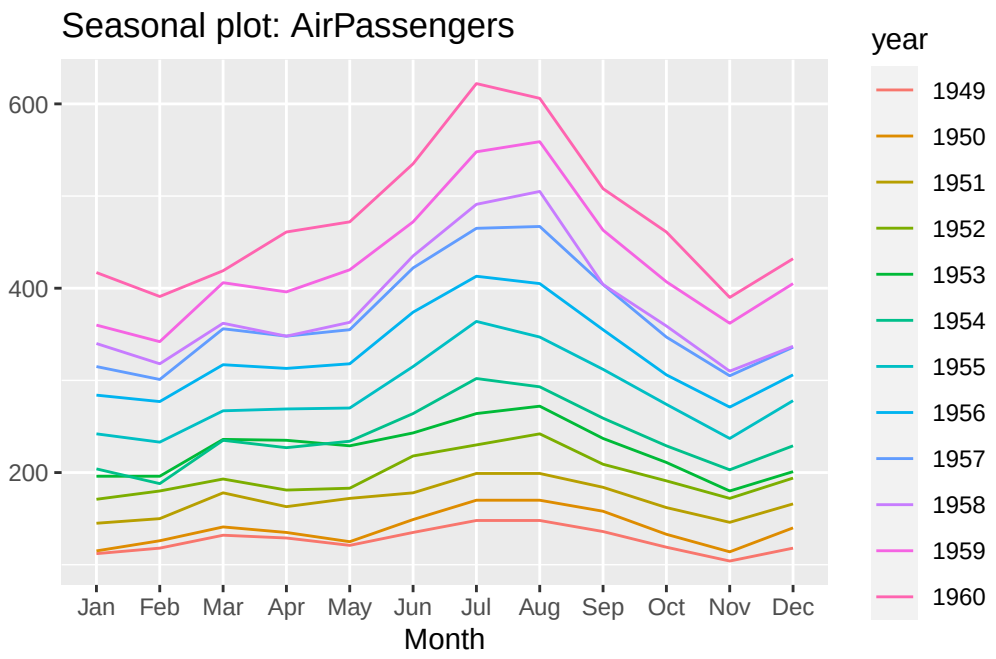


Figure 7: `ggseasonalplot()` seasonal

seasonal Figure 8 .

```
ggseasonplot(AirPassengers, year.labels = TRUE)
```

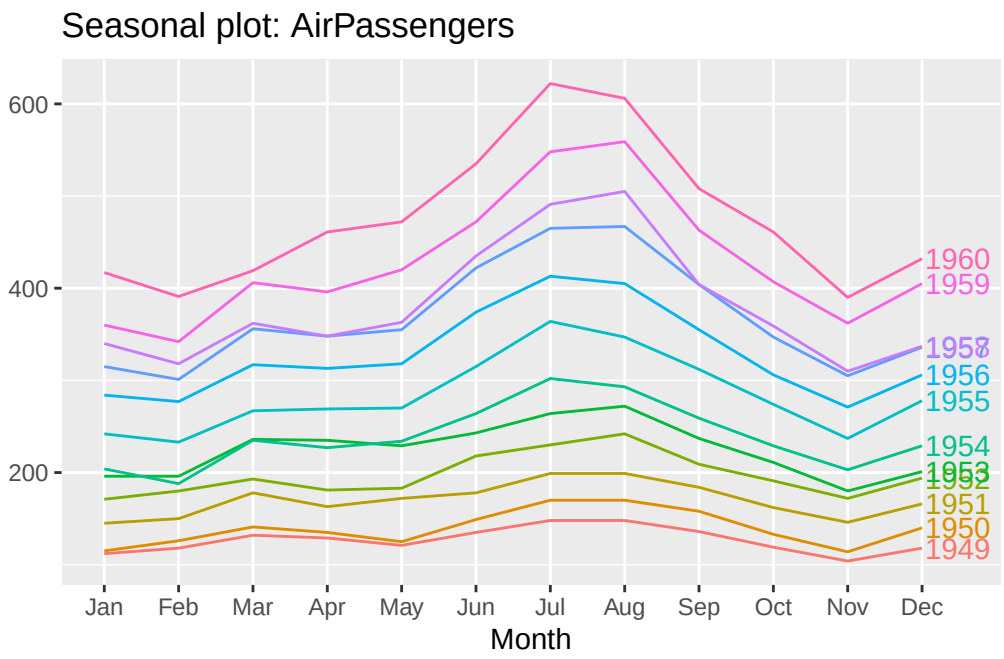


Figure 8: `ggseasonalplot()` seasonal

seasonal Figure 9 .

```
ggseasonplot(AirPassengers,
             year.labels = TRUE, year.labels.left = TRUE)
```

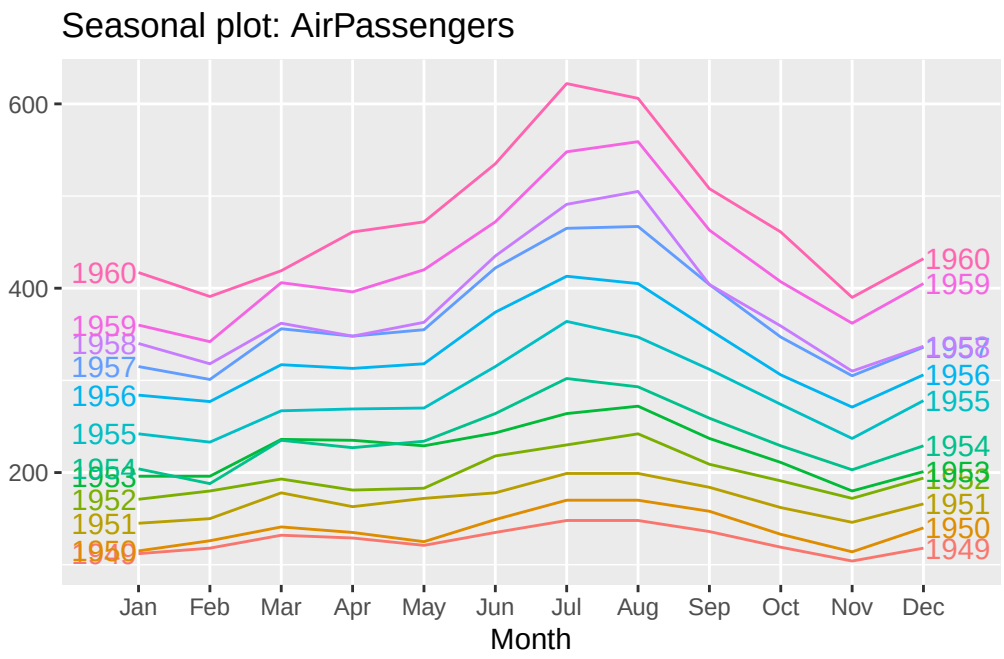


Figure 9: `ggseasonalplot()` `year.labels.left = TRUE` seasonal

seasonal Figure 10 .

```
ggseasonplot(AirPassengers, polar = TRUE)
```

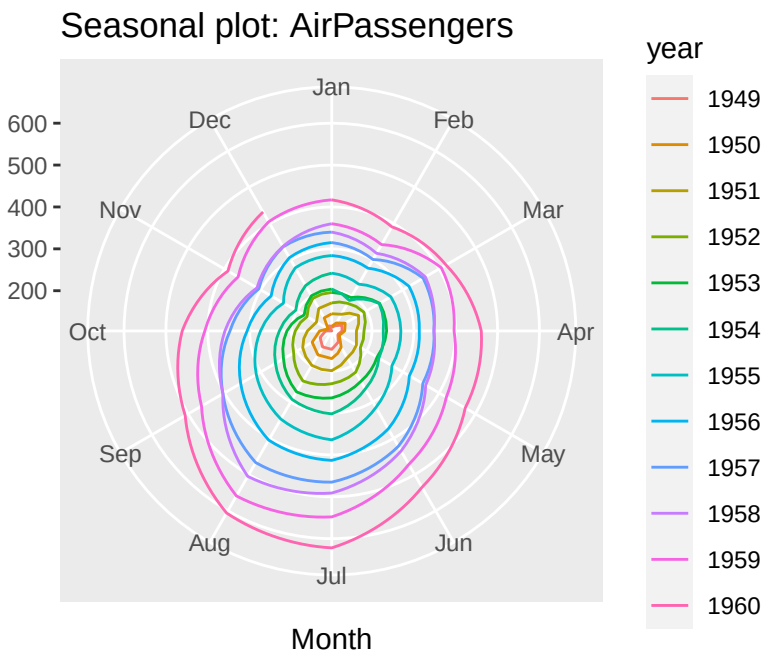


Figure 10: `ggseasonalplot()` `polar = TRUE` seasonal

`ggsubseriesplot()` Figure 11 . , .

```
ggsubseriesplot(AirPassengers)
```

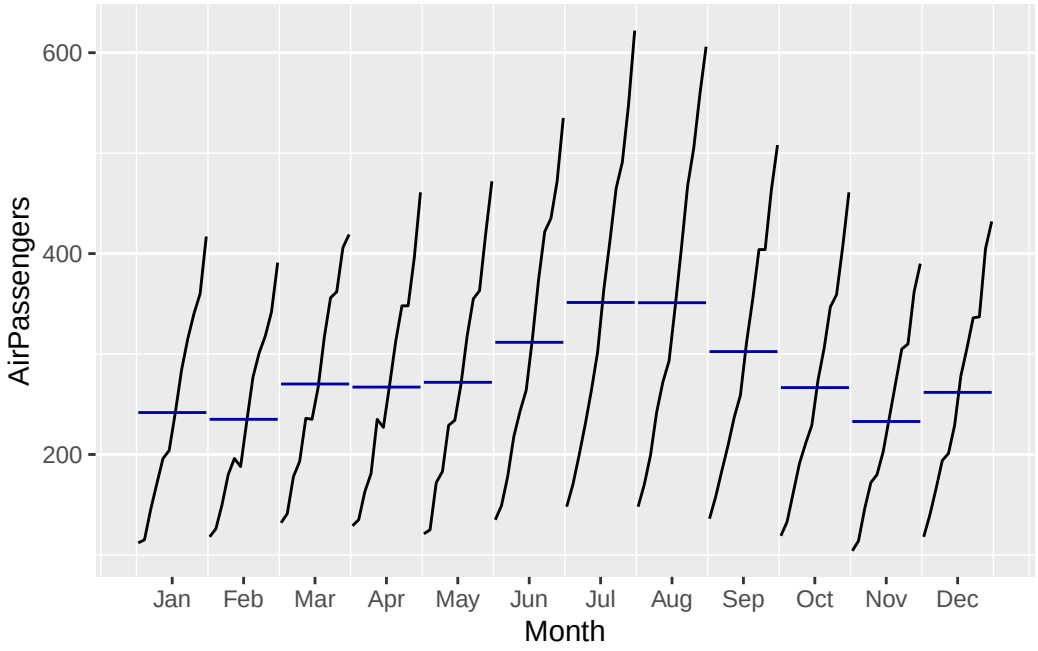


Figure 11: `ggsubseriesplot()` seasonal

. `ts` `AirPassengers` , `cycle()` . Figure 12 .

```
tibble(AP = as.numeric(AirPassengers),
       mon = as.factor(cycle(AirPassengers))) %>%
  ggplot(aes(x = mon, y = AP)) +
  geom_boxplot() +
  labs(x = "Month", y = "Air Passengers")
```

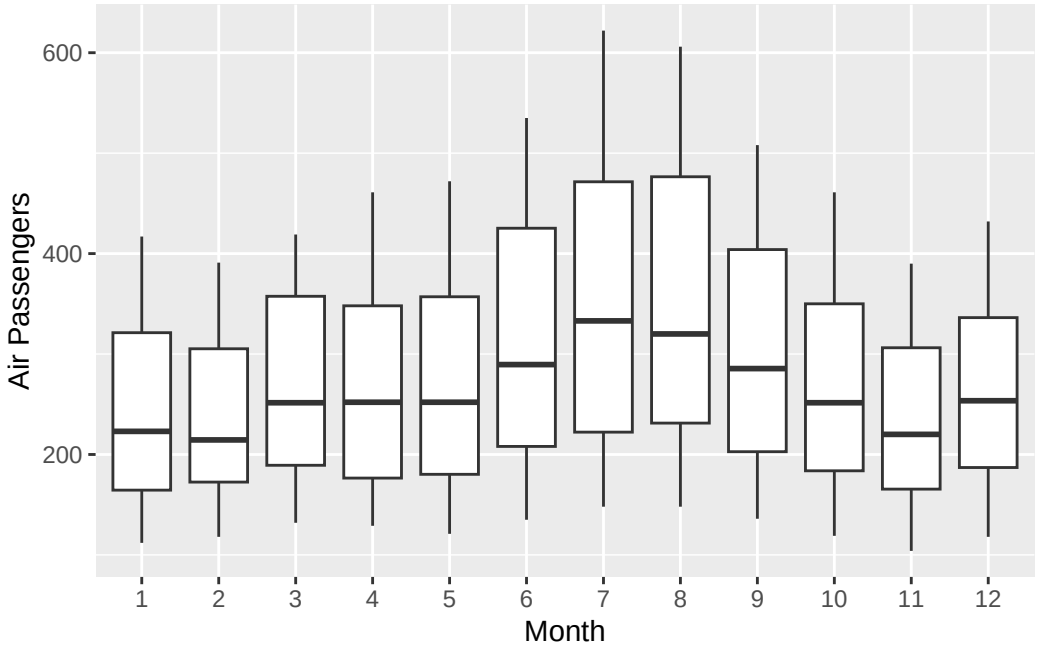
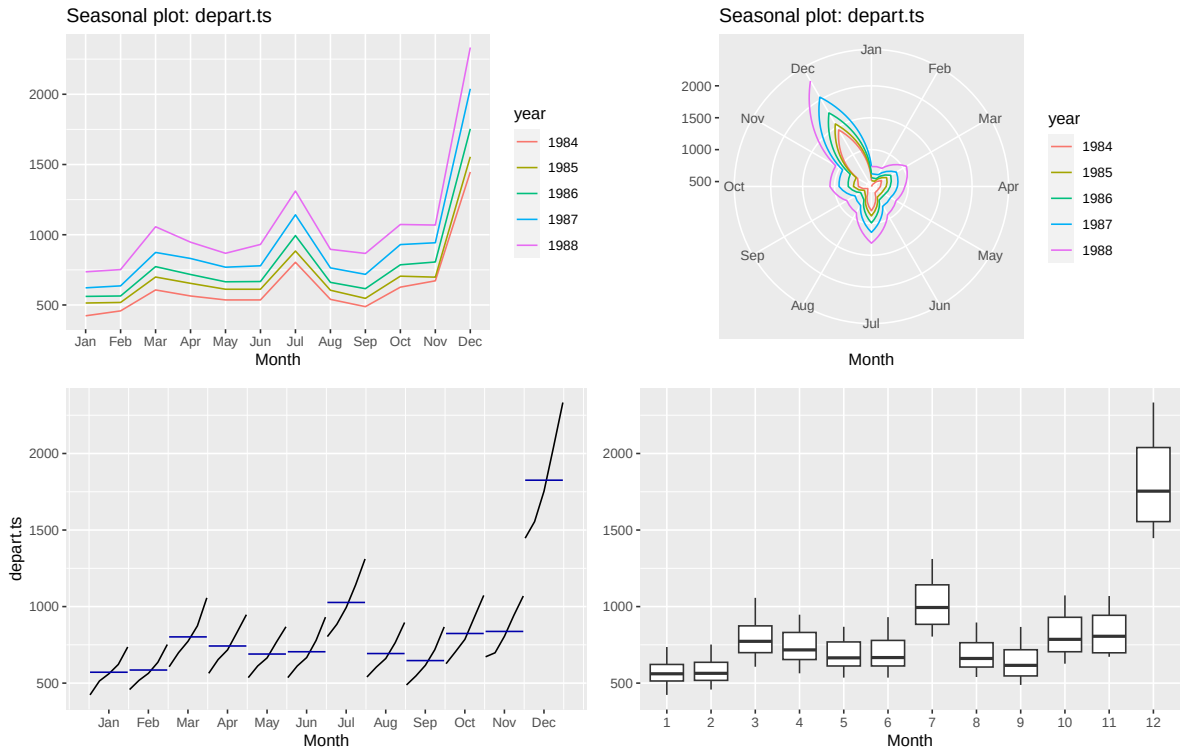


Figure 12:

1. `depart.ts` seasonal , .

2. 1981 1 1992 12 `Ktour.txt` , .

- ts
-
- seasonal


Seasonal plot: depart.ts
2000
1500
1000
500
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Month
year
1984
1985
1986
1987
1988
Seasonal plot: depart.ts
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
depart.ts
1 2 3 4 5 6 7 8 9 10 11 12
Month