

# Assignment-1

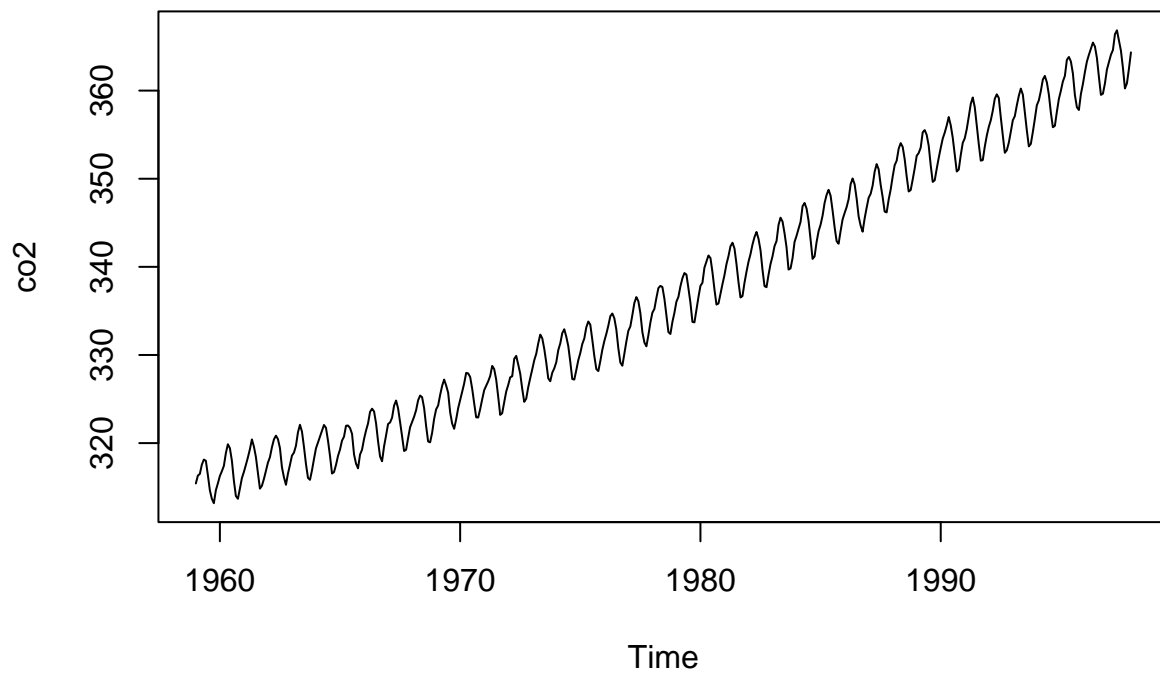
2023-03-01

## Excercise 1

```
str(co2)
```

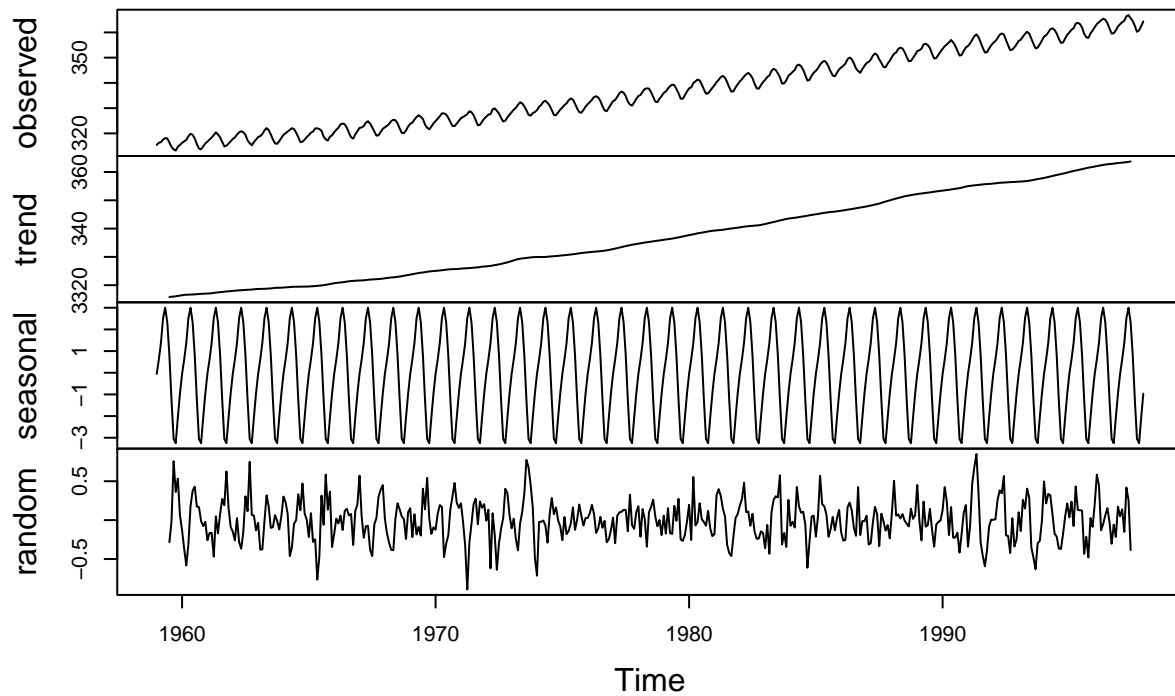
```
## Time-Series [1:468] from 1959 to 1998: 315 316 316 318 318 ...
```

```
plot(co2)
```



```
co2_d <- decompose(co2, type = "additive")  
plot(co2_d)
```

## Decomposition of additive time series



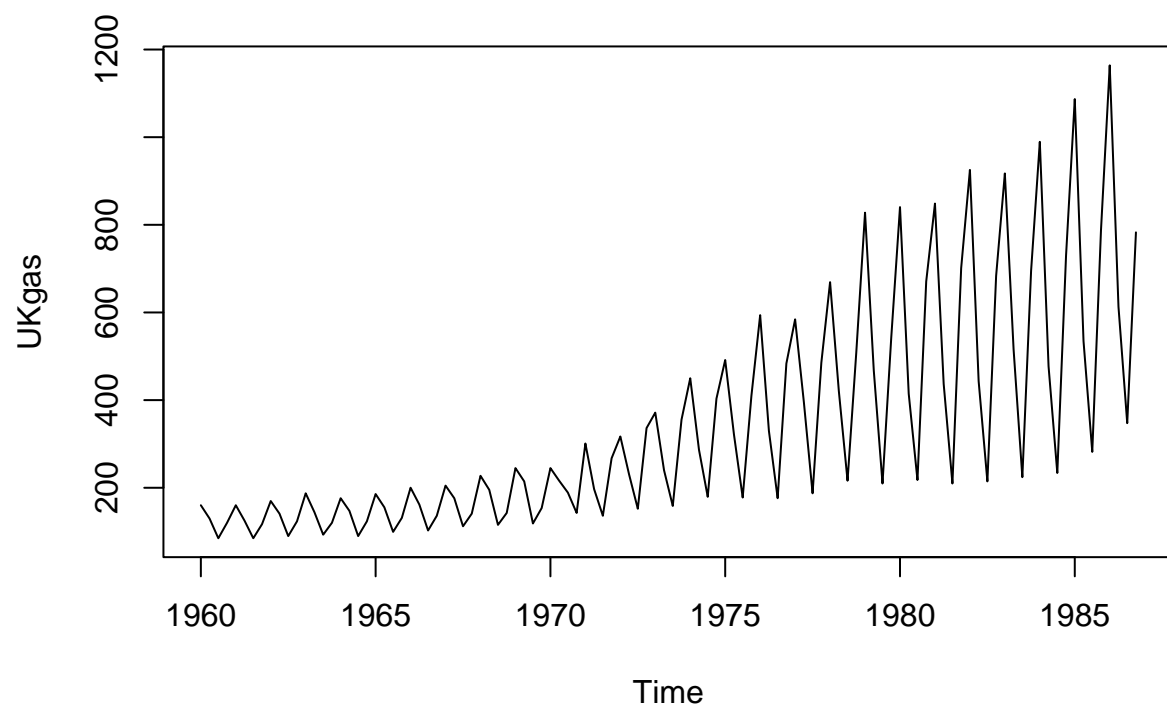
### Excercise 2

You can also embed plots, for example:

```
str(UKgas)
```

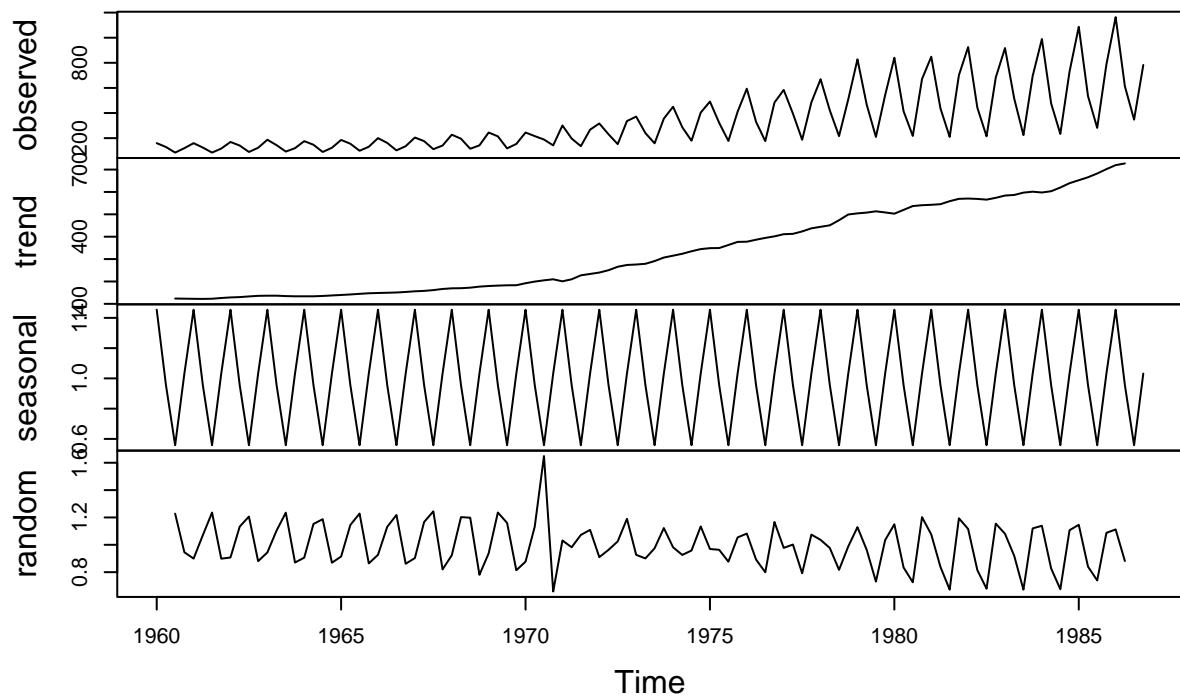
```
## Time-Series [1:108] from 1960 to 1987: 160.1 129.7 84.8 120.1 160.1 ...
```

```
plot(UKgas)
```



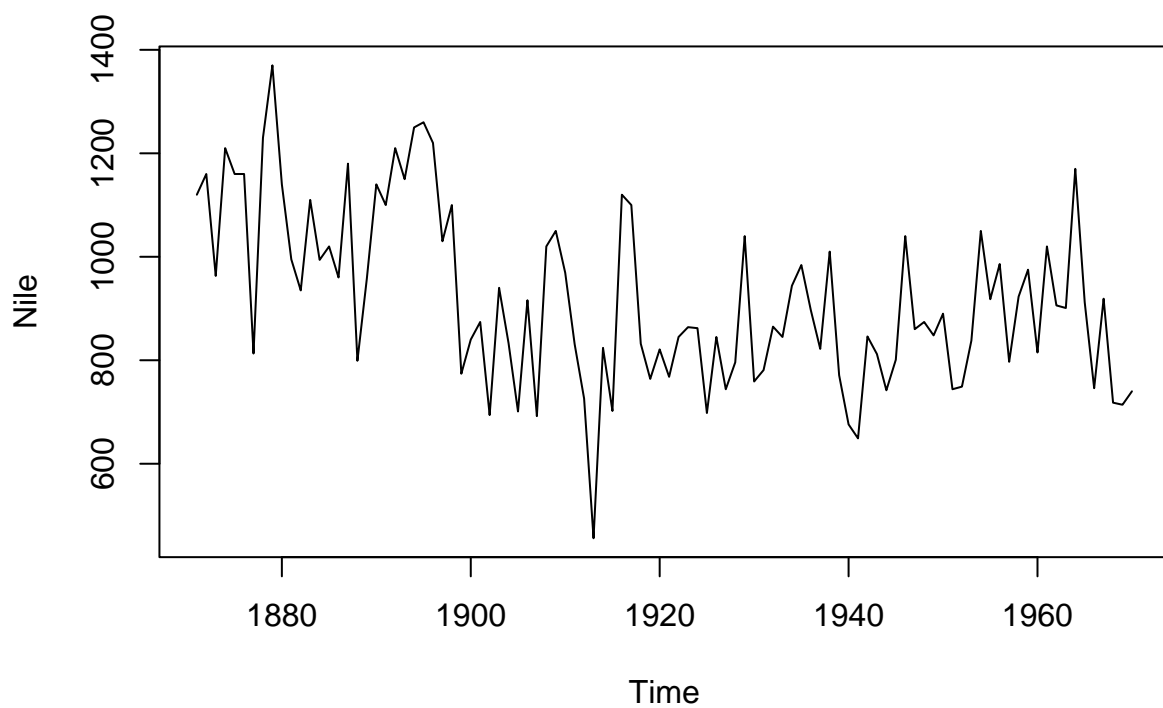
```
UKgas_d <- decompose(UKgas, type = "multiplicative")  
plot(UKgas_d)
```

## Decomposition of multiplicative time series



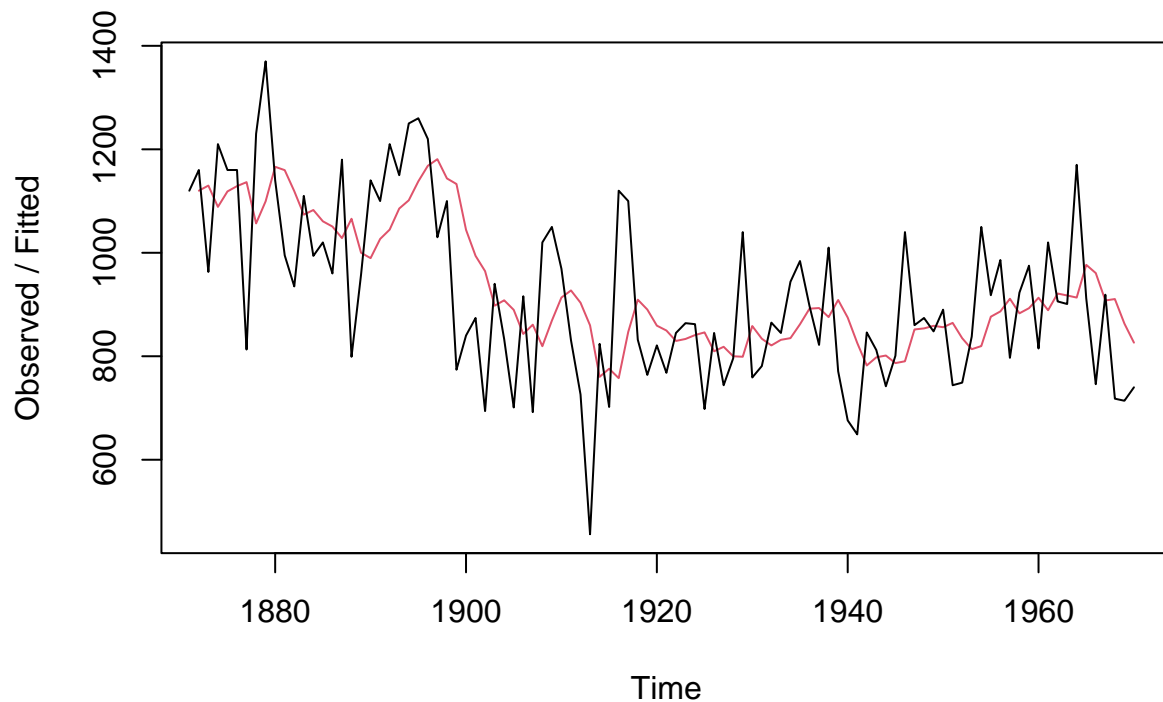
### Exercise 3

```
plot(Nile)
```



```
HWNile<- HoltWinters(Nile, beta= F, gamma= F)  
plot(HWNile)
```

## Holt-Winters filtering



HWNile

```
## Holt-Winters exponential smoothing without trend and without seasonal component.
##
## Call:
## HoltWinters(x = Nile, beta = F, gamma = F)
##
## Smoothing parameters:
##   alpha: 0.2465579
##   beta  : FALSE
##   gamma : FALSE
##
## Coefficients:
##      [,1]
## a 805.0389
```

```
par(mfrow=c(3,1), cex=.4)
plot(HWNile, main="Nile data: simple exponential smoothing, alpha=0.24")

HWNile2 <- HoltWinters(Nile, alpha=.1, beta=F, gamma=F)
plot(HWNile2, main="Nile data: simple exponential smoothing, alpha=0.1")

HWNile3 <- HoltWinters(Nile, alpha=.9, beta=F, gamma=F)
plot(HWNile3, main="Nile data: simple exponential smoothing, alpha=0.9")
```

