4_Exercise

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```
library("tidyverse")
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.1 --

## v ggplot2 3.3.5     v purrr   0.3.4
## v tibble  3.1.5     v dplyr   1.0.7
## v tidyr   1.1.4     v stringr 1.4.0
## v readr   2.1.1     v forcats 0.5.1

## Warning: Paket 'readr' wurde unter R Version 4.1.2 erstellt

## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library("lubridate")
```

```
##
## Attache Paket: 'lubridate'

## Die folgenden Objekte sind maskiert von 'package:base':
##
##     date, intersect, setdiff, union
```

```
library("tibbletime")
```

```
## Warning: Paket 'tibbletime' wurde unter R Version 4.1.2 erstellt

##
## Attache Paket: 'tibbletime'

## Das folgende Objekt ist maskiert 'package:stats':
##
##     filter
```

```
rm(list=ls())
```

import

tnight tday tavg

```
tdaynight <- data %>%
  mutate(daytime = ifelse(hour(dttm) < 6 | hour(dttm) >= 18, "night", "day")) %>%
  group_by(daytime) %>%
  summarise(mean = mean(temp))

tavg <- mean(data$temp)

head(tdaynight)
```

```
## # A tibble: 2 x 2
##   daytime  mean
##   <chr>   <dbl>
## 1 day      8.48
## 2 night    8.16
```

```
tavg
```

```
## [1] 8.321018
```

tamp

```
tamp_data <- data %>%
  mutate(date = date(dttm)) %>%
  group_by(date) %>%
  summarise(tmin = min(temp), tmax =(max(temp)))

tamp = mean(tamp_data$tmax) - mean(tamp_data$tmin)
tamp
```

```
## [1] 4.475454
```

t6h

```
t6h_data <- data %>%
  mutate(t6h_1 = abs(temp - lead(temp)),
         t6h_2 = abs(temp - lead(temp, n = 2)),
         t6h_3 = abs(temp - lead(temp, n = 3)),
         t6h_4 = abs(temp - lead(temp, n = 4)),
         t6h_5 = abs(temp - lead(temp, n = 5)),
         t6h_6 = abs(temp - lead(temp, n = 6))) %>%
  rowwise() %>%
  mutate(t6h = max(t6h_1, t6h_2, t6h_3, t6h_4, t6h_5, t6h_6, na.rm = T))
```

```
## Warning in max(t6h_1, t6h_2, t6h_3, t6h_4, t6h_5, t6h_6, na.rm = T): kein nicht-
## fehlendes Argument für max; gebe -Inf zurück
```

```
head(t6h_data)
```

```
## # A tibble: 6 x 10
## # Rowwise:
##   dttm                 temp origin  t6h_1 t6h_2 t6h_3  t6h_4 t6h_5 t6h_6   t6h
##   <dttm>              <dbl> <chr>   <dbl> <dbl> <dbl>  <dbl> <dbl> <dbl> <dbl>
## 1 2021-12-13 00:00:00  7.71 R      0.825  0.809 0.543 0.0742 0.476 0.761 0.825
## 2 2021-12-13 01:00:00  8.53 H      0.0167 0.283 0.900 1.30   1.59  1.92  1.92
## 3 2021-12-13 02:00:00  8.51 H      0.266  0.883 1.28  1.57   1.91  2.08  2.08
## 4 2021-12-13 03:00:00  8.25 H      0.617  1.02  1.30  1.64   1.81  1.09  1.81
## 5 2021-12-13 04:00:00  7.63 H      0.402  0.687 1.03  1.19   0.471 1.18  1.19
## 6 2021-12-13 05:00:00  7.23 H      0.285  0.623 0.793 0.0695 1.58  3.53  3.53
```

```
tail(t6h_data)
```

```
## # A tibble: 6 x 10
## # Rowwise:
##   dttm                 temp origin  t6h_1  t6h_2  t6h_3 t6h_4 t6h_5 t6h_6
##   <dttm>              <dbl> <chr>   <dbl>  <dbl>  <dbl> <dbl> <dbl> <dbl>
## 1 2022-01-09 18:00:00  7.22 R       0.244  0.406  0.894  1.22  1.38    NA
## 2 2022-01-09 19:00:00  6.97 R       0.162  0.650  0.975  1.14 NA       NA
## 3 2022-01-09 20:00:00  6.81 R       0.487  0.812  0.975 NA    NA       NA
## 4 2022-01-09 21:00:00  6.32 R       0.325  0.487 NA     NA    NA       NA
## 5 2022-01-09 22:00:00  6.00 R       0.162 NA     NA     NA    NA       NA
## 6 2022-01-09 23:00:00  5.84 R      NA     NA     NA     NA    NA       NA
## # ... with 1 more variable: t6h <dbl>
```

```
t6h <- max(t6h_data$t6h)
t6h
```

```
## [1] 9.9154
```

Last value for t6h_data$t6h is -Inf due to teh algorythm, this should be no problem for futher calculation

lavg

```
data_lavg <- data_ex1 %>%
  mutate(daytime = if_else(hour(dttm) < 6 | hour(dttm) >= 18, "night", "day")) %>%
  group_by(daytime)

head(data_lavg)
```

```
## # A tibble: 6 x 5
## # Groups:   daytime [1]
##      id dttm                 temp   lux daytime
##   <int> <dttm>              <dbl> <dbl> <chr>
```

```
## 1     1 2021-12-13 00:00:00  9.08     0 night
## 2     2 2021-12-13 00:10:00  9.08     0 night
## 3     3 2021-12-13 00:20:00  8.88     0 night
## 4     4 2021-12-13 00:30:00  8.78     0 night
## 5     5 2021-12-13 00:40:00  8.78     0 night
## 6     6 2021-12-13 00:50:00  8.78     0 night
```

```
median_lux <- summarise(data_lavg, median = median(lux, na.rm = T))[1,2]
median_lux
```

```
## # A tibble: 1 x 1
##   median
##    <dbl>
## 1   32.3
```

lmax

```
data_lmax <- data_lavg %>%
  ungroup() %>%
  filter(daytime == "day") %>%
  mutate(hm = hm(format(dttm, "%H:%M"))) %>%
  group_by(hm) %>%
  summarise(meanlux = mean(lux, na.rm = TRUE)) %>%
  arrange(desc(meanlux))

head(data_lmax)
```

```
## # A tibble: 6 x 2
##   hm         meanlux
##   <Period>     <dbl>
## 1 11H 20M 0S    900.
## 2 11H 30M 0S    893.
## 3 11H 40M 0S    877.
## 4 11H 50M 0S    871.
## 5 12H 0M 0S     866.
## 6 12H 30M 0S    859.
```

```
lmax <- data_lmax[1,1]
lmax
```

```
## # A tibble: 1 x 1
##   hm
##   <Period>
## 1 11H 20M 0S
```