

Inlämningsuppgift 2 grupp 19

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Uppgift 1

a) En positiv riktning innebär att tåget färdas från Lyon mot Paris. en negativ riktning innebär att tåget färdas från Paris mot Lyon.

b) En mer vertikallinje indikerar en högre hastighet. En horisontell linje indikerar att tåget står stilla.

c)

```
library(readxl)
library(tidyr)
library(dplyr)
```

Attaching package: 'dplyr'

The following objects are masked from 'package:stats':

filter, lag

The following objects are masked from 'package:base':

intersect, setdiff, setequal, union

```
library(ggplot2)
library(hms)
```

```

train_data = read_excel('train_data.xlsx', sheet = "turer")
station_data = read_excel('train_data.xlsx', sheet = "stationer")
train_data <-
  train_data %>%
  inner_join(station_data, by = "station")

train_data

```

```

# A tibble: 42 x 4
  train_id station      time      pos
  <dbl> <chr>      <dtm>      <dbl>
1    7401 Umeå C  1899-12-31 04:37:00    100
2    7401 Umeå Ö  1899-12-31 04:42:00     97
3    7401 Hörnefors 1899-12-31 04:57:00     75
4    7401 Nordmaling 1899-12-31 05:08:00     50
5    7401 Husum    1899-12-31 05:23:00     25
6    7401 Ö-vik N  1899-12-31 05:35:00      3
7    7401 Ö-vik C  1899-12-31 05:38:00      0
8    7405 Umeå C  1899-12-31 06:36:00    100
9    7405 Umeå Ö  1899-12-31 06:41:00     97
10   7405 Hörnefors 1899-12-31 06:55:00     75
# i 32 more rows

```

Här laddas tiderna in som datum vilket förklara varför det kommit med det spelar dock ingen roll senare.

```

train_data <-
  train_data %>%
  mutate( time2 = as.POSIXct(time, format="%H:%M:%S"))

```

```

majortimebreaks <- data.frame(hourbreaks =seq(from = min(train_data$time)-as.difftime(1, uni

```

```

majortimebreaks <-
  majortimebreaks%>%
  mutate( hourlabels = strftime(hourbreaks, format="%H") )

majortimebreaks

```

```

      hourbreaks hourlabels
1 1899-12-31 03:37:00      04
2 1899-12-31 04:37:00      05

```

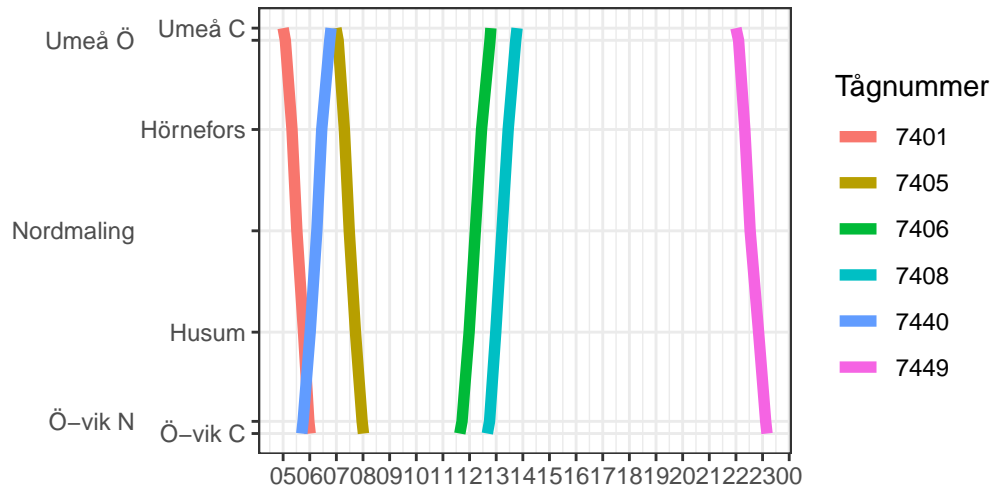
3	1899-12-31 05:37:00	06
4	1899-12-31 06:37:00	07
5	1899-12-31 07:37:00	08
6	1899-12-31 08:37:00	09
7	1899-12-31 09:37:00	10
8	1899-12-31 10:37:00	11
9	1899-12-31 11:37:00	12
10	1899-12-31 12:37:00	13
11	1899-12-31 13:37:00	14
12	1899-12-31 14:37:00	15
13	1899-12-31 15:37:00	16
14	1899-12-31 16:37:00	17
15	1899-12-31 17:37:00	18
16	1899-12-31 18:37:00	19
17	1899-12-31 19:37:00	20
18	1899-12-31 20:37:00	21
19	1899-12-31 21:37:00	22
20	1899-12-31 22:37:00	23
21	1899-12-31 23:37:00	00

```
train_plott <- ggplot(train_data, aes(x=time2,
                                     y=pos,
                                     color = as.character(train_id)))+
  geom_path(size = 2) +
  labs(title = "Tågtidtabell mellan Umeå Central och Örnsköldsviks Central", subtitle = "För
scale_y_continuous(name = "", breaks = station_data$pos, labels = station_data$station, gu
scale_x_time(breaks = majortimebreaks$hourbreaks, labels= majortimebreaks$hourlabels) +
theme_bw()
```

Warning: Using `size` aesthetic for lines was deprecated in ggplot2 3.4.0.
i Please use `linewidth` instead.

```
train_plott
```

Tågtidtabell mellan Umeå Central och Örnsköldsvik För ett antal utvalda turer vintern 2025



:/wp-content/uploads/2024/12/Tidtabell_Umea-Ovik-Sundsvall-Vinter-25.pdf

Uppgift 2

```
tempdata <- read.table("uppsala_tm_1722-2022.dat")
colnames(tempdata) <- c("År", "Månad", "Dag", "Temp", "Temp_korr", "Station")
dim(tempdata)
```

```
[1] 109927      6
```

```
head(tempdata)
```

	År	Månad	Dag	Temp	Temp_korr	Station
1	1722	1	12	1.9	1.8	1
2	1722	1	13	2.3	2.2	1
3	1722	1	14	1.8	1.7	1
4	1722	1	15	0.9	0.8	1
5	1722	1	16	-1.8	-1.9	1
6	1722	1	17	0.5	0.4	1

a)

```
medeltemp = mean(tempdata$Temp_korr)
medeltemp
```

[1] 5.284333

Svar: 5,3 grader

b)

```
year_mean <-
  tempdata %>%
  select(År, Temp_korr) %>%
  group_by(År) %>%
  summarize( Medeltemp = mean(Temp_korr))

year_mean
```

A tibble: 301 x 2

	År	Medeltemp
	<int>	<dbl>
1	1722	7.18
2	1723	7.83
3	1724	5.02
4	1725	5.69
5	1726	5.21
6	1727	6.34
7	1728	5.03
8	1729	4.59
9	1730	6.36
10	1731	5.68

i 291 more rows

c)

```
year_mean <-
  year_mean %>%
  mutate(Temp_diff = Medeltemp - medeltemp)

year_mean
```

```
# A tibble: 301 x 3
  År Medeltemp Temp_diff
  <int>     <dbl>     <dbl>
1  1722      7.18      1.90
2  1723      7.83      2.54
3  1724      5.02     -0.259
4  1725      5.69      0.405
5  1726      5.21     -0.0726
6  1727      6.34      1.06
7  1728      5.03     -0.252
8  1729      4.59     -0.698
9  1730      6.36      1.07
10 1731      5.68      0.393
# i 291 more rows
```

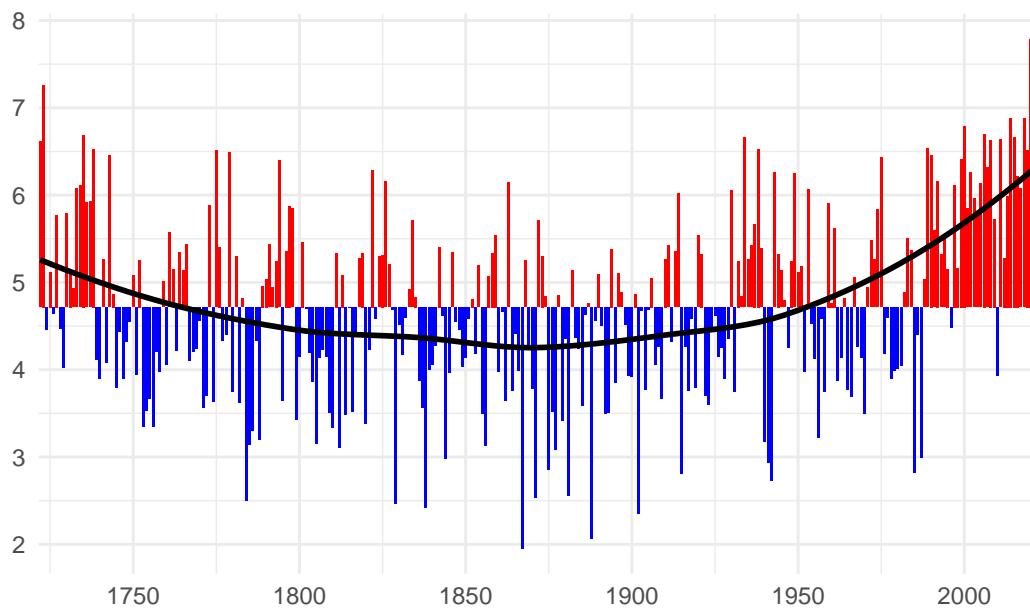
d)

```
year_mean <-
  year_mean %>%
  mutate( fill_color = ifelse(Temp_diff <= 0, "blue", "red"))

dplot <- ggplot(year_mean, aes(x=År
                             ))+
  geom_col(data=subset(year_mean, Temp_diff >= 0), aes(y = Medeltemp - medeltemp, fill= fill_
  geom_col(data=subset(year_mean, Temp_diff < 0), aes(y = Medeltemp - medeltemp, fill= fill_
  geom_smooth(aes(y=Medeltemp-medeltemp), se=FALSE, color = "black", method = "loess", formu
  scale_fill_identity()+
  scale_y_continuous(breaks = c(-8:3) + medeltemp, labels=(2:13))+
  scale_x_continuous(breaks = seq(from = 1700, to = 2022, by = 50), expand=c(0,0))+
  labs(title = "Rekonstruerad årsmedeltemperatur, Uppsala 1722-2022", x = NULL, y = NULL)+
  theme_minimal()

dplot
```

Rekonstruerad årsmedeltemperatur, Uppsala 1722–2022



e)

```
month_data <- tempdata %>%
  mutate(period = case_when(År >= 1993 ~ "1993-2022",
                             År < 1993 ~ "1722-1992")) %>%
  group_by(Månad, period) %>%
  summarize(medel = mean(Temp_korr))
```

`summarise()` has grouped output by 'Månad'. You can override using the
`.groups` argument.

month_data

```
# A tibble: 24 x 3
# Groups:   Månad [12]
  Månad period      medel
  <int> <chr>      <dbl>
1     1 1722-1992 -4.51
2     1 1993-2022 -2.41
3     2 1722-1992 -4.50
4     2 1993-2022 -2.39
5     3 1722-1992 -2.17
```

```

6      3 1993-2022  0.0978
7      4 1722-1992  3.12
8      4 1993-2022  5.17
9      5 1722-1992  9.04
10     5 1993-2022 10.1
# i 14 more rows

```

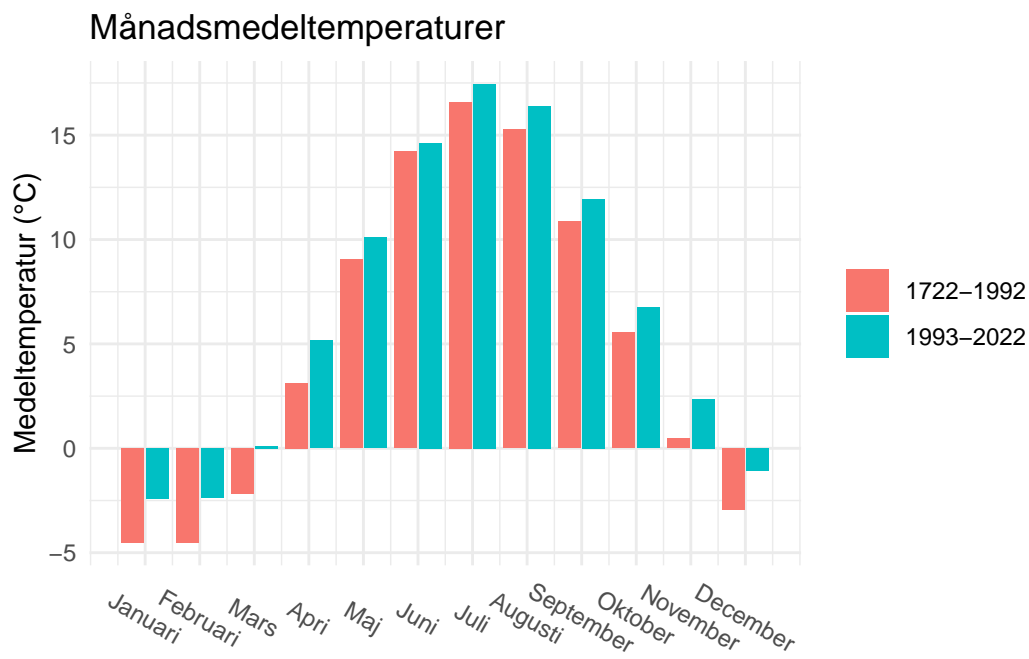
```

month_mean <- ggplot(month_data, aes(
  x = Månad,
  y = medel,
  fill = period
))+
  geom_col(position = "dodge2")+
  scale_x_continuous(breaks = c(1:12), labels = c("Januari", "Februari", "Mars", "Apri", "Ma

  labs(fill = NULL, title = "Månadsmedeltemperaturer", x = NULL, y = "Medeltemperatur (\u00B0C)"),
  theme_minimal()+
  theme(axis.text.x = element_text(angle = -30, hjust = 0.5, vjust = 0.5))

month_mean

```



f)

Enligt diagrammet ovan ser det ut som att det är de kallare månaderna där temperaturen ökat mest.