```
library(readr)
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(lubridate)
```

```
##
## Attaching package: 'lubridate'
```

```
## The following objects are masked from 'package:base':
##
##     date, intersect, setdiff, union
```

```
library(magrittr)
library(data.table)
```

```
##
## Attaching package: 'data.table'
```

```
## The following objects are masked from 'package:lubridate':
##
##     hour, isoweek, mday, minute, month, quarter, second, wday, week,
##     yday, year
```

```
## The following objects are masked from 'package:dplyr':
##
##     between, first, last
```

```
library(ggplot2)
```

```
file_root<-"https://www.ndbc.noaa.gov/view_text_file.php?filename=44013h"
year<-"2023"
tail<- ".txt.gz&dir=data/historical/stdmet/"
path<-paste0(file_root,year,tail)
header=scan(path,what= 'character',nlines=1)
buoy<-fread(path,header=FALSE,skip=2)
colnames(buoy)<-header
```

```r
buoy$ATMP <- ifelse(buoy$ATMP == 999, NA, buoy$ATMP)
buoy$WDIR <- ifelse(buoy$WDIR == 999, NA, buoy$WDIR)
buoy$MWD <- ifelse(buoy$MWD == 999, NA, buoy$MWD)
buoy$DEWP <- ifelse(buoy$DEWP == 999, NA, buoy$DEWP)
View(buoy)
```

```r
buoy$month <- format(as.Date(paste(buoy$`#YY`, buoy$MM, buoy$DD, sep="-")), "%Y-%m")

monthly_temp <- buoy %>%
  group_by(month) %>%
  summarise(mean_temp = mean(ATMP, na.rm = TRUE))

ggplot(monthly_temp, aes(x = month, y = mean_temp, group = 1)) +
  geom_line() +
  geom_point() +
  labs(title = "2023 Climate change by month ", x = "month", y = "avarage temp") +
  theme_minimal() +
  theme(axis.text.x = element_text(angle = 45, hjust = 1))
```
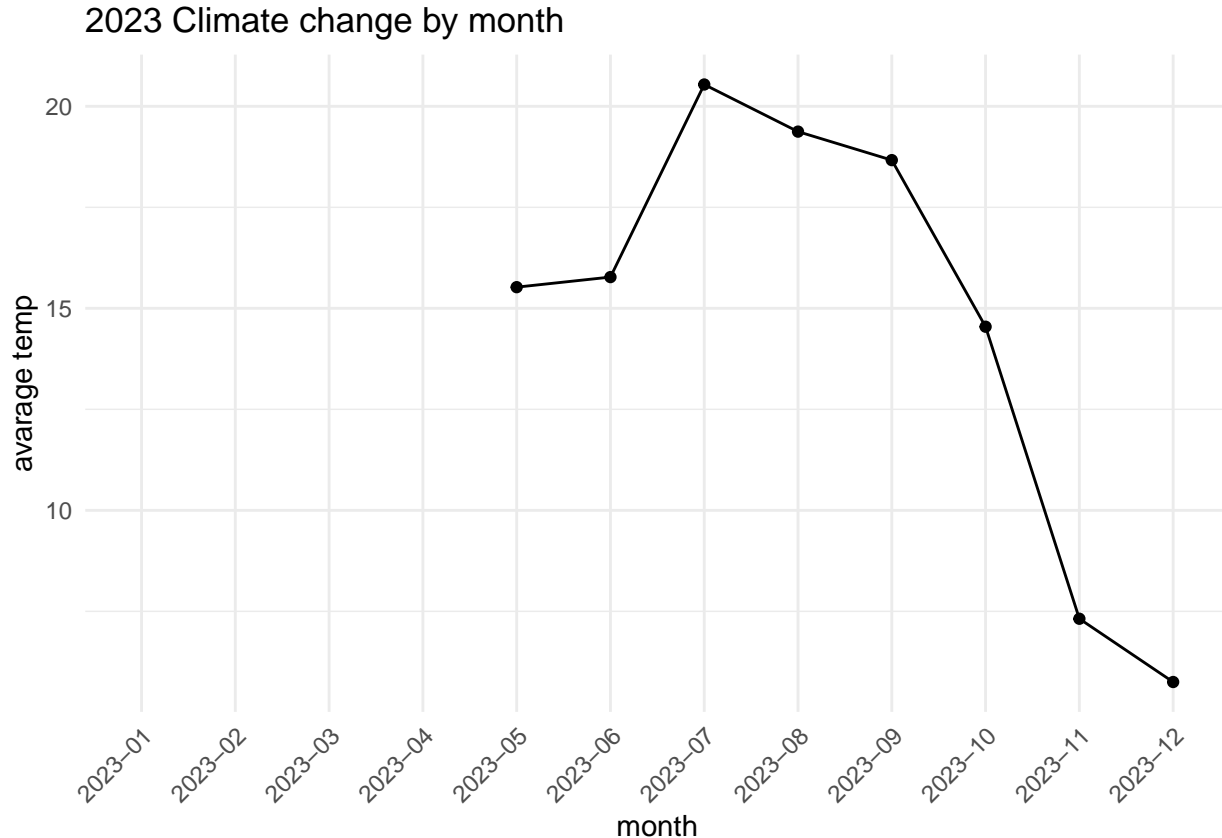
```
## Warning: Removed 4 rows containing missing values or values outside the scale range
## (`geom_line()`).
```

```
## Warning: Removed 4 rows containing missing values or values outside the scale range
## (`geom_point()`).
```


2023 Climate change by month

```r
monthly_temp$month_numeric <- as.numeric(as.factor(monthly_temp$month))


model <- lm(mean_temp ~ month_numeric, data = monthly_temp)
summary(model)
```

```
##
## Call:
## lm(formula = mean_temp ~ month_numeric, data = monthly_temp)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -4.5531 -3.5250 -0.2976  3.6363  4.7514
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)     27.7773     5.7760   4.809  0.00297 **
## month_numeric   -1.5401     0.6561  -2.347  0.05726 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4.252 on 6 degrees of freedom
##   (4 observations deleted due to missingness)
## Multiple R-squared:  0.4787, Adjusted R-squared:  0.3918
## F-statistic:  5.51 on 1 and 6 DF,  p-value: 0.05726
```

```
## the p-vale is 0.05726, is greater than 0.05 that indicate the liner relationship between the  month
```

```r
rainfall_data <- read.csv("Rainfall.csv")

rainfall_data$DATE <- as.POSIXct(rainfall_data$DATE, format="%Y%m%d %H:%M")

rainfall_data$year <- format(rainfall_data$DATE, "%Y")


annual_rainfall_stats <- rainfall_data %>%
  group_by(year) %>%
  summarise(mean_rainfall = mean(HPCP, na.rm = TRUE),
            total_rainfall = sum(HPCP, na.rm = TRUE))

ggplot(annual_rainfall_stats, aes(x = as.numeric(year), y = total_rainfall)) +
  geom_line() +
  geom_point() +
  labs(title = "Total Rainfall in Boston (1985-2013)", x = "Year", y = "Total Rainfall (inches)") +
  theme_minimal()
```

```
## Warning: Removed 1 row containing missing values or values outside the scale range
## ('geom_line()').
```

```
## Warning: Removed 1 row containing missing values or values outside the scale range
## ('geom_point()').
```

Total Rainfall in Boston (1985–2013)