Homework 1

Kaixi Wang

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```r
library(data.table)
```

```
## data.table 1.15.4 using 1 threads (see ?getDTthreads).  Latest news: r-datatable.com
## **********
## This installation of data.table has not detected OpenMP support. It should still work but in single-
## This is a Mac. Please read https://mac.r-project.org/openmp/. Please engage with Apple and ask them
## **********
```

```r
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ------------------------------------------------------------
## v dplyr     1.1.4     v readr     2.1.5
## v forcats   1.0.0     v stringr   1.5.1
## v ggplot2   3.5.1     v tibble    3.2.1
## v lubridate 1.9.3     v tidyr     1.3.1
## v purrr     1.0.2
## -- Conflicts ------------------------------------------------------------------------------ tidyv
## x dplyr::between()     masks data.table::between()
## x dplyr::filter()      masks stats::filter()
## x dplyr::first()       masks data.table::first()
## x lubridate::hour()    masks data.table::hour()
## x lubridate::isoweek() masks data.table::isoweek()
## x dplyr::lag()         masks stats::lag()
## x dplyr::last()        masks data.table::last()
## x lubridate::mday()    masks data.table::mday()
## x lubridate::minute()  masks data.table::minute()
## x lubridate::month()   masks data.table::month()
## x lubridate::quarter() masks data.table::quarter()
## x lubridate::second()  masks data.table::second()
## x purrr::transpose()   masks data.table::transpose()
## x lubridate::wday()    masks data.table::wday()
## x lubridate::week()    masks data.table::week()
## x lubridate::yday()    masks data.table::yday()
## x lubridate::year()    masks data.table::year()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```r
library(leaflet)
library(here)
```

```
## here() starts at /Users/anthonywang/Documents/JSC370-2025
```

```r
met <- data.table::fread(here("assignments", "data", "Met All.gz"))
```

```r
met %>% glimpse()
```

```
## Rows: 2,377,343
## Columns: 30
## $ USAFID          <int> 690150, 690150, 690150, 690150, 690150, 690150, 6901~
## $ WBAN            <int> 93121, 93121, 93121, 93121, 93121, 93121, 93121, 931~
## $ year            <int> 2019, 2019, 2019, 2019, 2019, 2019, 2019, 2019, 2019~
## $ month           <int> 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8~
## $ day             <int> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1~
## $ hour            <int> 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15~
## $ min             <int> 56, 56, 56, 56, 56, 56, 56, 56, 56, 56, 56, 56, 56, ~
## $ lat             <dbl> 34.300, 34.300, 34.300, 34.300, 34.300, 34.300, 34.3~
## $ lon             <dbl> -116.166, -116.166, -116.166, -116.166, -116.166, -1~
## $ elev            <int> 696, 696, 696, 696, 696, 696, 696, 696, 696, 696, 62~
## $ wind.dir        <int> 220, 230, 230, 210, 120, NA, 320, 10, 320, 350, 360,~
## $ wind.dir.qc     <chr> "5", "5", "5", "5", "5", "9", "5", "5", "5", "5", "1~
## $ wind.type.code  <chr> "N", "N", "N", "N", "N", "C", "N", "N", "N", "N", "N~
## $ wind.sp         <dbl> 5.7, 8.2, 6.7, 5.1, 2.1, 0.0, 1.5, 2.1, 2.6, 1.5, 1.~
## $ wind.sp.qc      <chr> "5", "5", "5", "5", "5", "5", "5", "5", "5", "5", "1~
## $ ceiling.ht      <int> 22000, 22000, 22000, 22000, 22000, 22000, 22000, 220~
## $ ceiling.ht.qc   <int> 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 1, 1, 5, 5, 5, 5, 5, 5~
## $ ceiling.ht.method <chr> "9", "9", "9", "9", "9", "9", "9", "9", "9", "9", "9~
## $ sky.cond        <chr> "N", "N", "N", "N", "N", "N", "N", "N", "N", "N", "N~
## $ vis.dist        <int> 16093, 16093, 16093, 16093, 16093, 16093, 16093, 160~
## $ vis.dist.qc     <chr> "5", "5", "5", "5", "5", "5", "5", "5", "5", "5", "1~
## $ vis.var         <chr> "N", "N", "N", "N", "N", "N", "N", "N", "N", "N", "9~
## $ vis.var.qc      <chr> "5", "5", "5", "5", "5", "5", "5", "5", "5", "5", "9~
## $ temp            <dbl> 37.2, 35.6, 34.4, 33.3, 32.8, 31.1, 29.4, 28.9, 27.2~
## $ temp.qc         <chr> "5", "5", "5", "5", "5", "5", "5", "5", "5", "5", "1~
## $ dew.point       <dbl> 10.6, 10.6, 7.2, 5.0, 5.0, 5.6, 6.1, 6.7, 7.8, 7.8, ~
## $ dew.point.qc    <chr> "5", "5", "5", "5", "5", "5", "5", "5", "5", "5", "1~
## $ atm.press       <dbl> 1009.9, 1010.3, 1010.6, 1011.6, 1012.7, 1012.7, 1012~
## $ atm.press.qc    <int> 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 1, 1, 5, 5, 5, 5, 5, 5~
## $ rh              <dbl> 19.881266, 21.760980, 18.482122, 16.888622, 17.38410~
```

```
met %>%
  summary()
```

```
##      USAFID            WBAN             year          month        day
## Min.   :690150   Min.   :  116   Min.   :2019   Min.   :8   Min.   : 1
## 1st Qu.:720928   1st Qu.:  3706   1st Qu.:2019   1st Qu.:8   1st Qu.: 8
## Median :722728   Median :13860   Median :2019   Median :8   Median :16
## Mean   :723100   Mean   :29539   Mean   :2019   Mean   :8   Mean   :16
## 3rd Qu.:725090   3rd Qu.:54767   3rd Qu.:2019   3rd Qu.:8   3rd Qu.:24
## Max.   :726813   Max.   :94998   Max.   :2019   Max.   :8   Max.   :31
##
##       hour            min             lat             lon
## Min.   : 0.00   Min.   : 0.00   Min.   :24.55   Min.   :-124.29
## 1st Qu.: 5.00   1st Qu.:23.00   1st Qu.:33.97   1st Qu.: -98.02
## Median :11.00   Median :50.00   Median :38.35   Median : -91.71
## Mean   :11.34   Mean   :39.56   Mean   :37.94   Mean   : -92.15
## 3rd Qu.:17.00   3rd Qu.:55.00   3rd Qu.:41.94   3rd Qu.: -82.99
## Max.   :23.00   Max.   :59.00   Max.   :48.94   Max.   : -68.31
##
##       elev            wind.dir       wind.dir.qc        wind.type.code
## Min.   : -13.0   Min.   :   3   Length:2377343     Length:2377343
## 1st Qu.: 101.0   1st Qu.:120     Class :character   Class :character
```

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```
##    Median : 252.0    Median :180      Mode  :character    Mode  :character
##    Mean   : 415.8    Mean   :185
##    3rd Qu.: 400.0    3rd Qu.:260
##    Max.   :9999.0    Max.   :360
##                      NA's   :785290
##      wind.sp        wind.sp.qc        ceiling.ht      ceiling.ht.qc
##    Min.   : 0.00   Length:2377343   Min.   :     0   Min.   :1.000
##    1st Qu.: 0.00   Class :character  1st Qu.: 3048   1st Qu.:5.000
##    Median : 2.10   Mode  :character  Median :22000   Median :5.000
##    Mean   : 2.46                     Mean   :16166   Mean   :5.027
##    3rd Qu.: 3.60                     3rd Qu.:22000   3rd Qu.:5.000
##    Max.   :36.00                     Max.   :22000   Max.   :9.000
##    NA's   :79693                     NA's   :121275
##  ceiling.ht.method    sky.cond          vis.dist       vis.dist.qc
##  Length:2377343    Length:2377343    Min.   :     0   Length:2377343
##  Class :character  Class :character  1st Qu.: 16093   Class :character
##  Mode  :character  Mode  :character  Median : 16093   Mode  :character
##                                      Mean   : 14921
##                                      3rd Qu.: 16093
##                                      Max.   :160000
##                                      NA's   :80956
##      vis.var          vis.var.qc           temp         temp.qc
##  Length:2377343    Length:2377343    Min.   :-40.00   Length:2377343
##  Class :character  Class :character  1st Qu.: 19.60   Class :character
##  Mode  :character  Mode  :character  Median : 23.50   Mode  :character
##                                      Mean   : 23.59
##                                      3rd Qu.: 27.80
##                                      Max.   : 56.00
##                                      NA's   :60089
##     dew.point       dew.point.qc       atm.press      atm.press.qc
##  Min.   :-37.20   Length:2377343    Min.   : 960.5   Min.   :1.000
##  1st Qu.: 13.80   Class :character  1st Qu.:1011.8   1st Qu.:5.000
##  Median : 18.10   Mode  :character  Median :1014.1   Median :9.000
##  Mean   : 17.02                     Mean   :1014.2   Mean   :7.728
##  3rd Qu.: 21.70                     3rd Qu.:1016.4   3rd Qu.:9.000
##  Max.   : 36.00                     Max.   :1059.9   Max.   :9.000
##  NA's   :66288                      NA's   :1666274
##        rh
##  Min.   :  0.83
##  1st Qu.: 55.79
##  Median : 76.55
##  Mean   : 71.64
##  3rd Qu.: 90.63
##  Max.   :100.00
##  NA's   :66426
```