

Proiect

Qingdian Luo 2021013514

```
#
library(tidyverse)

## -- Attaching core tidyverse packages ----- tidyverse 2.0.0 --
## 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 ----- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()     masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
library(lubridate)
library(ggplot2)

Mode <- function(x) {
  uniqx <- unique(x)
  uniqx[which.max(tabulate(match(x, uniqx)))]
}

#
data <- read.csv("data.csv")

#
head(data)
```

```
##      Date      City Weather.Condition Temperature
## 1 2011-01-01 beijing      /      0C/-9C
## 2 2011-01-02 beijing      /     -2C/-7C
## 3 2011-01-03 beijing      /      1C/-8C
## 4 2011-01-04 beijing      /     -1C/-11C
## 5 2011-01-05 beijing      /     -1C/-8C
## 6 2011-01-06 beijing      /      0C/-10C
##      Wind.Force.and.Direction Day.Weather Night.Weather Day.Temp Night.Temp
## 1    3 /    3                0          -9
## 2    3 /    3                -2          -7
## 3    3-4 /    3                1          -8
## 4    3 /    3                -1         -11
## 5    4-5 / 3-4                -1          -8
## 6    3 /    3                0         -10
##      Day.Wind.Direction Night.Wind.Direction Day.Wind.Force Night.Wind.Force
## 1                      3                      3
```

```
## 2          3          3
## 3          3-4        3
## 4          3          3
## 5          4-5        3-4
## 6          3          3
```

```
# 1. (EDA)
```

```
## 1.1
```

```
#
summary(data)
```

```
##      Date          City      Weather.Condition  Temperature
## Length:14584      Length:14584      Length:14584      Length:14584
## Class :character  Class :character  Class :character  Class :character
## Mode  :character  Mode  :character  Mode  :character  Mode  :character
##
##
##
## Wind.Force.and.Direction Day.Weather      Night.Weather
## Length:14584            Length:14584      Length:14584
## Class :character        Class :character  Class :character
## Mode  :character        Mode  :character  Mode  :character
##
##
##
##      Day.Temp      Night.Temp      Day.Wind.Direction  Night.Wind.Direction
## Min.   :-12.00     Min.    :-17.00     Length:14584        Length:14584
## 1st Qu.: 15.00     1st Qu.:  4.00     Class :character    Class :character
## Median : 23.00     Median : 13.00     Mode  :character    Mode  :character
## Mean   : 21.47     Mean    : 12.29
## 3rd Qu.: 29.00     3rd Qu.: 22.00
## Max.    : 40.00     Max.     : 31.00
## NA's    :1         NA's     :1
## Day.Wind.Force      Night.Wind.Force
## Length:14584        Length:14584
## Class :character    Class :character
## Mode  :character    Mode  :character
##
##
##
##
```

```
## 1.2
```

```
city_weather_summary <- data %>%
  group_by(City) %>%
  summarise(
    Avg_Day_Temperature = mean(Day.Temp, na.rm = TRUE),
    Avg_Night_Temperature = mean(Night.Temp, na.rm = TRUE),
    Temp_Range_Day = max(Day.Temp, na.rm = TRUE) - min(Day.Temp, na.rm = TRUE),
    Temp_Range_Night = max(Night.Temp, na.rm = TRUE) - min(Night.Temp, na.rm = TRUE),
```

```

Most_Common_Day_Weather = Mode(Day.Weather),
Most_Common_Night_Weather = Mode(Night.Weather),
Most_Common_Day_Wind_Direction = Mode(Day.Wind.Direction),
Most_Common_Night_Wind_Direction = Mode(Night.Wind.Direction),
Most_Common_Day_Wind_Force = Mode(Day.Wind.Force),
Most_Common_Night_Wind_Force = Mode(Night.Wind.Force)
)

print(city_weather_summary)

## # A tibble: 4 x 11
##   City      Avg_Day_Temperature Avg_Night_Temperature Temp_Range_Day
##   <chr>          <dbl>          <dbl>          <dbl>
## 1 beijing          18.9            8.55            51
## 2 haikou           28.6           22.2            30
## 3 lasa             17.2            3.55            29
## 4 shanghai         21.2           14.9            44
## # i 7 more variables: Temp_Range_Night <dbl>, Most_Common_Day_Weather <chr>,
## #   Most_Common_Night_Weather <chr>, Most_Common_Day_Wind_Direction <chr>,
## #   Most_Common_Night_Wind_Direction <chr>, Most_Common_Day_Wind_Force <chr>,
## #   Most_Common_Night_Wind_Force <chr>

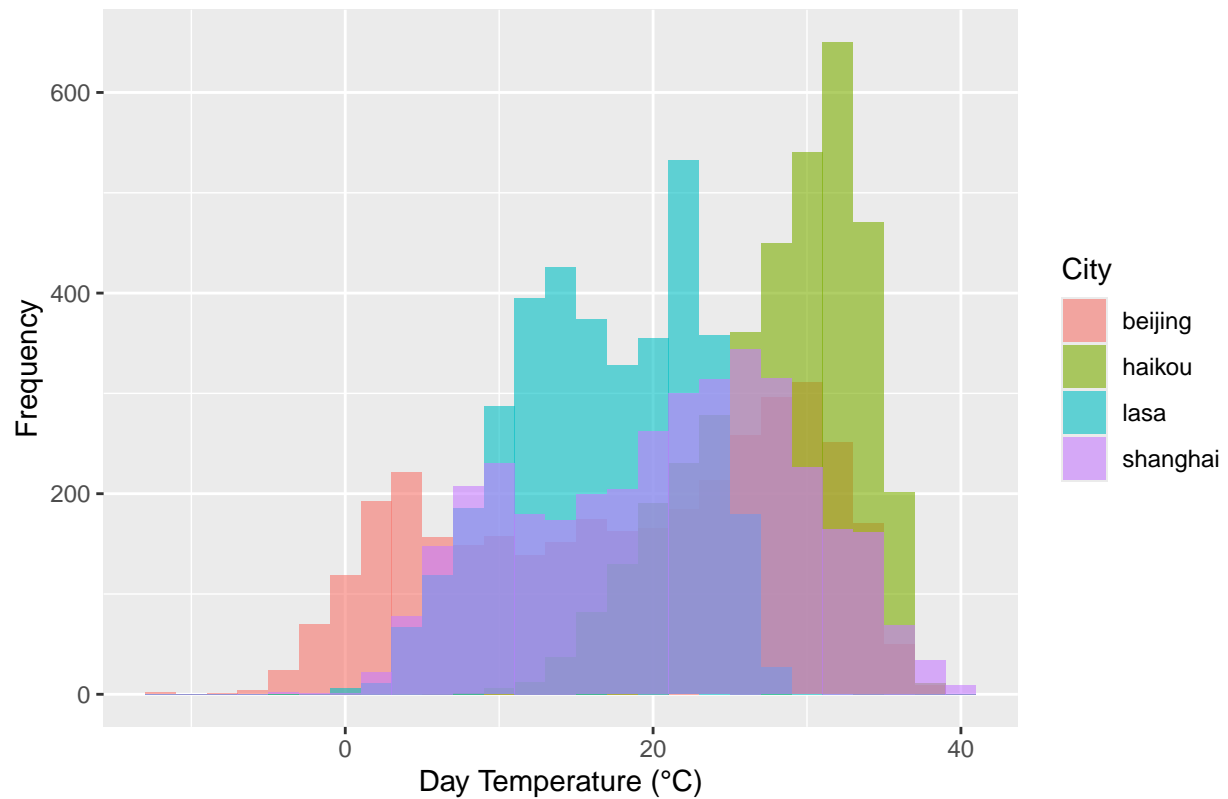
# 2.      (Exploratory Data Visualization)

## 2.1
ggplot(data, aes(x = Day.Temp, fill = City)) +
  geom_histogram(binwidth = 2, alpha = 0.6, position = "identity") +
  ggtitle("Day Temperature Distribution by City") +
  xlab("Day Temperature (°C)") +
  ylab("Frequency")

## Warning: Removed 1 row containing non-finite outside the scale range
## (`stat_bin()`).

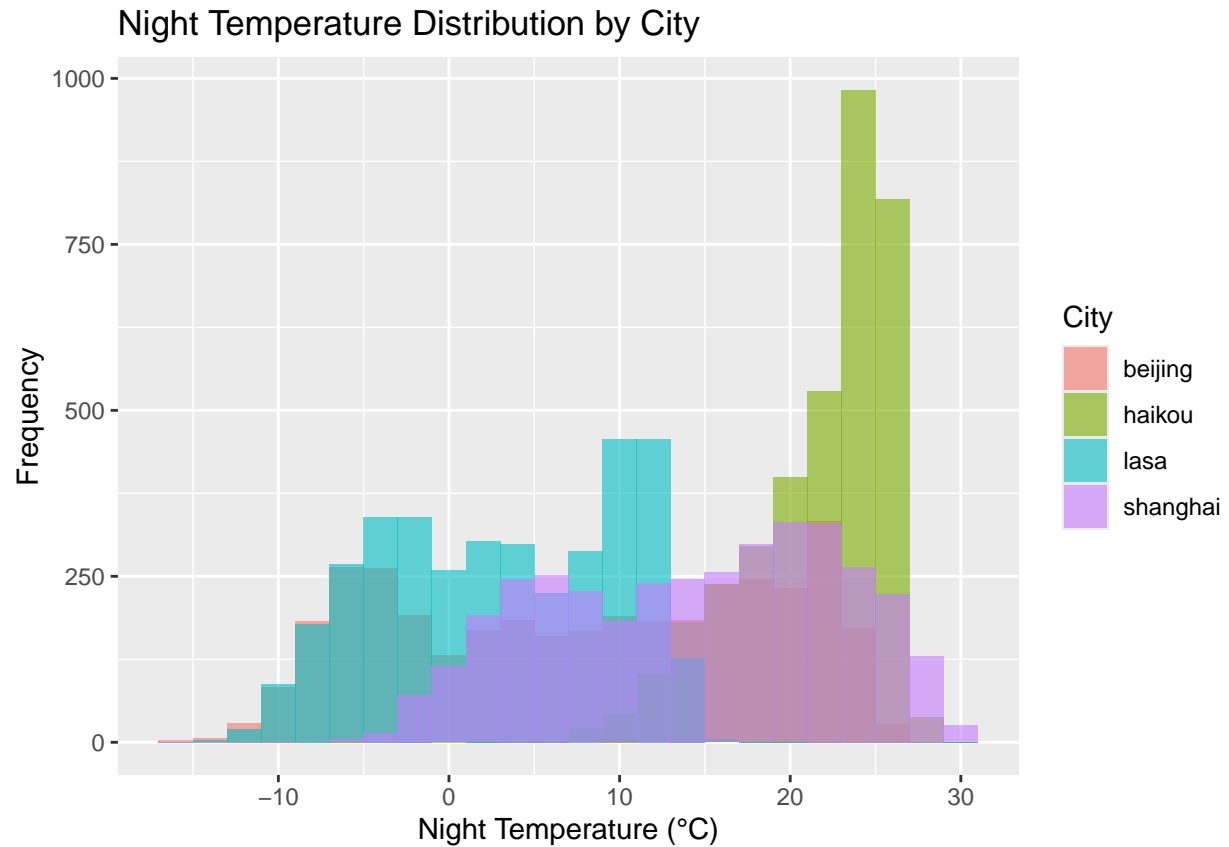
```

Day Temperature Distribution by City



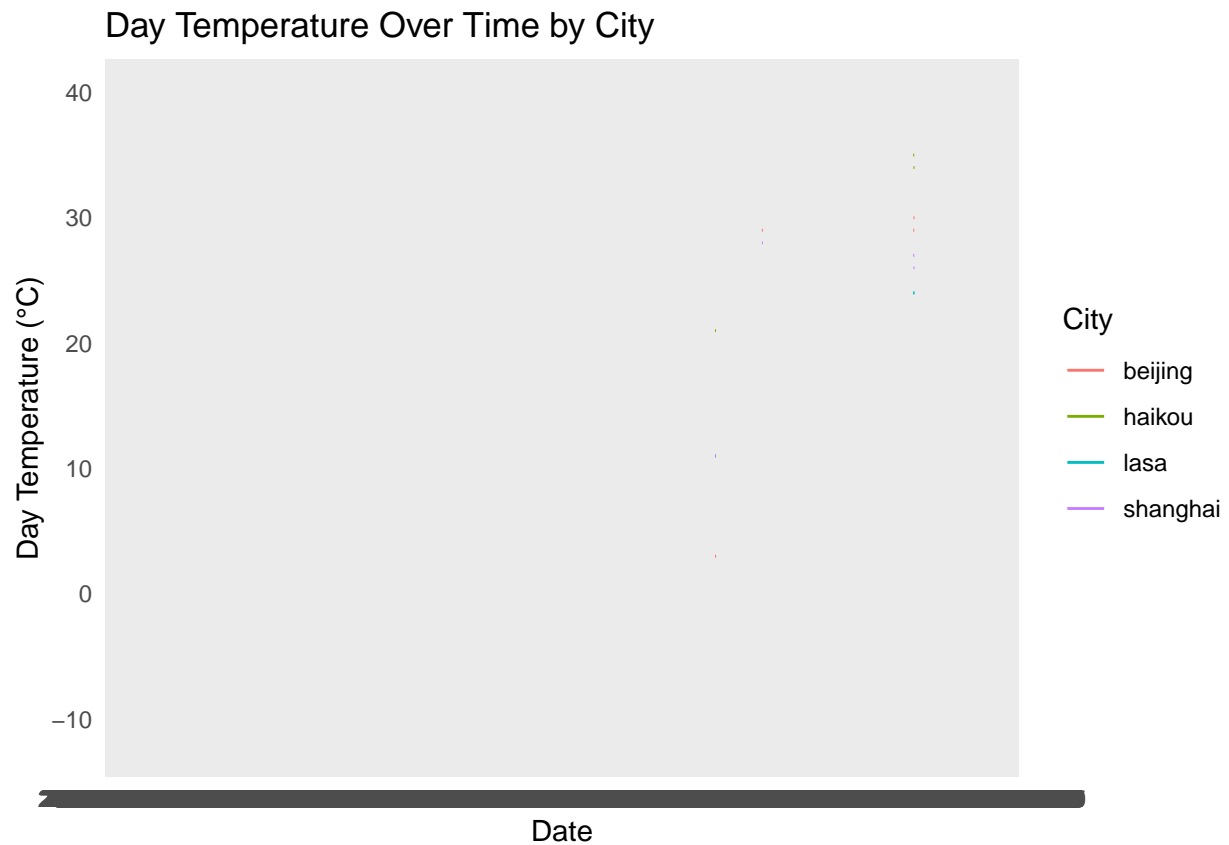
```
ggplot(data, aes(x = Night.Temp, fill = City)) +
  geom_histogram(binwidth = 2, alpha = 0.6, position = "identity") +
  ggtitle("Night Temperature Distribution by City") +
  xlab("Night Temperature (°C)") +
  ylab("Frequency")
```

```
## Warning: Removed 1 row containing non-finite outside the scale range
## (`stat_bin()`).
```



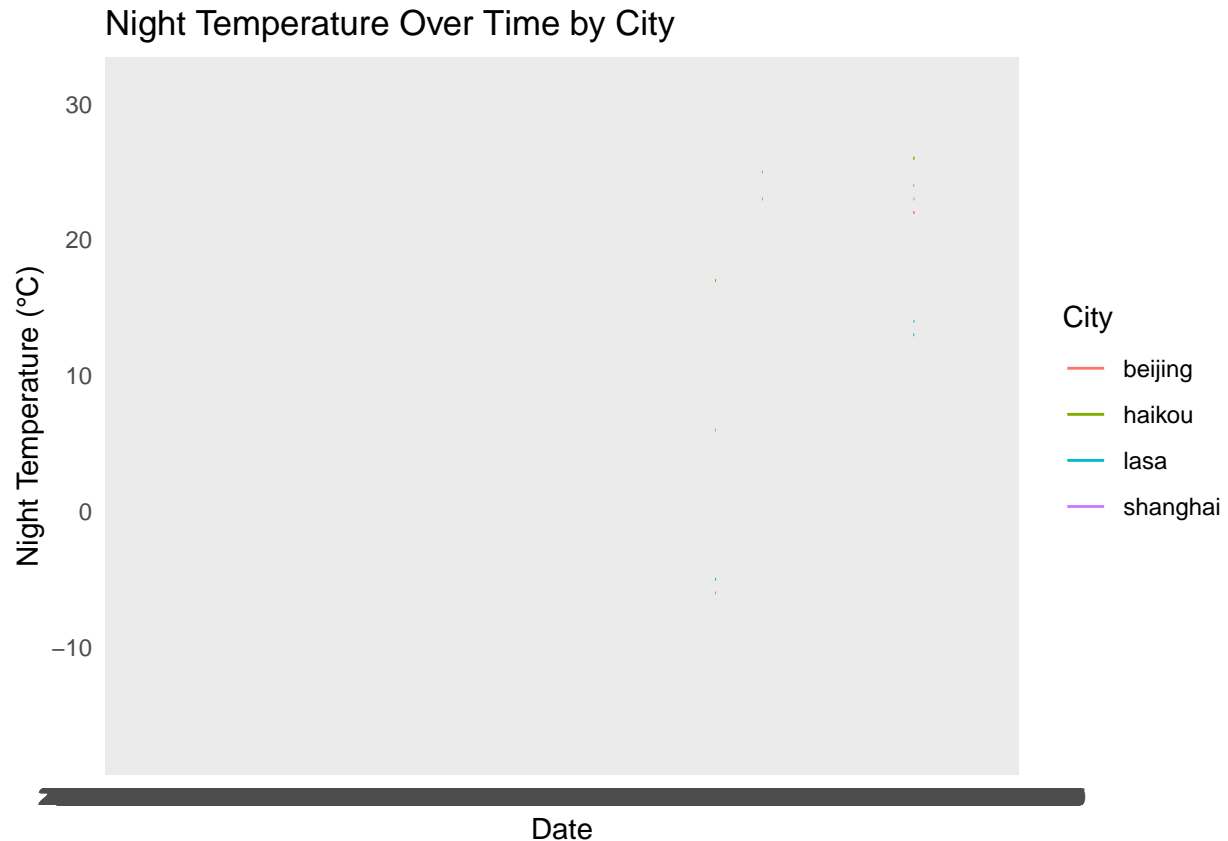
```
## 2.2 ( )
ggplot(data, aes(x = Date, y = Day.Temp, color = City)) +
  geom_line() +
  labs(title = "Day Temperature Over Time by City", x = "Date", y = "Day Temperature (°C)") +
  theme_minimal()
```

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



```
ggplot(data, aes(x = Date, y = Night.Temp, color = City)) +
  geom_line() +
  labs(title = "Night Temperature Over Time by City", x = "Date", y = "Night Temperature (°C)") +
  theme_minimal()
```

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



```
## 2.3 ( )
ggplot(data, aes(x = Day.Weather, fill = City)) +
  geom_bar(position = "dodge") +
  ggtitle("Day Weather Distribution by City") +
  xlab("Day Weather") +
  ylab("Count")
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e4>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <b8>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <ad>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e5>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <88>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <b0>
```



```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e6>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9a>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <b4>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e9>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9b>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a8>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e5>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a4>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a7>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e9>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9b>
```


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[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

```

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <98>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <b4>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e9>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <98>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <b5>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e9>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9b>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a8>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e9>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9b>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <aa>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e9>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9b>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a8>

```

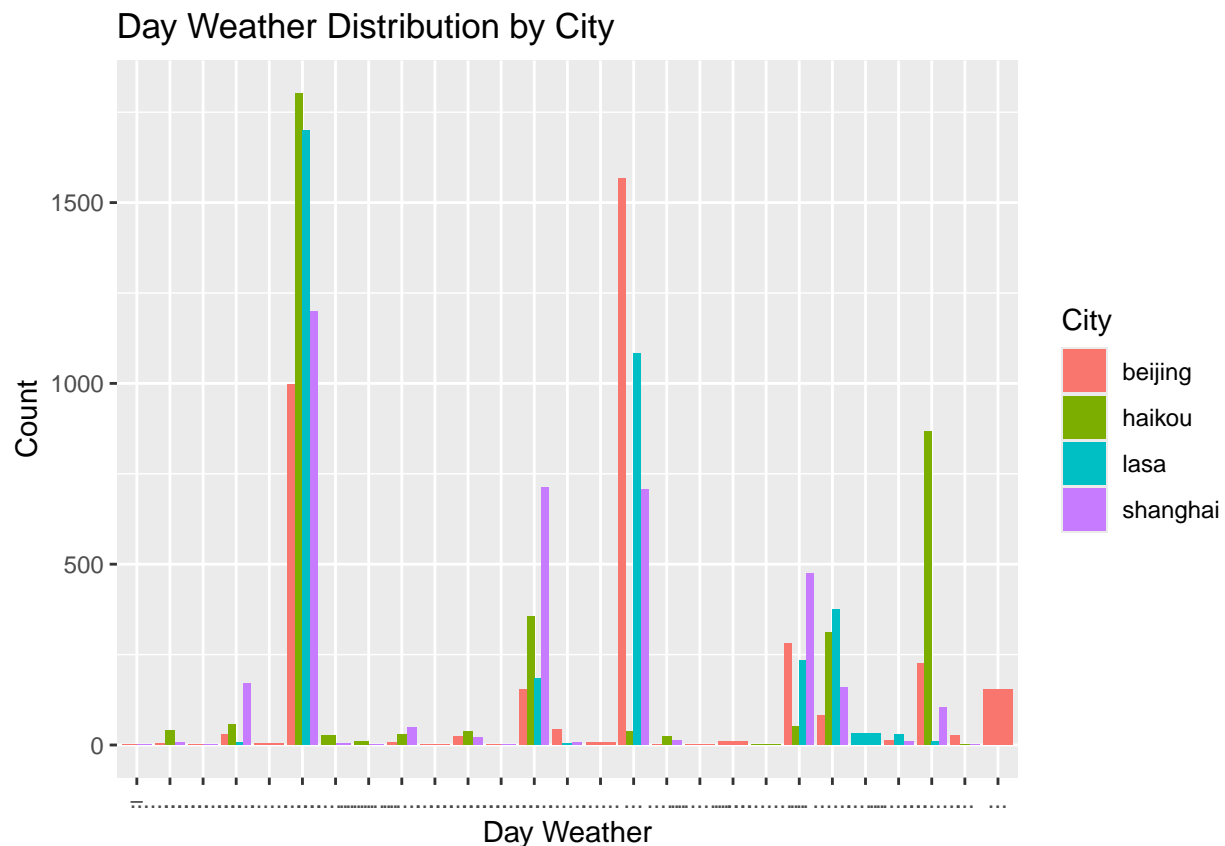


```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <be>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e9>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9c>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <be>
```



```
ggplot(data, aes(x = Night.Weather, fill = City)) +
  geom_bar(position = "dodge") +
  ggtitle("Night Weather Distribution by City") +
  xlab("Night Weather") +
  ylab("Count")
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e4>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <b8>
```

[illegible]

[illegible]


```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e6>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9a>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <b4>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e9>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9b>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a8>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e5>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a4>
```


[illegible]

[illegible]

[illegible]

```

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9a>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <b4>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e9>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9b>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a8>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e6>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <b5>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <ae>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e5>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <b0>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <98>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <89>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <b9>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e5>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a4>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a7>

```



```

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <98>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <b5>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e9>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9b>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a8>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e9>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9b>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <be>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e9>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9c>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <be>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e4>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <b8>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <ad>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e5>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <88>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <b0>

```


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[illegible]

[illegible]


```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a8>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e9>

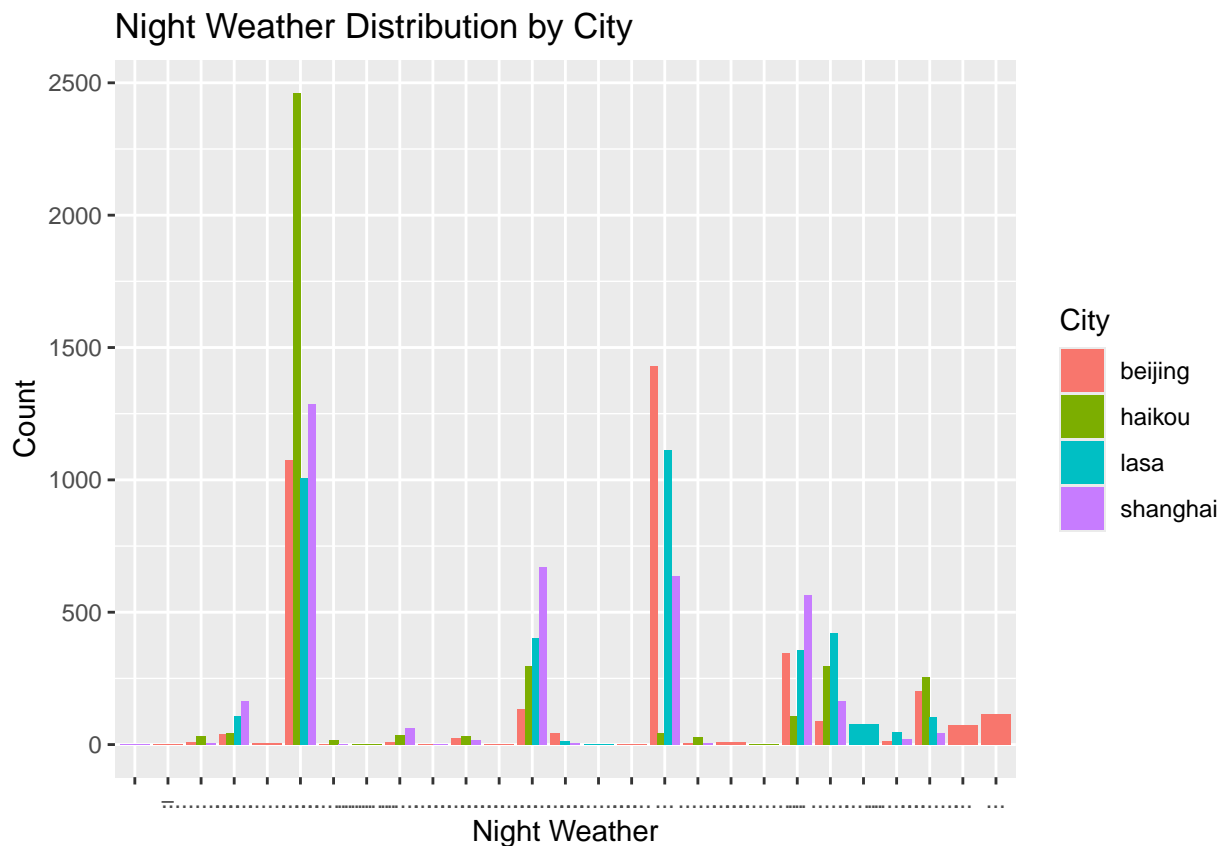
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9b>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <be>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e9>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9c>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <be>
```



```
## 2.4 ( )
ggplot(data, aes(x = Day.Wind.Force, fill = City)) +
  geom_bar(position = "dodge") +
```

```
ggtitle("Day Wind Force Distribution by City") +  
xlab("Day Wind Force") +  
ylab("Count")
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on '3' in 'mbcsToSbcs': dot substituted for <e2>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on '3' in 'mbcsToSbcs': dot substituted for <89>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on '3' in 'mbcsToSbcs': dot substituted for <a4>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on '3' in 'mbcsToSbcs': dot substituted for <e7>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on '3' in 'mbcsToSbcs': dot substituted for <ba>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on '3' in 'mbcsToSbcs': dot substituted for <a7>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on '1-2' in 'mbcsToSbcs': dot substituted for <e7>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on '1-2' in 'mbcsToSbcs': dot substituted for <ba>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on '1-2' in 'mbcsToSbcs': dot substituted for <a7>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on '10-11' in 'mbcsToSbcs': dot substituted for <e7>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on '10-11' in 'mbcsToSbcs': dot substituted for <ba>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on '10-11' in 'mbcsToSbcs': dot substituted for <a7>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on '11-12' in 'mbcsToSbcs': dot substituted for <e7>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on '11-12' in 'mbcsToSbcs': dot substituted for <ba>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on '11-12' in 'mbcsToSbcs': dot substituted for <a7>
```

[illegible]

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '5 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6-7 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6-7 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6-7 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '7-8 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '7-8 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '7-8 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '8-9 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '8-9 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '8-9 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '9-10 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '9-10 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '9-10 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3 ' in 'mbcsToSbcs': dot substituted for <e2>
```

```

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3' in 'mbcsToSbcs': dot substituted for <89>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3' in 'mbcsToSbcs': dot substituted for <a4>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '1-2' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '1-2' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '1-2' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '10-11' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '10-11' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '10-11' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '11-12' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '11-12' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '11-12' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3-4' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3-4' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3-4' in 'mbcsToSbcs': dot substituted for <a7>

```


[illegible]

```

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6-7 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '7-8 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '7-8 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '7-8 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '8-9 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '8-9 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '8-9 ' in 'mbcsToSbcs': dot substituted for <a7>

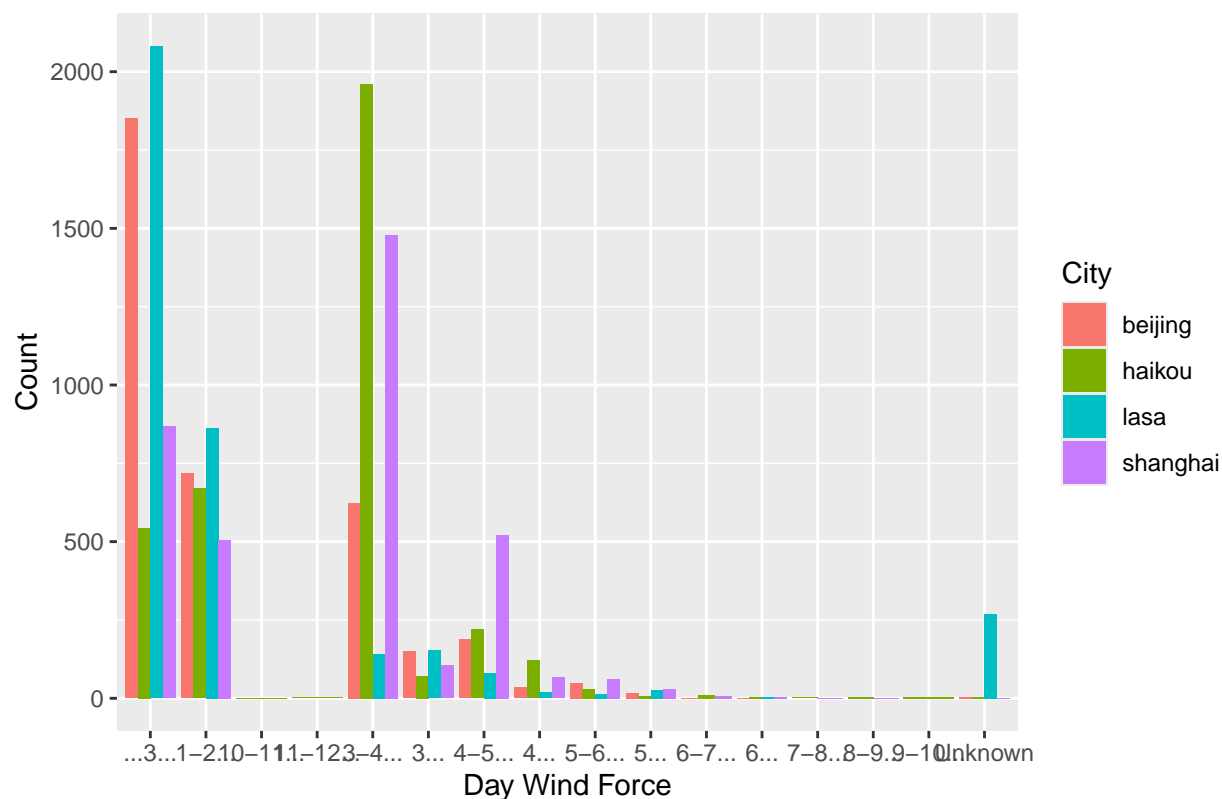
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '9-10 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '9-10 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '9-10 ' in 'mbcsToSbcs': dot substituted for <a7>

```

Day Wind Force Distribution by City



```
ggplot(data, aes(x = Night.Wind.Force, fill = City)) +
  geom_bar(position = "dodge") +
  ggtitle("Night Wind Force Distribution by City") +
  xlab("Night Wind Force") +
  ylab("Count")
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3' in 'mbcsToSbcs': dot substituted for <e2>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3' in 'mbcsToSbcs': dot substituted for <89>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3' in 'mbcsToSbcs': dot substituted for <a4>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3' in 'mbcsToSbcs': dot substituted for <e7>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3' in 'mbcsToSbcs': dot substituted for <ba>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3' in 'mbcsToSbcs': dot substituted for <a7>
```

```

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '1-2 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '1-2 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '1-2 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '10-11 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '10-11 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '10-11 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3-4 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3-4 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3-4 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '3 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '4-5 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '4-5 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '4-5 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '4 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '4 ' in 'mbcsToSbcs': dot substituted for <ba>

```

```

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '4 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '5-6 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '5-6 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '5-6 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '5 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '5 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '5 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6-7 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6-7 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6-7 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '7-8 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '7-8 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '7-8 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '8-9 ' in 'mbcsToSbcs': dot substituted for <e7>

```

```

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '8-9 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '8-9 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '9-10 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '9-10 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '9-10 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' 3 ' in 'mbcsToSbcs': dot substituted for <e2>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' 3 ' in 'mbcsToSbcs': dot substituted for <89>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' 3 ' in 'mbcsToSbcs': dot substituted for <a4>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' 3 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' 3 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' 3 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '1-2 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '1-2 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '1-2 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '10-11 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '10-11 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '10-11 ' in 'mbcsToSbcs': dot substituted for <a7>

```

[illegible]

```

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '5 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6-7 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6-7 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6-7 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '6 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '7-8 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '7-8 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '7-8 ' in 'mbcsToSbcs': dot substituted for <a7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '8-9 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '8-9 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '8-9 ' in 'mbcsToSbcs': dot substituted for <a7>

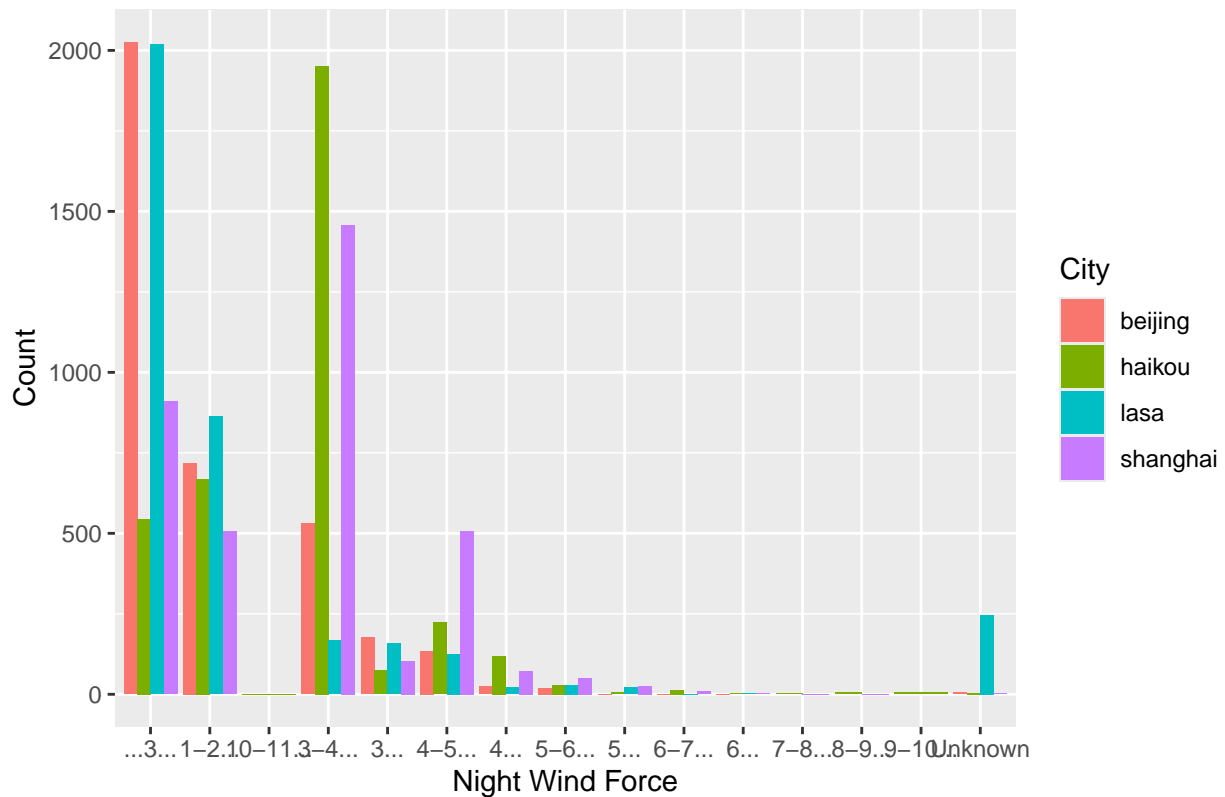
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '9-10 ' in 'mbcsToSbcs': dot substituted for <e7>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '9-10 ' in 'mbcsToSbcs': dot substituted for <ba>

## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '9-10 ' in 'mbcsToSbcs': dot substituted for <a7>

```


Night Wind Force Distribution by City



```
## 2.5      ( )
ggplot(data, aes(x = Day.Wind.Direction, fill = City)) +
  geom_bar(position = "dodge") +
  ggtitle("Day Wind Direction Distribution by City") +
  xlab("Day Wind Direction") +
  ylab("Count")
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e4>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <b8>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9c>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e5>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <8c>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <97>
```

```

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e9>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a3>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <8e>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e4>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <b8>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9c>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <97>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e9>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a3>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <8e>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e4>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <b8>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9c>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e9>

## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a3>

```

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e8>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbscsToSbcs': dot substituted for <a5>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbscsToSbcs': dot substituted for <bf>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e5>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <8c>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbscsToSbcs': dot substituted for <97>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbscsToSbcs': dot substituted for <e9>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a3>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <8e>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e8>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a5>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <bf>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <05>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <8d>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '1' in 'mbasToShas': dot substituted for <?>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on '1' in 'lmscToShex': dot substituted for '<0>'
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbscsToSbcs': dot substituted for <a3>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbscsToSbcs': dot substituted for <8e>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbscToSbsc': dot substituted for <e8>
```

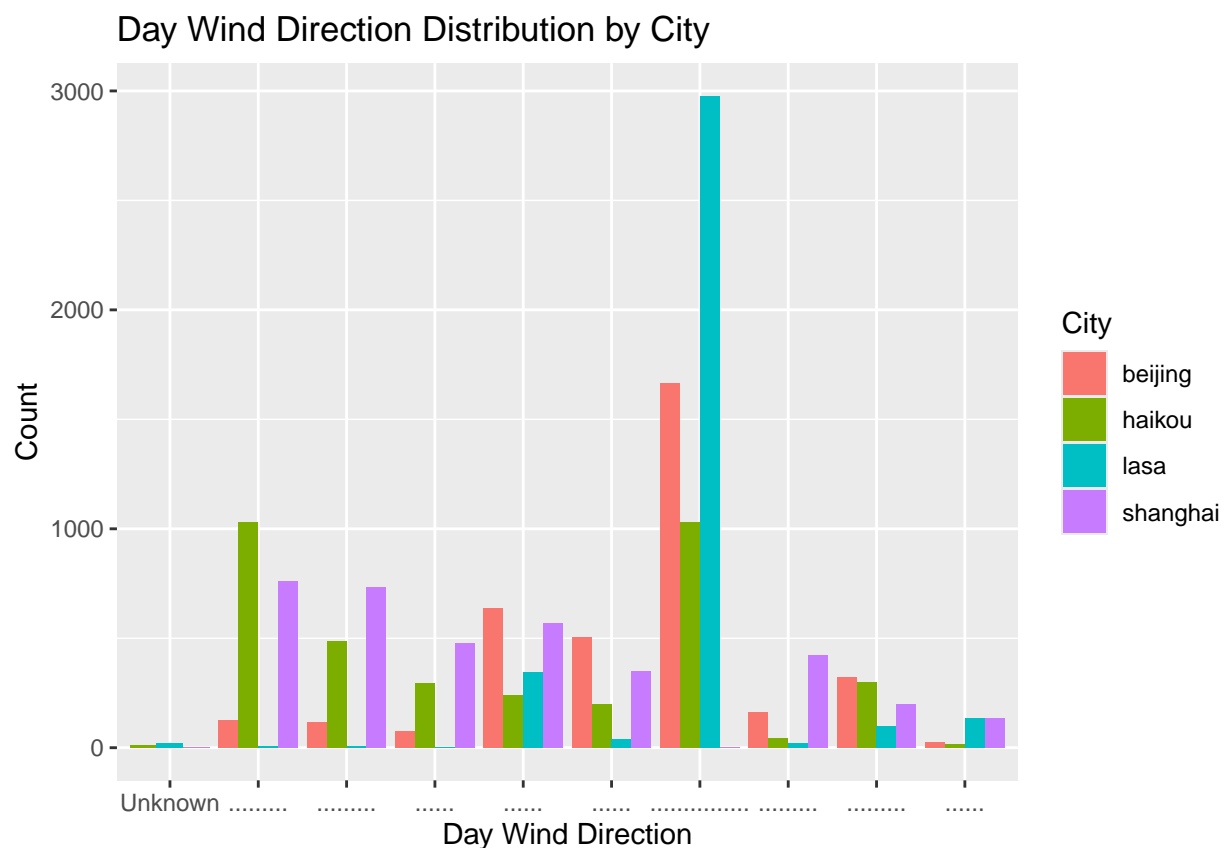
```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbscsToSbcs': dot substituted for <a5>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <bf>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e9>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a3>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <8e>
```



```
ggplot(data, aes(x = Night.Wind.Direction, fill = City)) +
  geom_bar(position = "dodge") +
  ggtitle("Night Wind Direction Distribution by City") +
  xlab("Night Wind Direction") +
  ylab("Count")
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e4>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <b8>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9c>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e5>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <8c>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <97>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e9>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a3>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <8e>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e4>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <b8>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <9c>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e5>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <8d>
```

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <97>
```

[illegible]

[illegible]

```
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbc': dot substituted for <e9>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbc': dot substituted for <a3>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbc': dot substituted for <8e>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbc': dot substituted for <e8>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbc': dot substituted for <a5>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbc': dot substituted for <bfi>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbc': dot substituted for <e9>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbc': dot substituted for <a3>  
  
## Warning in grid.Call(C_textBounds, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbc': dot substituted for <8e>  
  
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbc': dot substituted for <e4>  
  
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbc': dot substituted for <b8>  
  
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbc': dot substituted for <9c>  
  
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbc': dot substituted for <e5>  
  
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbc': dot substituted for <8c>  
  
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbc': dot substituted for <97>  
  
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbc': dot substituted for <e9>  
  
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbcsToSbc': dot substituted for <a3>
```

[illegible]

[illegible]

[illegible]

[illegible]

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <e8>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbcsToSbcs': dot substituted for <a5>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbscsToSbcs': dot substituted for <bf>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbscsToSbcs': dot substituted for <e5>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbscsToSbcs': dot substituted for <8d>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :  
## conversion failure on ' ' in 'mbscsToSbcs': dot substituted for <97>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbscsToSbcs': dot substituted for <e9>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbscsToSbcs': dot substituted for <a3>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbscsToSbcs': dot substituted for <8e>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbscsToSbscs': dot substituted for <e8>
```

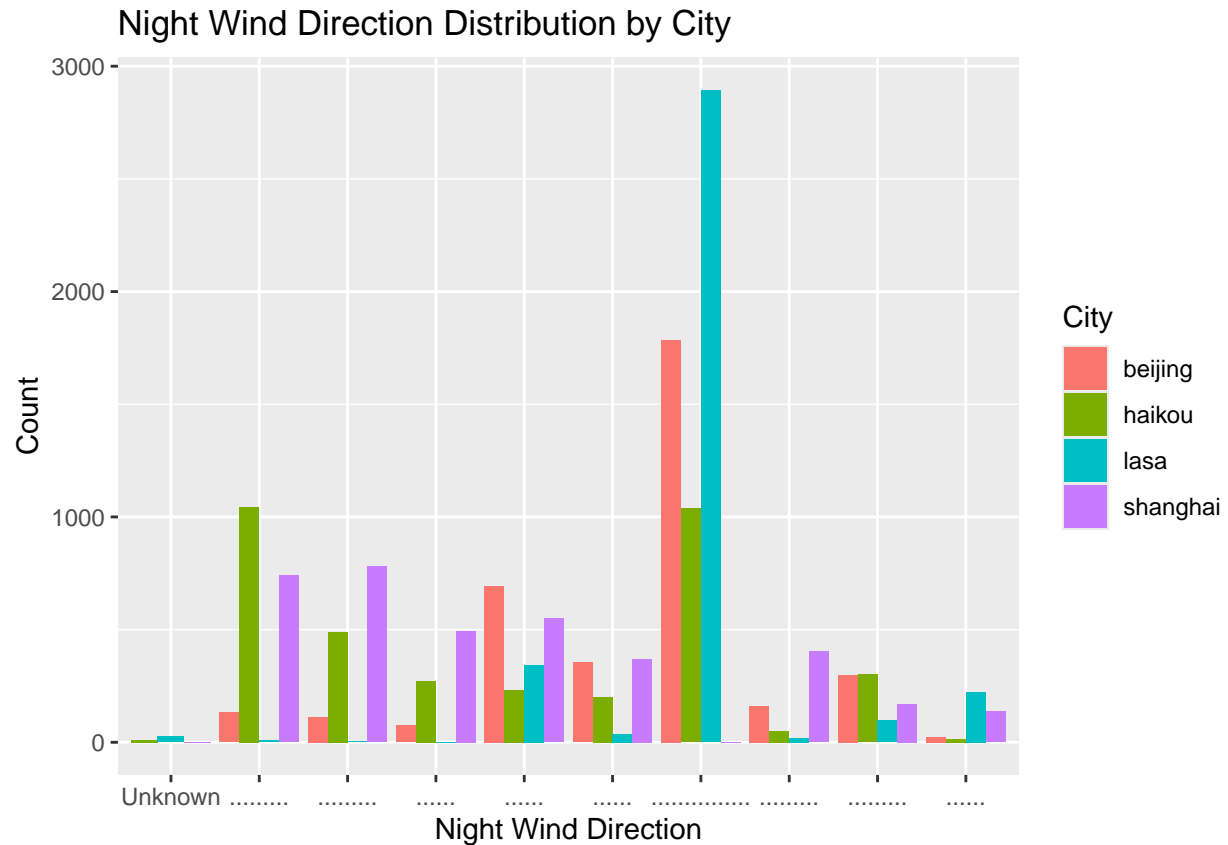
```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbsToSbs': dot substituted for <a5>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbsToSbs': dot substituted for <b>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbsToSbs': dot substituted for <a>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbsToSbs': dot substituted for <a3>
```

```
## Warning in grid.Call.graphics(C_text, as.graphicsAnnot(x$label), x$x, x$y, :
## conversion failure on ' ' in 'mbsToSbs': dot substituted for <8>
```



```
# 3.

## 3.1
city_temp_diff <- data %>%
  group_by(City) %>%
  summarise(Avg_Temperature_Difference = mean(Day.Temp - Night.Temp, na.rm = TRUE))

print(city_temp_diff)
```

```
## # A tibble: 4 x 2
##   City      Avg_Temperature_Difference
##   <chr>          <dbl>
## 1 beijing          10.4
## 2 haikou           6.45
## 3 lasa            13.6
## 4 shanghai         6.31
```

```
## 3.2
weather_comparison <- data %>%
  group_by(City) %>%
  summarise(
    Most_Common_Day_Weather = Mode(Day.Weather),
    Most_Common_Night_Weather = Mode(Night.Weather)
  )

print(weather_comparison)
```

```
## # A tibble: 4 x 3
##   City      Most_Common_Day_Weather Most_Common_Night_Weather
##   <chr>      <chr>                  <chr>
## 1 beijing
## 2 haikou
## 3 lasa
## 4 shanghai
```

```
#
head(data)
```

```
##      Date      City Weather.Condition Temperature
## 1 2011-01-01 beijing      /      0℃/-9℃
## 2 2011-01-02 beijing      /      -2℃/-7℃
## 3 2011-01-03 beijing      /      1℃/-8℃
## 4 2011-01-04 beijing      /      -1℃/-11℃
## 5 2011-01-05 beijing      /      -1℃/-8℃
## 6 2011-01-06 beijing      /      0℃/-10℃
##      Wind.Force.and.Direction Day.Weather Night.Weather Day.Temp Night.Temp
## 1      3 /      3              0          -9
## 2      3 /      3             -2          -7
## 3      3-4 /      3              1          -8
## 4      3 /      3             -1         -11
## 5      4-5 / 3-4              -1          -8
## 6      3 /      3              0         -10
##      Day.Wind.Direction Night.Wind.Direction Day.Wind.Force Night.Wind.Force
## 1              3              3
## 2              3              3
## 3              3-4              3
## 4              3              3
## 5              4-5              3-4
## 6              3              3
```