Loading and preprocessing the data

```
library("data.table")
library(ggplot2)
fileUrl <- "https://d396qusza40orc.cloudfront.net/repdata%2Fdata%2Factivity.zip"
download.file(fileUrl, destfile = paste0(getwd(), '/repdata%2Fdata%2Factivity.zip'), method = "curl")
unzip("repdata%2Fdata%2Factivity.zip",exdir = "data")
activityDT <- data.table::fread(input = "data/activity.csv")
```

1.What is mean total number of steps taken per day?

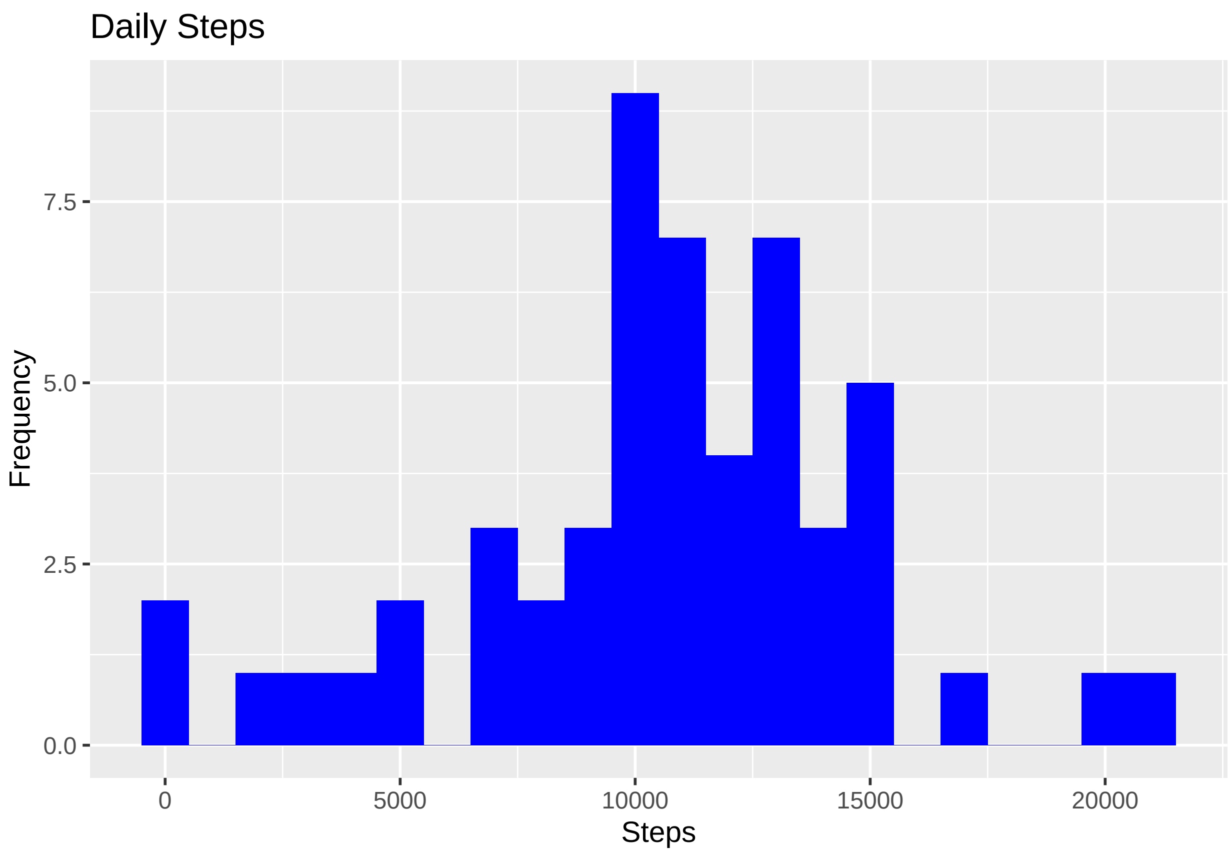
```
Total_Steps <- activityDT[, c(lapply(.SD, sum, na.rm = FALSE)), .SDcols = c("steps"), by = .(date)]
head(Total_Steps, 10)
```

```
##            date steps
##  1: 2012-10-01    NA
##  2: 2012-10-02   126
##  3: 2012-10-03 11352
##  4: 2012-10-04 12116
##  5: 2012-10-05 13294
##  6: 2012-10-06 15420
##  7: 2012-10-07 11015
##  8: 2012-10-08    NA
##  9: 2012-10-09 12811
## 10: 2012-10-10  9900
```

2.If you do not understand the difference between a histogram and a barplot, research the difference between them. Make a histogram of the total number of steps taken each day.

```
ggplot(Total_Steps, aes(x = steps)) +
    geom_histogram(fill = "blue", binwidth = 1000) +
    labs(title = "Daily Steps", x = "Steps", y = "Frequency")
```

```
## Warning: Removed 8 rows containing non-finite values (‘stat_bin()‘).
```



3.Calculate and report the mean and median of the total number of steps taken per day?

```
Total_Steps[, .(Mean_Steps = mean(steps, na.rm = TRUE), Median_Steps = median(steps, na.rm = TRUE))]
```

```
##    Mean_Steps Median_Steps
## 1:   10766.19        10765
```

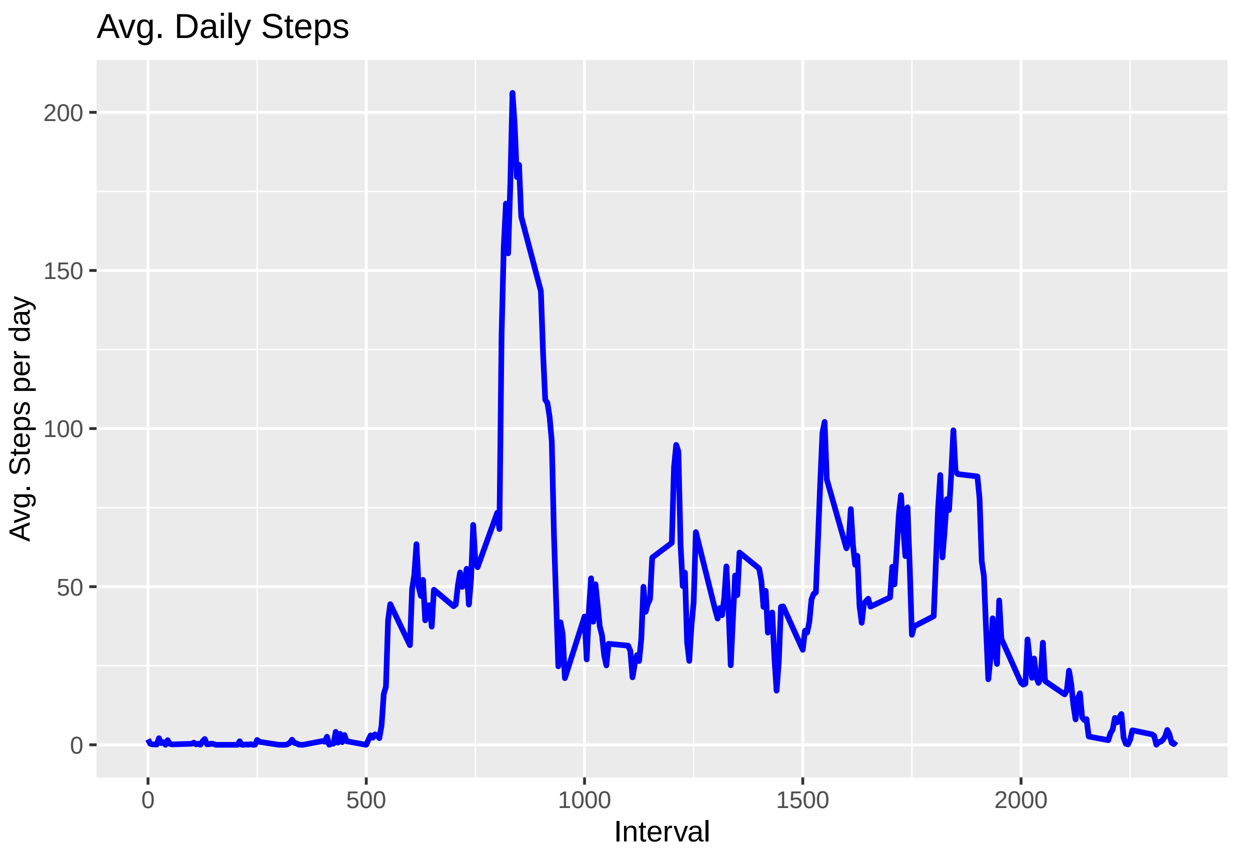
What is the average daily activity pattern?

1.Make a time series plot of the 5-minute interval (x-axis) and the average number of steps taken, averaged across all days (y-axis)

```
IntervalDT <- activityDT[, c(lapply(.SD, mean, na.rm = TRUE)), .SDcols = c("steps"), by = .(interval)]

ggplot(IntervalDT, aes(x = interval , y = steps)) + geom_line(color="blue", size=1) + labs(title = "Avg
```

```
## Warning: Using ‘size‘ aesthetic for lines was deprecated in ggplot2 3.4.0.
## i Please use ‘linewidth‘ instead.
## This warning is displayed once every 8 hours.
## Call ‘lifecycle::last_lifecycle_warnings()‘ to see where this warning was
## generated.
```



2.Which 5-minute interval, on average across all the days in the dataset, contains the maximum number of steps?

```
IntervalDT[steps == max(steps), .(max_interval = interval)]
```

```
##    max_interval
## 1:          835
```

Imputing missing values

1.Calculate and report the total number of missing values in the dataset

```
activityDT[is.na(steps), .N ]
```

```
## [1] 2304
```

2.Devise a strategy for filling in all of the missing values in the dataset. The strategy does not need to be sophisticated. For example, you could use the mean/median for that day, or the mean for that 5-minute interval, etc.

```
# Filling in missing values with median of dataset.
activityDT[is.na(steps), "steps"] <- activityDT[, c(lapply(.SD, median, na.rm = TRUE)), .SDcols = c("st
```

3.Create a new dataset that is equal to the original dataset but with the missing data filled in.

```
data.table::fwrite(x = activityDT, file = "data/tidyData.csv", quote = FALSE)
```

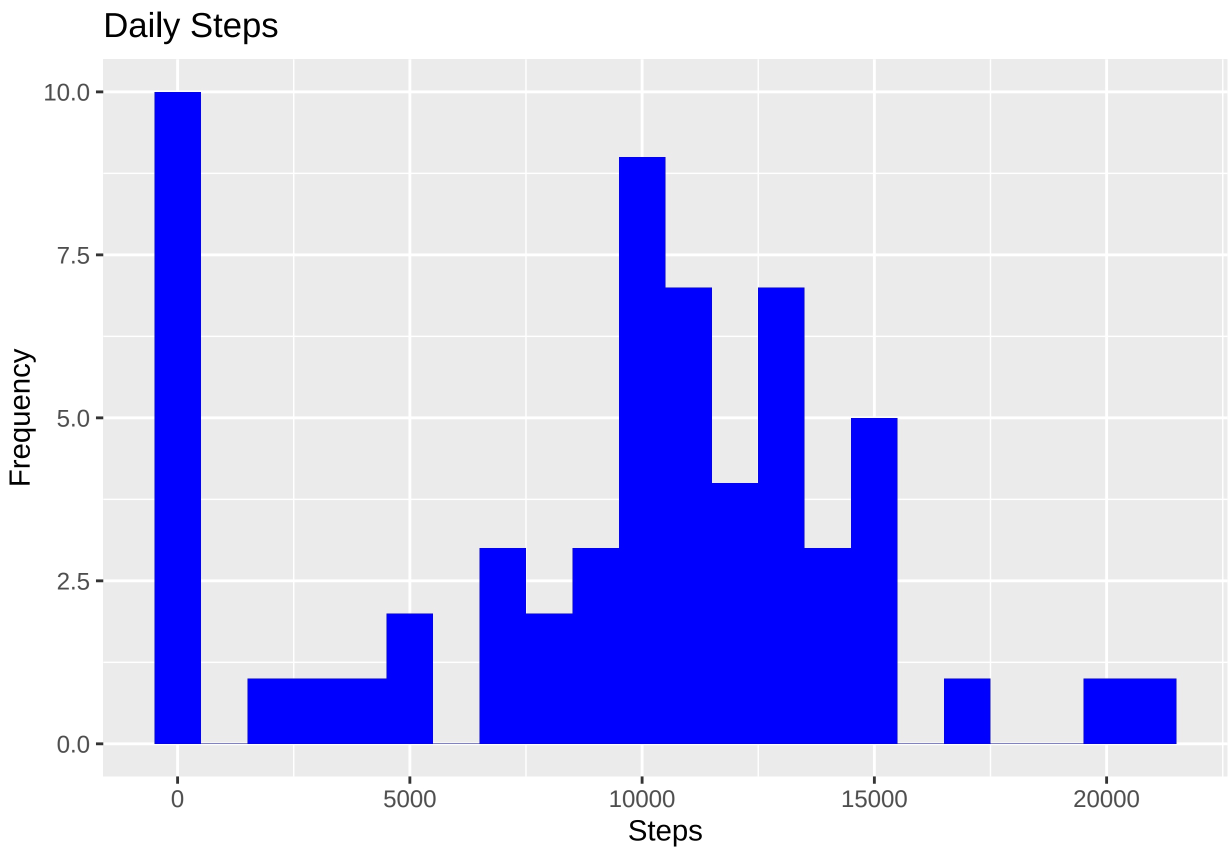
4.Make a histogram of the total number of steps taken each day and calculate and report the mean and median total number of steps taken per day. Do these values differ from the estimates from the first part of the assignment? What is the impact of imputing missing data on the estimates of the total daily number of steps?

```
# total number of steps taken per day
Total_Steps <- activityDT[, c(lapply(.SD, sum)), .SDcols = c("steps"), by = .(date)]

# mean and median total number of steps taken per day
Total_Steps[, .(Mean_Steps = mean(steps), Median_Steps = median(steps))]
```

```
##    Mean_Steps Median_Steps
## 1:    9354.23        10395
```

```
ggplot(Total_Steps, aes(x = steps)) + geom_histogram(fill = "blue", binwidth = 1000) + labs(title = "Da
```



Are there differences in activity patterns between weekdays and weekends?

1.Create a new factor variable in the dataset with two levels – "weekday" and "weekend" indicating whether a given date is a weekday or weekend day.

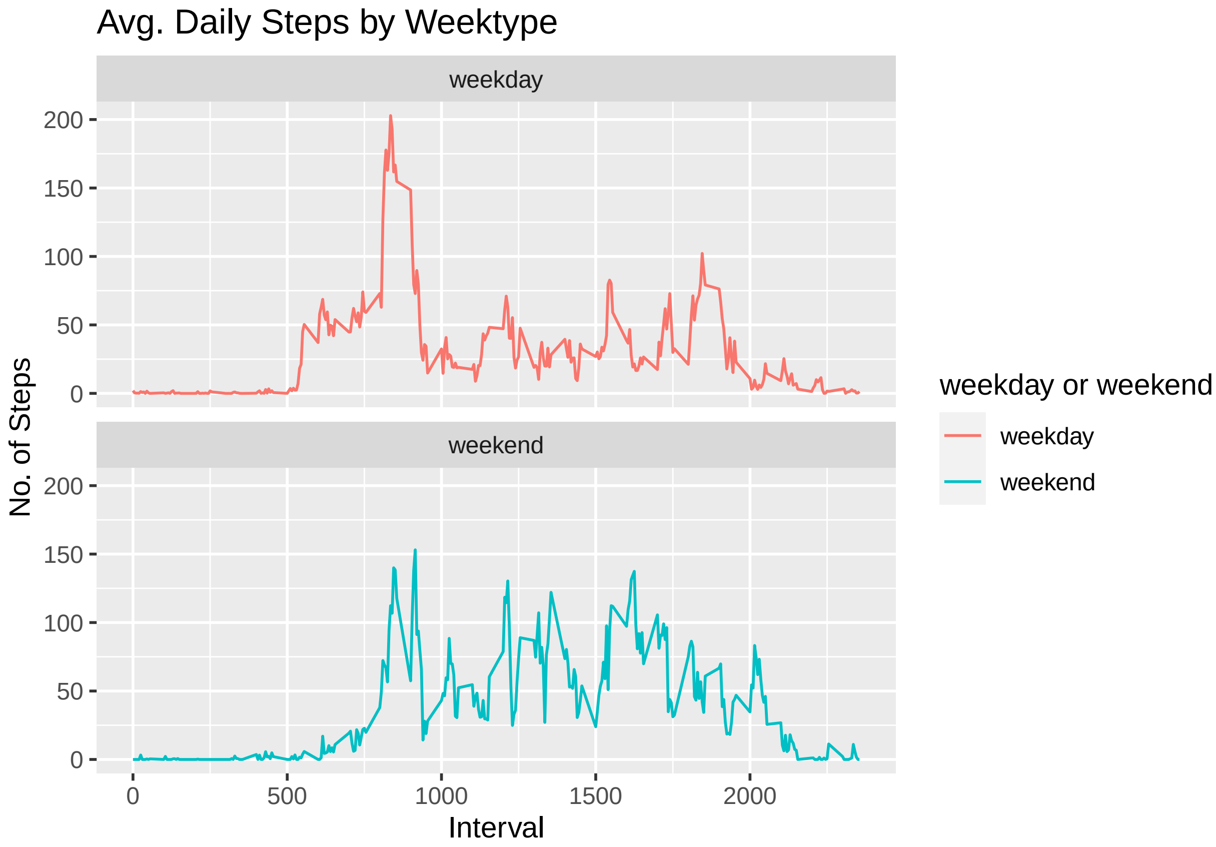
```
# Just recreating activityDT from scratch then making the new factor variable. (No need to, just want t
activityDT <- data.table::fread(input = "data/activity.csv")
activityDT[, date := as.POSIXct(date, format = "%Y-%m-%d")]
activityDT[, `Day of Week`:= weekdays(x = date)]
activityDT[grepl(pattern = "Monday|Tuesday|Wednesday|Thursday|Friday", x = `Day of Week`), "weekday or w
activityDT[grepl(pattern = "Saturday|Sunday", x = `Day of Week`), "weekday or weekend"] <- "weekend"
activityDT[, `weekday or weekend` := as.factor(`weekday or weekend`)]
head(activityDT, 10)
```

```
##     steps       date interval Day of Week weekday or weekend
##  1:    NA 2012-10-01        0      Monday            weekday
##  2:    NA 2012-10-01        5      Monday            weekday
##  3:    NA 2012-10-01       10      Monday            weekday
##  4:    NA 2012-10-01       15      Monday            weekday
##  5:    NA 2012-10-01       20      Monday            weekday
##  6:    NA 2012-10-01       25      Monday            weekday
##  7:    NA 2012-10-01       30      Monday            weekday
##  8:    NA 2012-10-01       35      Monday            weekday
##  9:    NA 2012-10-01       40      Monday            weekday
## 10:    NA 2012-10-01       45      Monday            weekday
```

2.Make a panel plot containing a time series plot of the 5-minute interval (x-axis) and the average number of steps taken, averaged across all weekday days or weekend days (y-axis). See the README file in the GitHub repository to see an example of what this plot should look like using simulated data.

```
activityDT[is.na(steps), "steps"] <- activityDT[, c(lapply(.SD, median, na.rm = TRUE)), .SDcols = c("ste
IntervalDT <- activityDT[, c(lapply(.SD, mean, na.rm = TRUE)), .SDcols = c("steps"), by = .(interval, `w

ggplot(IntervalDT , aes(x = interval , y = steps, color=`weekday or weekend`)) + geom_line() + labs(titl
```


Avg. Daily Steps by Weektype
weekday
weekend
No. of Steps
200
150
100
50
0
0
500
1000
1500
2000
Interval
weekday or weekend
weekday
weekend