Reproducible Research: Peer Assessment 1

Loading and preprocessing the data

The data is sourced from: https://d396qusza40orc.cloudfront.net/repdata%2Fdata%2Factivity.zip (https://d396qusza40orc.cloudfront.net/repdata%2Fdata%2Factivity.zip)

The date is the second column and that is converted in the call to read.csv().

```
my.steps <- read.csv("activity.csv",
                     header=TRUE,
                     na.strings = "NA",
                     stringsAsFactors = FALSE,
                     colClasses = c("integer", "Date", "integer"))
```

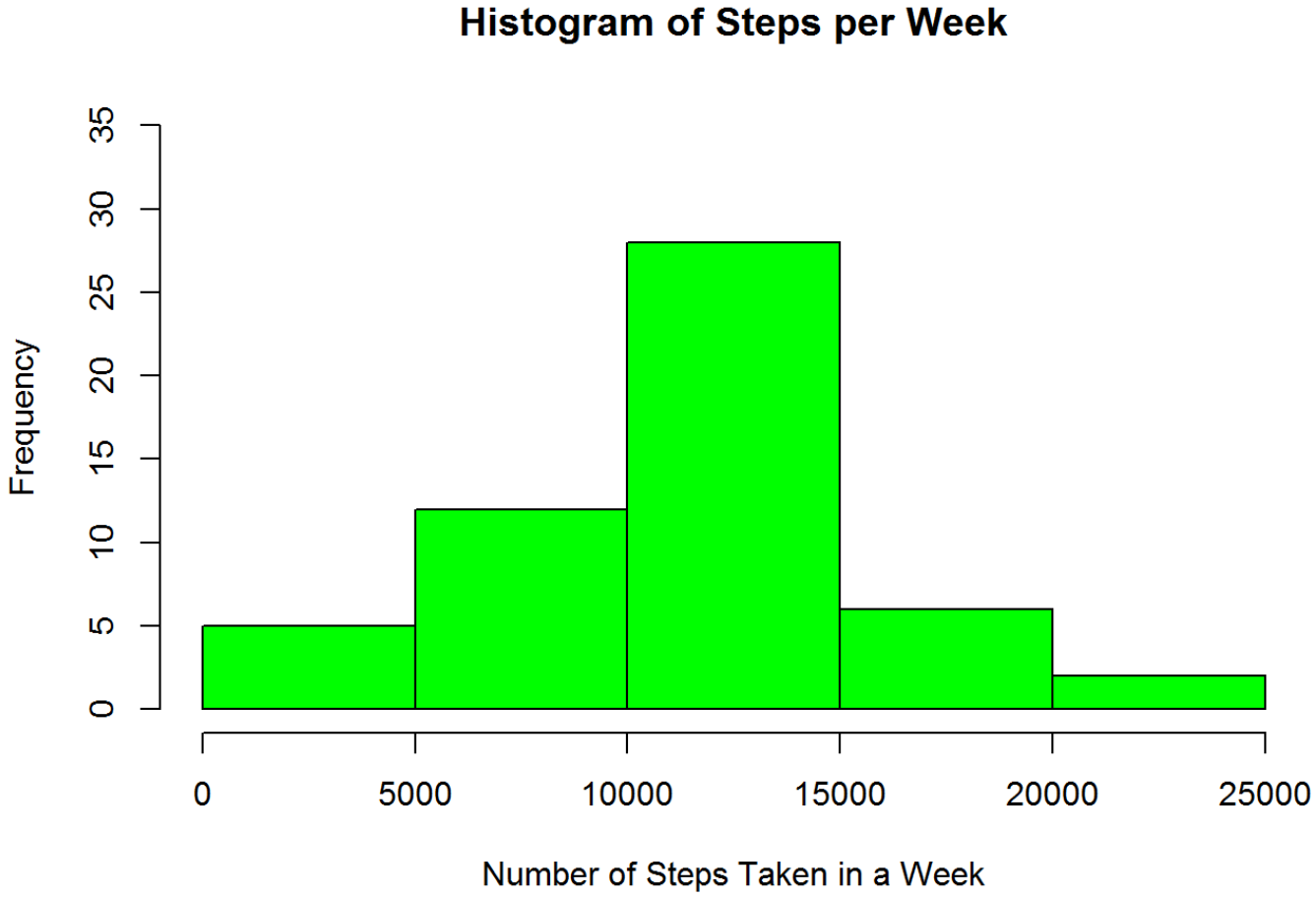
What is mean total number of steps taken per day?

The aggregate() function was used to calculate the mean total number of steps per day.

```
total.steps.per.day <- aggregate(steps ~ date, my.steps, sum, na.action = na.omit)
```

The plotted data on a weekly basis appears as follows:

```
DAYS.PER.WEEK <- 7
hist(total.steps.per.day$steps,
     breaks = DAYS.PER.WEEK,
     col= "green",
     main = "Histogram of Steps per Week",
     xlab = "Number of Steps Taken in a Week",
     ylim=c(0,35))
```



The following was used for the daily average:

```
mean.steps.per.day <- aggregate(steps ~ date, total.steps.per.day, mean, na.action = na.o
mit)
head(mean.steps.per.day)
```

```
##         date steps
## 1 2012-10-02   126
## 2 2012-10-03 11352
## 3 2012-10-04 12116
## 4 2012-10-05 13294
## 5 2012-10-06 15420
## 6 2012-10-07 11015
```

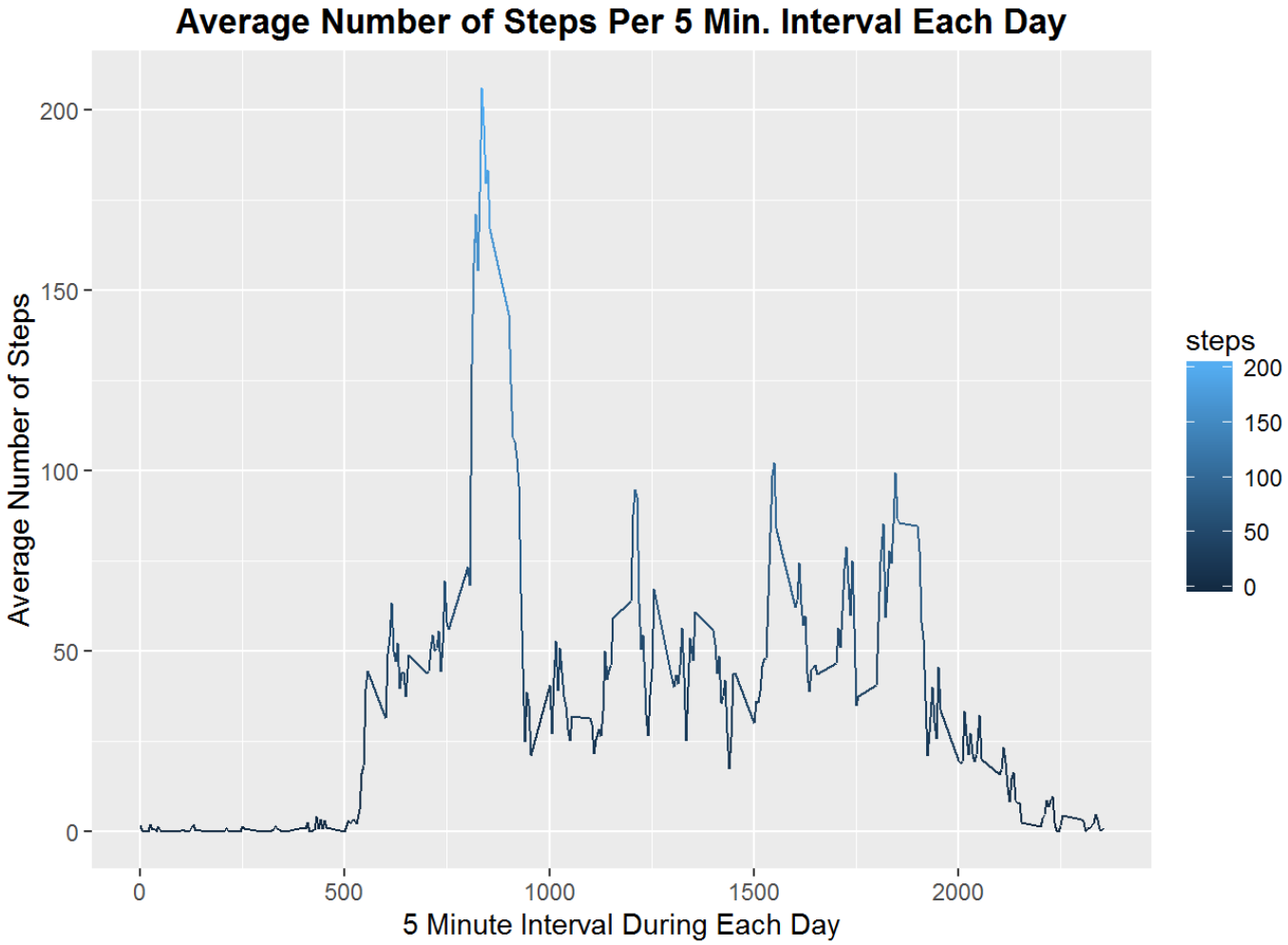
What is the average daily activity pattern?

Here, we're calculating the average number of steps taken per 5-minute interval during the day:

```
mean.steps.per.interval <- aggregate(steps ~ interval, my.steps, mean, na.action = na.omi
t)
```

As a plot:

```
ggplot(mean.steps.per.interval, aes(interval, steps, color = steps)) + geom_line() + xlab
("5 Minute Interval During Each Day") + ylab("Average Number of Steps") + ggtitle("Averag
e Number of Steps Per 5 Min. Interval Each Day" ) + theme(plot.title = element_text(lineh
eight=.9, face="bold"))
```



On interval 835, The Stepper took 206 steps on average. And that is the most they took on average across all the days in the dataset.

Imputing missing values

The original dataset has several missing data values. They're represented as NA. The data for each 5-minute interval was calculated in mean.steps.per.interval. For step values that are represented as NA in the original dataset, a substitution is made using the average for that interval.

```
        my.complete.steps <-
          mutate(my.steps,
                 steps = ifelse(is.na(my.steps$steps),
                                mean.steps.per.interval[match(my.steps$interval, mean.ste
ps.per.interval$interval),2],
                                my.steps$steps))
```

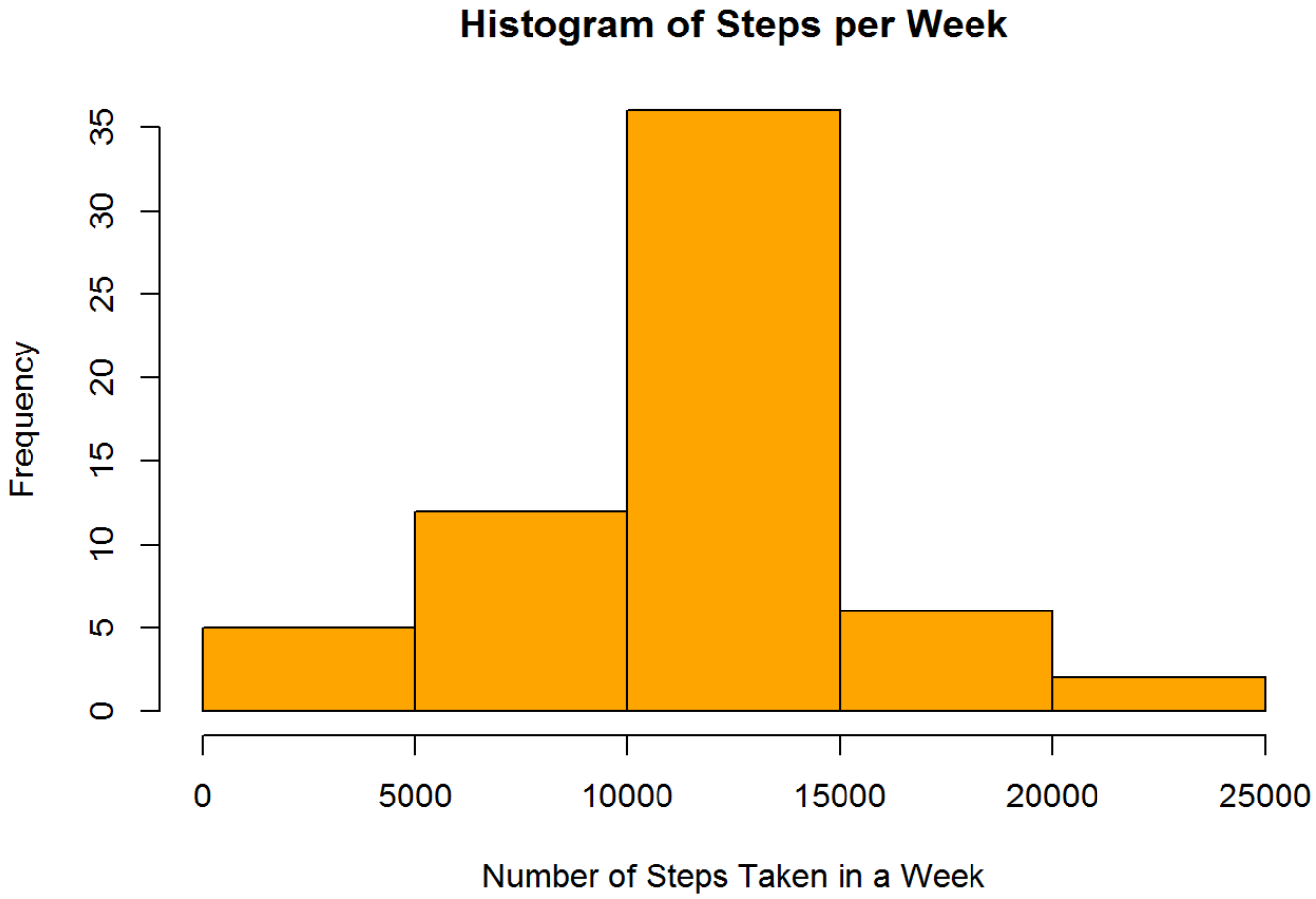
Recalculate the total number of steps taken per day with the updated average values used for NA values.

```
total.steps.per.day <- aggregate(steps ~ date, my.complete.steps, sum, na.action = na.omi
t)
head(total.steps.per.day)
```

```
##         date    steps
## 1 2012-10-01 10766.19
## 2 2012-10-02   126.00
## 3 2012-10-03 11352.00
## 4 2012-10-04 12116.00
## 5 2012-10-05 13294.00
## 6 2012-10-06 15420.00
```

This is how it looks on a weekly basis:

```
        hist(total.steps.per.day$steps,
             breaks = DAYS.PER.WEEK,
             col= "orange",
             main = "Histogram of Steps per Week",
             xlab = "Number of Steps Taken in a Week",
             ylim=c(0,35))
```



Are there differences in activity patterns between weekdays and weekends?

Start by Identifying the weekend days (day == 1 or 7) from the rest.

```
        total.steps.per.daytype <- mutate(my.complete.steps,
                                          daytype = ifelse(wday(my.complete.steps$date) =
= 1 | wday(my.complete.steps$date) == 7, "weekend", "weekday"))
```

Calculate the average steps per interval on a weekend

```
        weekend.steps <- filter(total.steps.per.daytype, daytype == "weekend")
        weekend.steps.average <- aggregate(steps ~ interval, weekend.steps, mean)
        weekend.steps.average <- mutate(weekend.steps.average, daytype = "weekend")
        head(weekend.steps.average)
```

```
##   interval       steps daytype
## 1        0 0.214622642 weekend
## 2        5 0.042452830 weekend
## 3       10 0.016509434 weekend
## 4       15 0.018867925 weekend
## 5       20 0.009433962 weekend
## 6       25 3.511792453 weekend
```

Calculate the average steps per interval on a weekday

```
        weekday.steps <- filter(total.steps.per.daytype, daytype == "weekday")
        weekday.steps.average <- aggregate(steps ~ interval, weekday.steps,mean)
        weekday.steps.average <- mutate(weekday.steps.average, daytype = "weekday")
        head(weekday.steps.average)
```

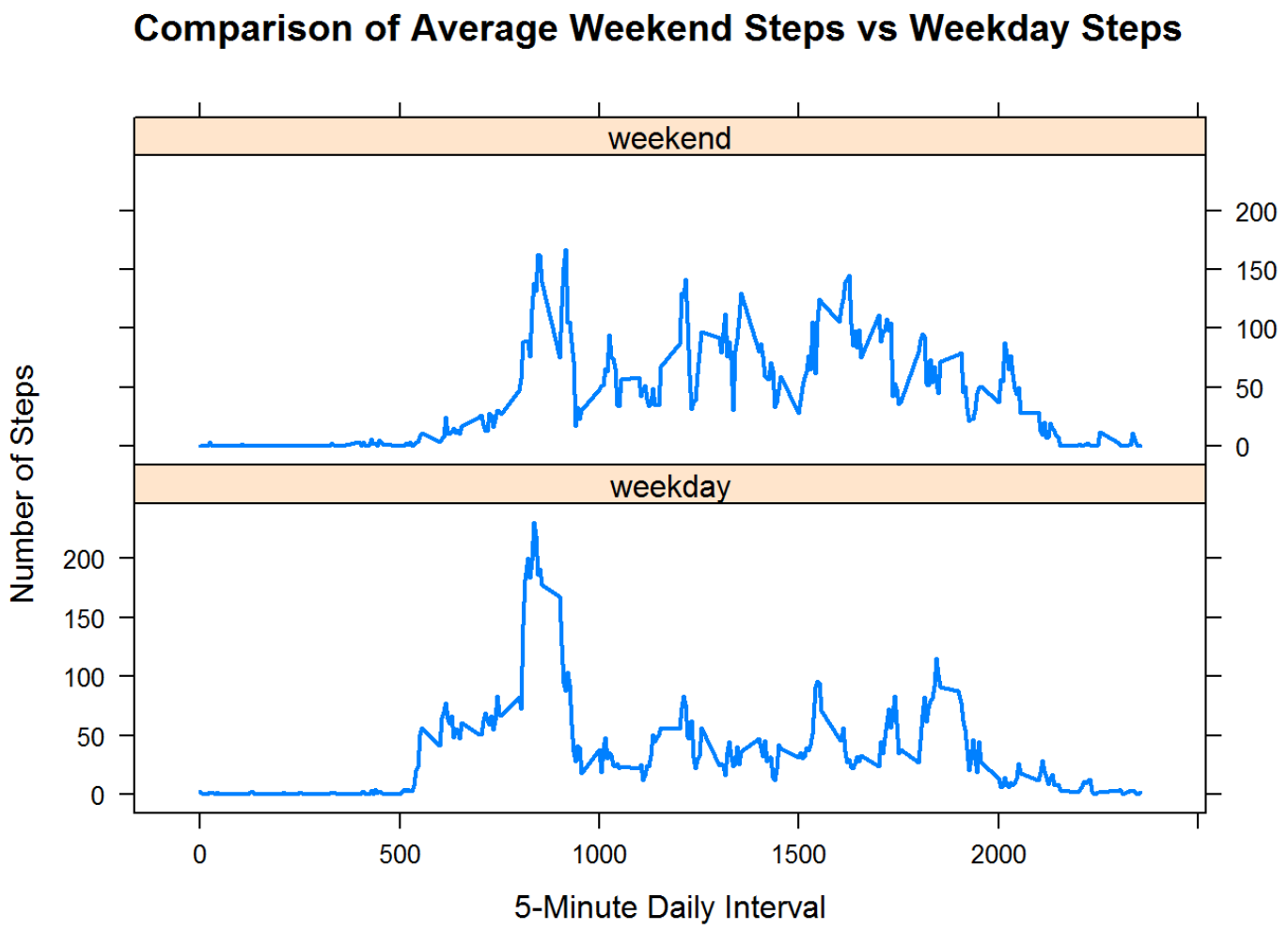
```
##   interval      steps daytype
## 1        0 2.25115304 weekday
## 2        5 0.44528302 weekday
## 3       10 0.17316562 weekday
## 4       15 0.19790356 weekday
## 5       20 0.09895178 weekday
## 6       25 1.59035639 weekday
```

Rejoin the two datasets. Both datasets calculate the average number of steps taken per interval. One average is over weekdays and the other weekends.

```
        total.steps.per.daytype <- rbind(weekend.steps.average, weekday.steps.average)
```

Compose a panel plot contrasting the steps taken per interval on weekends and on weekdays.

```
my.plot <- xyplot(steps ~ interval|as.factor(daytype),
                          total.steps.per.daytype,layout = c(1,2),
                          ylab = "Number of Steps",
                          xlab = "5-Minute Daily Interval",
                          main="Comparison of Average Weekend Steps vs Weekday Steps",
                          type="l",
                          lwd = 2)
print(my.plot)
```



The last plot show the average number of steps take during the day is higher on weekends that on weekdays. Possiby The Stepper has a desk-type position and need not move around too much.