Reproducible Research: Peer Assessment 1

```r
library(ggplot2)
library(scales)
library(Hmisc)
```

Loading and preprocessing the data

1. Load the data (i.e. read.csv())

```r
if(!file.exists('activity.csv')){
    unzip('activity.zip')
}
activityData <- read.csv('activity.csv')
```

2. Process/transform the data (if necessary) into a format suitable for your analysis

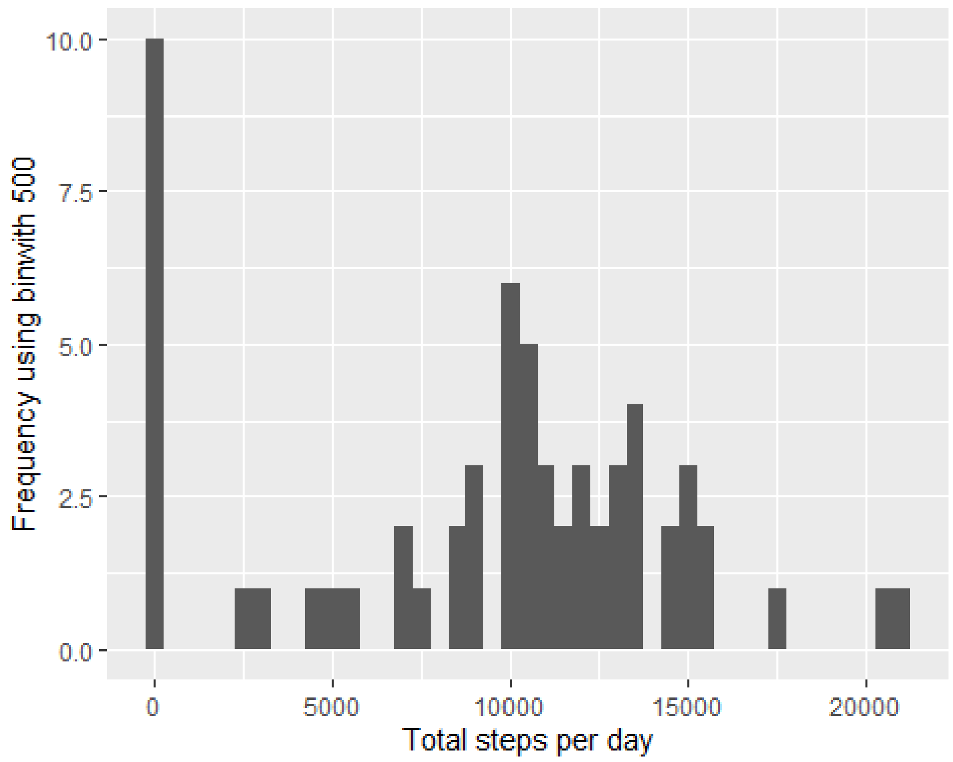
```r
#activityData$interval <- strptime(gsub("([0-9]{1,2})([0-9]{2})", "\\1:\\2",
activityData$interval), format='%H:%M')
```

What is mean total number of steps taken per day?

```r
stepsByDay <- tapply(activityData$steps, activityData$date, sum, na.rm=TRUE)
```

1. Make a histogram of the total number of steps taken each day

```r
qplot(stepsByDay, xlab='Total steps per day', ylab='Frequency using binwith
500', binwidth=500)
```



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

```
stepsByDayMean <- mean(stepsByDay)
stepsByDayMedian <- median(stepsByDay)
```

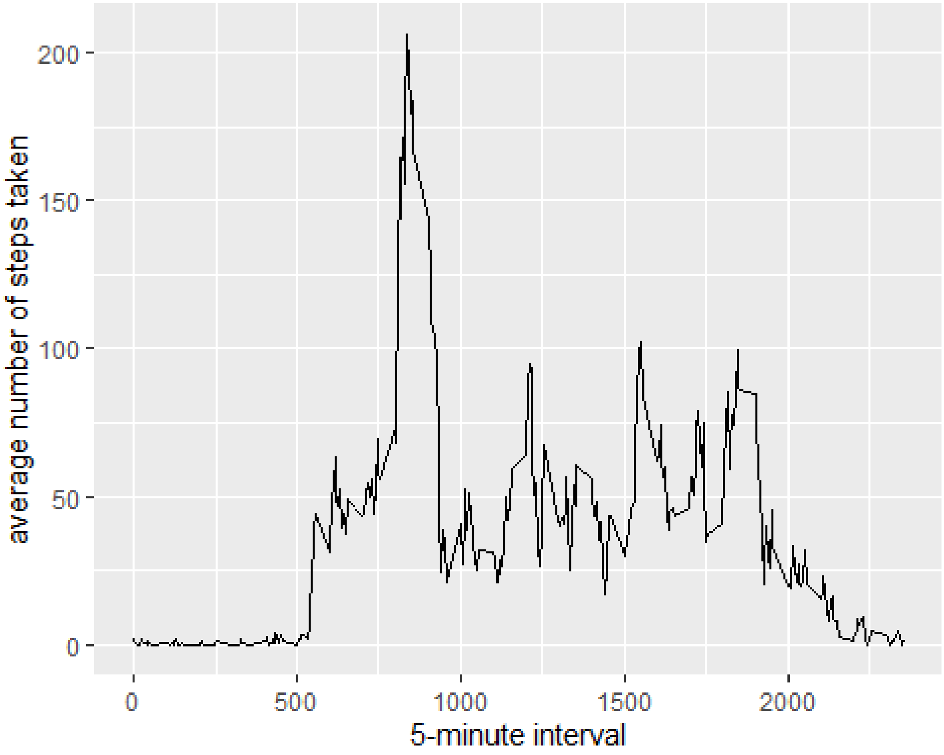
- Mean: 9354.2295082
- Median: 10395

What is the average daily activity pattern?

```
averageStepsPerTimeBlock <- aggregate(x=list(meanSteps=activityData$steps),
by=list(interval=activityData$interval), FUN=mean, na.rm=TRUE)
```

1. Make a time series plot

```
ggplot(data=averageStepsPerTimeBlock, aes(x=interval, y=meanSteps)) +
    geom_line() +
    xlab("5-minute interval") +
    ylab("average number of steps taken")
```



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

```
mostSteps <- which.max(averageStepsPerTimeBlock$meanSteps)
timeMostSteps <-  gsub("([0-9]{1,2})([0-9]{2})", "\\1:\\2",
averageStepsPerTimeBlock[mostSteps,'interval'])
```

- Most Steps at: 8:35

Imputing missing values

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

```
numMissingValues <- length(which(is.na(activityData$steps)))
```

- Number of missing values: 2304

2. Devise a strategy for filling in all of the missing values in the dataset.

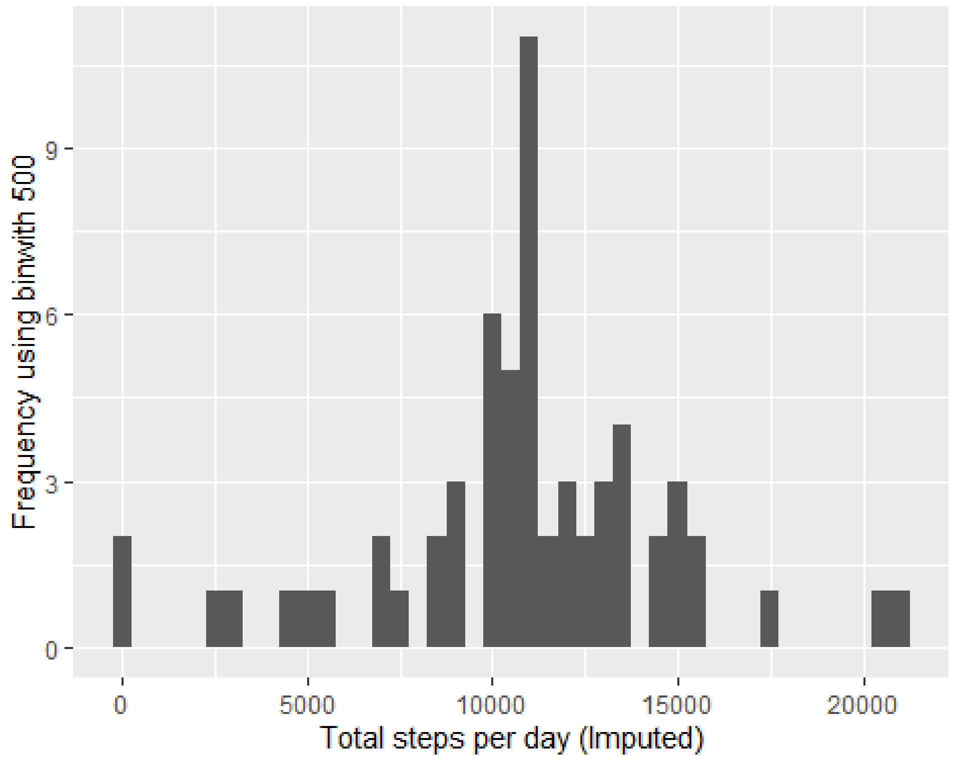
3. Create a new dataset that is equal to the original dataset but with the missing data filled in.

```
activityDataImputed <- activityData
activityDataImputed$steps <- impute(activityData$steps, fun=mean)
```

4. Make a histogram of the total number of steps taken each day

```
stepsByDayImputed <- tapply(activityDataImputed$steps,
activityDataImputed$date, sum)
```

```
qplot(stepsByDayImputed, xlab='Total steps per day (Imputed)',
ylab='Frequency using binwith 500', binwidth=500)
```



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

```
stepsByDayMeanImputed <- mean(stepsByDayImputed)
stepsByDayMedianImputed <- median(stepsByDayImputed)
```

- Mean (Imputed): 1.076618910^{4}
- Median (Imputed): 1.076618910^{4}

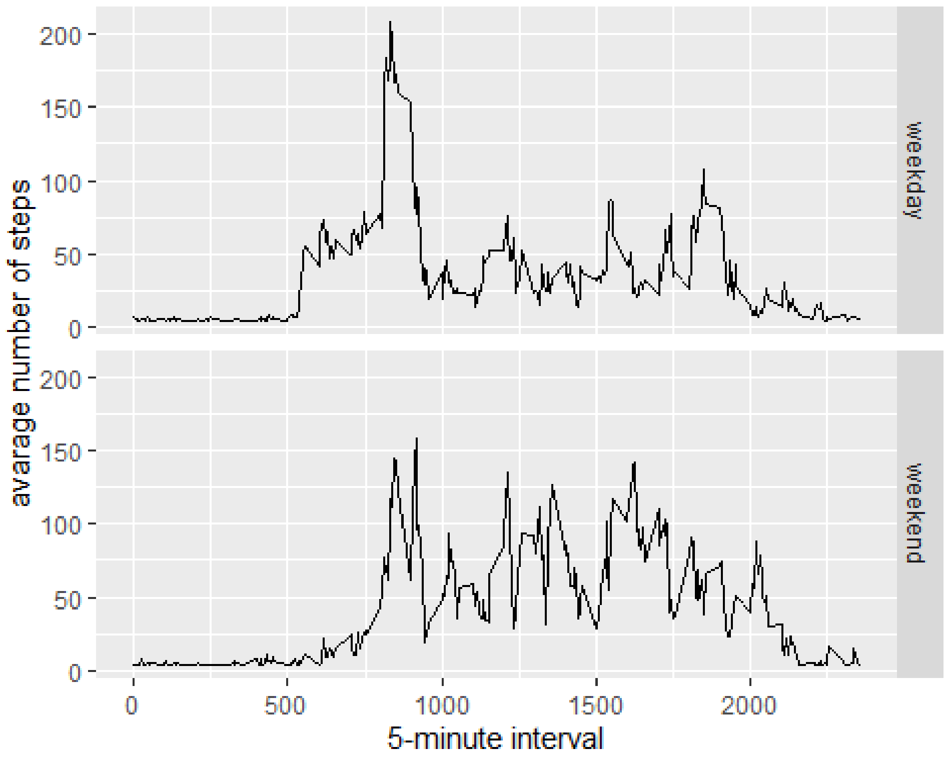
Are there differences in activity patterns between weekdays and weekends?

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.

```
activityDataImputed$dateType <-
ifelse(as.POSIXlt(activityDataImputed$date)$wday %in% c(0,6), 'weekend',
'weekday')
```

2. Make a panel plot containing a time series plot

```
averagedActivityDataImputed <- aggregate(steps ~ interval + dateType,
data=activityDataImputed, mean)
ggplot(averagedActivityDataImputed, aes(interval, steps)) +
    geom_line() +
    facet_grid(dateType ~ .) +
    xlab("5-minute interval") +
    ylab("avarage number of steps")
```



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