Reproducible Research Project 01

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```
knitr::opts_chunk$set(echo = TRUE)
```

Reproducible Research

Project 01

```
library(ggplot2)
library(Hmisc)
```

```
## Loading required package: lattice
```

```
## Loading required package: survival
```

```
## Loading required package: Formula
```

```
##
## Attaching package: 'Hmisc'
```

```
## The following objects are masked from 'package:base':
##
##     format.pval, round.POSIXt, trunc.POSIXt, units
```

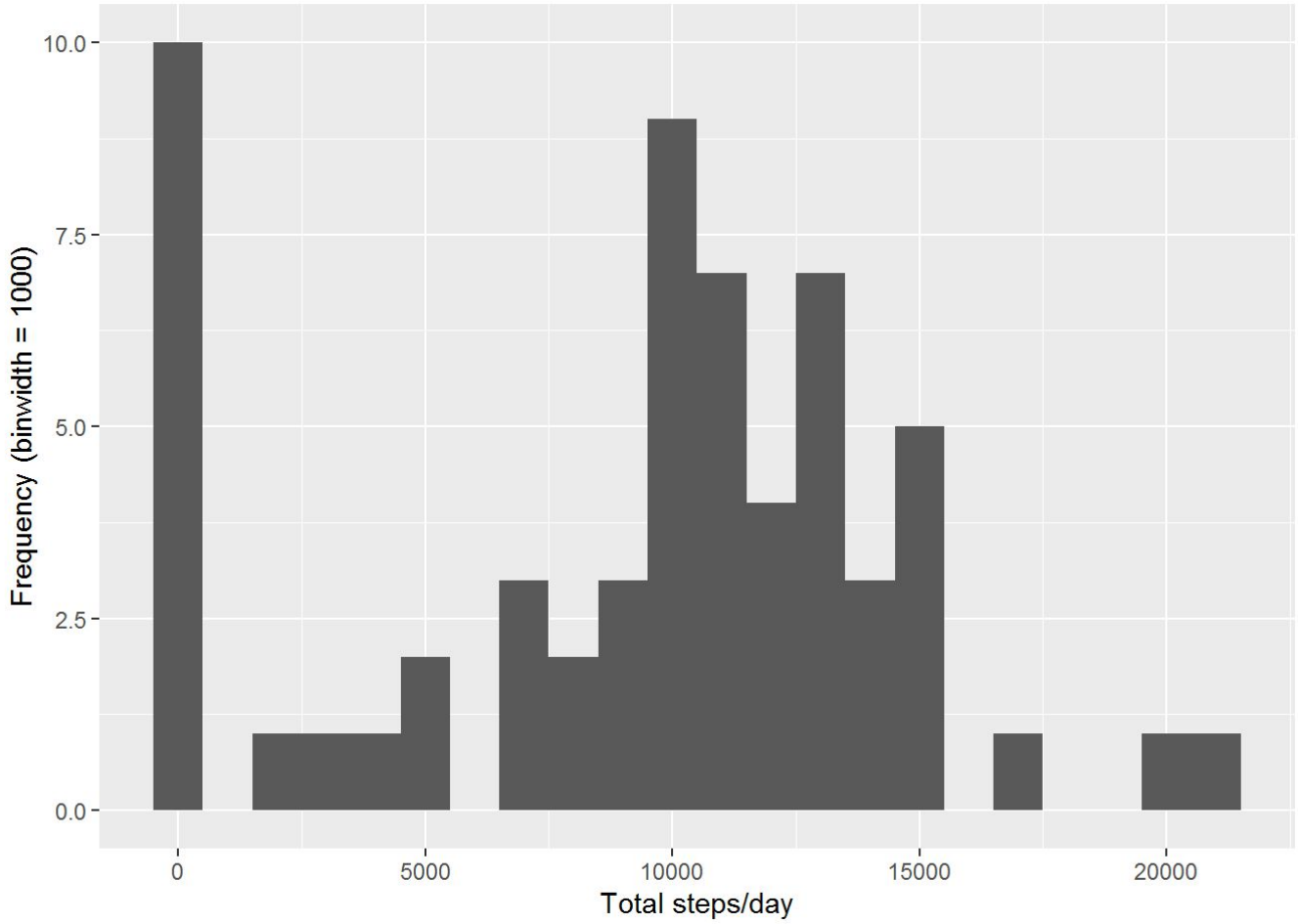
1. Load the data from source file and pre-process

```
# Read activity file into activity
activity <- read.csv(file="C:/Users/Dave/Documents/DataScienceSpecialization/ReproducibleResearc
h/Project01/Working/Data/activity.csv")

# Pre-process data
activity$date <- as.Date(activity$date)
```

2. What is the mean total number of steps taken each day?

```
# Calculate steps per day and create histogram
stepsDay <- tapply(activity$steps,activity$date,sum,na.rm=TRUE)
qplot(stepsDay,xlab = "Total steps/day",ylab = "Frequency (binwidth = 1000)",binwidth=1000)
```

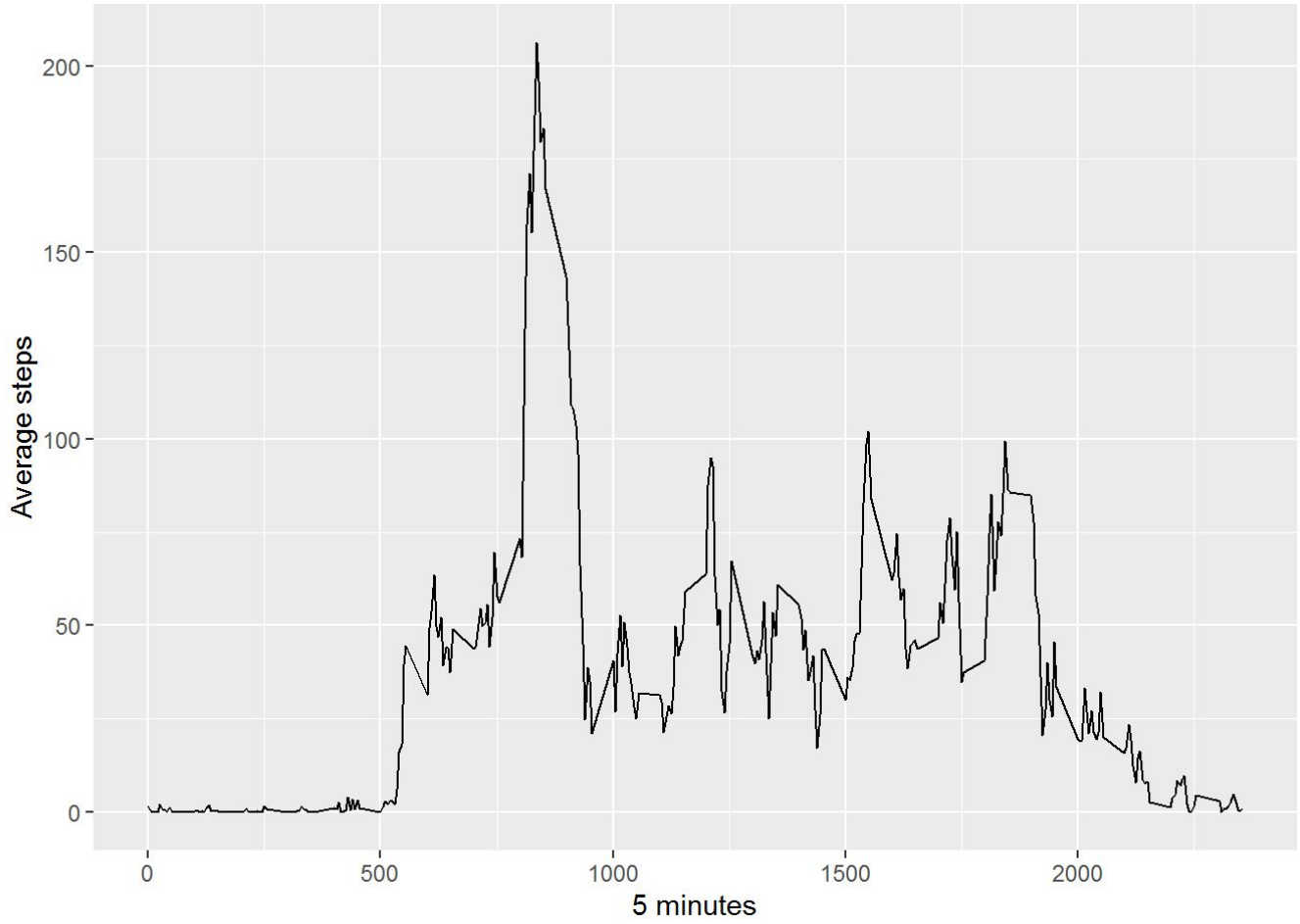



```
meanTotalSteps <- mean(stepsDay,na.rm = TRUE)
medianTotalSteps <- median(stepsDay,na.rm = TRUE)
```

The mean number of steps per day is 9354.2295082. The median number of steps per day is 10395.

3. What is the average daily activity pattern?

```
# Create time series plot
average <- aggregate(x=list(meanSteps=activity$steps), by=list(interval=activity$interval),
FUN=mean, na.rm=TRUE)
ggplot(data = average,aes(x = interval,y = meanSteps))+geom_line()+xlab("5 minutes")+ylab("Avera
ge steps")
```




```
# Calculate which interval contains maximum number of steps
maxInterval <- average[which.max(average$meanSteps),]
```

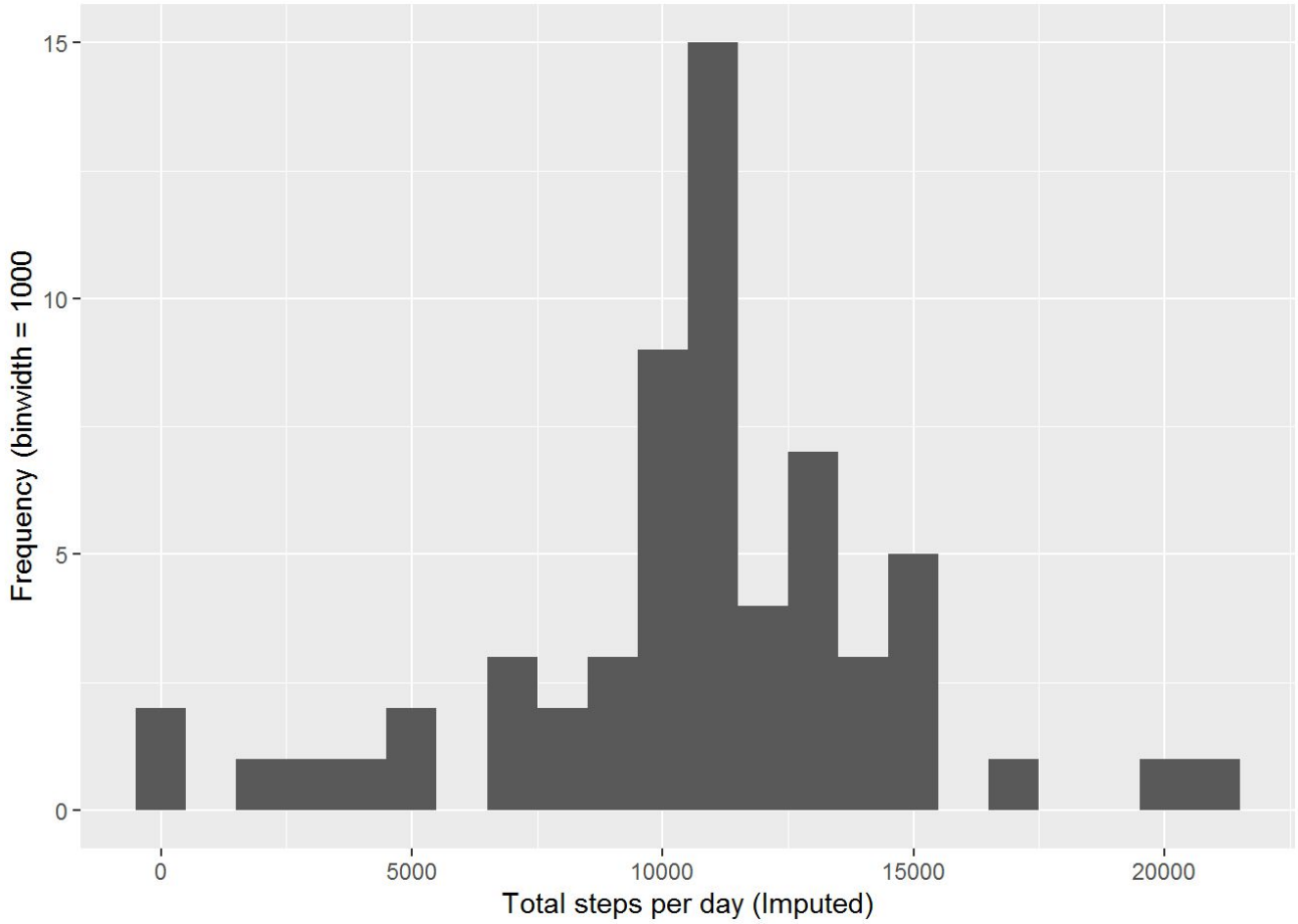
The interval with the maximum number of steps is: 835, 206.1698113.

4. Input missing values in data and analyze differences in activity patterns between weekdays and weekends.

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

The number of missing values is: 2304.

```
# Impute missing values
activityImputed <- activity
activityImputed$steps <- impute(activity$steps, fun=mean)
stepsByDayImputed <- tapply(activityImputed$steps, activityImputed$date, sum)
qplot(stepsByDayImputed, xlab='Total steps per day (Imputed)', ylab='Frequency (binwidth =
1000', binwidth=1000)
```

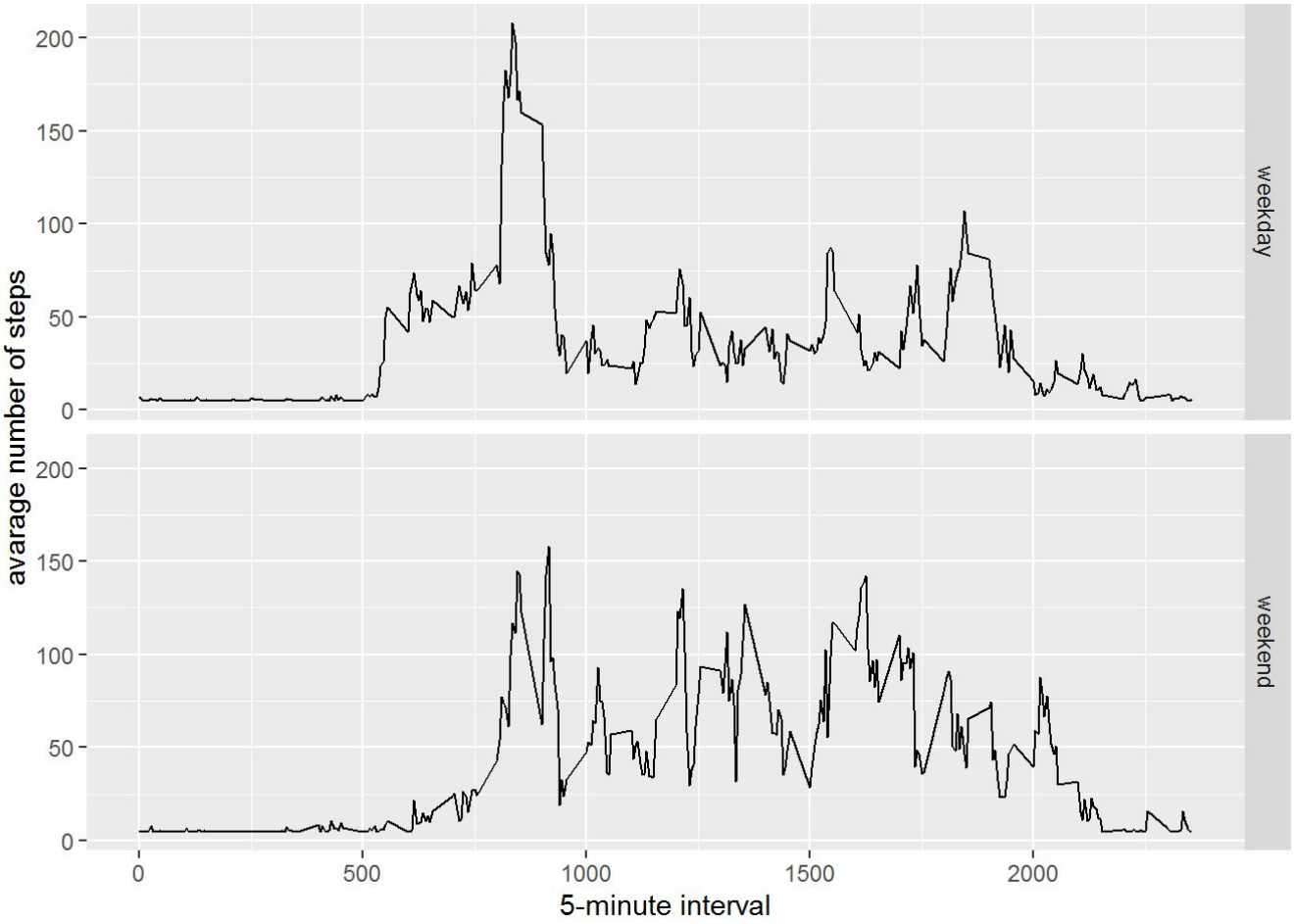



```
meanISteps <- mean(stepsByDayImputed)
medianISteps <- median(stepsByDayImputed)
```

The mean steps/day is 1.076618910^{4} and the median is 1.076618910^{4}.

5. Difference in activity patterns between weekdays and weekends?

```
activityImputed$dateType <-  ifelse(as.POSIXlt(activityImputed$date)$wday %in% c(0,6),
'weekend', 'weekday')
# Make time series plots
averagedActivityImputed <- aggregate(steps ~ interval + dateType, data=activityImputed, mean)
ggplot(averagedActivityImputed, aes(interval, steps)) +
    geom_line() +
    facet_grid(dateType ~ .) +
    xlab("5-minute interval") +
    ylab("avarage number of steps")
```


avarage number of steps
200
150
100
50
0
weekday
weekend
0
500
1000
1500
2000
5-minute interval