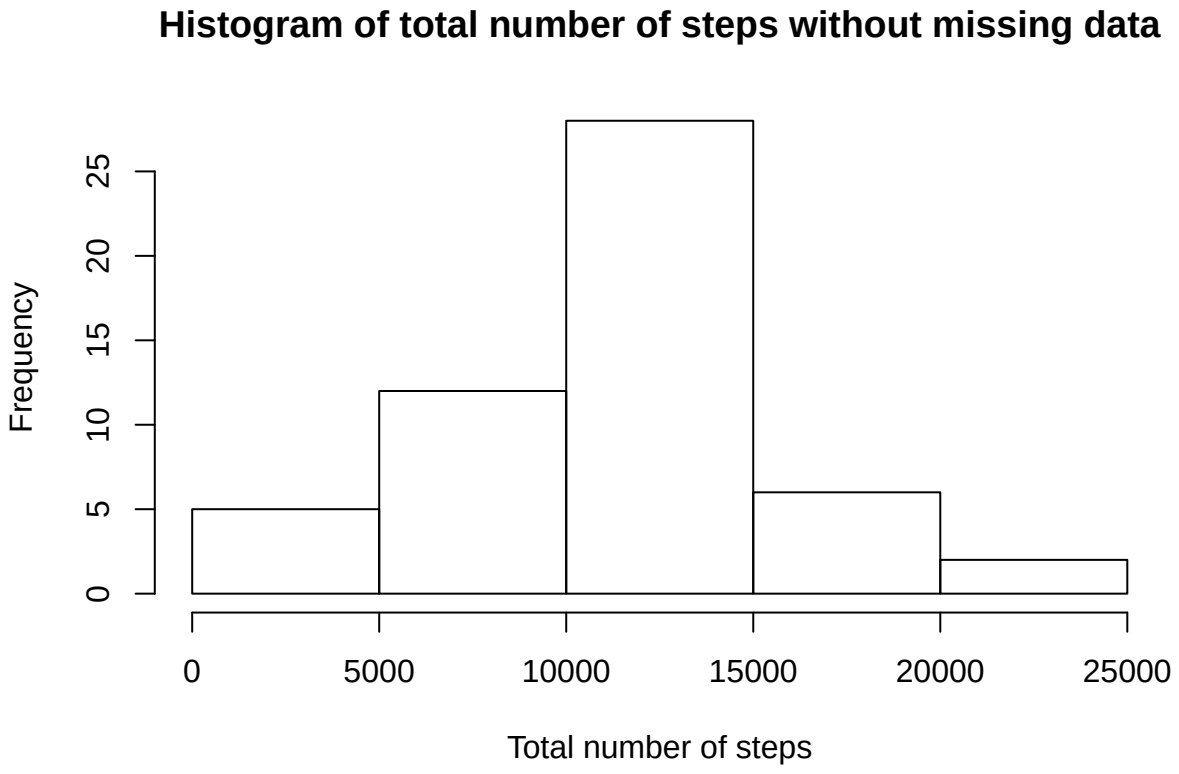
Reproducible Research: Peer Assessment 1

Loading and preprocessing the data

```
#Load the data
data<-read.csv("activity.csv",header=T,sep=",",na.strings="NA")
#get subset without missing values
dataNoNA<-na.omit(data) #remove rows with NA data
```

What is mean total number of steps taken per day?

```
#total number of steps taken per day
totalSteps<-aggregate(steps~date,FUN=sum,data=dataNoNA)
#histogram of the total number of steps taken each day
hist(totalSteps$steps,xlab="Total number of steps",
     main="Histogram of total number of steps without missing data")
```




```
#mean of the total number of steps taken per day
meanSteps <- mean(totalSteps[,"steps"]) #store to use for imputing
meanSteps
```

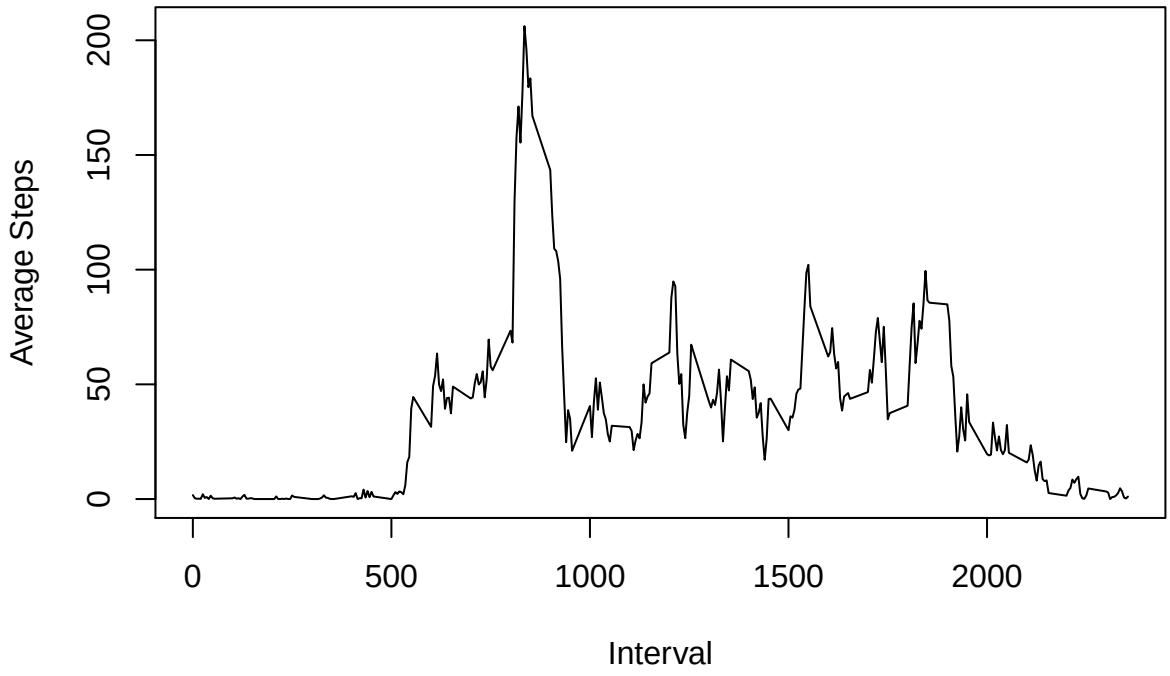
```
## [1] 10766.19
```

```r
#median of the total number of steps taken per day
median(totalSteps[,"steps"])
```

```
## [1] 10765
```

What is the average daily activity pattern?

```r
#plot of the 5-minute interval (x-axis) and the average number of steps taken, averaged across all days
#get total number of days with data
numDays <-nrow(totalSteps)
#average number of steps per day taken per interval
avgStepsPerInt<-aggregate(steps~interval,FUN=sum,data=dataNoNA)
avgStepsPerInt$steps <- avgStepsPerInt$steps/numDays
#plot interval (x-axis) vs average number of steps (y-axis)
plot(avgStepsPerInt$interval,avgStepsPerInt$steps,type="l",
     xlab="Interval",ylab="Average Steps")
```




```r
#5-minute interval, on average across all the days in the dataset,
#contains the maximum number of steps
avgStepsPerInt[which.max(avgStepsPerInt[,"steps"]),"interval"]
```

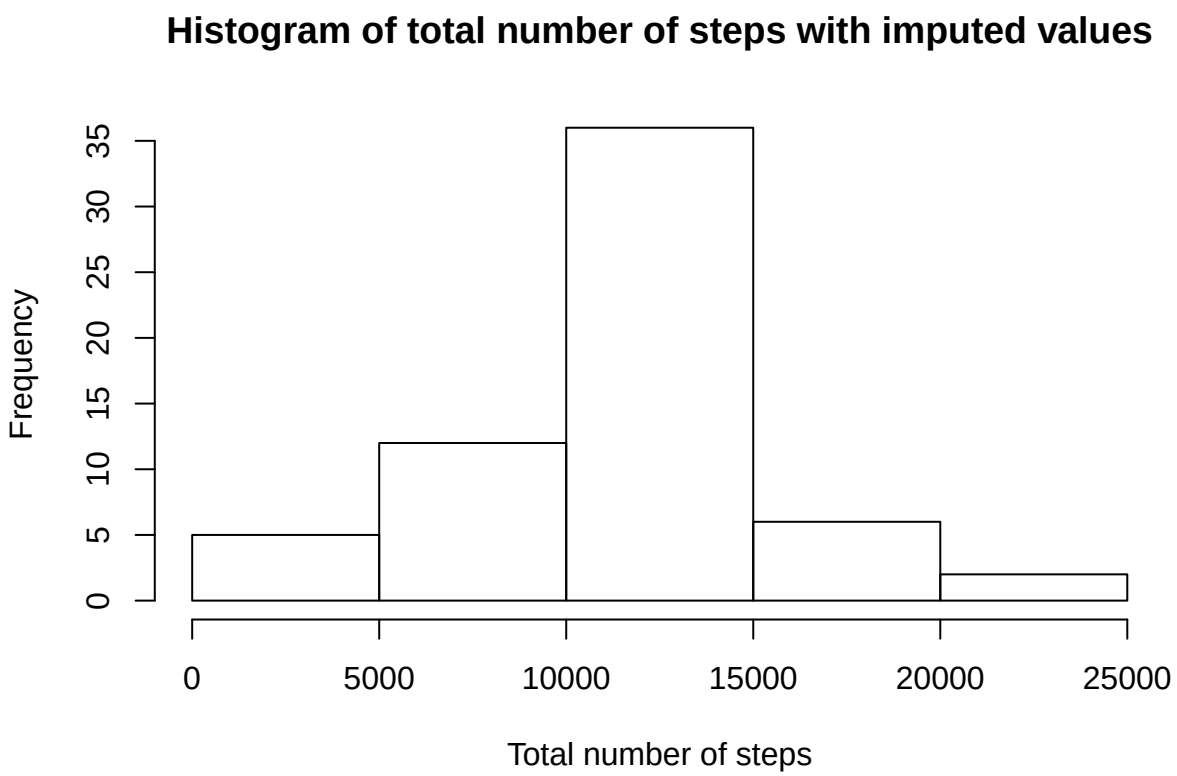
```
## [1] 835
```

Imputing missing values

```r
#total number of missing values in the dataset
sum(is.na(data))
```

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

```r
#create new dataset for imputed data
imputed <- data
#fill in all of the missing values in the dataset with mean for each interval in a day
imputed$steps[is.na(imputed$steps)] <- meanSteps/288
#total number of steps taken per day with imputed data
totalSteps<-aggregate(steps~date,FUN=sum,data=imputed)
#histogram of total number of steps taken each day with imputed data
hist(totalSteps$steps,xlab="Total number of steps",
     main="Histogram of total number of steps with imputed values")
```




```r
#calculate mean and median with dataset with imputed values
imputedTotal<-aggregate(steps~date,FUN=sum,data=imputed) #total steps taken per day with imputed data
mean(imputedTotal[,"steps"])
```

```
## [1] 10766.19
```

```r
median(imputedTotal[,"steps"])
```

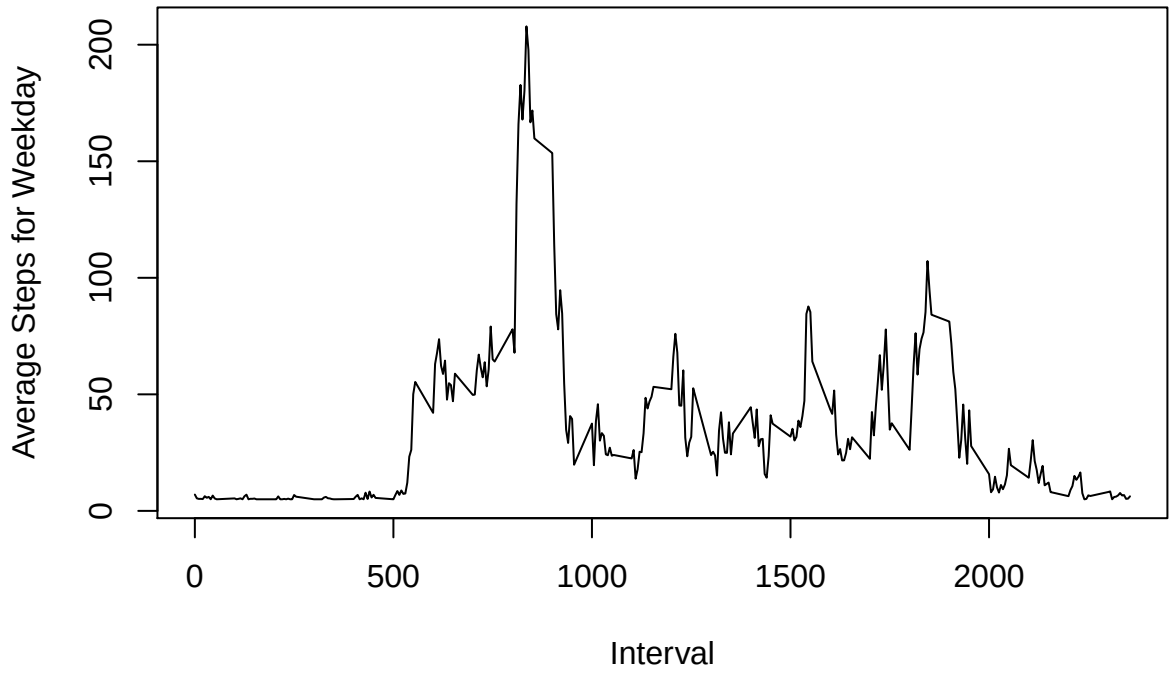
```
## [1] 10766.19
```

Imputing missing values with the mean keeps the mean same. If there are enough missing values, the median changes to reflect that. In our case since the number of missing values was large, the median became equal to the mean after imputation.

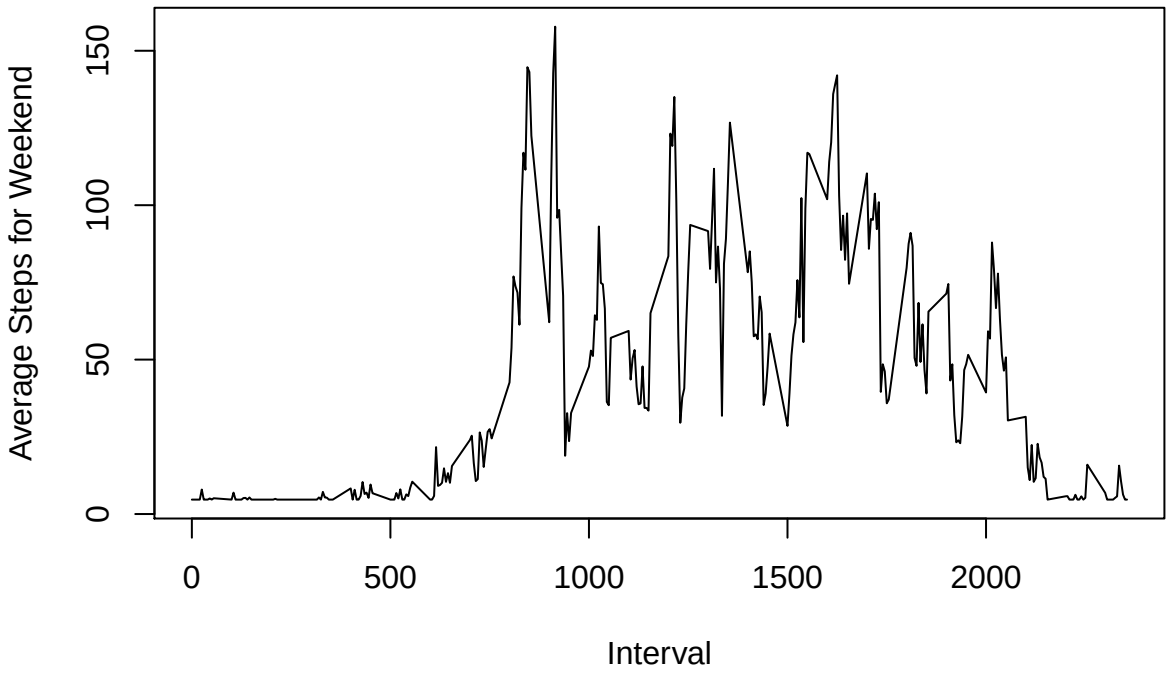
Are there differences in activity patterns between weekdays and weekends?

```
#new column in the dataset with two levels - "weekday" and "weekend"
imputed$date <- as.Date(imputed$date)
weekend <- c('Saturday','Sunday')
imputed$dayType <- ifelse(weekdays(imputed$date) %in% weekend,"weekend","weekday")

#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)
#par(mfrow=c(2,1))
weekdayData <- imputed[imputed$dayType=="weekday",]
numWeekdayDays <- nrow(weekdayData)/288
avgStepsPerInt<-aggregate(steps~interval,FUN=sum,data=weekdayData)
avgStepsPerInt$steps <- avgStepsPerInt$steps/numWeekdayDays
#plot interval (x-axis) vs average number of steps (y-axis) for weekdays
plot(avgStepsPerInt$interval,avgStepsPerInt$steps,type="l",
     xlab="Interval",ylab="Average Steps for Weekday")
```




```
weekendData <- imputed[imputed$dayType=="weekend",]
numWeekendDays <- nrow(weekendData)/288
avgStepsPerInt<-aggregate(steps~interval,FUN=sum,data=weekendData)
avgStepsPerInt$steps <- avgStepsPerInt$steps/numWeekendDays
#plot interval (x-axis) vs average number of steps (y-axis) for weekends
plot(avgStepsPerInt$interval,avgStepsPerInt$steps,type="l",
     xlab="Interval",ylab="Average Steps for Weekend")
```


Average Steps for Weekend
0
50
100
150
0
500
1000
1500
2000
Interval