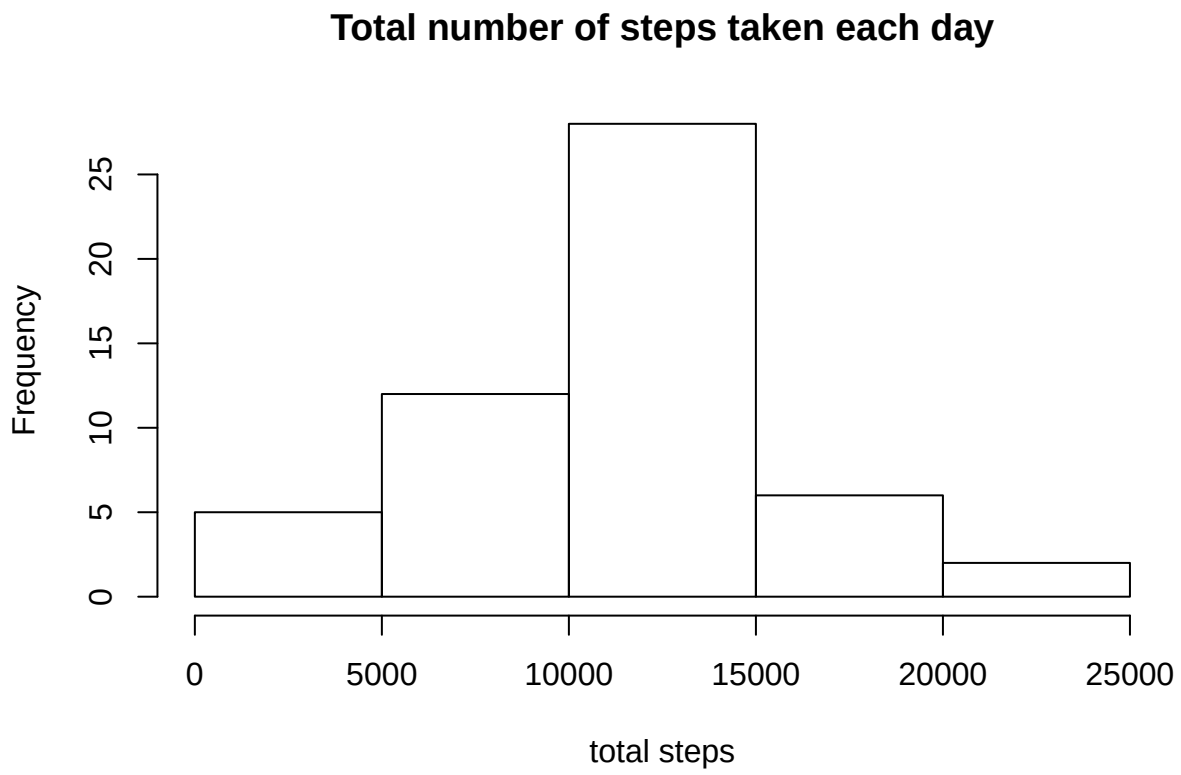
Reproducible Research: Peer Assessment 1

Loading and preprocessing the data

```
data = read.csv(file = "activity.csv", header = TRUE, sep = ",",na.strings= "NA",stringsAsFactors = FALS
data$date= as.Date(data$date,format = "%Y-%m-%d")
```

What is mean total number of steps taken per day?

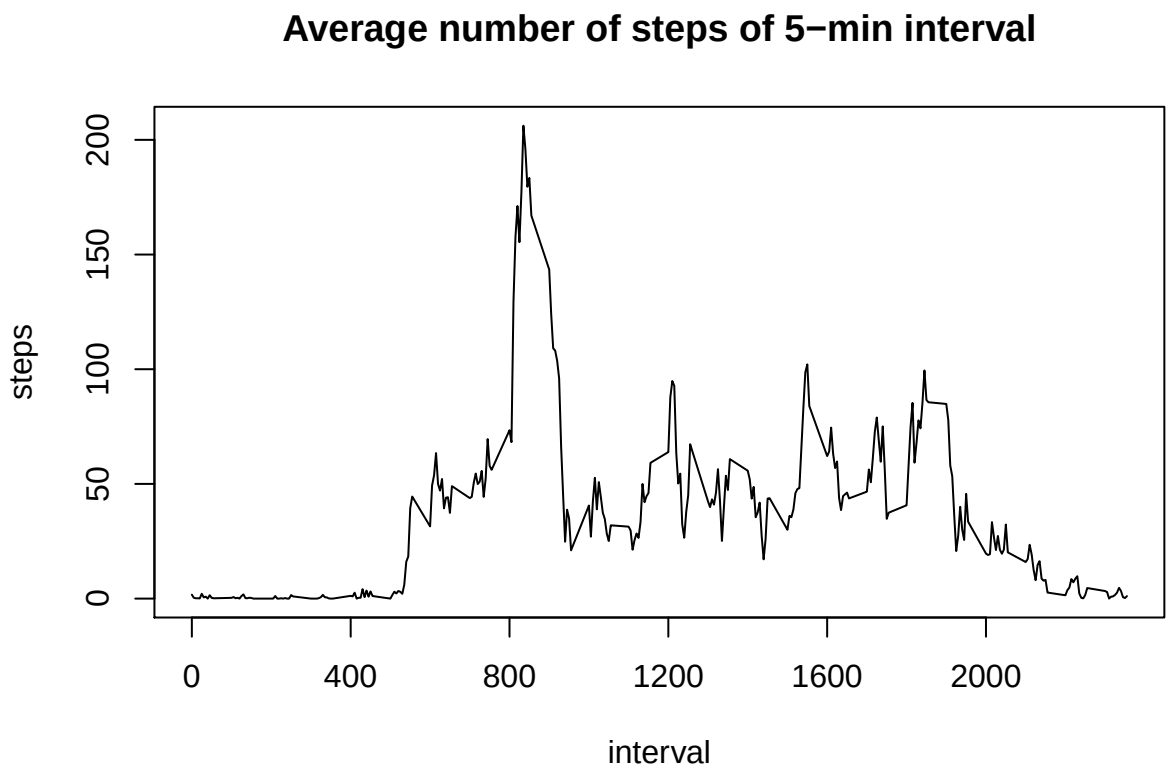
```
aggTotals = aggregate(steps ~ date,data, FUN=sum,na.action= na.omit)
hist(aggTotals$steps,
     main = "Total number of steps taken each day",
     xlab = "total steps")
```



The mean and median of total number of steps taken per day are 10766.19 and 10765, respectively.

What is the average daily activity pattern?

```
aggTotals = aggregate(steps ~ interval,data, FUN=mean,na.action= na.omit)
plot(aggTotals$interval,aggTotals$steps,type = "l",xlab = "", ylab="",xaxt="n")
axis(side=1,at = seq(from = min(aggTotals$interval), to =max(aggTotals$interval), by = 400))
title(main = "Average number of steps of 5-min interval",xlab= "interval",ylab = "steps")
```



The 835 5-min interval, on average across all the days in the dataset, contains the maximum number of steps.

Imputing missing values

1. The total number of rows with NAs are 2304.
2. Impute missing values by **the mean for that 5-min interval**

```
aggTotals = aggregate(steps ~ interval,data, FUN=mean,na.action= na.omit)
missing_idx = which(is.na(data$steps))
for (i in missing_idx ) {
  interval = data$interval[i]
  mean_steps = aggTotals$steps[aggTotals$interval==interval]
  data$steps[i]=mean_steps
}
```

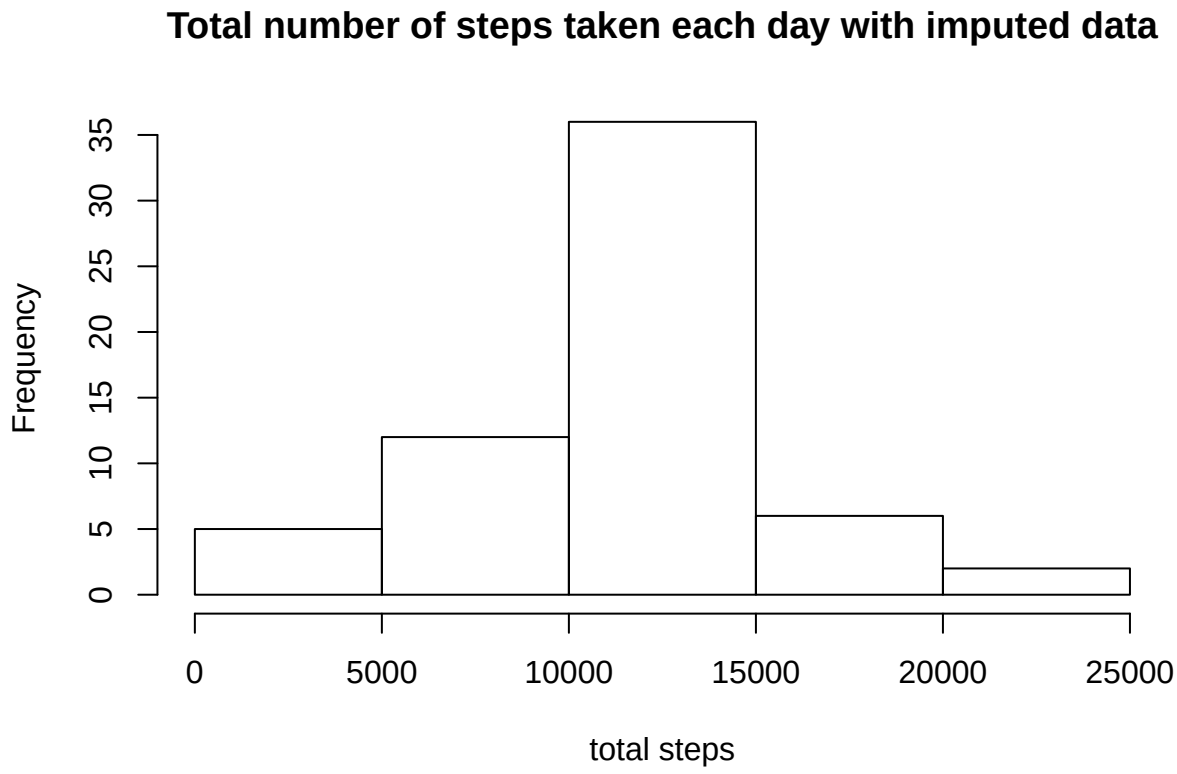
3. Create a new dataset that is equal to the original dataset but with the missing data filled in.

```
head(data)
```

```
##       steps       date interval
## 1 1.7169811 2012-10-01        0
## 2 0.3396226 2012-10-01        5
## 3 0.1320755 2012-10-01       10
## 4 0.1509434 2012-10-01       15
## 5 0.0754717 2012-10-01       20
## 6 2.0943396 2012-10-01       25
```

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.

```
aggTotals = aggregate(steps ~ date,data, FUN=sum,na.action= na.omit)
hist(aggTotals$steps,
     main = "Total number of steps taken each day with imputed data",
     xlab = "total steps")
```



The mean and median of total number of steps taken per day are 10766.19 and 10766.19, respectively. These values are close to the values from first part. Missing value imputation doesn't skew the distribution of original data.

Are there differences in activity patterns between weekdays and weekends?

```
library(chron)
library(lattice)
data$weekend = is.weekend(data$date)
data$weekend[data$weekend==TRUE] = "weekend"
data$weekend[data$weekend==FALSE] = "weekday"
aggTotals = aggregate(steps ~ interval + weekend,data, FUN=mean,na.action= na.omit)
xyplot(aggTotals$steps ~ aggTotals$interval | aggTotals$weekend,
       layout = c(1, 2), type = "l",
       xlab = "Interval", ylab = "Number of steps")
```