Reproducible Research Project 1

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R Markdown

Reproducible Research: Peer Assessment 1

Loading and preprocessing the data

```
getwd()
```

```
## [1] "D:/LND/COURSERA_DATA_SCIENCE/COURSERA_05_Reproducible Research/WEEK2_05RR_Markdown_kn
itr/Assignment"
```

```
setwd ("D:/LND/COURSERA_DATA_SCIENCE/COURSERA_05_Reproducible Research/WEEK2_05RR_Markdown_kn
itr/Assignment")
```

Loading and preprocessing the data

install.packages(“ggplot2”) install.packages(“dplyr”) install.packages(“chron”)

```
library(ggplot2)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library (chron)
```

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

Downloading zip file if it doesn’t already exist in the workspace

```
path <- getwd()
download.file(url = "https://d396qusza40orc.cloudfront.net/repdata%2Fdata%2Factivity.zip"
              , destfile = paste(path, "dataFiles.zip", sep = "/"))
unzip(zipfile = "dataFiles.zip")
```

Clear the workspace load raw activity data

```
rm(list=ls())
activity_raw <- read.csv("activity.csv", stringsAsFactors=FALSE)
```

Process/transform the data suitable for analysis

Transform the date attribute to an actual date format

```
activity_raw$date <- as.POSIXct(activity_raw$date, format="%Y-%m-%d")
activity_raw <- data.frame(date=activity_raw$date,
                           weekday=tolower(weekdays(activity_raw$date)),
                           steps=activity_raw$steps,
                           interval=activity_raw$interval)
```

Compute the day type (weekend or weekday)

```
activity_raw <- cbind(activity_raw,
                      daytype=ifelse(activity_raw$weekday == "saturday" |
                                       activity_raw$weekday == "sunday", "weekend",
                                     "weekday"))

activity <- data.frame(date=activity_raw$date,
                       weekday=activity_raw$weekday,
                       daytype=activity_raw$daytype,
                       interval=activity_raw$interval,
                       steps=activity_raw$steps)

rm(activity_raw)
```

Checking activity frame

```
dim(activity)
```

```
## [1] 17568     5
```

```
head(activity)
```

```
##         date weekday daytype interval steps
## 1 2012-10-01  monday weekday        0    NA
## 2 2012-10-01  monday weekday        5    NA
## 3 2012-10-01  monday weekday       10    NA
## 4 2012-10-01  monday weekday       15    NA
## 5 2012-10-01  monday weekday       20    NA
## 6 2012-10-01  monday weekday       25    NA
```

```
str(activity)
```

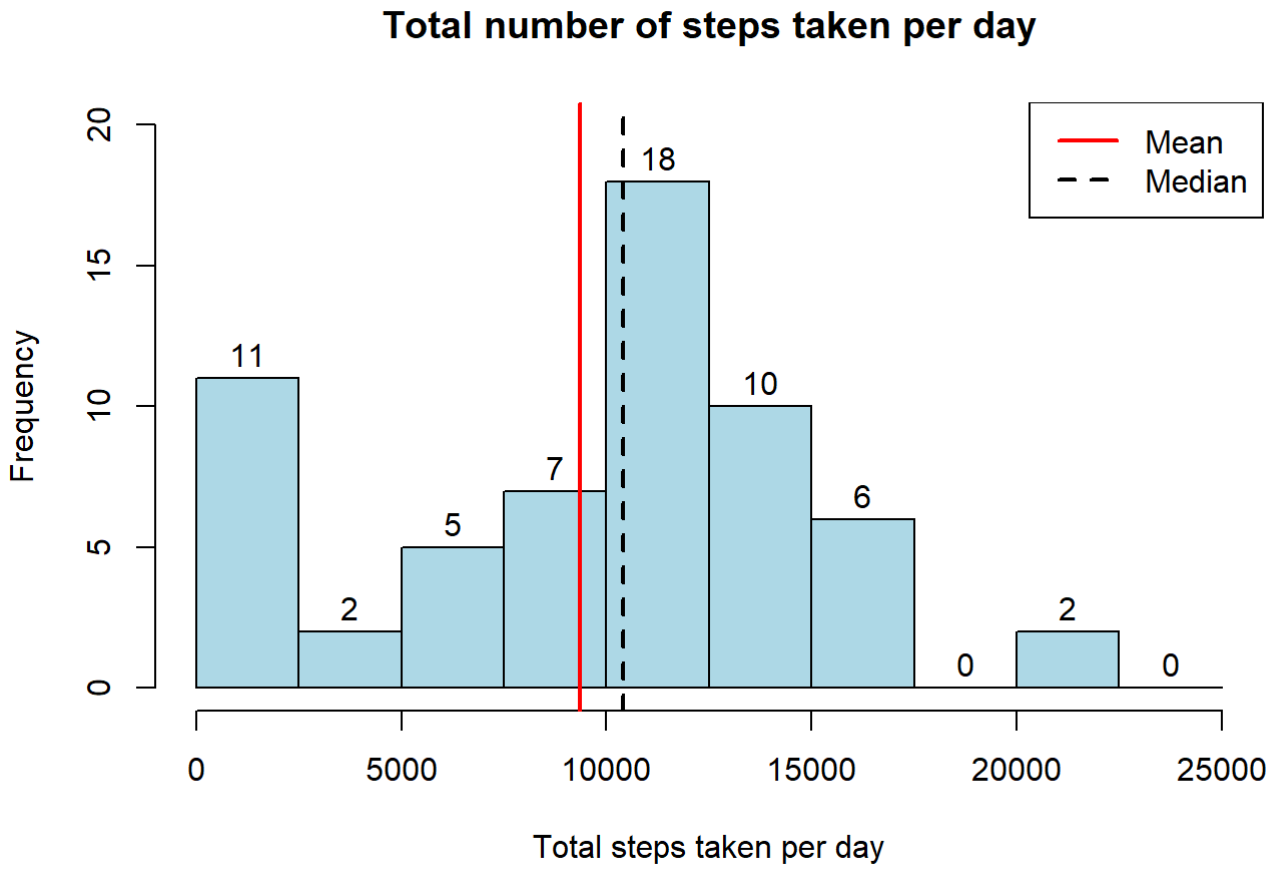
```
## 'data.frame':    17568 obs. of  5 variables:
##  $ date    : POSIXct, format: "2012-10-01" "2012-10-01" ...
##  $ weekday : Factor w/ 7 levels "friday","monday",..: 2 2 2 2 2 2 2 2 2 2 ...
##  $ daytype : Factor w/ 2 levels "weekday","weekend": 1 1 1 1 1 1 1 1 1 1 ...
##  $ interval: int  0 5 10 15 20 25 30 35 40 45 ...
##  $ steps   : int  NA NA NA NA NA NA NA NA NA NA ...
```

```
summary(activity)
```

```
##       date                 weekday        daytype         interval
##  Min.   :2012-10-01   friday   :2592   weekday:12960   Min.   :   0.0
##  1st Qu.:2012-10-16   monday   :2592   weekend: 4608   1st Qu.: 588.8
##  Median :2012-10-31   saturday :2304                   Median :1177.5
##  Mean   :2012-10-31   sunday   :2304                   Mean   :1177.5
##  3rd Qu.:2012-11-15   thursday :2592                   3rd Qu.:1766.2
##  Max.   :2012-11-30   tuesday  :2592                   Max.   :2355.0
##                       wednesday:2592
##      steps
##  Min.   :  0.00
##  1st Qu.:  0.00
##  Median :  0.00
##  Mean   : 37.38
##  3rd Qu.: 12.00
##  Max.   :806.00
##  NA's   :2304
```

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

```
activity_total_steps <- with(activity, aggregate(steps, by = list(date), FUN = sum, na.rm = T
RUE))
names(activity_total_steps) <- c("date", "steps")
hist(activity_total_steps$steps, main = "Total number of steps taken per day", xlab = "Total
 steps taken per day",  col = "lightblue", ylim = c(0,20), breaks = seq(0,25000, by=2500), la
bels=TRUE)
abline(v = mean(activity_total_steps$steps), lty = 1, lwd = 2, col = "red")
abline(v = median(activity_total_steps$steps), lty = 2, lwd = 2, col = "black")
legend(x = "topright", c("Mean", "Median"), col = c("red", "black"),
       lty = c(1, 2), lwd = c(2, 2))
```




```
##Mean
mean(activity_total_steps$steps)
```

```
## [1] 9354.23
```

```
##Median
median(activity_total_steps$steps)
```

```
## [1] 10395
```

```
summary(activity_total_steps$steps)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##       0    6778   10395    9354   12811   21194
```

What is the average daily activity pattern?

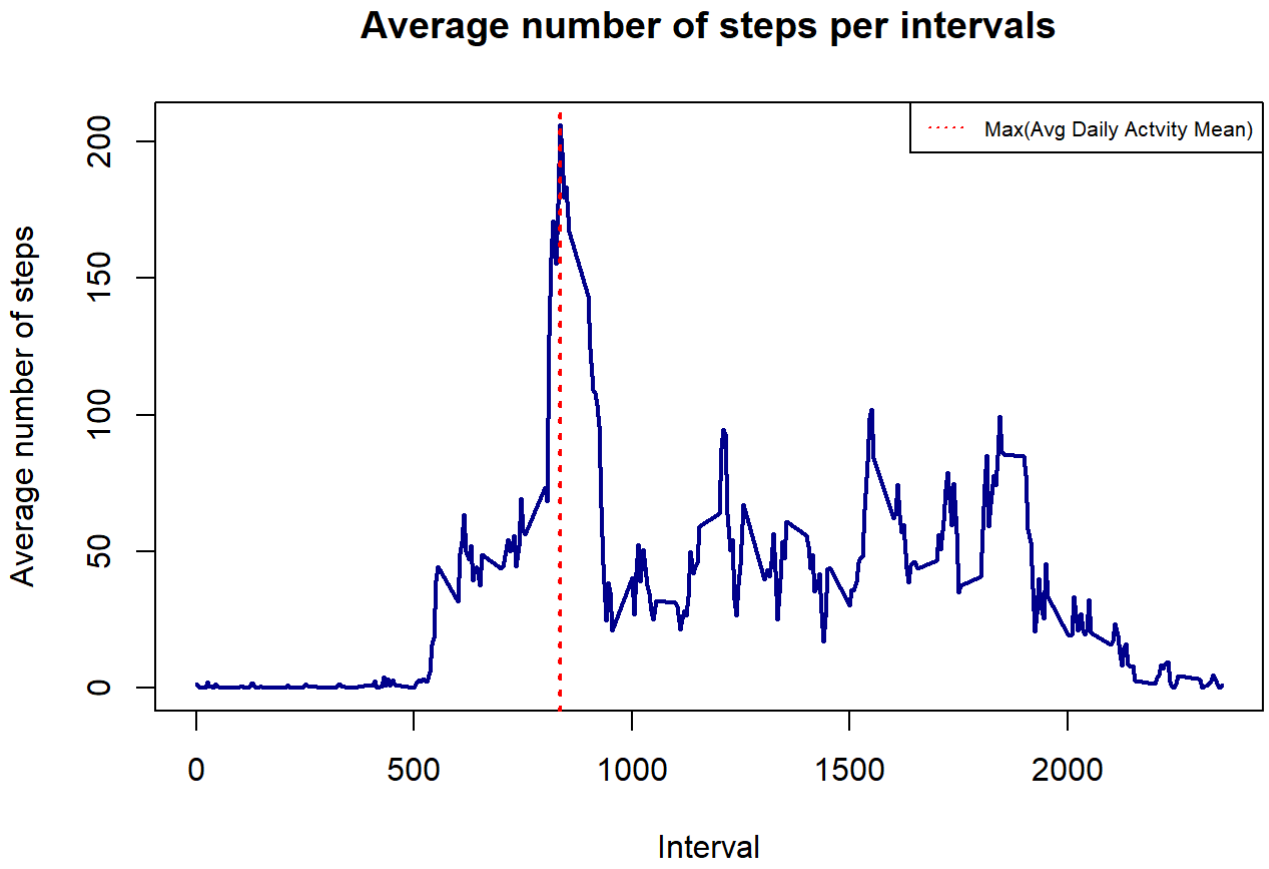
Excludes Missing Values“NA” using na.rm=TRUE

```
average_daily_activity <- aggregate(activity$steps, by=list(activity$interval), FUN=mean, na.
rm=TRUE)
names(average_daily_activity) <- c("interval", "mean")

plot(average_daily_activity$interval, average_daily_activity$mean, type = "l", col="darkblue"
, lwd = 2, xlab="Interval", ylab="Average number of steps", main="Average number of steps per
 intervals")
average_daily_activity[which.max(average_daily_activity$mean), ]$interval
```

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

```
abline(v = average_daily_activity[which.max(average_daily_activity$mean), ]$interval, lty = 3
, lwd = 2, col = "red")
legend(x = "topright", c("Max(Avg Daily Actvity Mean)"), col = c("red"),lty = c(3), cex=0.65)
```




```
## Max Average
## average_daily_activity[which.max(average_daily_activity$mean), [1]

average_daily_activity[which.max(average_daily_activity$mean), ]$interval
```

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

```
## Maximum Average Number of Steps
## average_daily_activity[which.max(average_daily_activity$mean), ][2]

average_daily_activity[which.max(average_daily_activity$mean), ]$mean
```

```
## [1] 206.1698
```

Split into two sets: complete and missing.

```
activity.missing <- activity[is.na(activity$steps),]
activity.complete<-activity[complete.cases(activity),]

NA_count <- sum(is.na(activity$steps))
NA_pos <- which(is.na(activity$steps))
mean_vec <- rep(mean(activity$steps, na.rm=TRUE), times=length(NA_pos))
activity.complete[NA_pos, "steps"] <- mean_vec
head(activity.complete)
```

```
##           date weekday daytype interval   steps
## 289 2012-10-02 tuesday weekday        0 37.3826
## 290 2012-10-02 tuesday weekday        5 37.3826
## 291 2012-10-02 tuesday weekday       10 37.3826
## 292 2012-10-02 tuesday weekday       15 37.3826
## 293 2012-10-02 tuesday weekday       20 37.3826
## 294 2012-10-02 tuesday weekday       25 37.3826
```

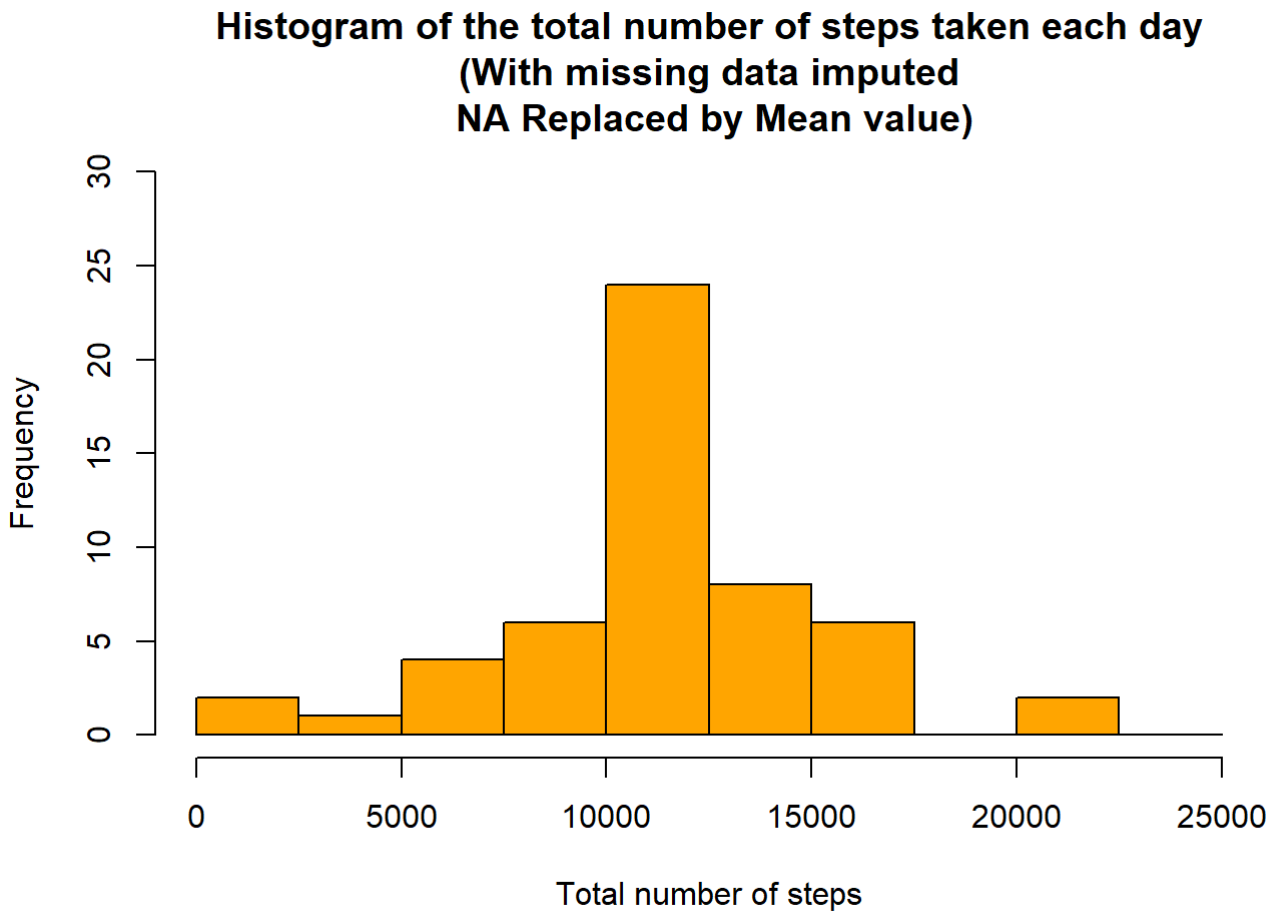
Compute the total number of steps each day (NA values removed)

```
sum_data <- aggregate(activity.complete$steps, by=list(activity.complete$date), FUN=sum)

## Rename the attributes
names(sum_data) <- c("date", "total")
```

Compute the histogram of the total number of steps each day

```
hist(sum_data$total,
     breaks=seq(from=0, to=25000, by=2500),
     col="orange",
     xlab="Total number of steps",
     ylim=c(0, 30),
     main="Histogram of the total number of steps taken each day\n(With missing data imputed
\n NA Replaced by Mean value)")
```




```
## Mean
 mean(sum_data$total)
```

```
## [1] 11126.8
```

```
## Median
median(sum_data$total)
```

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

```
## Clear the workspace
rm(sum_data)

## Load the lattice graphical library---
library(lattice)
```

Compute the average number of steps taken, averaged across all daytype variable

```
head(activity.complete)
```

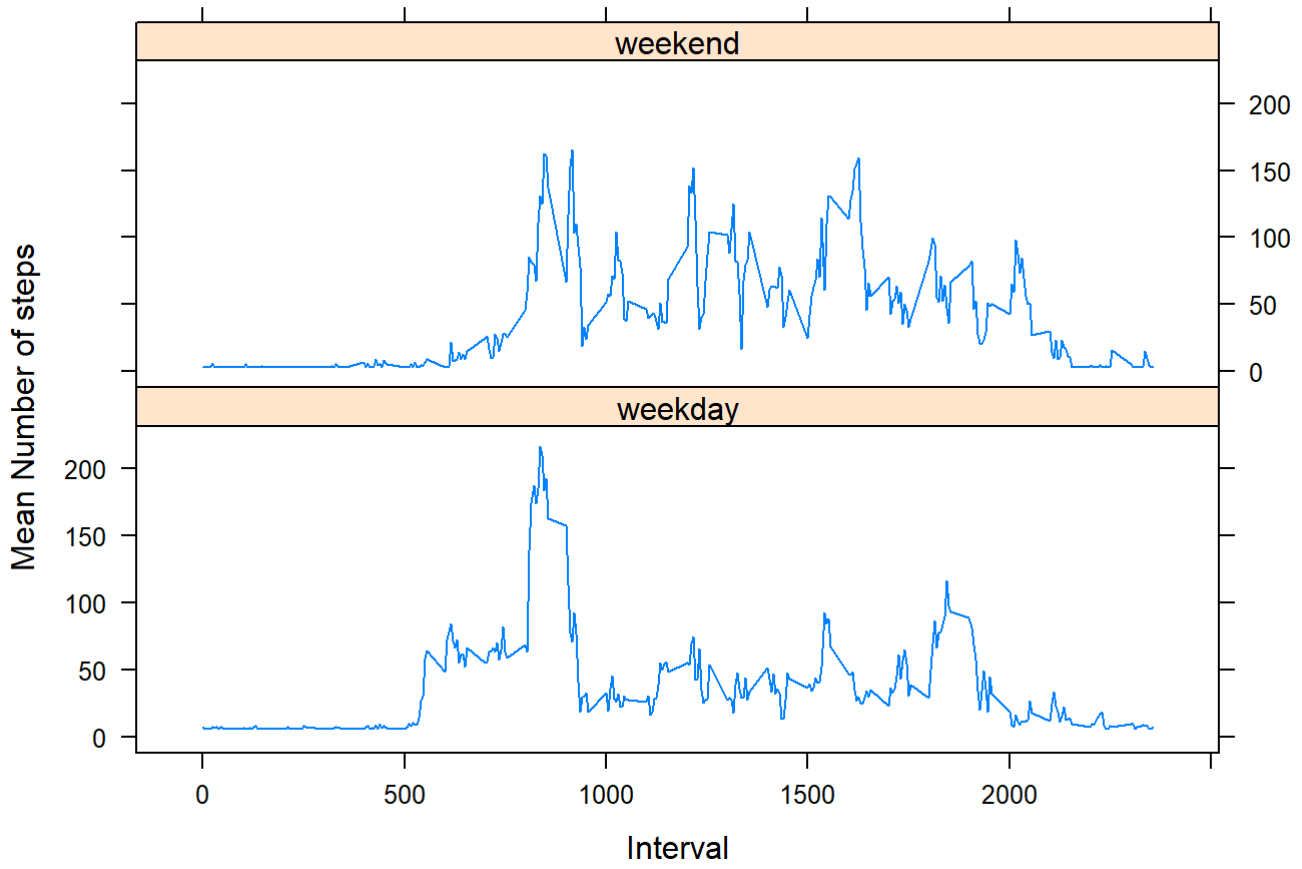
```
##           date weekday daytype interval   steps
## 289 2012-10-02 tuesday weekday        0 37.3826
## 290 2012-10-02 tuesday weekday        5 37.3826
## 291 2012-10-02 tuesday weekday       10 37.3826
## 292 2012-10-02 tuesday weekday       15 37.3826
## 293 2012-10-02 tuesday weekday       20 37.3826
## 294 2012-10-02 tuesday weekday       25 37.3826
```

```
activity.complete.daytype <- aggregate(steps ~ daytype+interval, data=activity.complete, FUN=
mean)
head(activity.complete.daytype)
```

```
##   daytype interval    steps
## 1 weekday        0 7.212708
## 2 weekend        0 2.670186
## 3 weekday        5 5.751169
## 4 weekend        5 2.670186
## 5 weekday       10 5.751169
## 6 weekend       10 2.670186
```

Compute the time serie plot

```
xyplot(steps ~ interval | daytype, activity.complete.daytype,
       type="l",
       lwd=1,
       xlab="Interval",
       ylab="Mean Number of steps",
       layout=c(1,2))
```




```
## It seems that the weekday activities starts earlier than the weekends and weekday activiti
es starts around 5-6am and weekend activities starts around 8am.
## Another observation is that from 10am to 5pm in the weekends have higher activity levels t
han the weekdays.
```