Reproducible Research: Peer Assessment 1

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Loading and preprocessing the data

```
if (!exists("activity.csv")){
unzip("activity.zip")} # decompress zip if not exists
activity<-read.csv("activity.csv")
#remove any rows with missing step values (NA)
activity<-activity[!is.na(activity$steps),]
```

What is mean total number of steps taken per day?

```
library(dplyr)
```

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

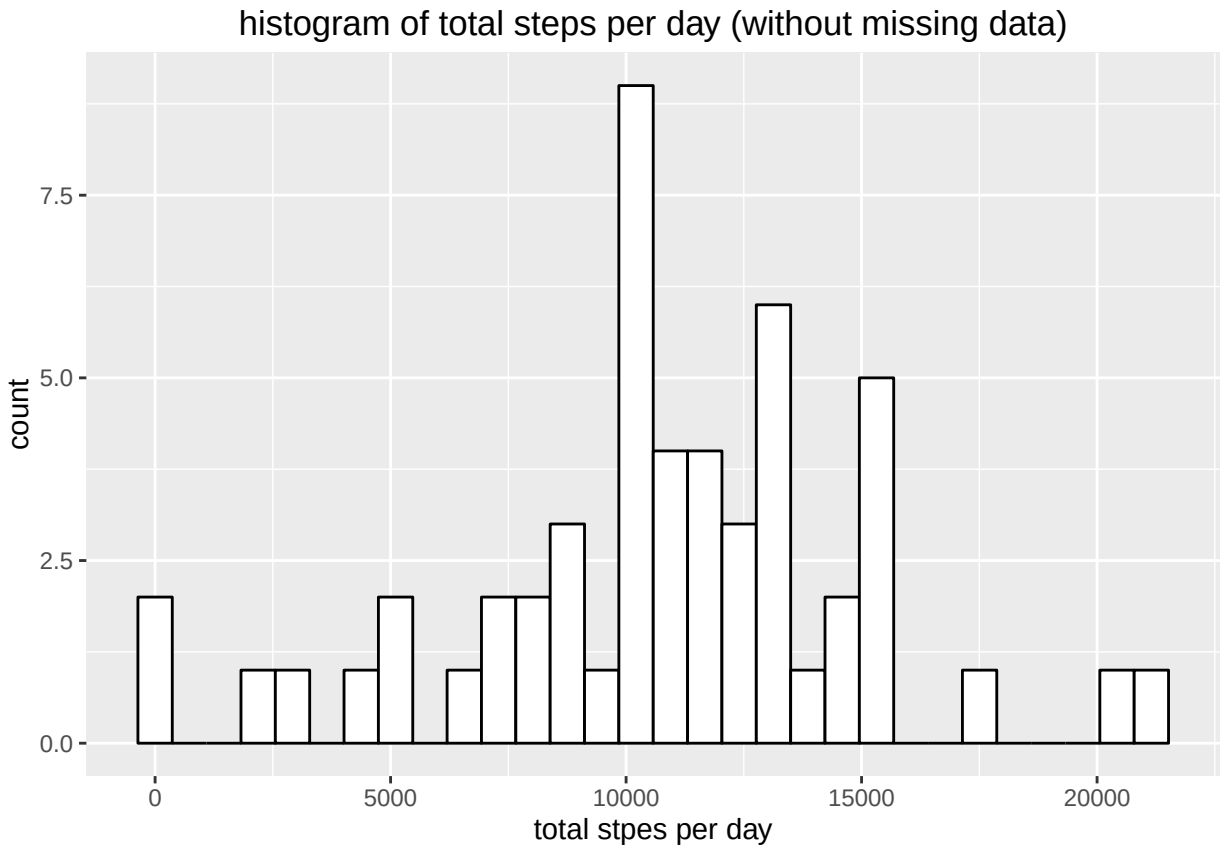
```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

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

```
library(ggplot2)
library(timeDate)

#Calculate the total number of steps taken per day
total_steps_per_day=activity%>%group_by(date)%>%summarise(total_steps=sum(steps))
#Histogram of the total number of steps taken each day
gg=ggplot(total_steps_per_day,aes(x=total_steps))
gg+geom_histogram(colour="black", fill="white")+
  labs(title="histogram of total steps per day (without missing data)",
       x="total stpes per day")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```




```
mean_total_steps_per_day=mean(total_steps_per_day$total_steps)
# mean total steps per day
print(mean_total_steps_per_day)
```

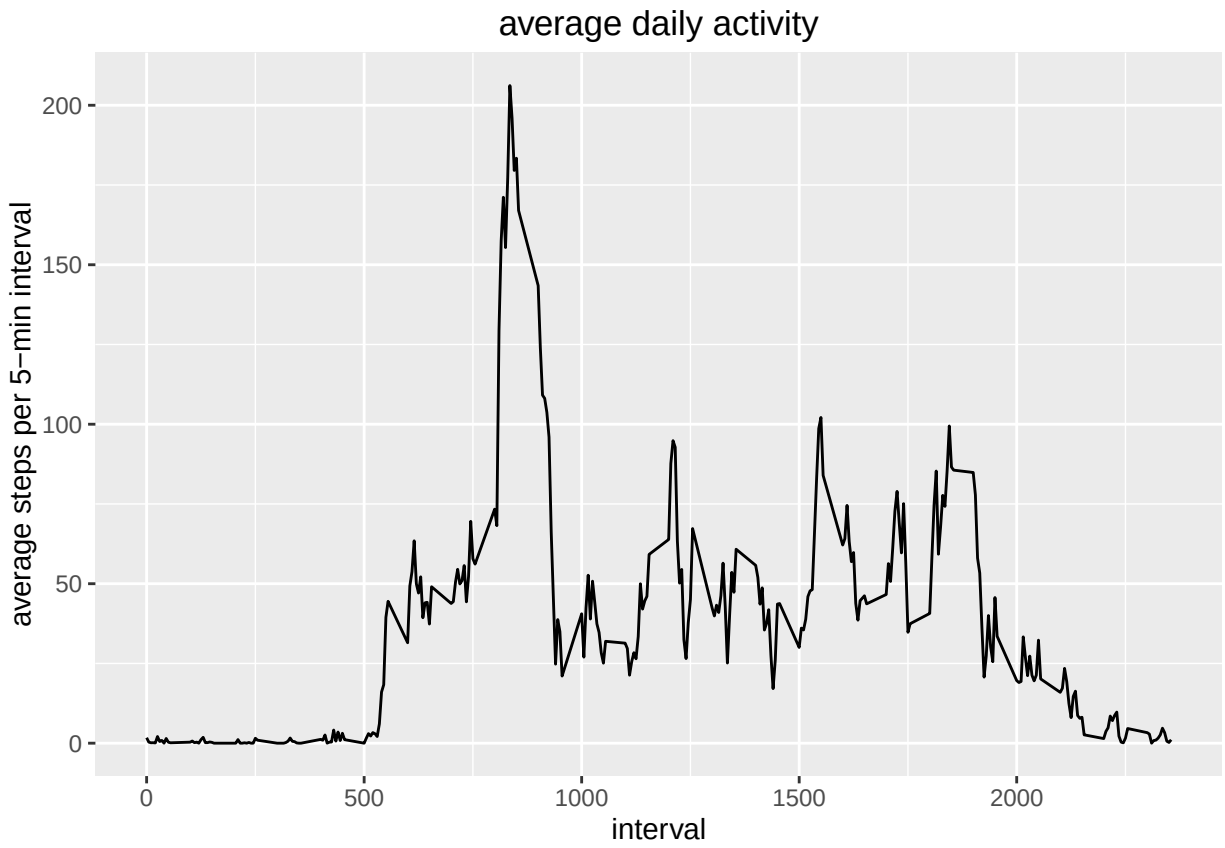
```
## [1] 10766.19
```

```
median_total_steps_per_day=median(total_steps_per_day$total_steps)
# median total steps per day
print(median_total_steps_per_day)
```

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

What is the average daily activity pattern?

```
#Time series plot of the average number of steps taken
mean_steps_per_interval=activity%>%group_by(interval)%>%summarise(mean_steps_per_interval=mean(steps))
g<-ggplot(mean_steps_per_interval,aes(x=interval,y=mean_steps_per_interval))+
  labs(title="average daily activity",y="average steps per 5-min interval")
g+geom_line()
```




```
# Sort activities in the descending order
ordered<-mean_steps_per_interval%>%arrange(desc(mean_steps_per_interval))

# Which 5-minute interval, on average across all the days in the dataset,contains the maximum number of
ordered$interval[1]
```

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

Imputing missing values

```
activity_na<-read.csv("activity.csv")

row_is_na<-apply(activity_na, 1, function(x) any(is.na(x)))
# Calculate and report the total number of missing values in the dataset (i.e. the total number of rows
print(sum(row_is_na))
```

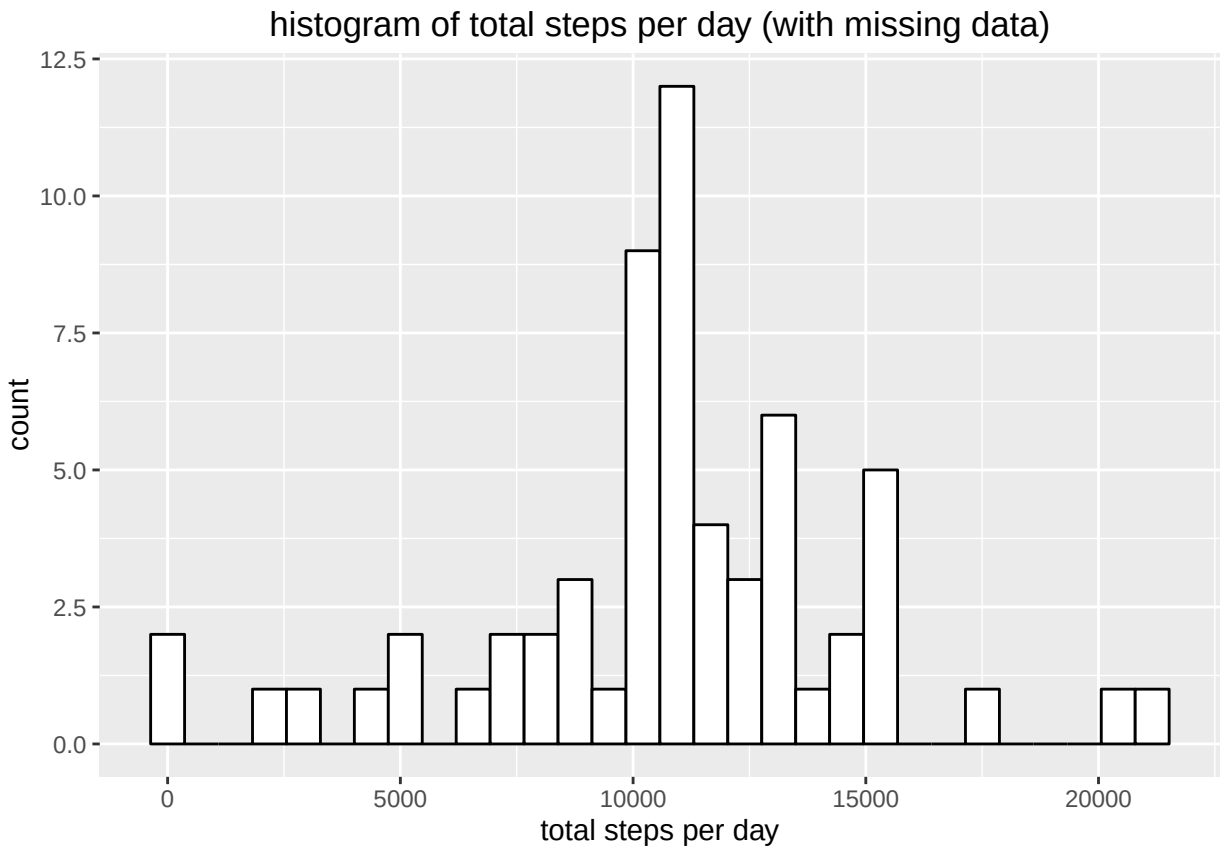
```
## [1] 2304
```

```
# replacing NA (missing values) with the mean of corresponding 5-min intervals
activity_new<-activity_na %>% group_by(interval) %>% mutate(steps = ifelse(is.na(steps),
                                                    mean(steps,na.rm=T), steps))

# re-calculate total steps per day
```

```
total_steps_per_day=activity_new%>%group_by(date)%>%summarise(total_steps=sum(steps))
# Histogram of the total number of steps taken each day after missing values are imputed
gg=ggplot(total_steps_per_day,aes(x=total_steps))
gg+geom_histogram(colour="black", fill="white")+
  labs(title="histogram of total steps per day (with missing data)",x="total steps per day")
```

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```




```
mean_total_steps_per_day=mean(total_steps_per_day$total_steps)
# mean total steps per day
print(mean_total_steps_per_day)
```

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

```
median_total_steps_per_day=median(total_steps_per_day$total_steps)
# median total steps per day
print(median_total_steps_per_day)
```

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

- Do these values differ from the estimates from the first part of the assignment?
  Mean was not affected. Median was slightly increased (from 10765 to 10766.19).
- What is the impact of imputing missing data on the estimates of the total daily number of steps?
  Imputing missing values resulted in additional days with average total steps (10766.19).

Are there differences in activity patterns between weekdays and weekends?

```
activity_new_wkd<-activity_new%>%mutate(wkd=ifelse(isWeekend(date),"weekend","weekday"))
activity_new_wkd$wkd<-factor(activity_new_wkd$wkd)
activity_wkd_weekday=activity_new_wkd%>%group_by(wkd,interval)%>%
  summarise(mean_steps_per_interval=mean(steps))
# Panel plot comparing the average number of steps taken per 5-minute interval across weekdays and week
g<-ggplot(activity_wkd_weekday,aes(x=interval,y=mean_steps_per_interval))+
  labs(title="average daily activity",y="average steps per 5-min interval")
g+geom_line(col="blue")+facet_wrap(~wkd,ncol=1)+theme_bw()
```