Reproductible research project 1

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R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see http://rmarkdown.rstudio.com.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

1. Code for reading in the dataset and/or processing the data

```r
download.file("https://d396qusza40orc.cloudfront.net/repdata%2Fdata%2Factivity.zip", destfile = "activi
# unzip and read dataset
unzip("activity.zip")
stepdata <- read.csv("activity.csv", header = TRUE)
head(stepdata)
```

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

load magrittr and dplyr packages

```r
library(magrittr)
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
```

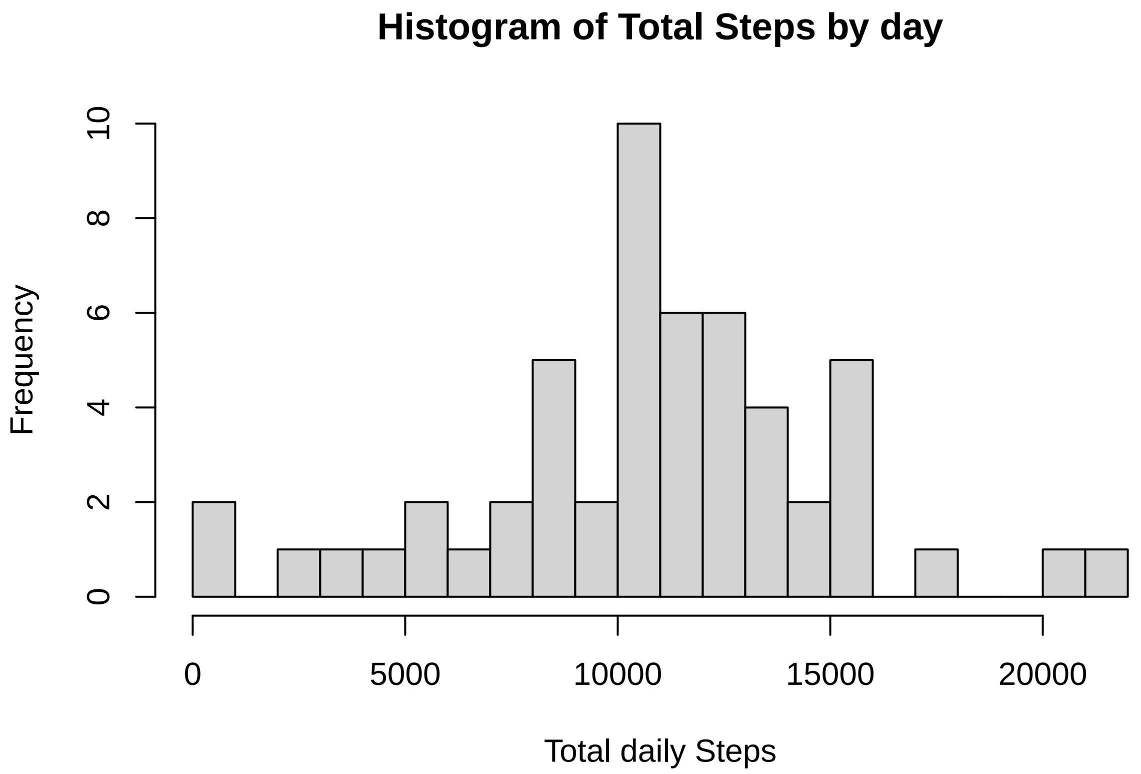
```r
## calculate number of steps by date --> stepsbydate variable

stepsbydate <- stepdata %>% select(date, steps) %>% group_by(date) %>% summarize(tsteps= sum(steps)) %>
```

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

```
# 2. display histogram of the total number of steps each day

hist(stepsbydate$tsteps, xlab = "Total daily Steps",main="Histogram of Total Steps by day", breaks = 20
```



```
# 3a. mean value of steps by date
mean(stepsbydate$tsteps)
```

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

```
# 3b. median value of steps by date
median(stepsbydate$tsteps)
```

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

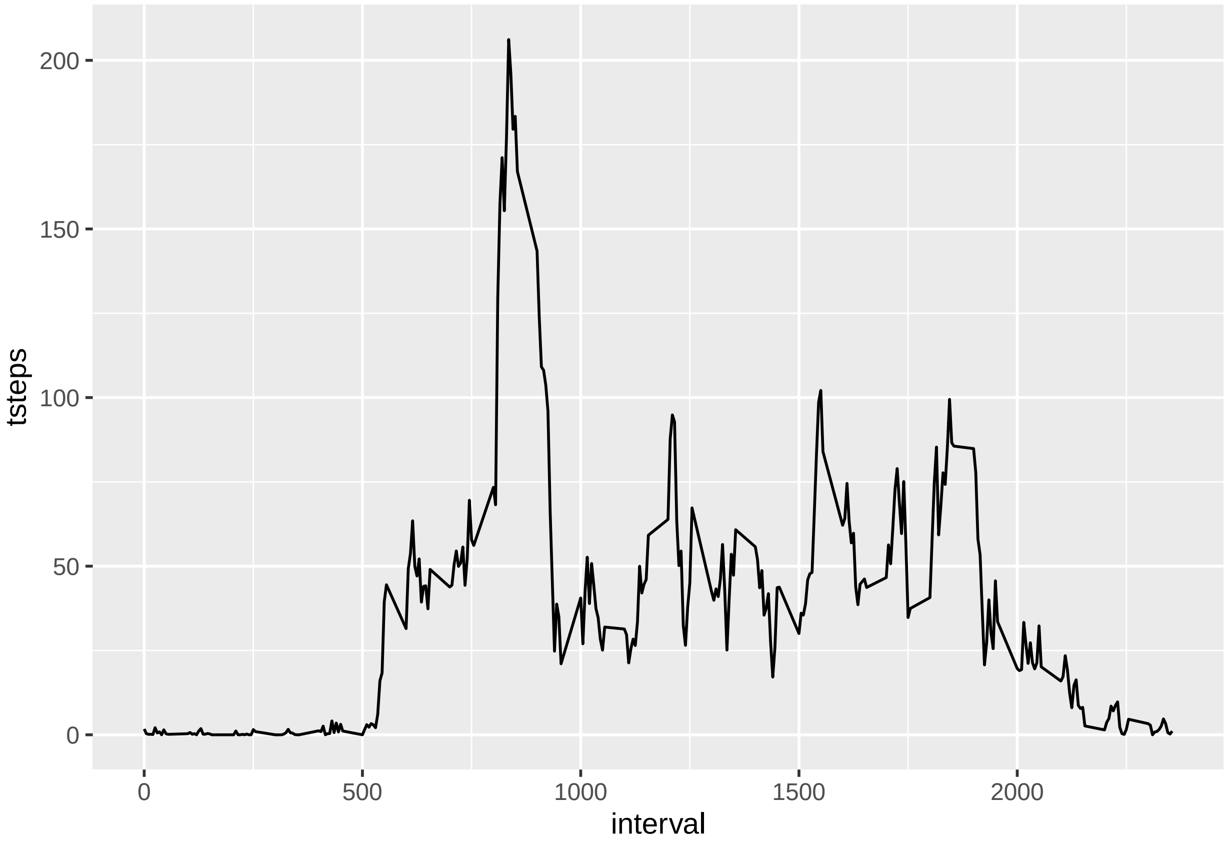
```
## install package ggplot2
library(ggplot2)

## calculate average number of steps taken
stepsbyinterval <- stepdata%>% select(interval, steps) %>% na.omit() %>% group_by(interval) %>% summari
```

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

```
# 4. time series plot display

ggplot(stepsbyinterval, aes(x=interval, y=tsteps))+ geom_line()
```



```r
# 5. The 5-minute interval that, on average, contains the maximum number of steps
stepsbyinterval[which(stepsbyinterval$tsteps== max(stepsbyinterval$tsteps)),]
```

```
## Warning: `...` is not empty.
##
## We detected these problematic arguments:
## * `needs_dots`
##
## These dots only exist to allow future extensions and should be empty.
## Did you misspecify an argument?

## # A tibble: 1 x 2
##   interval tsteps
##      <int>  <dbl>
## 1      835   206.
```

```r
## imputing missing values NAs
missingVals <- sum(is.na(data))
```

```
## Warning in is.na(data): is.na() applied to non-(list or vector) of type
## 'closure'
```

```r
## display missing values
missingVals
```

```
## [1] 0
```

```r
# 6. Code to describe and show a strategy for imputing missing data
library(magrittr)
library(dplyr)
```

```
replacewithmean <- function(x) replace(x, is.na(x), mean(x, na.rm = TRUE))
meandata <- stepdata%>% group_by(interval) %>% mutate(steps= replacewithmean(steps))
head(meandata)
```

```
## Warning: `...` is not empty.
##
## We detected these problematic arguments:
## * `needs_dots`
##
## These dots only exist to allow future extensions and should be empty.
## Did you misspecify an argument?
```

```
## # A tibble: 6 x 3
## # Groups:   interval [6]
##    steps date       interval
##    <dbl> <chr>         <int>
## 1 1.72   2012-10-01        0
## 2 0.340  2012-10-01        5
## 3 0.132  2012-10-01       10
## 4 0.151  2012-10-01       15
## 5 0.0755 2012-10-01       20
## 6 2.09   2012-10-01       25
```

```
FullSummedDataByDay <- aggregate(meandata$steps, by=list(meandata$date), sum)

names(FullSummedDataByDay)[1] ="date"
names(FullSummedDataByDay)[2] ="totalsteps"
head(FullSummedDataByDay,15)
```

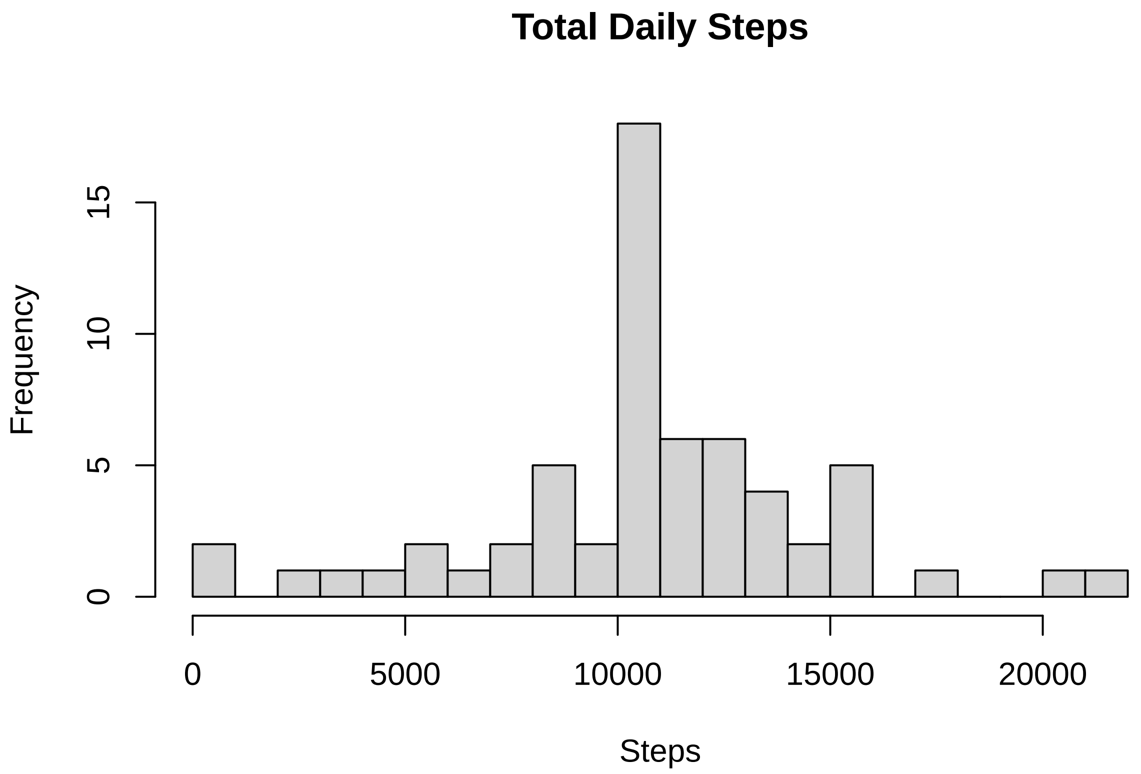
```
##          date totalsteps
## 1  2012-10-01   10766.19
## 2  2012-10-02     126.00
## 3  2012-10-03   11352.00
## 4  2012-10-04   12116.00
## 5  2012-10-05   13294.00
## 6  2012-10-06   15420.00
## 7  2012-10-07   11015.00
## 8  2012-10-08   10766.19
## 9  2012-10-09   12811.00
## 10 2012-10-10    9900.00
## 11 2012-10-11   10304.00
## 12 2012-10-12   17382.00
## 13 2012-10-13   12426.00
## 14 2012-10-14   15098.00
## 15 2012-10-15   10139.00
```

```
## Summary of new data : mean & median
summary(FullSummedDataByDay)
```

```
##      date             totalsteps
##  Length:61          Min.   :   41
##  Class :character   1st Qu.: 9819
##  Mode  :character   Median :10766
##                     Mean   :10766
##                     3rd Qu.:12811
##                      Max.   :21194
```

```
# 7. Histogram of the total number of steps taken each day after missing values are imputed

hist(FullSummedDataByDay$totalsteps, xlab = "Steps", ylab = "Frequency", main = "Total Daily Steps", br
```



8. compare mean and median of these new data vs initial dataset

oldmean <- mean(databydate$tsteps, na.rm = TRUE)newmean < -mean(FullSummedDataByDay$totalsteps)
# Old mean and New mean oldmean newmean

oldmedian <- median(databydate$tsteps, na.rm = TRUE)newmedian < -median(FullSummedDataByDay$totalsteps)
# Old median and New median oldmedian newmedian

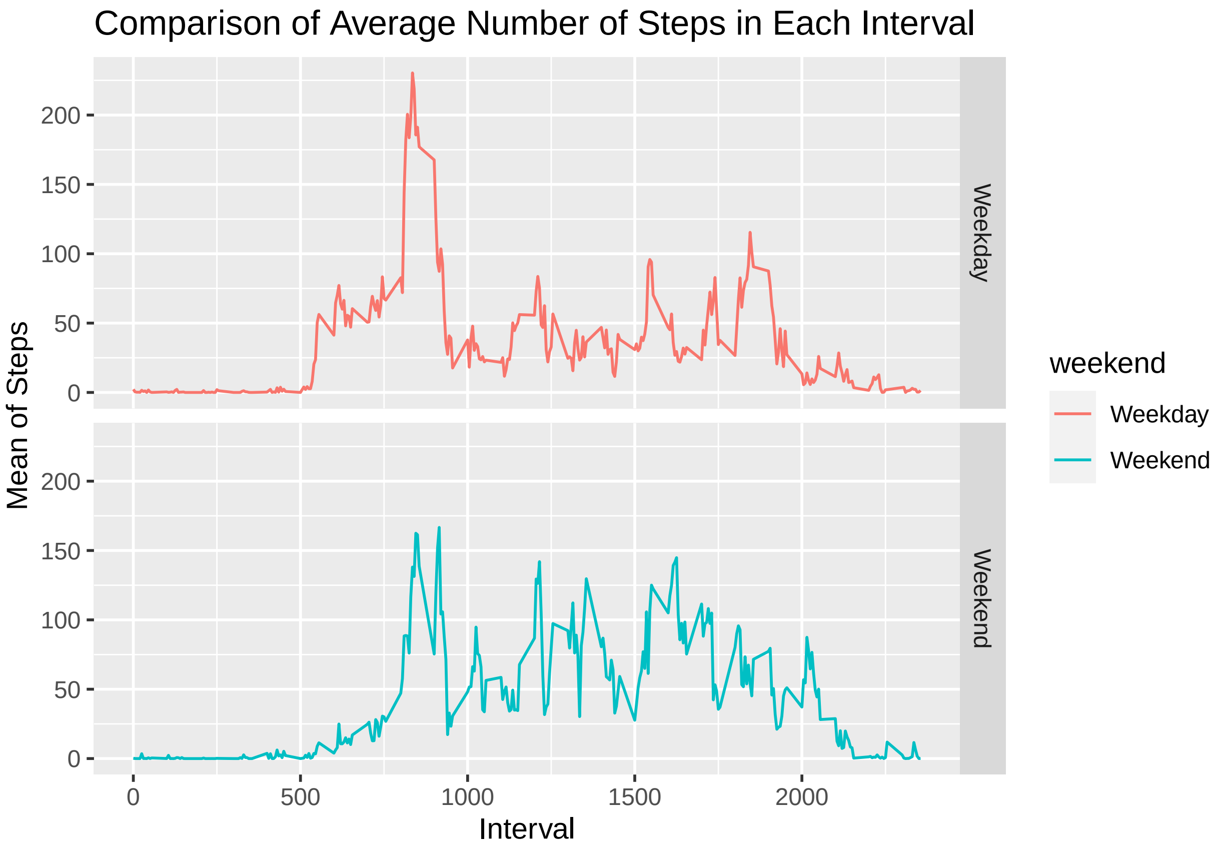
meandata$date < -as.Date(meandata$date) meandata$weekday < -weekdays(meandata$date) meandata$weekend <$
$-ifelse(meandata$weekday==“Saturday” | meandata$weekday==“Sunday”, “Weekend”, “Weekday”)

```
## 9. Panel plot comparing the average number of steps taken per 5-minute interval across weekdays and 

meandata$date <- as.Date(meandata$date)
meandata$weekday <- weekdays(meandata$date)
meandata$weekend <- ifelse(meandata$weekday=="Saturday" | meandata$weekday=="Sunday", "Weekend", "Weekda

library(ggplot2)
meandataweekendweekday <- aggregate(meandata$steps , by= list(meandata$weekend, meandata$interval), na.
names(meandataweekendweekday) <- c("weekend", "interval", "steps")

ggplot(meandataweekendweekday, aes(x=interval, y=steps, color=weekend)) + geom_line()+
facet_grid(weekend ~.) + xlab("Interval") + ylab("Mean of Steps") +
    ggtitle("Comparison of Average Number of Steps in Each Interval")
```


Comparison of Average Number of Steps in Each Interval
Mean of Steps
200
150
100
50
0
200
150
100
50
0
Weekday
Weekend
0
500
1000
1500
2000
Interval
weekend
Weekday
Weekend