Reproducible research peer assignment 1

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Peer assignment one for the Coursera Data Science specialty's *Reproducible research* course.

Loading and preprocessing the data

```
Sys.setlocale("LC_TIME", "English")
```

```
## [1] "English_United States.1252"
```

```
library(lattice)
```

Reading datafiles

```
unzip("activity.zip")
data<-read.csv("activity.csv", colClasses = c("integer","Date","integer"))
```

What is mean total number of steps taken per day?

Aggregating data by day

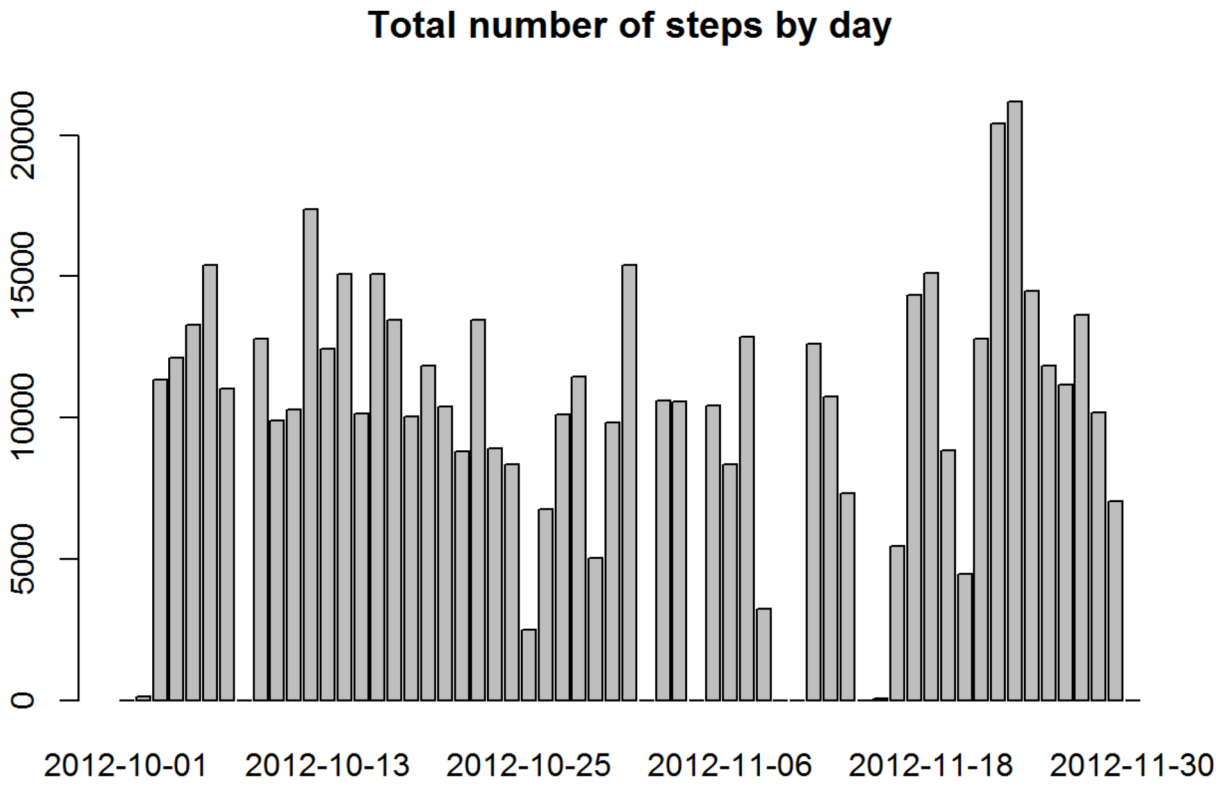
Using aggregate function

```
stp_per_day<-aggregate(data$steps, by=list(data$date), "sum",na.rm=TRUE, na.action=NULL)
names(stp_per_day)<-c("date","tt_steps")
```

Producing an histogram

Using barplot

```
barplot(stp_per_day$tt_steps, names.arg=stp_per_day$date,width = 0.1,main="Total number of steps
by day")
```



Calculating mean and median “total steps per day” values

Using common R functions

```
stp_mean<-mean(stp_per_day$tt_steps)
stp_med<-median(stp_per_day$tt_steps)
```

The mean number of steps per day is **9354.2295082**.
The median number of steps per day is **10395**.

What is the average daily activity pattern?

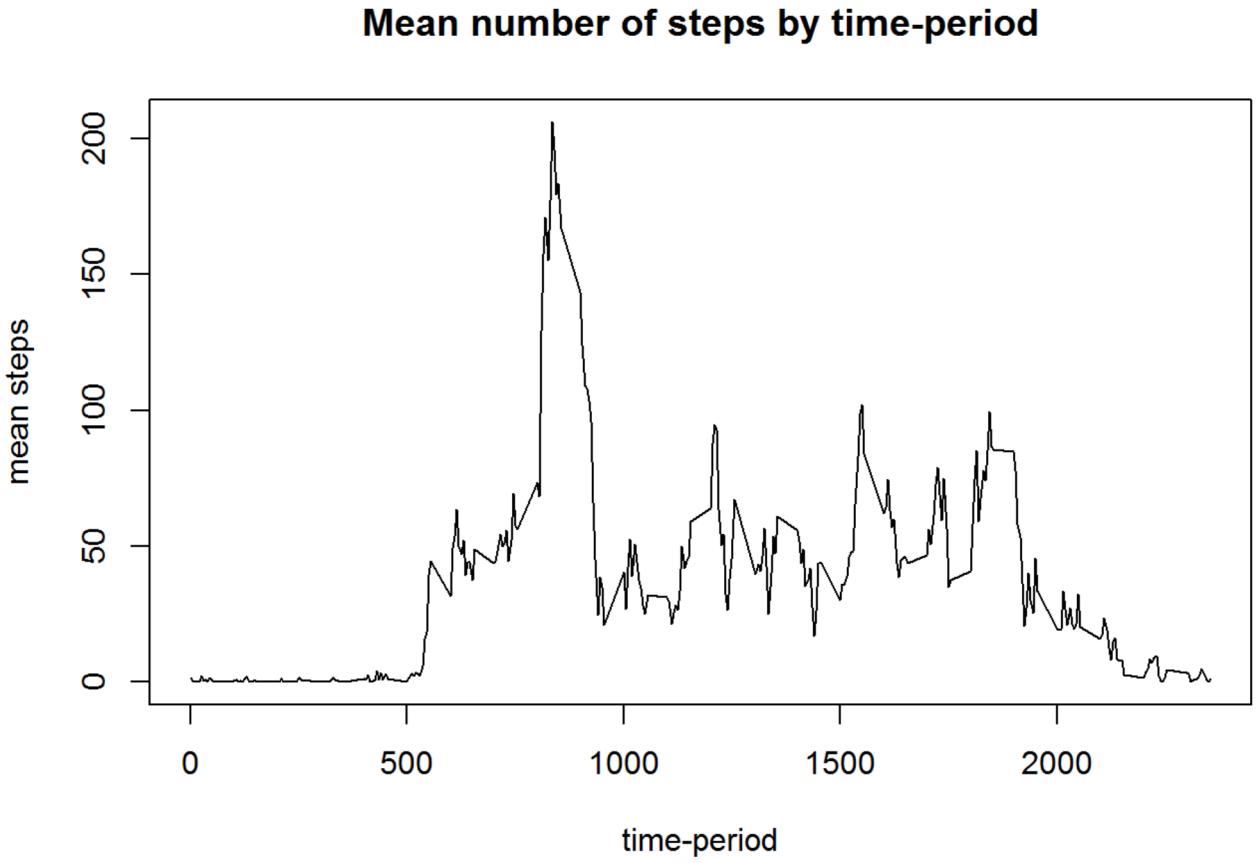
Aggregating data by time-period

Using aggregate function

```
stp_per_tp<-aggregate(data$steps, by=list(data$interval), "mean",na.rm=TRUE, na.action=NULL)
names(stp_per_tp)<-c("interval","mean_steps")
```

Producing an histogram

```
plot(stp_per_tp$interval,stp_per_tp$mean_steps, type="l",
     xlab="time-period", ylab="mean steps",main="Mean number of steps by time-period")
```



Max time-period

time-period with max mean steps:

```
max_mean_step_tp<-
  stp_per_tp[which.max(stp_per_tp$mean_steps),1]

max_mean_step_val<-round(
  stp_per_tp[which.max(stp_per_tp$mean_steps),2],digits=2)
```

The time period with max mean number of steps is interval **835**.
The max mean steps value is **206.17**.

Imputing missing values

Total number of missing values in the dataset

```
nb_na_rows<-NROW(data[,1])-NROW(na.omit(data[,1]))
```

There are **2304** out of 17568 rows.

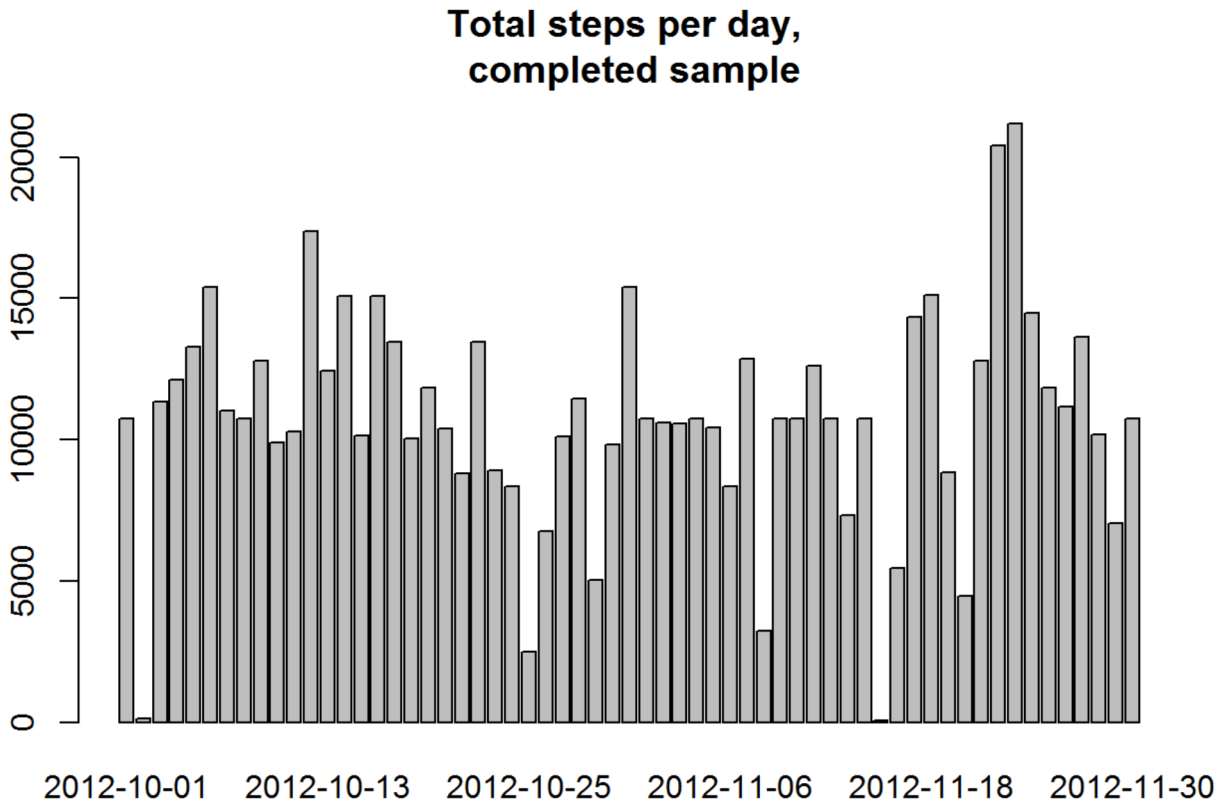
Filling in all of the missing values

In order to fill missing value we will feed median values for interval in the dataset. In order to do this we'll create a modified datasample names ***datam***.

```
datam<-data
for (i in (1:NROW(datam)))
{
  if(is.na(datam[i,1]))
    {datam[i,1]<-
       stp_per_tp[which(stp_per_tp$interval==datam[i,3]),2]}}
```

Producing an histogram for completed data

```
stp_per_daym<-aggregate(datam$steps, by=list(datam$date), "sum",na.rm=TRUE, na.action=NULL)
names(stp_per_daym)<-c("date","tt_steps")
barplot(stp_per_daym$tt_steps, names.arg=stp_per_day$date,width = 0.1, main = "Total steps per da
y,
 completed sample")
```




```
stp_meanm<-mean(stp_per_daym$tt_steps)
stp_medm<-median(stp_per_daym$tt_steps)
```

The mean number of steps per day is **1.076618910^{4}** for completed sample.
The median number of steps per day is **1.076618910^{4}** for completed sample. **Both mean and median have slightly increased**.

Are there differences in activity patterns between weekdays and weekends?

Defining WE/non-WE days

Creating the WE/non-WE table:

```
WE_table<-cbind(
  rbind("Monday","Tuesday","Wednesday","Thursday","Friday","Saturday","Sunday"),rbind("non_WE","non_WE","non_WE","non_WE","non_WE","WE","WE"))
colnames(WE_table)<-c("weekday","is_we")
```

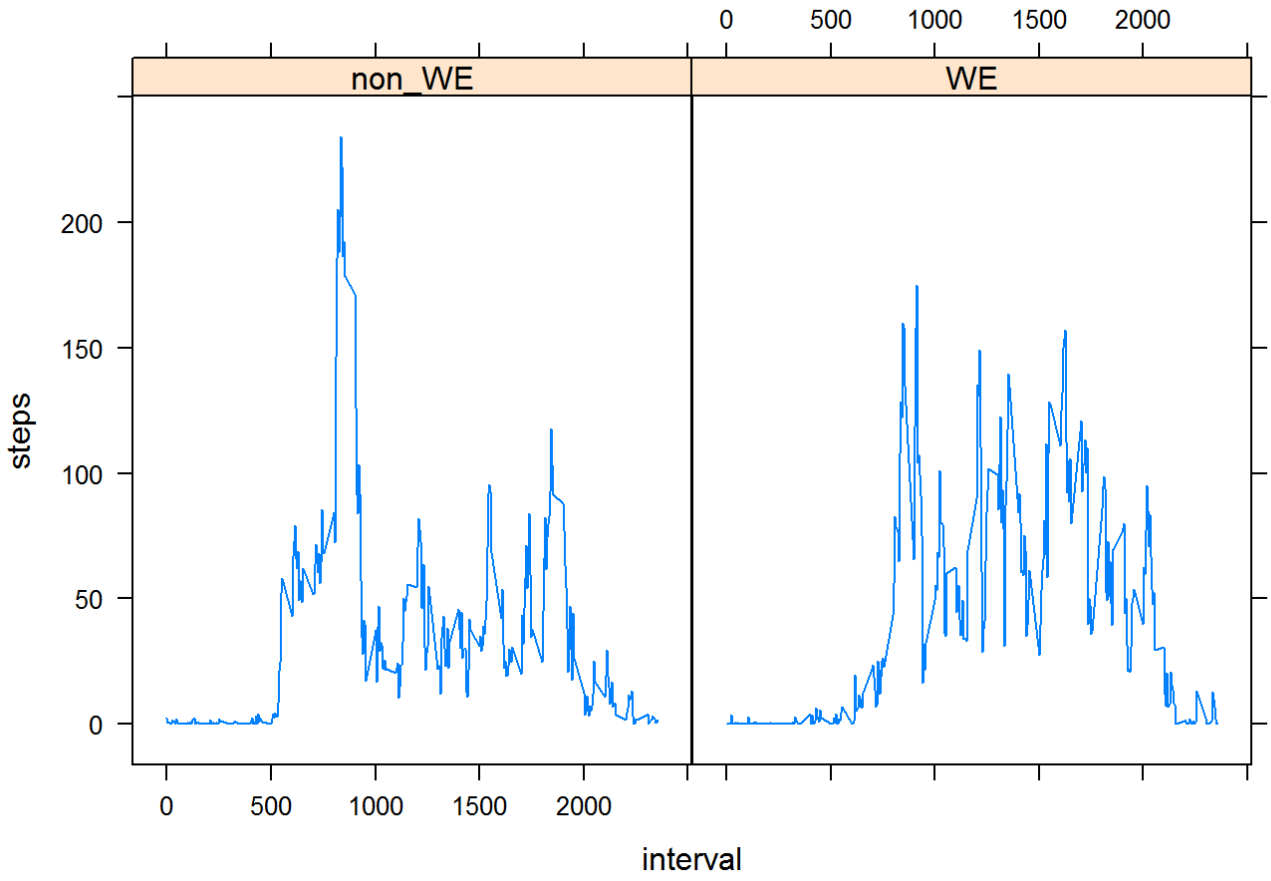
Applying to data, displaying result sample:

```
dataw<-cbind(data,weekday=weekdays(data$date))
dataw<-merge(dataw,WE_table,by="weekday")

##displaying result sample
samdataw<-dataw[which(dataw$interval==0),c(3,1,5)]
samdataw<-samdataw[order(samdataw$date),]
row.names(samdataw) <- NULL
head(samdataw[order(samdataw$date),],n=10)
```

```
##          date   weekday  is_we
## 1  2012-10-01    Monday non_WE
## 2  2012-10-02   Tuesday non_WE
## 3  2012-10-03 Wednesday non_WE
## 4  2012-10-04  Thursday non_WE
## 5  2012-10-05    Friday non_WE
## 6  2012-10-06  Saturday     WE
## 7  2012-10-07    Sunday     WE
## 8  2012-10-08    Monday non_WE
## 9  2012-10-09   Tuesday non_WE
## 10 2012-10-10 Wednesday non_WE
```

Comparing WE/non-WE days

```
stp_interv_we<-aggregate(dataw$steps, by=list(dataw$interval,dataw$is_we), "mean",na.rm=TRUE, na.action=NULL)
colnames(stp_interv_we)<-c("interval","is_we","steps")

xyplot(steps~interval|is_we, data=stp_interv_we, type="l")
```


non_WE
WE
steps
interval
0
50
100
150
200
0
500
1000
1500
2000