Cookbook for Final Project for Getting and Cleaning Data Course

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```
knitr::opts_chunk$set(echo = TRUE, tidy = TRUE)
```

Final Project for Getting and Cleaning Data Course

Cookbook for this Assignment

Script Assignment: You should create one R script called run_analysis.R that does the following.

1. Merges the training and the test sets to create one data set.
2. Extracts only the measurements on the mean and standard deviation for each measurement.
3. Uses descriptive activity names to name the activities in the data set
4. Appropriately labels the data set with descriptive variable names.
5. From the data set in step 4, creates a second, independent tidy data set with the average of each variable for each activity and each subject.

Step 1: Library Calls and Helper Function

Helper `function` **create_data_tbl(file_name)** reads data into dataframe tbl from a provided **file_name** and returns a `tbl_df` dataframe table

```
library(data.table)
library(dplyr)
```

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

```
## The following objects are masked from 'package:data.table':
##
##     between, first, last
```

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

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

```
## Function reads a dataframe from a provided file_name and returns a dplyr
## dataframe tbl
create_data_tbl <- function(file_name) {

    data <- read.table(file_name)
    data_tble <- data.table(data)
    data_tble <- tbl_df(data_tble)
}
```

Step 2: Setup Data Directory Names and Read-in the Data from data files

Also, reads-in the activity labels and data labels.
Each data file is stored as a `tbl_df` from the Helper function `create_data_tbl(file_name)` using `file.path` and **_directory** name as **file_name** argument to the function.

```
## Create directory names:
test_directory <- c("UCI HAR Dataset/test/")  ## Directory location for Test Data
train_directory <- c("UCI HAR Dataset/train/")  ## Directory location for Train Data
data_directory <- c("UCI HAR Dataset/")  ## Base Directory location data

## Read Test Data, Training Data, and Labels (Total of 8 .txt Files):
x_test_data <- create_data_tbl(file.path(test_directory, "X_test.txt"))
y_test_data <- create_data_tbl(file.path(test_directory, "y_test.txt"))
subject_test_data <- create_data_tbl(file.path(test_directory, "subject_test.txt"))

x_train_data <- create_data_tbl(file.path(train_directory, "X_train.txt"))
y_train_data <- create_data_tbl(file.path(train_directory, "y_train.txt"))
subject_train_data <- create_data_tbl(file.path(train_directory, "subject_train.txt"))

activity_labels <- create_data_tbl(file.path(data_directory, "activity_labels.txt"))
data_labels <- create_data_tbl(file.path(data_directory, "features.txt"))
```

Step 3: Combine Test and Training Data by Rows

subjects, test and training data are row-combined into 3 data tables of **subjects_combined, y_data_combined, x_data_combined** using `bind_rows`.

```
## Combine Test and Training Data by Rows
subjects_combined <- bind_rows(subject_test_data, subject_train_data)
y_data_combined <- bind_rows(y_test_data, y_train_data)
x_data_combined <- bind_rows(x_test_data, x_train_data)
```

Step 4: Update Data with descriptive column names

All 561 observation data column names are updated with **data_labels** from **features.txt**. Activity columns names given **acty_num** and **acty_name**. Subject column name given **subject_num**.

Creates a new **activity_combined** data table that combines the long list of test numbers with the 6 activity labels, keyed by **acty_num** using `merge` function with `sort = FALSE` to prevent re-sorting the new table.

Satisfies Project requirement: 3. Uses descriptive activity names to name the activities in the data set.

All column names will be given more "tidy names"" later when the tidy dataset is formed.

```
## Update Data with descriptive column names
activity_labels <- rename(activity_labels, acty_num = "V1", acty_name = "V2")
subjects_combined <- rename(subjects_combined, subject_num = "V1")
y_data_combined <- rename(y_data_combined, acty_num = "V1")
x_data_combined <- rename_all(x_data_combined, funs(data_labels$V2))

## Bring Activity Numbers together with Activity Labels:
```

```
activity_combined <- merge(y_data_combined, activity_labels, key = acty_num,
    sort = FALSE)
```

Step 5: Column Bind All Data Into One Large Combined Dataset *combined_dataset*:

Display characteristics of *combined_dataset* using `str(combined_dataset)` to demonstrate that the R script satisfies the **Project requirement: ### 1. Merges the training and the test sets to create one data set.**

Data rows are by Subject Number and the dataset preserves the activity number with corresponding activity number keyed-activity labels.

```
## Column Bind All Data Into One Large Combined Dataset:
combined_dataset <- cbind(subjects_combined, activity_combined, x_data_combined)

str(combined_dataset)  ## Provides detailed summary of Large Combined Dataset
```

```
## 'data.frame':    10299 obs. of  564 variables:
##  $ subject_num                         : int  2 2 2 2 2 2 2 2 2 2 ...
##  $ acty_num                            : int  5 5 5 5 5 5 5 5 5 5 ...
##  $ acty_name                           : Factor w/ 6 levels "LAYING","SITTING",..: 3 3 3 3 3 3 3 3 3
##  $ tBodyAcc-mean()-X                   : num  0.257 0.286 0.275 0.27 0.275 ...
##  $ tBodyAcc-mean()-Y                   : num  -0.0233 -0.0132 -0.0261 -0.0326 -0.0278 ...
##  $ tBodyAcc-mean()-Z                   : num  -0.0147 -0.1191 -0.1182 -0.1175 -0.1295 ...
##  $ tBodyAcc-std()-X                    : num  -0.938 -0.975 -0.994 -0.995 -0.994 ...
##  $ tBodyAcc-std()-Y                    : num  -0.92 -0.967 -0.97 -0.973 -0.967 ...
##  $ tBodyAcc-std()-Z                    : num  -0.668 -0.945 -0.963 -0.967 -0.978 ...
##  $ tBodyAcc-mad()-X                    : num  -0.953 -0.987 -0.994 -0.995 -0.994 ...
##  $ tBodyAcc-mad()-Y                    : num  -0.925 -0.968 -0.971 -0.974 -0.966 ...
##  $ tBodyAcc-mad()-Z                    : num  -0.674 -0.946 -0.963 -0.969 -0.977 ...
##  $ tBodyAcc-max()-X                    : num  -0.894 -0.894 -0.939 -0.939 -0.939 ...
##  $ tBodyAcc-max()-Y                    : num  -0.555 -0.555 -0.569 -0.569 -0.561 ...
##  $ tBodyAcc-max()-Z                    : num  -0.466 -0.806 -0.799 -0.799 -0.826 ...
##  $ tBodyAcc-min()-X                    : num  0.717 0.768 0.848 0.848 0.849 ...
##  $ tBodyAcc-min()-Y                    : num  0.636 0.684 0.668 0.668 0.671 ...
##  $ tBodyAcc-min()-Z                    : num  0.789 0.797 0.822 0.822 0.83 ...
##  $ tBodyAcc-sma()                      : num  -0.878 -0.969 -0.977 -0.974 -0.975 ...
##  $ tBodyAcc-energy()-X                 : num  -0.998 -1 -1 -1 -1 ...
##  $ tBodyAcc-energy()-Y                 : num  -0.998 -1 -1 -0.999 -0.999 ...
##  $ tBodyAcc-energy()-Z                 : num  -0.934 -0.998 -0.999 -0.999 -0.999 ...
##  $ tBodyAcc-iqr()-X                    : num  -0.976 -0.994 -0.993 -0.995 -0.993 ...
##  $ tBodyAcc-iqr()-Y                    : num  -0.95 -0.974 -0.974 -0.979 -0.967 ...
##  $ tBodyAcc-iqr()-Z                    : num  -0.83 -0.951 -0.965 -0.97 -0.976 ...
##  $ tBodyAcc-entropy()-X                : num  -0.168 -0.302 -0.618 -0.75 -0.591 ...
##  $ tBodyAcc-entropy()-Y                : num  -0.379 -0.348 -0.695 -0.899 -0.74 ...
##  $ tBodyAcc-entropy()-Z                : num  0.246 -0.405 -0.537 -0.554 -0.799 ...
##  $ tBodyAcc-arCoeff()-X,1              : num  0.521 0.507 0.242 0.175 0.116 ...
##  $ tBodyAcc-arCoeff()-X,2              : num  -0.4878 -0.1565 -0.115 -0.0513 -0.0289 ...
##  $ tBodyAcc-arCoeff()-X,3              : num  0.4823 0.0407 0.0327 0.0342 -0.0328 ...
##  $ tBodyAcc-arCoeff()-X,4              : num  -0.0455 0.273 0.1924 0.1536 0.2943 ...
##  $ tBodyAcc-arCoeff()-Y,1              : num  0.21196 0.19757 -0.01194 0.03077 0.00063 ...
##  $ tBodyAcc-arCoeff()-Y,2              : num  -0.1349 -0.1946 -0.0634 -0.1293 -0.0453 ...
##  $ tBodyAcc-arCoeff()-Y,3              : num  0.131 0.411 0.471 0.446 0.168 ...
##  $ tBodyAcc-arCoeff()-Y,4              : num  -0.0142 -0.3405 -0.5074 -0.4195 -0.0682 ...
```

```
##  $ tBodyAcc-arCoeff()-Z,1            : num  -0.106 0.0776 0.1885 0.2715 0.0744 ...
##  $ tBodyAcc-arCoeff()-Z,2            : num  0.0735 -0.084 -0.2316 -0.2258 0.0271 ...
##  $ tBodyAcc-arCoeff()-Z,3            : num  -0.1715 0.0353 0.6321 0.4164 -0.1459 ...
##  $ tBodyAcc-arCoeff()-Z,4            : num  0.0401 -0.0101 -0.5507 -0.2864 -0.0502 ...
##  $ tBodyAcc-correlation()-X,Y        : num  0.077 -0.105 0.3057 -0.0638 0.2352 ...
##  $ tBodyAcc-correlation()-X,Z        : num  -0.491 -0.429 -0.324 -0.167 0.29 ...
##  $ tBodyAcc-correlation()-Y,Z        : num  -0.709 0.399 0.28 0.545 0.458 ...
##  $ tGravityAcc-mean()-X              : num  0.936 0.927 0.93 0.929 0.927 ...
##  $ tGravityAcc-mean()-Y              : num  -0.283 -0.289 -0.288 -0.293 -0.303 ...
##  $ tGravityAcc-mean()-Z              : num  0.115 0.153 0.146 0.143 0.138 ...
##  $ tGravityAcc-std()-X               : num  -0.925 -0.989 -0.996 -0.993 -0.996 ...
##  $ tGravityAcc-std()-Y               : num  -0.937 -0.984 -0.988 -0.97 -0.971 ...
##  $ tGravityAcc-std()-Z               : num  -0.564 -0.965 -0.982 -0.992 -0.968 ...
##  $ tGravityAcc-mad()-X               : num  -0.93 -0.989 -0.996 -0.993 -0.996 ...
##  $ tGravityAcc-mad()-Y               : num  -0.938 -0.983 -0.989 -0.971 -0.971 ...
##  $ tGravityAcc-mad()-Z               : num  -0.606 -0.965 -0.98 -0.993 -0.969 ...
##  $ tGravityAcc-max()-X               : num  0.906 0.856 0.856 0.856 0.854 ...
##  $ tGravityAcc-max()-Y               : num  -0.279 -0.305 -0.305 -0.305 -0.313 ...
##  $ tGravityAcc-max()-Z               : num  0.153 0.153 0.139 0.136 0.134 ...
##  $ tGravityAcc-min()-X               : num  0.944 0.944 0.949 0.947 0.946 ...
##  $ tGravityAcc-min()-Y               : num  -0.262 -0.262 -0.262 -0.273 -0.279 ...
##  $ tGravityAcc-min()-Z               : num  -0.0762 0.149 0.145 0.1421 0.1309 ...
##  $ tGravityAcc-sma()                 : num  -0.0178 0.0577 0.0406 0.0461 0.0554 ...
##  $ tGravityAcc-energy()-X            : num  0.829 0.806 0.812 0.809 0.804 ...
##  $ tGravityAcc-energy()-Y            : num  -0.865 -0.858 -0.86 -0.854 -0.843 ...
##  $ tGravityAcc-energy()-Z            : num  -0.968 -0.957 -0.961 -0.963 -0.965 ...
##  $ tGravityAcc-iqr()-X               : num  -0.95 -0.988 -0.996 -0.992 -0.996 ...
##  $ tGravityAcc-iqr()-Y               : num  -0.946 -0.982 -0.99 -0.973 -0.972 ...
##  $ tGravityAcc-iqr()-Z               : num  -0.76 -0.971 -0.979 -0.996 -0.969 ...
##  $ tGravityAcc-entropy()-X           : num  -0.425 -0.729 -0.823 -0.823 -0.83 ...
##  $ tGravityAcc-entropy()-Y           : num  -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 ...
##  $ tGravityAcc-entropy()-Z           : num  0.219 -0.465 -0.53 -0.7 -0.302 ...
##  $ tGravityAcc-arCoeff()-X,1         : num  -0.43 -0.51 -0.295 -0.343 -0.482 ...
##  $ tGravityAcc-arCoeff()-X,2         : num  0.431 0.525 0.305 0.359 0.539 ...
##  $ tGravityAcc-arCoeff()-X,3         : num  -0.432 -0.54 -0.315 -0.375 -0.596 ...
##  $ tGravityAcc-arCoeff()-X,4         : num  0.433 0.554 0.326 0.392 0.655 ...
##  $ tGravityAcc-arCoeff()-Y,1         : num  -0.795 -0.746 -0.232 -0.233 -0.493 ...
##  $ tGravityAcc-arCoeff()-Y,2         : num  0.781 0.733 0.169 0.176 0.463 ...
##  $ tGravityAcc-arCoeff()-Y,3         : num  -0.78 -0.737 -0.155 -0.169 -0.465 ...
##  $ tGravityAcc-arCoeff()-Y,4         : num  0.785 0.749 0.164 0.185 0.483 ...
##  $ tGravityAcc-arCoeff()-Z,1         : num  -0.984 -0.845 -0.429 -0.297 -0.536 ...
##  $ tGravityAcc-arCoeff()-Z,2         : num  0.987 0.869 0.44 0.304 0.544 ...
##  $ tGravityAcc-arCoeff()-Z,3         : num  -0.989 -0.893 -0.451 -0.311 -0.553 ...
##  $ tGravityAcc-arCoeff()-Z,4         : num  0.988 0.913 0.458 0.315 0.559 ...
##  $ tGravityAcc-correlation()-X,Y     : num  0.981 0.945 0.548 0.986 0.998 ...
##  $ tGravityAcc-correlation()-X,Z     : num  -0.996 -0.911 -0.335 0.653 0.916 ...
##  $ tGravityAcc-correlation()-Y,Z     : num  -0.96 -0.739 0.59 0.747 0.929 ...
##  $ tBodyAccJerk-mean()-X             : num  0.072 0.0702 0.0694 0.0749 0.0784 ...
##  $ tBodyAccJerk-mean()-Y             : num  0.04575 -0.01788 -0.00491 0.03227 0.02228 ...
##  $ tBodyAccJerk-mean()-Z             : num  -0.10604 -0.00172 -0.01367 0.01214 0.00275 ...
##  $ tBodyAccJerk-std()-X              : num  -0.907 -0.949 -0.991 -0.991 -0.992 ...
##  $ tBodyAccJerk-std()-Y              : num  -0.938 -0.973 -0.971 -0.973 -0.979 ...
##  $ tBodyAccJerk-std()-Z              : num  -0.936 -0.978 -0.973 -0.976 -0.987 ...
##  $ tBodyAccJerk-mad()-X              : num  -0.916 -0.969 -0.991 -0.99 -0.991 ...
```

```
##  $ tBodyAccJerk-mad()-Y                : num  -0.937 -0.974 -0.973 -0.973 -0.977 ...
##  $ tBodyAccJerk-mad()-Z                : num  -0.949 -0.979 -0.975 -0.978 -0.985 ...
##  $ tBodyAccJerk-max()-X                : num  -0.903 -0.915 -0.992 -0.992 -0.994 ...
##  $ tBodyAccJerk-max()-Y                : num  -0.95 -0.981 -0.975 -0.975 -0.986 ...
##  $ tBodyAccJerk-max()-Z                : num  -0.891 -0.978 -0.962 -0.962 -0.986 ...
##  $ tBodyAccJerk-min()-X                : num  0.898 0.898 0.994 0.994 0.994 ...
##  $ tBodyAccJerk-min()-Y                : num  0.95 0.968 0.976 0.976 0.98 ...
##  $ tBodyAccJerk-min()-Z                : num  0.946 0.966 0.966 0.97 0.985 ...
##  $ tBodyAccJerk-sma()                  : num  -0.931 -0.974 -0.982 -0.983 -0.987 ...
##   [list output truncated]
```

Step 6: Extract the measurements on the mean and standard deviation for each measurement:

Logically extract measurement data and summarize by subject number the mean of the measurements' mean and standard deviation.

Satisfies the Project Requirement for R Script that: "2. Extracts only the measurements on the mean and standard deviation for each measurement."

There are 17 measurements x 33 computed variables in this 561-column dataset (17 x 33 = 561).
The measurements are: tBodyAcc-XYZ, tGravityAcc-XYZ, tBodyAccJerk-XYZ, tBodyGyro-XYZ, tBodyGyroJerk-XYZ, tBodyAccMag, and tGravityAccMag – where -XYZ means there are 3 measurements for each.

All 17 measurements have a mean and a standard deviation measuremnt. Script extracts these 2 x 17 measurements for 34 total measurements to form the data that will go into the tidy dataset.

`grepel` is used with string combinations to form a series of 4 logical vectors from the **data_labels** vector of measurment names.
The 4 logical vectors are logically-**Or**-ed (`|`) together to a **final_vector** that is logically used to create a **final_datanames** character vector corresponding to the column names of measurements to be extracted.

The **final_extract** data table is created by rows of Subject Numbers and the extracted measurement column names from **final_datanames**.

The **final_extract** data table is then grouped (`group_by`) the Subject Number (**subject_group**).

The tidy dataset is initially formed by calling `summarize_all` on the grouped data table, **subject_group** with a `funs(mean)` parameter to summarize the mean of the 34 mean and standard deviation measurements, by **subject_num**.

```
## Total 17 measurements: (15) of tBodyAcc-XYZ and tBodyGyro-XYZ, (1)
## tBodyAccMag, & (1) tGravityAccMag 17 measurements over: (1) mean and (2)
## standard deviation = 34 columns to extract:

## First, Logical Vectors of columns with measurements named: 'tBody' AND
## with: (mean or std):
measure_means_vector <- grepl("^(tBody)", data_labels$V2) & grepl("mean", data_labels$V2)
measure_std_vector <- grepl("^(tBody)", data_labels$V2) & grepl("std", data_labels$V2)

## Second, Logical Vector columns with measurement named: 'tGravity' AND
## with: (mean or std):
measure_gravity_vector_mean <- grepl("^(tGravityAccMag)", data_labels$V2) &
    grepl("mean", data_labels$V2)
measure_gravity_vector_std <- grepl("^(tGravityAccMag)", data_labels$V2) & grepl("std",
    data_labels$V2)
```

```
## Combine both logical vectors of columns and assemble measurment names to
## be extracted:
final_vector <- (measure_means_vector | measure_std_vector | measure_gravity_vector_mean |
    measure_gravity_vector_std)
## OR combines mean and std columns together

final_datanames <- as.character(data_labels$V2[final_vector])
## character vector of measurement names

## Extract the subject number column and measurement columns:
final_extract <- tbl_df(combined_dataset[, c("subject_num", final_datanames)])

## Create Tidy Dataset grouped by subject number:
subject_group <- group_by(final_extract, subject_num)  ## group by subject number
independent_tidydataset <- summarize_all(subject_group, funs(mean))  ## summarize with mean
```

Step 7: Provide read-able column names to the data for a Tidy Dataset

Satisfies Project Requirement: 5. From the data set in step 4, creates a second, independent tidy data set with the average of each variable for each activity and each subject.

Tidy Data Set Rows are the Subjects and are linked to each Observation Column of Mean and Std Dev.

```
## Tidy-Up column names of the results with read-able column names:
tidy_colnames <- c("subject number", "body acceleration mean-X", "body acceleration mean-Y",
    "body acceleration mean-Z", "body acceleration std dev-X", "body acceleration std dev-Y",
    "body acceleration std dev-Z", "body acceleration jerk mean-X", "body acceleration jerk mean-Y",
    "body acceleration jerk mean-Z", "body acceleration jerk std dev-X", "body acceleration jerk std dev
    "body acceleration jerk std dev-Z", "body gyro mean-X", "body gyro mean-Y",
    "body gyro mean-Z", "body gyro std dev-X", "body gyro std dev-Y", "body gyro std dev-Z",
    "body gyro jerk mean-X", "body gyro jerk mean-Y", "body gyro jerk mean-Z",
    "body gyro jerk std dev-X", "body gyro jerk std dev-Y", "body gyro jerk std dev-Z",
    "body acceleration magnitude mean", "body acceleration magnitude std dev",
    "gravity acceleration magnitude mean", "gravity acceleration magnitude std dev",
    "body accleration jerk magnitude mean", "body accleration jerk magnitude std dev",
    "body gyro magnitude mean", "body gyro magnitude std dev", "body gyro jerk magnitude mean",
    "body gyro jerk magnitude std dev")

## Apply new tidy column names to the Tidy Dataset:
names(independent_tidydataset) <- tidy_colnames
```

Step 8: Print the Tidy Dataset in a read-able output format write to .txt and .csv files

Use pander to print a neat, wide data table across several pages.

Each column of the **Wide Dataset** is linked to rows in *Subject Number*.

Satisfies requirement that: each variable you measure should be in one column; and each different observation of that variable should be in a different row.

```
library(pander)

## Prints out full datatable in rmarkdown format spanning multiple pages Tidy
## Data Set Rows are the Subjects linked to each Observation Column of Mean
## and Std Dev
pandoc.table(as.data.frame(independent_tidydataset), split.table = 80, style = "rmarkdown",
    caption = "Independent Tidy Dataset", keep.line.breaks = TRUE)
```

```
##
##
## |  subject number  |  body acceleration mean-X  |  body acceleration mean-Y  |
## |:----------------:|:--------------------------:|:--------------------------:|
## |        1         |           0.2657           |          -0.0183           |
## |        2         |           0.2731           |          -0.01913          |
## |        3         |           0.2734           |          -0.01786          |
## |        4         |           0.2742           |          -0.01481          |
## |        5         |           0.2792           |          -0.01548          |
## |        6         |           0.2724           |          -0.01757          |
## |        7         |           0.2702           |          -0.01879          |
## |        8         |           0.2708           |          -0.01819          |
## |        9         |           0.2703           |          -0.02095          |
## |        10        |           0.2768           |          -0.01784          |
## |        11        |           0.2766           |          -0.01913          |
## |        12        |           0.2736           |          -0.01834          |
## |        13        |           0.2759           |          -0.01765          |
## |        14        |           0.2702           |          -0.01625          |
## |        15        |           0.2782           |          -0.01646          |
## |        16        |           0.2779           |          -0.01586          |
## |        17        |           0.274            |          -0.01754          |
## |        18        |           0.2763           |          -0.01728          |
## |        19        |           0.2697           |          -0.0182           |
## |        20        |           0.2684           |          -0.01759          |
## |        21        |           0.2775           |          -0.01767          |
## |        22        |           0.2748           |          -0.01683          |
## |        23        |           0.2735           |          -0.01959          |
## |        24        |           0.2768           |          -0.01768          |
## |        25        |           0.2753           |          -0.01932          |
## |        26        |           0.273            |          -0.01617          |
## |        27        |           0.2773           |          -0.0168           |
## |        28        |           0.2775           |          -0.01917          |
## |        29        |           0.2791           |          -0.01847          |
## |        30        |           0.2763           |          -0.01759          |
##
## Table: Independent Tidy Dataset (continued below)
##
##
##
## |  body acceleration mean-Z  |  body acceleration std dev-X  |
## |:--------------------------:|:-----------------------------:|
## |          -0.1078           |            -0.5458            |
## |          -0.1156           |            -0.6056            |
```

```
## |          -0.1065          |           -0.6234           |
## |          -0.1075          |           -0.6052           |
## |          -0.1057          |           -0.5077           |
## |           -0.116          |           -0.5051           |
## |          -0.1125          |           -0.5775           |
## |          -0.1068          |           -0.583            |
## |          -0.1012          |           -0.5557           |
## |          -0.1113          |           -0.5378           |
## |          -0.1089          |           -0.5895           |
## |          -0.1066          |           -0.584            |
## |          -0.1091          |           -0.6248           |
## |           -0.101          |           -0.6117           |
## |          -0.1126          |           -0.5565           |
## |          -0.1073          |           -0.6682           |
## |          -0.1092          |           -0.6085           |
## |          -0.1081          |           -0.6946           |
## |          -0.1183          |           -0.5747           |
## |           -0.108          |           -0.6048           |
## |          -0.1088          |           -0.6723           |
## |          -0.1087          |           -0.5461           |
## |          -0.1091          |           -0.6226           |
## |          -0.1079          |           -0.6755           |
## |          -0.1096          |           -0.7163           |
## |          -0.1076          |           -0.6231           |
## |          -0.1108          |           -0.661            |
## |          -0.1097          |           -0.649            |
## |          -0.1087          |           -0.5743           |
## |          -0.1059          |           -0.6159           |
##
## Table: Table continues below
##
##
##
## |  body acceleration std dev-Y  |  body acceleration std dev-Z  |
## |:-----------------------------:|:-----------------------------:|
## |            -0.3677            |            -0.5026            |
## |            -0.429             |            -0.5894            |
## |             -0.48             |            -0.6536            |
## |            -0.5099            |            -0.7095            |
## |            -0.4027            |            -0.6464            |
## |            -0.3684            |            -0.6725            |
## |            -0.5464            |            -0.4565            |
## |            -0.3494            |            -0.4995            |
## |            -0.5759            |            -0.5061            |
## |            -0.4974            |            -0.6148            |
## |            -0.4904            |            -0.6653            |
## |            -0.522             |            -0.6993            |
## |            -0.4488            |            -0.5872            |
## |            -0.3747            |            -0.2935            |
## |            -0.4817            |            -0.7057            |
## |            -0.6499            |            -0.6038            |
## |            -0.567             |            -0.6606            |
## |            -0.6271            |            -0.7016            |
## |            -0.507             |            -0.6492            |
```

```
## |            -0.3693           |            -0.6348           |
## |            -0.5656           |            -0.6696           |
## |            -0.4912           |            -0.6551           |
## |            -0.5321           |            -0.4506           |
## |            -0.5825           |            -0.6365           |
## |            -0.5314           |            -0.6471           |
## |            -0.586            |            -0.705            |
## |            -0.6305           |            -0.6832           |
## |            -0.5737           |            -0.6858           |
## |            -0.5984           |            -0.6065           |
## |            -0.519            |            -0.5226           |
##
## Table: Table continues below
##
##
##
## |  body acceleration jerk mean-X  |  body acceleration jerk mean-Y  |
## |:-------------------------------:|:-------------------------------:|
## |             0.07709             |              0.01659            |
## |             0.07854             |             0.007088            |
## |             0.07017             |              0.01447            |
## |             0.07886             |             0.003513            |
## |             0.0841              |             0.001766            |
## |             0.08138             |             0.0004793           |
## |             0.08318             |             0.007609            |
## |             0.08422             |             0.0008603           |
## |             0.08402             |             0.006785            |
## |             0.07981             |              0.01291            |
## |             0.08301             |             0.007804            |
## |             0.07043             |             0.005312            |
## |             0.07944             |              0.00388            |
## |             0.07418             |             0.004437            |
## |             0.07769             |             0.004894            |
## |             0.07755             |              0.00884            |
## |             0.08141             |             0.008489            |
## |             0.07748             |              0.01289            |
## |             0.07742             |              0.01158            |
## |             0.07982             |             0.002209            |
## |             0.08222             |             0.003501            |
## |             0.0791              |              0.01526            |
## |             0.07786             |              0.02005            |
## |             0.07847             |             0.003969            |
## |             0.08177             |             0.006386            |
## |             0.08087             |             0.007677            |
## |             0.07683             |             0.006177            |
## |             0.08073             |              0.01382            |
## |             0.07884             |             0.009002            |
## |             0.07348             |             0.007304            |
##
## Table: Table continues below
##
##
##
## |  body acceleration jerk mean-Z  |  body acceleration jerk std dev-X  |
```

```
## |:------------------------------:|:---------------------------------:|
## |            -0.009108           |              -0.5247              |
## |            0.0007558           |              -0.5578              |
## |           -0.0005268           |              -0.6355              |
## |            -0.007374           |              -0.6319              |
## |            -0.002954           |              -0.5759              |
## |            -0.002259           |              -0.5315              |
## |            -0.007917           |              -0.6151              |
## |            -0.01967            |               -0.576              |
## |            -0.00103            |              -0.5783              |
## |            -0.01136            |              -0.5294              |
## |            -0.006574           |              -0.6593              |
## |            0.0003081           |              -0.5824              |
## |            -0.01235            |              -0.6389              |
## |            -0.00253            |               -0.642              |
## |            -0.00441            |              -0.6241              |
## |            -0.001437           |              -0.7279              |
## |            0.002703            |              -0.6826              |
## |            0.0008485           |              -0.7346              |
## |            -0.001862           |              -0.5711              |
## |            -0.004506           |              -0.6271              |
## |            -0.01066            |              -0.6998              |
## |            -0.007229           |               -0.585              |
## |           -0.0007177           |              -0.6082              |
## |            -0.00701            |              -0.7403              |
## |            -0.01035            |              -0.7968              |
## |            -0.007249           |              -0.6828              |
## |            -0.00495            |              -0.7005              |
## |            0.0008242           |              -0.6808              |
## |            -0.003553           |              -0.6235              |
## |           -0.0006539           |               -0.679              |
##
## Table: Table continues below
##
##
##
## |  body acceleration jerk std dev-Y  |  body acceleration jerk std dev-Z  |
## |:----------------------------------:|:----------------------------------:|
## |              -0.4704               |              -0.7173               |
## |              -0.4919               |              -0.7419               |
## |              -0.5572               |              -0.7961               |
## |              -0.5841               |              -0.8434               |
## |              -0.5065               |              -0.7846               |
## |              -0.4544               |               -0.739               |
## |               -0.623               |              -0.6643               |
## |              -0.4587               |              -0.6684               |
## |              -0.6789               |              -0.7216               |
## |              -0.5402               |              -0.7507               |
## |              -0.6088               |              -0.8425               |
## |              -0.5714               |              -0.7926               |
## |              -0.5697               |              -0.7285               |
## |              -0.5865               |              -0.6569               |
## |              -0.5943               |              -0.8258               |
## |              -0.7351               |              -0.7679               |
```

```
## |              -0.6687              |              -0.8133              |
## |               -0.733              |              -0.8473              |
## |              -0.5713              |              -0.7053              |
## |              -0.5272              |              -0.7474              |
## |              -0.6652              |              -0.7818              |
## |              -0.5605              |              -0.7605              |
## |               -0.619              |               -0.603              |
## |               -0.686              |              -0.7364              |
## |              -0.7225              |              -0.8607              |
## |              -0.6784              |              -0.7783              |
## |              -0.6748              |              -0.7836              |
## |              -0.6516              |              -0.8009              |
## |              -0.6355              |              -0.7937              |
## |              -0.6608              |              -0.7816              |
##
## Table: Table continues below
##
##
##
## |  body gyro mean-X  |  body gyro mean-Y  |  body gyro mean-Z  |
## |:------------------:|:------------------:|:------------------:|
## |      -0.02088      |      -0.08807      |      0.08626       |
## |      -0.0517       |      -0.05684      |      0.08726       |
## |      -0.02485      |      -0.07436      |      0.08669       |
## |      -0.02894      |      -0.07872      |      0.09572       |
## |      -0.02945      |      -0.07743      |      0.08663       |
## |      -0.04336      |      -0.07061      |      0.09731       |
## |      -0.05187      |      -0.06461      |      0.09777       |
## |      0.003591      |      -0.09108      |      0.06409       |
## |      -0.07013      |      -0.07299      |       0.1091       |
## |      -0.0185       |      -0.08464      |      0.09103       |
## |      -0.05473      |      -0.05823      |      0.08728       |
## |      -0.06287      |      -0.0592       |      0.09607       |
## |      -0.05625      |      -0.06166      |      0.09887       |
## |     0.0002537      |      -0.09549      |      0.06067       |
## |      -0.02813      |      -0.07588      |      0.09067       |
## |      -0.01223      |      -0.07244      |      0.07301       |
## |      -0.01467      |      -0.08271      |      0.07703       |
## |      -0.0374       |      -0.06782      |      0.09084       |
## |      -0.03857      |      -0.06814      |      0.08836       |
## |      -0.02425      |      -0.07894      |      0.08563       |
## |      -0.02763      |      -0.07847      |      0.08612       |
## |     -0.008006      |      -0.09497      |      0.08124       |
## |      -0.02209      |      -0.0826       |      0.07469       |
## |      -0.02126      |      -0.07824      |      0.08417       |
## |     -0.002982      |      -0.0839       |      0.09936       |
## |      -0.02066      |      -0.08274      |      0.09179       |
## |      -0.06089      |      -0.05522      |       0.1089       |
## |      -0.0645       |      -0.04715      |       0.1008       |
## |      -0.01018      |      -0.08829      |      0.08816       |
## |      -0.03542      |      -0.07175      |      0.08345       |
##
## Table: Table continues below
##
```

```
##
##
## |  body gyro std dev-X  |  body gyro std dev-Y  |  body gyro std dev-Z  |
## |:---------------------:|:---------------------:|:---------------------:|
## |        -0.6866        |        -0.451         |        -0.5975        |
## |        -0.7106        |        -0.7229        |        -0.6349        |
## |        -0.6993        |        -0.763         |        -0.7095        |
## |        -0.7014        |        -0.7982        |        -0.7264        |
## |         -0.71         |        -0.7056        |        -0.6066        |
## |        -0.6538        |        -0.6263        |        -0.5999        |
## |        -0.6872        |        -0.6524        |        -0.6633        |
## |        -0.6562        |        -0.5709        |        -0.5114        |
## |        -0.6765        |        -0.6705        |        -0.5876        |
## |        -0.6739        |        -0.5913        |        -0.5981        |
## |        -0.7399        |        -0.7035        |        -0.725         |
## |        -0.7279        |        -0.7351        |        -0.6711        |
## |        -0.7151        |        -0.6457        |        -0.6433        |
## |        -0.7287        |        -0.399         |        -0.3645        |
## |        -0.6969        |        -0.7088        |        -0.7218        |
## |        -0.7995        |        -0.8101        |        -0.7376        |
## |        -0.759         |        -0.7649        |        -0.7207        |
## |        -0.8045        |        -0.7774        |        -0.7456        |
## |        -0.6378        |        -0.6439        |        -0.6457        |
## |        -0.6846        |        -0.5737        |        -0.5273        |
## |        -0.7962        |        -0.7651        |        -0.7016        |
## |        -0.6959        |        -0.7841        |        -0.6545        |
## |        -0.7557        |        -0.5003        |        -0.6097        |
## |        -0.7762        |        -0.7634        |        -0.7083        |
## |        -0.6831        |        -0.7523        |        -0.7474        |
## |        -0.7667        |        -0.8007        |        -0.7033        |
## |        -0.7959        |        -0.802         |        -0.6741        |
## |        -0.7403        |        -0.7413        |        -0.6698        |
## |        -0.7347        |        -0.6346        |        -0.7139        |
## |        -0.671         |        -0.539         |        -0.5898        |
##
## Table: Table continues below
##
##
##
## |  body gyro jerk mean-X  |  body gyro jerk mean-Y  |  body gyro jerk mean-Z  |
## |:-----------------------:|:-----------------------:|:-----------------------:|
## |         -0.09711        |         -0.04172        |         -0.04714        |
## |         -0.08756        |          -0.0434        |         -0.05575        |
## |         -0.09916        |         -0.04019        |         -0.05212        |
## |          -0.1079        |         -0.04004        |         -0.05781        |
## |          -0.1035        |         -0.04906        |         -0.05063        |
## |         -0.08292        |         -0.04549        |         -0.05336        |
## |          -0.0942        |         -0.04144        |         -0.06103        |
## |          -0.105         |         -0.04009        |         -0.05829        |
## |         -0.08923        |         -0.03973        |          -0.0534        |
## |          -0.1082        |         -0.04242        |         -0.05555        |
## |         -0.08055        |         -0.04939        |         -0.04801        |
## |         -0.07311        |         -0.04368        |         -0.05746        |
## |         -0.08812        |         -0.04408        |         -0.05827        |
```

```
## |         -0.1076         |        -0.04332         |        -0.04507         |
## |        -0.09609         |        -0.04413         |        -0.05556         |
## |         -0.1074         |        -0.04166         |        -0.05395         |
## |         -0.1079         |        -0.03917         |        -0.05085         |
## |         -0.0944         |        -0.04417         |        -0.05685         |
## |        -0.08959         |        -0.03832         |        -0.05696         |
## |        -0.09498         |        -0.04144         |         -0.0543         |
## |         -0.1006         |        -0.04082         |        -0.05339         |
## |         -0.1093         |        -0.03846         |        -0.05821         |
## |         -0.0967         |        -0.04327         |         -0.0622         |
## |        -0.09983         |        -0.03907         |         -0.0553         |
## |         -0.1083         |        -0.03899         |        -0.05558         |
## |        -0.09881         |        -0.04048         |        -0.05583         |
## |        -0.08931         |        -0.04504         |        -0.05863         |
## |        -0.08812         |         -0.0448         |        -0.06077         |
## |         -0.1007         |        -0.04643         |        -0.05279         |
## |        -0.09268         |        -0.04129         |        -0.04936         |
##
## Table: Table continues below
##
##
##
## |  body gyro jerk std dev-X  |  body gyro jerk std dev-Y  |
## |:--------------------------:|:--------------------------:|
## |          -0.6378           |          -0.6345           |
## |          -0.6717           |          -0.7836           |
## |          -0.6893           |          -0.8427           |
## |          -0.7238           |          -0.9025           |
## |          -0.6626           |          -0.7741           |
## |           -0.546           |          -0.6776           |
## |          -0.7017           |          -0.6749           |
## |           -0.675           |          -0.6831           |
## |          -0.7617           |          -0.7733           |
## |          -0.7032           |          -0.7686           |
## |          -0.7817           |          -0.8684           |
## |          -0.7097           |          -0.8112           |
## |          -0.7158           |           -0.719           |
## |          -0.7863           |          -0.6979           |
## |          -0.7314           |           -0.854           |
## |          -0.8583           |          -0.8696           |
## |          -0.7884           |           -0.826           |
## |          -0.8429           |          -0.8841           |
## |          -0.6188           |           -0.726           |
## |          -0.6984           |          -0.6843           |
## |          -0.7925           |          -0.8159           |
## |          -0.7089           |          -0.8599           |
## |          -0.7287           |           -0.546           |
## |          -0.7645           |          -0.7927           |
## |          -0.7687           |          -0.9026           |
## |          -0.7323           |          -0.8361           |
## |          -0.8211           |          -0.8373           |
## |          -0.7205           |           -0.825           |
## |          -0.7361           |          -0.8536           |
## |          -0.7806           |          -0.7989           |
```

```
##
## Table: Table continues below
##
##
##
## |  body gyro jerk std dev-Z  |  body acceleration magnitude mean  |
## |:--------------------------:|:----------------------------------:|
## |          -0.6646           |               -0.4536              |
## |          -0.6746           |               -0.5353              |
## |           -0.743           |               -0.5631              |
## |          -0.7484           |               -0.5616              |
## |          -0.5647           |               -0.4609              |
## |          -0.5269           |               -0.4648              |
## |          -0.7508           |               -0.5113              |
## |           -0.696           |               -0.4685              |
## |          -0.7447           |               -0.5052              |
## |          -0.6868           |               -0.5025              |
## |          -0.7955           |               -0.5428              |
## |          -0.7494           |               -0.5596              |
## |          -0.7127           |               -0.5399              |
## |          -0.6383           |               -0.4533              |
## |          -0.7956           |               -0.5273              |
## |           -0.837           |               -0.6161              |
## |          -0.8083           |               -0.5684              |
## |          -0.8386           |               -0.6584              |
## |          -0.6867           |               -0.5315              |
## |          -0.6367           |               -0.5173              |
## |           -0.812           |               -0.6203              |
## |          -0.7423           |               -0.5041              |
## |          -0.7405           |               -0.5328              |
## |          -0.7968           |                -0.62               |
## |          -0.8318           |               -0.5834              |
## |          -0.7731           |               -0.6009              |
## |          -0.7829           |               -0.6279              |
## |          -0.7698           |                -0.61               |
## |          -0.7702           |               -0.5536              |
## |          -0.7632           |               -0.5381              |
##
## Table: Table continues below
##
##
##
## |  body acceleration magnitude std dev  |
## |:-------------------------------------:|
## |                -0.4971                |
## |                -0.5528                |
## |                -0.5912                |
## |                -0.6066                |
## |                -0.5216                |
## |                -0.4838                |
## |                -0.5107                |
## |                -0.554                 |
## |                -0.553                 |
## |                -0.5453                |
```

```
## |                -0.6129                |
## |                -0.5744                |
## |                -0.5972                |
## |                -0.4741                |
## |                -0.5571                |
## |                -0.6617                |
## |                -0.6361                |
## |                -0.6897                |
## |                -0.5996                |
## |                -0.5723                |
## |                -0.6602                |
## |                -0.596                 |
## |                -0.5656                |
## |                -0.6509                |
## |                -0.659                 |
## |                -0.6204                |
## |                -0.6779                |
## |                -0.6358                |
## |                -0.5791                |
## |                -0.5882                |
##
## Table: Table continues below
##
##
##
## |  gravity acceleration magnitude mean  |
## |:--------------------------------------:|
## |                -0.4536                |
## |                -0.5353                |
## |                -0.5631                |
## |                -0.5616                |
## |                -0.4609                |
## |                -0.4648                |
## |                -0.5113                |
## |                -0.4685                |
## |                -0.5052                |
## |                -0.5025                |
## |                -0.5428                |
## |                -0.5596                |
## |                -0.5399                |
## |                -0.4533                |
## |                -0.5273                |
## |                -0.6161                |
## |                -0.5684                |
## |                -0.6584                |
## |                -0.5315                |
## |                -0.5173                |
## |                -0.6203                |
## |                -0.5041                |
## |                -0.5328                |
## |                 -0.62                 |
## |                -0.5834                |
## |                -0.6009                |
## |                -0.6279                |
```

```
## |                 -0.61                |
## |                -0.5536               |
## |                -0.5381               |
##
## Table: Table continues below
##
##
##
## |  gravity acceleration magnitude std dev  |
## |:-----------------------------------------:|
## |                 -0.4971                   |
## |                 -0.5528                   |
## |                 -0.5912                   |
## |                 -0.6066                   |
## |                 -0.5216                   |
## |                 -0.4838                   |
## |                 -0.5107                   |
## |                  -0.554                   |
## |                  -0.553                   |
## |                 -0.5453                   |
## |                 -0.6129                   |
## |                 -0.5744                   |
## |                 -0.5972                   |
## |                 -0.4741                   |
## |                 -0.5571                   |
## |                 -0.6617                   |
## |                 -0.6361                   |
## |                 -0.6897                   |
## |                 -0.5996                   |
## |                 -0.5723                   |
## |                 -0.6602                   |
## |                  -0.596                   |
## |                 -0.5656                   |
## |                 -0.6509                   |
## |                  -0.659                   |
## |                 -0.6204                   |
## |                 -0.6779                   |
## |                 -0.6358                   |
## |                 -0.5791                   |
## |                 -0.5882                   |
##
## Table: Table continues below
##
##
##
## |  body accleration jerk magnitude mean  |
## |:---------------------------------------:|
## |                -0.5454                  |
## |                -0.5878                  |
## |                -0.6502                  |
## |                -0.6561                  |
## |                -0.5893                  |
## |                -0.5514                  |
## |                -0.6228                  |
```

```
## |                -0.5342                |
## |                -0.6216                |
## |                -0.5778                |
## |                -0.6798                |
## |                -0.6301                |
## |                -0.6255                |
## |                 -0.609                |
## |                -0.6548                |
## |                -0.7252                |
## |                -0.6965                |
## |                -0.7539                |
## |                -0.5762                |
## |                -0.6197                |
## |                -0.7035                |
## |                -0.6098                |
## |                -0.5864                |
## |                -0.7137                |
## |                -0.7834                |
## |                -0.6949                |
## |                -0.7018                |
## |                -0.6894                |
## |                -0.6645                |
## |                -0.6971                |
##
## Table: Table continues below
##
##
##
## |  body accleration jerk magnitude std dev  |  body gyro magnitude mean  |
## |:-----------------------------------------:|:--------------------------:|
## |                  -0.5159                  |          -0.4754           |
## |                  -0.5121                  |          -0.6148           |
## |                  -0.6077                  |          -0.6432           |
## |                  -0.6472                  |          -0.6563           |
## |                  -0.589                   |          -0.6028           |
## |                  -0.5029                  |          -0.5495           |
## |                  -0.5506                  |          -0.5819           |
## |                  -0.5645                  |          -0.4762           |
## |                  -0.6089                  |          -0.5502           |
## |                  -0.5293                  |          -0.5218           |
## |                  -0.6642                  |          -0.6284           |
## |                  -0.5664                  |          -0.6317           |
## |                  -0.6102                  |          -0.5812           |
## |                  -0.6051                  |          -0.4165           |
## |                  -0.6257                  |          -0.6177           |
## |                  -0.7196                  |          -0.7182           |
## |                  -0.6939                  |          -0.6762           |
## |                  -0.7452                  |          -0.7147           |
## |                  -0.6019                  |          -0.5489           |
## |                  -0.5886                  |          -0.5169           |
## |                  -0.6801                  |          -0.6938           |
## |                  -0.5898                  |          -0.6377           |
## |                  -0.5587                  |          -0.5442           |
## |                  -0.6894                  |          -0.6824           |
```

```
## |                  -0.7805                  |          -0.6257          |
## |                  -0.6774                  |          -0.6946          |
## |                  -0.696                   |           -0.694          |
## |                  -0.6877                  |          -0.6485          |
## |                  -0.6205                  |          -0.6022          |
## |                  -0.659                   |           -0.51           |
##
## Table: Table continues below
##
##
##
## |  body gyro magnitude std dev  |  body gyro jerk magnitude mean  |
## |:-----------------------------:|:-------------------------------:|
## |            -0.4998            |             -0.6395             |
## |            -0.6806            |             -0.7466             |
## |            -0.674             |             -0.7841             |
## |            -0.7067            |             -0.8192             |
## |            -0.6641            |             -0.7074             |
## |            -0.5798            |             -0.6219             |
## |            -0.5987            |             -0.7132             |
## |            -0.5814            |             -0.6736             |
## |            -0.6632            |             -0.763              |
## |            -0.6244            |             -0.7345             |
## |            -0.6968            |             -0.8268             |
## |            -0.6849            |             -0.7773             |
## |            -0.6364            |             -0.7127             |
## |            -0.4715            |             -0.7005             |
## |            -0.6753            |             -0.8053             |
## |            -0.7848            |             -0.8604             |
## |            -0.7501            |             -0.8104             |
## |            -0.7758            |             -0.8599             |
## |            -0.6101            |             -0.6834             |
## |             -0.58             |             -0.684              |
## |            -0.7613            |             -0.8078             |
## |            -0.6764            |             -0.7947             |
## |            -0.5419            |             -0.6234             |
## |            -0.743             |             -0.7916             |
## |            -0.6852            |             -0.8496             |
## |            -0.7518            |             -0.7983             |
## |            -0.7547            |             -0.8231             |
## |            -0.711             |             -0.7893             |
## |            -0.6537            |             -0.8023             |
## |            -0.5738            |             -0.7859             |
##
## Table: Table continues below
##
##
##
## |  body gyro jerk magnitude std dev  |
## |:----------------------------------:|
## |               -0.6521              |
## |               -0.7401              |
## |               -0.8037              |
## |               -0.8442              |
```

```
## |              -0.7342              |
## |              -0.6445              |
## |               -0.658              |
## |              -0.7158              |
## |              -0.7862              |
## |              -0.7688              |
## |              -0.8669              |
## |              -0.7864              |
## |              -0.7121              |
## |               -0.727              |
## |              -0.8371              |
## |              -0.8748              |
## |              -0.8253              |
## |              -0.8886              |
## |              -0.7256              |
## |              -0.6835              |
## |              -0.8241              |
## |              -0.8265              |
## |              -0.5739              |
## |               -0.789              |
## |              -0.8728              |
## |              -0.8183              |
## |              -0.8372              |
## |              -0.8057              |
## |              -0.8402              |
## |              -0.8104              |
```

```
write.table(independent_tidydataset, file = "project_tidy_dataset.txt", row.name = FALSE)
## writes the tidy dataset to .txt file in the local project directory

write.csv(independent_tidydataset, file = "project_tidy_dataset.csv")
## writes the tidy dataset to .csv file in the local project directory
```