# Codebook For Getting and Cleaning Data

This is the codebook for the outputted Tidydata file. The original source of the data can be found at:

<https://d396qusza40orc.cloudfront.net/getdata%2Fprojectfiles%2FUCI%20HAR%20Dataset.zip> 

## Structure of Data

Data is organised to produce the average of each variable for each subject and activity. This data is arranged in the form of Subject\_Id, Activity, average of Means, average of Standard deviations.

The features selected for this database come from the accelerometer and gyroscope 3-axial raw signals tAcc-XYZ and tGyro-XYZ. These time domain signals (prefix 't' to denote time) were captured at a constant rate of 50 Hz. Similarly, the acceleration signal was then separated into body and gravity acceleration signals (tBodyAcc-XYZ and tGravityAcc-XYZ).

Subsequently, the body linear acceleration and angular velocity were derived in time to obtain Jerk signals (tBodyAccJerk-XYZ and tBodyGyroJerk-XYZ). Also the magnitude of these three-dimensional signals were calculated using the Euclidean norm (tBodyAccMag, tGravityAccMag, tBodyAccJerkMag, tBodyGyroMag, tBodyGyroJerkMag).

Finally a Fast Fourier Transform (FFT) was applied to some of these signals producing fBodyAcc-XYZ, fBodyAccJerk-XYZ, fBodyGyro-XYZ, fBodyAccJerkMag, fBodyGyroMag, fBodyGyroJerkMag. (Note the 'f' to indicate frequency domain signals).

These signals were used to estimate variables of the feature vector for each pattern:

'-XYZ' is used to denote 3-axial signals in the X, Y and Z directions. (Note names have been adjusted to more descriptive variable names).

* time Body Accelerometer -XYZ
* time Gravity Accelerometer -XYZ
* time Body Accelerometer Jerk -XYZ
* time Body Gyroscope -XYZ
* time Body Gyroscope Jerk -XYZ
* time Body Accelerometer Magnitude
* time Gravity Accelerometer Magnitude
* time Body Accelerometer Jerk Magnitude
* time Body Gyroscope Magnitude
* time Body Gyroscope Jerk Magnitude
* frequency Body Accelerometer -XYZ
* frequency Body Accelerometer Jerk -XYZ
* frequency Body Gyroscope -XYZ
* frequency Body Accelerometer Magnitude
* frequency Body Accelerometer Jerk Magnitude
* frequency Body Gyroscope Magnitude
* frequency Body Gyroscope Jerk Magnitude

The set of variables that were kept in this assignment:

* mean: Mean value
* std: Standard deviation

Additional vectors obtained by averaging the signals in a signal window sample. These are used on the angle() variable:

* gravity Mean
* time Body Accelerometer Mean
* time Body Accelerometer Jerk Mean
* time Body Gyroscope Mean
* time Body Gyroscope Jerk Mean

All other variables were discarded for this assignment.

These names are structured in the format of:

Time body Accelerometer Mean – X = **timeBodyAccelerometer.mean...X**

Time body Accelerometer Std – Y = **timeBodyAccelerometer.std...Y**