# Codebook

### **General Steps:**

- Load library plyr
- Check working directory, then set to "..../getdata\_projectfiles\_UCI HAR Dataset/UCI HAR Dataset"
- Extract test features , then rename column names
- Extract test activity labels, then rename column names
- Extract test datasets, then set column name programmatically as features
- Combine test subject, activity label, and X dataset into single test data frame
- Extract train features, then rename column names
- Extract train activity labels, then rename column names
- Extract train datasets, then set column name programmatically as features
- Combine train subject, activity label, and X dataset into single train data frame
- Assignment STEP 1: Merges the training and the test sets to create one data set
- Obtain list of columns which include mean or std as part of names.
- Also include the subject and activity label columns on the left
- Assignment STEP 2: Extracts only the measurements on the mean and standard deviation for each measurement
- Assignment STEP 3: Uses descriptive activity names to name the activities in the data set
- Assignment STEP 4: Appropriately labels the data set with descriptive variable names
- Set subject and activity as factor
- Assignment STEP 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
- Write tidy data result into CSV file

#### Variable list and descriptions:

Variable Name	Description		
features_name	Data frame read from "feature.txt" file		
activity_label	Data frame read from "activity_labels.txt" file		
subject_test_data	Data frame read from "subject_test.txt" file		
X_test_data	Data frame read from "X_test.txt" file		
y_test_data	Data frame read from "y_test.txt" file		
test_data	Data frame combined from subject_test_data, y_test_data, and		
	X_test_data		
subject_train_data	Data frame read from "subject_train.txt" file		
X_train_data	Data frame read from "X_train.txt" file		
y_train_data	Data frame read from "y_train.txt" file		
train_data	Data frame combined from subject_train_data, y_train_data, and		
	X_train_data		

merged_data	Data frame combined from test_data and train_data			
col_list	List of columns from			
	- subject			
	- activity			
	- merge_data column includes "mean"			
	<ul> <li>merge_data column includes "std"</li> </ul>			
subset_data	Subset of merge_data data frame where column names in col_list			
tidy_data	Mean aggregated data frame from subset_data group by subject and			
	ActivityName			

#### **Dataset Structure:**

\$ fBodyBodyAccJerkMag.mean..

```
> str(tidy_data)
'data.frame': 180 obs. of 81 variables:
                                            : Factor w/ 30 levels "1","2","3","4",..: 1 2 3 4 5 6 7 8 : Factor w/ 6 levels "LAYING","SITTING",..: 1 1 1 1 1 1 1 : num 0.222 0.281 0.276 0.264 0.278 ...
 $ Group.1
 $ Group.2
 $ tBodyAcc.mean...X
                                                     -0.0405 -0.0182 -0.019 -0.015 -0.0183 ...

-0.113 -0.107 -0.101 -0.111 -0.108 ...

-0.249 -0.51 -0.242 -0.421 -0.483 ...

0.706 0.753 0.837 0.915 0.955 ...
   tBodyAcc.mean...Y
                                            : num
   tBodyAcc.mean...Z
                                            : num
   tGravityAcc.mean...X
                                              num
   tGravityAcc.mean...Y
                                              num
                                                     0.446 0.647 0.489 0.342 0.264
 $ tGravityAcc.mean...Z
                                            : num
   tBodyAccJerk.mean...X
                                                     0.0811 0.0826 0.077 0.0934 0.0848
                                            : num
                                                     0.00384 0.01225 0.0138 0.00693 0.00747
 $ tBodyAccJerk.mean...Y
                                            : num
                                                     0.01083 -0.0018 -0.00436 -0.00641 -0.00304
 $ tBodyAccJerk.mean...Z
                                            : num
                                                     -0.01655 -0.01848 -0.02082 -0.00923 -0.02189 ...
 $ tBodyGyro.mean...X
                                            : num
                                                     -0.0645 -0.1118 -0.0719 -0.093 -0.0799 ...
0.149 0.145 0.138 0.17 0.16 ...
-0.107 -0.102 -0.1 -0.105 -0.102 ...
-0.0415 -0.0359 -0.039 -0.0381 -0.0404 ...
   tBodyGyro.mean...Y
                                            : num
   tBodyGyro.mean...Z
                                            : num
   tBodyGyroJerk.mean...X
                                            : num
                                            : num
   tBodyGyroJerk.mean...Y
                                                     -0.0741 -0.0702 -0.0687 -0.0712 -0.0708 ...
                                           : num
   tBodyGyroJerk.mean...Z
                                                     -0.842 -0.977 -0.973 -0.955 -0.967 ...
-0.842 -0.977 -0.973 -0.955 -0.967 ...
   tBodyAccMag.mean..
                                           : num
 $ tGravityAccMag.mean..
                                           : num
                                                     -0.954 -0.988 -0.979 -0.97 -0.98 ...
 $ tBodyAccJerkMag.mean..
                                           : num
                                                     -0.934 -0.968 -0.979 -0.97 -0.96 ...

-0.875 -0.95 -0.952 -0.93 -0.947 ...

-0.963 -0.992 -0.987 -0.985 -0.986 ...

-0.939 -0.977 -0.981 -0.959 -0.969 ...

-0.867 -0.98 -0.961 -0.939 -0.965 ...

-0.883 -0.984 -0.968 -0.968 -0.977 ...

-0.159 -0.146 -0.074 -0.274 -0.136 ...
 $ tBodyGyroMag.mean..
                                            : num
   tBodyGyroJerkMag.mean..
                                            : num
   fBodyAcc.mean...X
                                            : num
   fBodyAcc.mean...Y
                                            : num
   fBodyAcc.mean...Z
                                            : num
   fBodyAcc.meanFreq...X
                                            : num
   fBodyAcc.meanFreq...Y
                                            : num
                                                     0.0975 0.2573 0.2385 0.3662 0.4665 ...
                                                     0.0894 0.4025 0.217 0.2013 0.1323 ...
 $ fBodyAcc.meanFreq...Z
                                            : num
                                                     -0.957 -0.986 -0.981 -0.979 -0.983 ...
-0.922 -0.983 -0.969 -0.944 -0.965 ...
-0.948 -0.986 -0.979 -0.975 -0.983 ...
 $ fBodyAccJerk.mean...X
                                            : num
 $ fBodyAccJerk.mean...Y
                                            : num
   fBodyAccJerk.mean...Z
                                              num
                                                     0.132 0.16 0.176 0.182 0.24
   fBodyAccJerk.meanFreq...X
                                            : num
                                                     0.0245 0.1212 -0.0132 0.0987 0.1957 ...
0.0244 0.1906 0.0448 0.077 0.0917 ...
   fBodyAccJerk.meanFreq...Y
                                              num
   fBodyAccJerk.meanFreq...Z
                                              num
                                                     -0.85 -0.986 -0.97 -0.967 -0.976
   fBodyGyro.mean...X
                                               num
                                                     -0.952 -0.983 -0.978 -0.972 -0.978 ...
   fBodyGyro.mean...Y
                                              num
                                                     -0.909 -0.963 -0.962 -0.961 -0.963 ...
   fBodyGyro.mean...Z
                                            : num
                                                     -0.00355 0.10261 -0.08222 -0.06609 -0.02272 ...
   fBodyGyro.meanFreq...X
                                            : num
                                                     -0.0915 0.0423 -0.0267 -0.5269 0.0681 ...
   fBodyGyro.meanFreq...Y
                                            : num
                                                     0.0105 0.0553 0.1477 0.1529 0.0414 ...
 $ fBodyGyro.meanFreq...Z
                                            : num
                                                     -0.862 -0.975 -0.966 -0.939 -0.962 ...
 $ fBodyAccMag.mean..
                                            : num
                                                     fBodyAccMag.meanFreq..
                                            : num
```

: num

## List the columns in the dataset:

```
> names(tidy_data)
[1] "Group.1" "tBodyAcc.mean...Y" "tBodyAcc.mean...Z" "tBodyAcc.mean...Z" "tBodyAcc.mean...Z" "tBodyAcc.mean...Z" "tBodyAccJerk.mean...Z" "tBodyAccJerk.mean...Z" "tBodyGyro.mean...X" "tBodyGyro.mean...Z" "fBodyAcc.mean...X" "fBodyAcc.mean...Y" "fBodyAcc.mean...Y" "fBodyAcc.mean...Y" "fBodyAcc.mean...Y" "fBodyAcc.mean...Y" "fBodyAcc.mean...Y" "fBodyAcc.mean...Y" "fBodyAccJerk.mean...X" "fBodyAccJerk.mean...X" "fBodyAccJerk.mean...Y" "fBodyGyro.mean...X" "fBodyGyro.mean...X" "fBodyGyro.mean...X" "fBodyGyro.mean...X" "fBodyGyro.mean...Y" "fBodyGyro.mean...X" "fBodyGyro.mean...Y" "fBodyGyro.mean...X" "fBodyGyro.mean...Y" "fBodyGyro.mean...X" "fBodyGyro.mean...Y" "fBodyGyro.mean.
```

```
[55] "tBodyAccJerk.std...X""tBodyAccJerk.std...Y""tBodyAccJerk.std...Y"[58] "tBodyGyro.std...X""tBodyGyro.std...Y""tBodyGyro.std...Z"[61] "tBodyGyroJerk.std...X""tBodyGyroJerk.std...Y""tBodyGyroJerk.std...Y"[64] "tBodyAccMag.std..""tGravityAccMag.std..""tBodyAccJerkMag.st[67] "tBodyGyroMag.std..""tBodyGyroJerkMag.std..""fBodyAcc.std...X"[70] "fBodyAcc.std...Y""fBodyAcc.std...Z""fBodyAccJerk.std...[73] "fBodyGyro.std...Y""fBodyGyro.std...Z""fBodyGyro.std...X"[76] "fBodyGyro.std...Y""fBodyGyro.std...Z""fBodyAccMag.std.."[79] "fBodyBodyAccJerkMag.std..""fBodyBodyGyroJerkMag.std..""fBodyBodyGyroJerkMag.std.."
```

#### Show a few rows of the dataset:

> head(tid	y_data) Group.2 tBodvA	.cc.meanX tBo	odvAcc.mea	ınY	tBodvAcc.mear	1Z	tGravitvAc	
c.meanx 1 1		0.2215982	-0.040		-0.113		-	
0.2488818	LAYING	0.2813734	-0.018	315874	-0.107	72456	-	
0.5097542 3 3 0.2417585	LAYING	0.2755169	-0.018	95568	-0.10	13005	-	
4 4 0.4206647	LAYING	0.2635592	-0.015	00318	-0.110	06882	-	
5 5 0.4834706	LAYING	0.2783343	-0.018	30421	-0.107	79376	-	
6 6 0.4767099	LAYING	0.2486565	-0.010	25292	-0.133	31196	-	
	Acc.meanY t	GravityAcc.mea	1Z tBod	lyAccJe	rk.meanx 1	tBodyA	ccJerk.mea	
1 8204	0.7055498	0.44	58177		0.08108653		0.00383	
2 4788	0.7525366	0.640	68349		0.08259725		0.01225	
3 4101	0.8370321	0.488	87032		0.07698111		0.01380	
4 3132	0.9151651	0.3415313		0.09344942			0.00693	
5 4608	0.9548903	0.26	36447		0.08481648		0.00747	
6 5292	0.9565938	0.17	58677		0.09634820		-0.00114	
	Jerk.meanZ	tBodyGyro.mean	X tBody	Gyro.m	eanY tBody	yGyro.	meanZ tB	
1	0.010834236 -0.1072709	-0.01655	3094	-0.0	6448612	0	.1486894	
2	-0.001802649 -0.1019741	-0.018470	6607	-0.1	1180082	0	.1448828	
3	-0.004356259 -0.1000445	-0.02081	7054	-0.0	7185072	0	.1379996	
4	-0.006410543 -0.1050199	-0.009231563		-0.09301282		0	0.1697204	
5	-0.003040672 -0.1021141	-0.02189	3501	-0.0	7987096	0	.1598944	
6	0.003288173	-0.007960	0503	-0.1	0721832	0	.1791021	
tBodyGyr		′tBodyGyroJerk	.meanz	tBodyA	ccMag.mean	tGrav	ityAccMag.m	
ean 1 19292	-0.04151729	-0	.07405012		-0.8419292		-0.84	

```
-0.03585902
                                      -0.07017830
                                                            -0.9774355
                                                                                    -0.97
74355
              -0.03897718
                                      -0.06873387
                                                            -0.9727913
                                                                                    -0.97
27913
              -0.03812304
                                      -0.07121563
                                                            -0.9545576
                                                                                    -0.95
45576
              -0.04044469
                                      -0.07083097
                                                                                    -0.96
                                                            -0.9667779
67779
              -0.04241043
                                      -0.07177747
                                                            -0.9188789
                                                                                    -0.91
88789
  tBodyAccJerkMag.mean.. tBodyGyroMag.mean.. tBodyGyroJerkMag.mean.. fBodyAcc.mea
n...X fBodyAcc.mean...Y
                                    -0.8747595
                                                              -0.9634610
               -0.9543963
                                                                                 -0.9390
991
           -0.8670652
                                                              -0.9917671
                                    -0.9500116
                                                                                 -0.9767
               -0.9877417
251
           -0.9798009
               -0.9794846
                                    -0.9515648
                                                              -0.9867136
                                                                                 -0.9806
656
           -0.9611700
               -0.9700958
                                    -0.9302365
                                                              -0.9850685
                                                                                 -0.9588
            -0.9388834
021
                                    -0.9469383
                                                              -0.9864194
                                                                                 -0.9687
               -0.9801413
417
            -0.9654195
               -0.9547505
                                    -0.9089802
                                                              -0.9556457
                                                                                 -0.9391
6
143
            -0.9237068
  fBodyAcc.mean...Z fBodyAcc.meanFreq...X fBodyAcc.meanFreq...Y fBodyAcc.meanFre
q...Z
         -0.8826669
                                -0.15879267
                                                         0.09753484
                                                                                0.089437
1
66
         -0.9843810
                                -0.14648279
                                                         0.25728947
                                                                                0.402532
55
3
         -0.9683321
                                -0.07395264
                                                         0.23847075
                                                                                0.216971
67
         -0.9675043
                                -0.27419462
                                                         0.36623145
                                                                                0.201329
4
59
         -0.9770077
                                -0.13563245
                                                         0.46652823
                                                                                0.132310
5
87
         -0.9380449
                                -0.21972993
                                                         0.34841875
                                                                                0.161457
6
  fBodyAccJerk.mean...X fBodyAccJerk.mean...Y fBodyAccJerk.mean...Z fBodyAccJerk.me
anFreq...X
              -0.9570739
                                     -0.9224626
                                                             -0.9480609
0.13241909
              -0.9858136
                                     -0.9827683
                                                             -0.9861971
0.15980833
              -0.9805132
                                     -0.9687521
                                                             -0.9791223
0.17597855
              -0.9785425
                                     -0.9439700
                                                             -0.9753833
0.18243648
             -0.9826897
                                     -0.9653286
                                                             -0.9832503
0.23991516
             -0.9670724
                                     -0.9360434
                                                             -0.9544258
6
0.01147319
  fBodyAccJerk.meanFreq...Y fBodyAccJerk.meanFreq...Z fBodyGyro.mean...X fBodyGyro.
mean...Y
                  0.02451362
                                              0.02438795
                                                                  -0.8502492
1
0.9521915
                  0.12120642
                                              0.19055822
                                                                  -0.9864311
0.9833216
                 -0.01317750
                                              0.04481969
                                                                  -0.9701673
0.9780997
                  0.09874288
                                              0.07702112
                                                                  -0.9672037
0.9721878
                  0.19567734
                                              0.09169388
                                                                  -0.9757975
0.9782496
```

6		220295	0	.0784684	0 -0.93	354398	-
	9417715 fBodyGyro.meanZ fBodyGyro.meanFreqX		fBodyGyr	o.meanFregY	fBodyGyro	.meanFr	
eqz	-0.9093027		03546796		-0.09152913	,.,	0.01
1 045813							
2 529860	-0.9626719	0.1	.02611319		0.04228067		0.05
3	-0.9623420	-0.0	82216645		-0.02668201		0.14
768646 4	-0.9614793	-0.0	66092182		-0.52689000		0.15
288631 5	-0.9632029	-0.0	22723586		0.06812485		0.04
136003							
6 452255	-0.9326366		.02549066		0.02365678		0.04
fBodyA	ccMag.mean meanFreq	fBodyAccMag.me	anFreq	fBodyBod	yAccJerkMag.me	an fBodyE	BodyAcc
1	-0.8617676	0.	08640856		-0.933	3004	
2	0.2663912 -0.9751102	0.	26629821		-0.985	3741	
	0.3417586						
3	-0.9655243 0.2386111	0.	23699013		-0.975	1496	
4	-0.9393897 0.2740273	0.	0.24169790		-0.9622871		
5	-0.9622350	0.29203209		-0.9773564			
6	0.1970050 -0.9123517	0.	14460509		-0.948	6555	
0.1825251 fBodyBodyGyroMag.mean fBodyBodyGyroMag.meanFreq fBodyBodyGyroJerkMag.mean							
	oayGyromag.me 0.862-			eanFreq. .1397750:		ојегкмад.me -0.942	
2	-0.972 -0.964			.0185644		-0.990 -0.984	
3 -0.9645867 -0.02292961 -0 4 -0.9615567 -0.25985197 -0			-0.983	36091			
5 -0.9682571 0.			.10244177 -0.9846180 .11931752 -0.9536960				
fBodyBo	odyGyroJerkMa	ıg.meanFreq t			z BodyAcc.std`		
Z tGravii 1	tyAcc.stdx	0.17648591	-0.9	280565	-0.836827	4 -0.	.826061
4	-0.8968300	)					
2	-0.9590144	0.26480151	-0.9	740595	-0.980277	1 -0.	.984233
3 0	-0.9825122	0.11069770	-0.98	827766	-0.962057	5 -0.	.963691
		0.20294938	-0.9	541937	-0.941714	0 -0.	.962667
4 3 5 5 6	-0.9212000	0.02473671	-0.9	659345	-0.969295	5 -0	.968562
5 6	-0.9456953	0.16376532	-0.9	340494	-0.924644	8 -0.	.925216
1	-0.8877463	}					
tBodyAc	tyacc.stdy cJerk.stdZ	r tGravityAcc.s Z	tα∠ τΒα	odyAccJe	rk.stdX tBo	ayaccjerk.s	sταΥ
1	-0.9077200 -0.9548551	-0.8	3523663		-0.9584821	-0.9	9241493
2	-0.9882119	-0.9	842304		-0.9858722	-0.9	9831725
3	-0.9884420 -0.9812027		648075		-0.9808793	-0.9	9687107
	-0.9820932 -0.9698166	)	761766				
4	-0.9785120				-0.9783028		9422095
5	-0.9859641 -0.9854194		770766		-0.9833079	-0.9	9645604
	0.3031137						

```
6
           -0.9591620
                                                       -0.9663411
                                 -0.9281307
                                                                              -0.9336745
           -0.9596461
  tBodyGyro.std...X tBodyGyro.std...Y tBodyGyro.std...Z tBodyGyroJerk.std...X tBody
GyroJerk.std...Y
         -0.8735439
                             -0.9510904
                                                -0.9082847
1
      -0.9679072
2
          -0.9882752
                             -0.9822916
                                                -0.9603066
                                                                        -0.9932358
      -0.9895675
                             -0.9772727
                                                -0.9635056
                                                                        -0.9803286
3
          -0.9745458
      -0.9867627
                             -0.9611093
                                                -0.9620738
                                                                       -0.9751032
4
         -0.9731024
      -0.9868556
                             -0.9774274
5
         -0.9794987
                                                -0.9605838
                                                                        -0.9834223
      -0.9837595
          -0.9553782
6
                             -0.9436349
                                                -0.9391419
                                                                        -0.9396116
      -0.9586288
  tBodyGyroJerk.std...Z tBodyAccMag.std.. tGravityAccMag.std.. tBodyAccJerkMag.st
   tBodyGyroMag.std.
              -0.9577902
                                 -0.7951449
                                                       -0.7951449
                                                                               -0.928245
1
          -0.8190102
6
2
                                 -0.9728739
              -0.9880358
                                                       -0.9728739
                                                                               -0.985518
1
          -0.9611641
3
              -0.9833383
                                 -0.9642182
                                                       -0.9642182
                                                                               -0.976121
          -0.9542751
4
              -0.9839654
                                 -0.9312922
                                                       -0.9312922
                                                                               -0.960786
4
           -0.9470318
              -0.9896796
                                 -0.9586128
                                                       -0.9586128
                                                                               -0.977477
1
          -0.9582879
6
              -0.9595791
                                 -0.8973262
                                                       -0.8973262
                                                                               -0.950341
9
          -0.9209145
  tBodyGyroJerkMag.std.. fBodyAcc.std...X fBodyAcc.std...Y fBodyAcc.std...Z fBodyAc
cJerk.std...X
               -0.9358410
                                 -0.9244374
                                                   -0.8336256
                                                                     -0.8128916
1
   -0.9641607
2
                                 -0.9732465
                                                   -0.9810251
                                                                     -0.9847922
               -0.9897181
   -0.9872503
               -0.9831393
3
                                 -0.9836911
                                                   -0.9640946
                                                                     -0.9632791
   -0.9831226
                                 -0.9524649
                                                                     -0.9621545
4
               -0.9826982
                                                   -0.9463810
   -0.9800793
5
               -0.9837714
                                 -0.9649539
                                                   -0.9729092
                                                                     -0.9658822
   -0.9856253
               -0.9531570
                                 -0.9324629
                                                   -0.9297112
                                                                     -0.9240047
6
   -0.9686192
  fBodyAccJerk.std...Y fBodyAccJerk.std...Z fBodyGyro.std...X fBodyGyro.std...Y fBo
dyGyro.std...Z
             -0.9322179
                                   -0.9605870
                                                      -0.8822965
                                                                          -0.9512320
    -0.9165825
2
             -0.9849874
                                   -0.9893454
                                                                          -0.9819106
                                                      -0.9888607
    -0.9631742
3
             -0.9710440
                                   -0.9837119
                                                      -0.9759864
                                                                          -0.9770325
    -0.9672569
                                   -0.9802612
                                                      -0.9750947
                                                                          -0.9561825
4
             -0.9443669
    -0.9658075
5
            -0.9662426
                                   -0.9861356
                                                      -0.9807058
                                                                          -0.9772578
    -0.9633057
6
             -0.9357175
                                   -0.9635675
                                                      -0.9621650
                                                                          -0.9453651
    -0.9471368
  fBodyAccMag.std.. fBodyBodyAccJerkMag.std.. fBodyBodyGyroMag.std.. fBodyBodyGyroJ
erkMag.std..
         -0.7983009
                                     -0.9218040
                                                              -0.8243194
  -0.9326607
         -0.9751214
                                     -0.9845685
                                                              -0.9610984
  -0.9894927
```

3	-0.9683502 -0.9825682	-0.9753054	-0.9554419
4	-0.9825082 -0.9371880 -0.9825436	-0.9580371	-0.9471003
5	-0.9823430 -0.9625254 -0.9834345	-0.9763819	-0.9592631
6	-0.9053740 -0.9555047	-0.9515527	-0.9286949

# Save to text file:

write.table(tidy\_data,file="./tidy\_data.txt",row.name=FALSE)

Thank you!