

Google Data Analytics Capstone Project

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Introduction

This case study demonstrated an analysis report of data from FitBit users. The purpose of this data analytics is for Bellabeat, a high-tech manufacturer of health-focused products for women. Bellabeat intended to find out behaviour of non-Bellabeat users, which could help better develop and improve the products of Bellabeat.

To answer the key business questions, the steps of the data analysis process were followed as below: ask, prepare, process, analyze, share, and act.

Scenario

You are a junior data analyst working on the marketing analyst team at Bellabeat, a high-tech manufacturer of health-focused products for women. Bellabeat is a successful small company, but they have the potential to become a larger player in the global smart device market. Urška Sršen, cofounder and Chief Creative Officer of Bellabeat, believes that analyzing smart device fitness data could help unlock new growth opportunities for the company. You have been asked to focus on one of Bellabeat's products and analyze smart device data to gain insight into how consumers are using their smart devices. The insights you discover will then help guide marketing strategy for the company. You will present your analysis to the Bellabeat executive team along with your high-level recommendations for Bellabeat's marketing strategy. (Excerpt from Google Data Analytics Capstone: Complete A Case Study)

Step 1: Install Packages

The following packages were installed.

```
install.packages("tidyverse")
```

```
## Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.1'  
## (as 'lib' is unspecified)
```

```
install.packages("janitor")
```

```
## Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.1'  
## (as 'lib' is unspecified)
```

```
install.packages("ggplot2")
```

```
## Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.1'  
## (as 'lib' is unspecified)
```

Each package installed were loaded it by running the `library()` function with the package name inside the parentheses:

```
library(tidyverse)
```

```
## -- Attaching packages ----- tidyverse 1.3.1 --
```

```
## v ggplot2 3.3.5      v purrr  0.3.4
## v tibble  3.1.6      v dplyr  1.0.8
## v tidyr   1.2.0      v stringr 1.4.0
## v readr   2.1.2      v forcats 0.5.1

## -- Conflicts ----- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()

library(lubridate)

##
## Attaching package: 'lubridate'

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

Step 2: Cleaning Data

The necessary packages were also installed and loaded to proceed with summarisation and skimming of data.

```
install.packages("here")

## Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.1'
## (as 'lib' is unspecified)

library("here")

## here() starts at /cloud/project

install.packages("skimr")

## Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.1'
## (as 'lib' is unspecified)

library("janitor")

##
## Attaching package: 'janitor'

## The following objects are masked from 'package:stats':
##
##     chisq.test, fisher.test

install.packages("dplyr")

## Installing package into '/cloud/lib/x86_64-pc-linux-gnu-library/4.1'
## (as 'lib' is unspecified)

library("dplyr")
```

Step 3: Import Data

The data used in this case study is provided by FitBit Fitness Tracker Data (CC0: Public Domain, dataset made available through Mobius): The Kaggle data set contains personal fitness tracker from thirty fitbit users. Thirty eligible Fitbit users consented to the submission of personal tracker data, including minute-level output for physical activity, heart rate, and sleep monitoring. It includes information about daily activity, steps, and heart rate that can be used to explore users' habits. (Excerpt from Google Data Analytics Capstone: Complete A Case Study)

```
daily_activity_summary <- read.csv("dailyActivity_merged.csv")
```

Step 4: Summary of Data

```
colnames(daily_activity_summary)
```

```
## [1] "Id" "ActivityDate"
## [3] "TotalSteps" "TotalDistance"
## [5] "TrackerDistance" "LoggedActivitiesDistance"
## [7] "VeryActiveDistance" "ModeratelyActiveDistance"
## [9] "LightActiveDistance" "SedentaryActiveDistance"
## [11] "VeryActiveMinutes" "FairlyActiveMinutes"
## [13] "LightlyActiveMinutes" "SedentaryMinutes"
## [15] "Calories"
```

```
glimpse(daily_activity_summary)
```

```
## Rows: 940
## Columns: 15
## $ Id <dbl> 1503960366, 1503960366, 1503960366, 150396036~
## $ ActivityDate <chr> "4/12/2016", "4/13/2016", "4/14/2016", "4/15/~
## $ TotalSteps <int> 13162, 10735, 10460, 9762, 12669, 9705, 13019~
## $ TotalDistance <dbl> 8.50, 6.97, 6.74, 6.28, 8.16, 6.48, 8.59, 9.8~
## $ TrackerDistance <dbl> 8.50, 6.97, 6.74, 6.28, 8.16, 6.48, 8.59, 9.8~
## $ LoggedActivitiesDistance <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, ~
## $ VeryActiveDistance <dbl> 1.88, 1.57, 2.44, 2.14, 2.71, 3.19, 3.25, 3.5~
## $ ModeratelyActiveDistance <dbl> 0.55, 0.69, 0.40, 1.26, 0.41, 0.78, 0.64, 1.3~
## $ LightActiveDistance <dbl> 6.06, 4.71, 3.91, 2.83, 5.04, 2.51, 4.71, 5.0~
## $ SedentaryActiveDistance <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, ~
## $ VeryActiveMinutes <int> 25, 21, 30, 29, 36, 38, 42, 50, 28, 19, 66, 4~
## $ FairlyActiveMinutes <int> 13, 19, 11, 34, 10, 20, 16, 31, 12, 8, 27, 21~
## $ LightlyActiveMinutes <int> 328, 217, 181, 209, 221, 164, 233, 264, 205, ~
## $ SedentaryMinutes <int> 728, 776, 1218, 726, 773, 539, 1149, 775, 818~
## $ Calories <int> 1985, 1797, 1776, 1745, 1863, 1728, 1921, 203~
```

```
head(daily_activity_summary)
```

```
##           Id ActivityDate TotalSteps TotalDistance TrackerDistance
## 1 1503960366 4/12/2016      13162           8.50           8.50
## 2 1503960366 4/13/2016      10735           6.97           6.97
## 3 1503960366 4/14/2016      10460           6.74           6.74
## 4 1503960366 4/15/2016       9762           6.28           6.28
## 5 1503960366 4/16/2016      12669           8.16           8.16
## 6 1503960366 4/17/2016       9705           6.48           6.48
## LoggedActivitiesDistance VeryActiveDistance ModeratelyActiveDistance
## 1                        0                1.88                0.55
## 2                        0                1.57                0.69
## 3                        0                2.44                0.40
## 4                        0                2.14                1.26
## 5                        0                2.71                0.41
## 6                        0                3.19                0.78
## LightActiveDistance SedentaryActiveDistance VeryActiveMinutes
## 1                6.06                0                25
## 2                4.71                0                21
## 3                3.91                0                30
```

## 4	2.83	0	29	
## 5	5.04	0	36	
## 6	2.51	0	38	
##	FairlyActiveMinutes	LightlyActiveMinutes	SedentaryMinutes	Calories
## 1	13	328	728	1985
## 2	19	217	776	1797
## 3	11	181	1218	1776
## 4	34	209	726	1745
## 5	10	221	773	1863
## 6	20	164	539	1728

Step 5: Process and Clean Data

It was found that the data table consisted of information regarding the distance and minutes of activity by the user. Steps were taken to separate the summary table into individual tables specifically for distance or minutes only.

```
activity_distance <- daily_activity_summary %>%
  select(Id, ActivityDate, TotalSteps, TotalDistance, VeryActiveDistance, ModeratelyActiveDistance, LightlyActiveDistance)
```

```
activity_minutes <- daily_activity_summary %>%
  select(Id, ActivityDate, TotalSteps, VeryActiveMinutes, FairlyActiveMinutes, LightlyActiveMinutes, SedentaryMinutes)
```

The following steps were also taken to overcome the inconsistencies between the two tables.

1. The total activity minutes was counted.

```
activity_minutes <- activity_minutes %>%
  mutate(TotalMinutes = VeryActiveMinutes+FairlyActiveMinutes+LightlyActiveMinutes+SedentaryMinutes)
```

```
activity_minutes <- activity_minutes %>%
  relocate(TotalMinutes, .after = TotalSteps)
```

2. The column name 'ModeratelyActiveDistance' was changed to 'FairlyActiveDistance' to ensure that it is consistent with 'FairlyActiveMinutes' in the activity minutes table.

```
activity_distance <- activity_distance %>%
  rename(FairlyActiveDistance = ModeratelyActiveDistance)
```

3. The column name 'LightActiveDistance' was changed to 'LightlyActiveDistance' to ensure that it is consistent with 'LightlyActiveMinutes' in the activity minutes table.

```
activity_distance <- activity_distance %>%
  rename(LightlyActiveDistance = LightActiveDistance)
```

4. The column name 'SedentaryMinutes' was changed to 'SedentaryActiveMinutes' to ensure that it is consistent with 'SedentaryActiveDistance' in the activity distance table.

```
activity_minutes <- activity_minutes %>%
  rename(SedentaryActiveMinutes = SedentaryMinutes)
```

The column names for both tables were also changed so that it remains consistent and easier to use as the analysis proceeds.

```
activity_distance <- rename_with(activity_distance, tolower)
```

```
activity_minutes <- rename_with(activity_minutes, tolower)
```

The data was also cleaned to ensure that the data only consist of numbers, underscores and characters in the name.

The data was also cleaned to remove any empty rows and columns.

```
activity_distance<-activity_distance %>% remove_empty(whic=c("rows"))
activity_distance<-activity_distance %>% remove_empty(whic=c("cols"))
```

```
activity_minutes<-activity_minutes %>% remove_empty(whic=c("rows"))
activity_minutes<-activity_minutes %>% remove_empty(whic=c("cols"))
```

Step 6: Analyze and Transform Data

The data was analyzed to determine the trends and insights based on the data obtained.

```
library(tidyverse)
```

```
activity_distance %>% arrange(totaldistance)
```

##	id	activitydate	totalsteps	totaldistance	veryactivedistance
## 1	1503960366	5/12/2016	0	0.00	0.00
## 2	1844505072	4/24/2016	0	0.00	0.00
## 3	1844505072	4/25/2016	0	0.00	0.00
## 4	1844505072	4/26/2016	0	0.00	0.00
## 5	1844505072	4/27/2016	4	0.00	0.00
## 6	1844505072	5/2/2016	0	0.00	0.00
## 7	1844505072	5/7/2016	0	0.00	0.00
## 8	1844505072	5/8/2016	0	0.00	0.00
## 9	1844505072	5/9/2016	0	0.00	0.00
## 10	1844505072	5/10/2016	0	0.00	0.00
## 11	1844505072	5/11/2016	0	0.00	0.00
## 12	1844505072	5/12/2016	0	0.00	0.00
## 13	1927972279	4/16/2016	0	0.00	0.00
## 14	1927972279	4/17/2016	0	0.00	0.00
## 15	1927972279	4/19/2016	0	0.00	0.00
## 16	1927972279	4/20/2016	0	0.00	0.00
## 17	1927972279	4/21/2016	0	0.00	0.00
## 18	1927972279	4/27/2016	0	0.00	0.00
## 19	1927972279	4/29/2016	0	0.00	0.00
## 20	1927972279	4/30/2016	0	0.00	0.00
## 21	1927972279	5/5/2016	0	0.00	0.00
## 22	1927972279	5/8/2016	0	0.00	0.00
## 23	1927972279	5/9/2016	0	0.00	0.00
## 24	1927972279	5/10/2016	0	0.00	0.00
## 25	1927972279	5/11/2016	0	0.00	0.00
## 26	1927972279	5/12/2016	0	0.00	0.00
## 27	4020332650	4/13/2016	0	0.00	0.00
## 28	4020332650	4/19/2016	0	0.00	0.00
## 29	4020332650	4/20/2016	0	0.00	0.00
## 30	4020332650	4/21/2016	0	0.00	0.00
## 31	4020332650	4/22/2016	0	0.00	0.00
## 32	4020332650	4/23/2016	0	0.00	0.00
## 33	4020332650	4/24/2016	0	0.00	0.00
## 34	4020332650	4/25/2016	0	0.00	0.00
## 35	4020332650	4/26/2016	0	0.00	0.00
## 36	4020332650	4/27/2016	0	0.00	0.00
## 37	4020332650	4/28/2016	0	0.00	0.00
## 38	4020332650	4/29/2016	0	0.00	0.00
## 39	4020332650	4/30/2016	0	0.00	0.00

## 40	4020332650	5/1/2016	0	0.00	0.00
## 41	4057192912	4/14/2016	0	0.00	0.00
## 42	4702921684	5/1/2016	0	0.00	0.00
## 43	5577150313	5/7/2016	0	0.00	0.00
## 44	5577150313	5/8/2016	0	0.00	0.00
## 45	6117666160	4/12/2016	0	0.00	0.00
## 46	6117666160	4/13/2016	0	0.00	0.00
## 47	6117666160	4/14/2016	0	0.00	0.00
## 48	6117666160	4/25/2016	0	0.00	0.00
## 49	6117666160	5/3/2016	0	0.00	0.00
## 50	6290855005	4/21/2016	0	0.00	0.00
## 51	6290855005	4/23/2016	0	0.00	0.00
## 52	6290855005	4/26/2016	0	0.00	0.00
## 53	6290855005	4/29/2016	0	0.00	0.00
## 54	6290855005	5/10/2016	0	0.00	0.00
## 55	6775888955	4/12/2016	0	0.00	0.00
## 56	6775888955	4/19/2016	0	0.00	0.00
## 57	6775888955	4/21/2016	0	0.00	0.00
## 58	6775888955	4/23/2016	0	0.00	0.00
## 59	6775888955	4/27/2016	0	0.00	0.00
## 60	6775888955	4/29/2016	0	0.00	0.00
## 61	6775888955	5/2/2016	0	0.00	0.00
## 62	6775888955	5/4/2016	0	0.00	0.00
## 63	6775888955	5/5/2016	0	0.00	0.00
## 64	7007744171	5/4/2016	0	0.00	0.00
## 65	7007744171	5/7/2016	0	0.00	0.00
## 66	7086361926	4/17/2016	0	0.00	0.00
## 67	8253242879	4/30/2016	0	0.00	0.00
## 68	8583815059	5/12/2016	0	0.00	0.00
## 69	8792009665	4/17/2016	0	0.00	0.00
## 70	8792009665	4/18/2016	0	0.00	0.00
## 71	8792009665	4/19/2016	0	0.00	0.00
## 72	8792009665	4/25/2016	0	0.00	0.00
## 73	8792009665	5/5/2016	0	0.00	0.00
## 74	8792009665	5/6/2016	0	0.00	0.00
## 75	8792009665	5/7/2016	0	0.00	0.00
## 76	8792009665	5/8/2016	0	0.00	0.00
## 77	8792009665	5/9/2016	0	0.00	0.00
## 78	8792009665	5/10/2016	0	0.00	0.00
## 79	1844505072	4/20/2016	8	0.01	0.00
## 80	4020332650	4/17/2016	16	0.01	0.00
## 81	4319703577	5/12/2016	17	0.01	0.00
## 82	6775888955	5/3/2016	9	0.01	0.00
## 83	7086361926	4/16/2016	31	0.01	0.00
## 84	4319703577	4/17/2016	29	0.02	0.00
## 85	1844505072	5/6/2016	44	0.03	0.00
## 86	2347167796	4/29/2016	42	0.03	0.00
## 87	4020332650	4/18/2016	62	0.04	0.00
## 88	4020332650	4/14/2016	108	0.08	0.00
## 89	8792009665	4/21/2016	144	0.09	0.00
## 90	1927972279	4/22/2016	149	0.10	0.00
## 91	1927972279	4/25/2016	152	0.11	0.00
## 92	1844505072	4/19/2016	197	0.13	0.00
## 93	2026352035	5/10/2016	254	0.16	0.00

## 94	8792009665	4/16/2016	244	0.16	0.00
## 95	1927972279	4/18/2016	244	0.17	0.00
## 96	1927972279	4/13/2016	356	0.25	0.00
## 97	8792009665	4/24/2016	400	0.26	0.04
## 98	4020332650	5/2/2016	475	0.34	0.00
## 99	4020332650	5/12/2016	590	0.42	0.00
## 100	5553957443	4/17/2016	655	0.43	0.00
## 101	6775888955	4/22/2016	637	0.46	0.00
## 102	1927972279	4/12/2016	678	0.47	0.00
## 103	3977333714	5/11/2016	746	0.50	0.37
## 104	6775888955	4/28/2016	703	0.50	0.06
## 105	2026352035	4/17/2016	838	0.52	0.00
## 106	2320127002	5/1/2016	772	0.52	0.00
## 107	4445114986	5/12/2016	768	0.52	0.00
## 108	2320127002	4/29/2016	924	0.62	0.00
## 109	1927972279	4/15/2016	980	0.68	0.00
## 110	5553957443	4/30/2016	1202	0.78	0.00
## 111	8792009665	4/14/2016	1219	0.78	0.00
## 112	2320127002	5/4/2016	1201	0.81	0.00
## 113	4319703577	5/1/2016	1251	0.84	0.00
## 114	8792009665	4/13/2016	1320	0.84	0.00
## 115	8053475328	5/1/2016	1170	0.85	0.00
## 116	8792009665	4/26/2016	1321	0.85	0.00
## 117	1644430081	4/21/2016	1223	0.89	0.00
## 118	1927972279	5/3/2016	1326	0.92	0.73
## 119	6775888955	4/15/2016	1282	0.92	0.00
## 120	1644430081	5/11/2016	1329	0.97	0.00
## 121	1624580081	4/15/2016	1510	0.98	0.00
## 122	2320127002	4/28/2016	1532	1.03	0.00
## 123	6962181067	4/14/2016	1551	1.03	0.00
## 124	1927972279	5/7/2016	1510	1.04	0.00
## 125	8792009665	5/1/2016	1619	1.04	0.00
## 126	1624580081	5/6/2016	1727	1.12	0.00
## 127	1624580081	5/9/2016	1732	1.13	0.00
## 128	8792009665	4/27/2016	1758	1.13	0.00
## 129	1927972279	4/28/2016	1675	1.16	0.00
## 130	2320127002	4/27/2016	1715	1.16	0.00
## 131	8792009665	5/2/2016	1831	1.17	0.00
## 132	5553957443	4/24/2016	1807	1.18	0.00
## 133	5553957443	5/7/2016	1868	1.22	0.00
## 134	1927972279	5/4/2016	1786	1.24	0.00
## 135	4020332650	4/15/2016	1882	1.35	0.21
## 136	4702921684	4/22/2016	1664	1.35	0.00
## 137	1624580081	5/3/2016	2100	1.37	0.00
## 138	1624580081	5/7/2016	2104	1.37	0.00
## 139	1844505072	5/4/2016	2080	1.37	0.00
## 140	4445114986	4/19/2016	2064	1.39	0.00
## 141	4445114986	4/20/2016	2072	1.39	0.00
## 142	6775888955	5/7/2016	1967	1.41	0.13
## 143	4020332650	4/16/2016	1982	1.42	0.45
## 144	1624580081	5/4/2016	2193	1.43	0.00
## 145	8053475328	5/2/2016	1969	1.43	0.00
## 146	1927972279	4/24/2016	2090	1.45	0.07
## 147	1927972279	5/6/2016	2091	1.45	0.00

## 148	8792009665	5/4/2016	2283	1.46	0.00
## 149	1844505072	5/5/2016	2237	1.48	0.00
## 150	1927972279	4/14/2016	2163	1.50	0.00
## 151	2026352035	4/19/2016	2424	1.50	0.00
## 152	4445114986	4/17/2016	2268	1.52	0.00
## 153	2026352035	4/21/2016	2467	1.53	0.00
## 154	6775888955	4/24/2016	2153	1.54	0.77
## 155	1624580081	4/29/2016	2390	1.55	0.00
## 156	4319703577	4/18/2016	2276	1.55	0.07
## 157	8792009665	5/3/2016	2421	1.55	0.00
## 158	2026352035	4/16/2016	2547	1.58	0.00
## 159	8792009665	4/15/2016	2483	1.59	0.00
## 160	1624580081	5/5/2016	2470	1.61	0.00
## 161	8792009665	4/12/2016	2564	1.64	0.00
## 162	1644430081	5/4/2016	2309	1.68	0.00
## 163	8378563200	4/17/2016	2132	1.69	0.00
## 164	1844505072	5/1/2016	2573	1.70	0.00
## 165	2873212765	4/17/2016	2524	1.70	0.00
## 166	1644430081	4/20/2016	2436	1.77	0.00
## 167	5553957443	4/20/2016	2713	1.77	0.00
## 168	8253242879	4/15/2016	2672	1.77	0.00
## 169	6775888955	5/1/2016	2487	1.78	0.48
## 170	1624580081	4/28/2016	2759	1.79	0.00
## 171	2320127002	5/12/2016	2661	1.79	0.00
## 172	6775888955	4/17/2016	2497	1.79	0.35
## 173	6775888955	4/30/2016	2503	1.79	0.16
## 174	8253242879	4/28/2016	2718	1.80	0.67
## 175	2026352035	4/22/2016	2915	1.81	0.00
## 176	7086361926	4/23/2016	2817	1.81	0.00
## 177	1624580081	4/26/2016	2826	1.84	0.00
## 178	1927972279	5/1/2016	2704	1.87	1.01
## 179	8253242879	4/22/2016	2824	1.87	0.00
## 180	1624580081	4/19/2016	2916	1.90	0.00
## 181	1624580081	5/10/2016	2969	1.93	0.00
## 182	1624580081	5/12/2016	2971	1.93	0.00
## 183	4445114986	5/4/2016	2923	1.96	0.00
## 184	4445114986	4/13/2016	2961	1.99	0.00
## 185	8792009665	4/20/2016	3147	2.01	0.00
## 186	1624580081	5/11/2016	3134	2.04	0.00
## 187	1927972279	4/23/2016	2945	2.04	0.00
## 188	5553957443	5/12/2016	3121	2.04	0.58
## 189	2026352035	4/18/2016	3325	2.06	0.00
## 190	2026352035	4/14/2016	3335	2.07	0.00
## 191	2320127002	5/9/2016	3090	2.08	0.00
## 192	3372868164	5/1/2016	3077	2.10	0.00
## 193	2026352035	4/24/2016	3490	2.16	0.00
## 194	7086361926	4/24/2016	3520	2.16	0.00
## 195	1644430081	4/27/2016	3032	2.20	0.00
## 196	4445114986	4/12/2016	3276	2.20	0.00
## 197	1624580081	5/8/2016	3427	2.23	0.00
## 198	4702921684	5/12/2016	2752	2.23	0.00
## 199	1844505072	4/16/2016	3414	2.26	0.00
## 200	6117666160	5/4/2016	2997	2.26	0.00
## 201	4445114986	4/25/2016	3385	2.27	0.00

##	202	4558609924	5/1/2016	3428	2.27	0.00
##	203	2026352035	5/1/2016	3609	2.28	0.00
##	204	2320127002	4/21/2016	3404	2.29	0.06
##	205	2320127002	4/26/2016	3409	2.30	0.00
##	206	1644430081	4/29/2016	3176	2.31	0.00
##	207	2022484408	5/8/2016	3292	2.31	0.00
##	208	8378563200	5/8/2016	2943	2.33	0.00
##	209	8378563200	4/30/2016	2946	2.34	0.00
##	210	8583815059	4/17/2016	3008	2.35	0.00
##	211	1844505072	4/23/2016	3570	2.36	0.00
##	212	2873212765	4/27/2016	3516	2.36	0.00
##	213	2026352035	4/15/2016	3821	2.37	0.00
##	214	6962181067	5/12/2016	3587	2.37	0.00
##	215	1644430081	4/24/2016	3321	2.41	0.00
##	216	2320127002	4/25/2016	3588	2.42	0.23
##	217	5553957443	4/18/2016	3727	2.43	0.00
##	218	2320127002	5/2/2016	3634	2.45	0.36
##	219	8583815059	4/14/2016	3135	2.45	0.00
##	220	4319703577	5/8/2016	3672	2.46	0.00
##	221	4319703577	4/21/2016	3702	2.48	0.00
##	222	4558609924	5/6/2016	3755	2.48	0.00
##	223	7007744171	4/30/2016	3761	2.52	0.00
##	224	1844505072	4/15/2016	3844	2.54	0.00
##	225	4445114986	5/5/2016	3800	2.55	0.12
##	226	4445114986	4/21/2016	3809	2.56	0.00
##	227	5577150313	5/9/2016	3421	2.56	1.43
##	228	7086361926	5/12/2016	3789	2.56	0.38
##	229	4388161847	5/12/2016	3369	2.59	0.00
##	230	1644430081	4/25/2016	3580	2.60	0.59
##	231	1927972279	4/26/2016	3761	2.60	0.00
##	232	2026352035	5/7/2016	4193	2.60	0.00
##	233	6117666160	4/28/2016	3403	2.60	0.00
##	234	8792009665	4/22/2016	4068	2.60	0.05
##	235	1624580081	4/22/2016	4026	2.62	0.00
##	236	1927972279	5/2/2016	3790	2.62	1.16
##	237	3372868164	4/22/2016	3843	2.62	0.00
##	238	4445114986	5/10/2016	3915	2.63	0.00
##	239	4020332650	5/11/2016	3689	2.65	0.11
##	240	4445114986	4/16/2016	3945	2.65	0.00
##	241	1644430081	4/22/2016	3673	2.67	0.00
##	242	1844505072	4/30/2016	4014	2.67	0.00
##	243	4445114986	4/14/2016	3974	2.67	0.00
##	244	1844505072	5/3/2016	4059	2.68	0.00
##	245	2320127002	4/14/2016	3973	2.68	0.00
##	246	6117666160	5/6/2016	3365	2.68	0.00
##	247	8583815059	4/15/2016	3430	2.68	0.00
##	248	5553957443	4/23/2016	4112	2.69	0.00
##	249	1644430081	5/2/2016	3758	2.73	0.07
##	250	2026352035	4/12/2016	4414	2.74	0.19
##	251	4319703577	4/24/2016	4081	2.74	0.06
##	252	5553957443	5/4/2016	4249	2.77	0.00
##	253	6962181067	5/8/2016	4188	2.77	0.00
##	254	8253242879	4/19/2016	4212	2.78	0.00
##	255	8583815059	5/4/2016	3588	2.80	0.00

##	256	2320127002	4/24/2016	4165	2.81	0.00
##	257	6775888955	4/13/2016	4053	2.91	1.11
##	258	2026352035	4/30/2016	4729	2.93	0.00
##	259	4445114986	4/23/2016	4363	2.93	0.00
##	260	8378563200	4/24/2016	3703	2.94	0.00
##	261	4057192912	4/15/2016	3984	2.95	0.21
##	262	1844505072	4/17/2016	4525	2.99	0.14
##	263	4445114986	4/28/2016	4493	3.01	0.00
##	264	8583815059	4/18/2016	3864	3.01	0.31
##	265	4319703577	4/22/2016	4500	3.02	0.06
##	266	4445114986	5/6/2016	4514	3.03	0.00
##	267	1844505072	4/18/2016	4597	3.04	0.00
##	268	5577150313	5/11/2016	4038	3.04	1.83
##	269	8253242879	4/26/2016	4562	3.04	1.18
##	270	2320127002	4/30/2016	4571	3.08	0.00
##	271	2026352035	4/13/2016	4993	3.10	0.00
##	272	7007744171	4/16/2016	4631	3.10	0.00
##	273	4020332650	5/6/2016	4369	3.13	0.00
##	274	4445114986	4/29/2016	4676	3.14	0.00
##	275	5553957443	4/13/2016	4832	3.16	0.00
##	276	4558609924	4/20/2016	4803	3.17	0.00
##	277	4319703577	4/16/2016	4744	3.18	0.00
##	278	1644430081	5/5/2016	4363	3.19	0.52
##	279	4020332650	5/3/2016	4496	3.22	0.00
##	280	5553957443	5/11/2016	4926	3.22	0.00
##	281	1624580081	4/20/2016	4974	3.23	0.00
##	282	3372868164	4/12/2016	4747	3.24	0.00
##	283	1844505072	4/29/2016	4920	3.25	0.00
##	284	1844505072	4/13/2016	4929	3.26	0.00
##	285	4020332650	5/9/2016	4556	3.27	0.20
##	286	2320127002	5/6/2016	4878	3.29	0.00
##	287	4558609924	4/13/2016	4978	3.29	1.24
##	288	4319703577	4/23/2016	4935	3.31	0.00
##	289	6962181067	4/24/2016	5029	3.32	0.00
##	290	3372868164	4/20/2016	4880	3.33	0.84
##	291	4445114986	4/24/2016	5002	3.36	0.00
##	292	8792009665	4/23/2016	5245	3.36	0.16
##	293	5553957443	5/1/2016	5164	3.37	0.00
##	294	6775888955	5/6/2016	4697	3.37	0.47
##	295	2873212765	5/7/2016	4940	3.38	2.28
##	296	6117666160	5/9/2016	4477	3.38	0.00
##	297	4558609924	4/12/2016	5135	3.39	0.00
##	298	6775888955	4/16/2016	4732	3.39	2.52
##	299	2320127002	4/16/2016	5057	3.41	0.00
##	300	2320127002	4/23/2016	5079	3.42	0.00
##	301	2026352035	5/8/2016	5528	3.45	0.00
##	302	6290855005	4/12/2016	4562	3.45	0.00
##	303	4558609924	5/4/2016	5232	3.46	0.00
##	304	8253242879	4/14/2016	5234	3.46	1.93
##	305	2320127002	5/8/2016	5161	3.48	0.00
##	306	4558609924	5/3/2016	5267	3.48	0.60
##	307	8253242879	4/18/2016	5151	3.48	1.04
##	308	1624580081	4/16/2016	5370	3.49	0.00
##	309	2320127002	4/15/2016	5205	3.51	0.00

## 310	2320127002	5/5/2016	5202	3.51	0.00
## 311	4445114986	5/1/2016	5232	3.51	0.00
## 312	8583815059	4/25/2016	4503	3.51	1.47
## 313	8583815059	5/1/2016	4512	3.52	0.78
## 314	7007744171	4/15/2016	5273	3.53	0.00
## 315	4445114986	5/9/2016	5275	3.54	0.00
## 316	8378563200	5/7/2016	4468	3.54	0.00
## 317	1844505072	4/22/2016	5372	3.55	0.00
## 318	4558609924	4/19/2016	5401	3.57	0.05
## 319	3372868164	4/30/2016	5250	3.58	1.06
## 320	4388161847	4/17/2016	4660	3.58	0.00
## 321	4445114986	5/7/2016	5183	3.59	2.13
## 322	2347167796	4/28/2016	5439	3.60	0.00
## 323	6962181067	5/1/2016	5454	3.61	0.00
## 324	2347167796	4/17/2016	5472	3.62	0.08
## 325	7086361926	4/13/2016	5813	3.62	0.56
## 326	8378563200	5/12/2016	4561	3.62	0.65
## 327	8877689391	5/2/2016	4790	3.64	0.00
## 328	2026352035	4/26/2016	5933	3.68	0.00
## 329	6962181067	4/15/2016	5563	3.68	0.00
## 330	5577150313	5/6/2016	4950	3.70	1.93
## 331	6775888955	4/14/2016	5162	3.70	0.87
## 332	2026352035	5/3/2016	5992	3.72	0.00
## 333	2026352035	4/25/2016	6017	3.73	0.00
## 334	6117666160	5/2/2016	4933	3.73	0.00
## 335	6962181067	4/13/2016	5652	3.74	0.57
## 336	7007744171	5/1/2016	5600	3.75	0.00
## 337	2320127002	4/22/2016	5583	3.76	0.00
## 338	3372868164	4/28/2016	5512	3.76	0.00
## 339	2026352035	4/27/2016	6088	3.77	0.00
## 340	5553957443	4/16/2016	5771	3.77	0.00
## 341	5577150313	4/13/2016	5077	3.79	0.32
## 342	4319703577	4/15/2016	5664	3.80	0.00
## 343	1644430081	4/15/2016	5263	3.83	0.22
## 344	5577150313	5/4/2016	5206	3.89	1.56
## 345	6117666160	4/18/2016	5153	3.91	0.00
## 346	6962181067	5/6/2016	5908	3.91	0.00
## 347	8053475328	5/12/2016	4998	3.91	2.95
## 348	8583815059	4/12/2016	5014	3.91	0.00
## 349	8792009665	4/28/2016	6157	3.94	0.00
## 350	1624580081	4/24/2016	6076	3.95	1.15
## 351	2026352035	4/28/2016	6375	3.95	0.00
## 352	2347167796	4/26/2016	5980	3.95	0.00
## 353	4020332650	5/10/2016	5546	3.98	0.00
## 354	5577150313	4/26/2016	5325	3.98	0.85
## 355	5553957443	5/8/2016	6083	4.00	0.22
## 356	4057192912	4/12/2016	5394	4.03	0.00
## 357	2320127002	4/19/2016	5997	4.04	0.00
## 358	1624580081	4/17/2016	6175	4.06	1.03
## 359	2026352035	5/4/2016	6564	4.07	0.00
## 360	3977333714	4/21/2016	6093	4.08	0.00
## 361	3372868164	4/25/2016	5995	4.09	0.00
## 362	8583815059	4/20/2016	5273	4.11	0.00
## 363	1624580081	4/21/2016	6349	4.13	0.00

## 364	8583815059	4/16/2016	5319	4.15	0.00
## 365	4558609924	5/12/2016	6307	4.17	0.00
## 366	6290855005	5/7/2016	5510	4.17	0.00
## 367	2320127002	4/17/2016	6198	4.18	0.00
## 368	4445114986	4/30/2016	6222	4.18	0.00
## 369	2320127002	5/10/2016	6227	4.20	0.00
## 370	4020332650	5/8/2016	5862	4.20	0.00
## 371	2022484408	4/23/2016	6001	4.21	0.00
## 372	6290855005	4/27/2016	5565	4.21	0.00
## 373	1624580081	4/25/2016	6497	4.22	0.00
## 374	4445114986	4/18/2016	6155	4.24	2.00
## 375	4558609924	5/10/2016	6435	4.25	0.74
## 376	8253242879	4/29/2016	6260	4.26	1.29
## 377	8253242879	4/20/2016	6466	4.27	0.33
## 378	1624580081	4/30/2016	6474	4.30	0.90
## 379	8378563200	4/28/2016	5417	4.30	0.90
## 380	2320127002	5/11/2016	6424	4.33	0.00
## 381	2873212765	5/11/2016	6440	4.33	0.00
## 382	4558609924	5/8/2016	6543	4.33	1.80
## 383	6290855005	4/28/2016	5731	4.33	0.00
## 384	2026352035	5/2/2016	7018	4.35	0.00
## 385	8583815059	4/13/2016	5571	4.35	0.15
## 386	4020332650	5/7/2016	6132	4.40	0.00
## 387	4445114986	4/26/2016	6326	4.41	2.41
## 388	6290855005	5/4/2016	5832	4.41	0.00
## 389	2320127002	4/18/2016	6559	4.42	0.00
## 390	1844505072	4/12/2016	6697	4.43	0.00
## 391	2347167796	4/19/2016	6711	4.44	0.00
## 392	6962181067	5/11/2016	6722	4.44	1.49
## 393	8583815059	4/19/2016	5697	4.44	0.53
## 394	1644430081	5/1/2016	6132	4.46	0.24
## 395	6290855005	4/24/2016	5896	4.46	0.00
## 396	4057192912	4/13/2016	5974	4.47	0.00
## 397	2026352035	4/20/2016	7222	4.48	0.00
## 398	4558609924	4/14/2016	6799	4.49	0.00
## 399	6962181067	5/7/2016	6815	4.50	0.00
## 400	8253242879	4/25/2016	6829	4.51	0.36
## 401	8378563200	4/23/2016	5709	4.53	1.52
## 402	1624580081	4/13/2016	7007	4.55	0.00
## 403	4558609924	4/23/2016	6890	4.55	0.34
## 404	8583815059	5/6/2016	5843	4.56	0.14
## 405	1844505072	4/28/2016	6907	4.57	0.00
## 406	6290855005	5/3/2016	6047	4.57	0.00
## 407	4445114986	4/22/2016	6831	4.58	0.00
## 408	3372868164	4/24/2016	6731	4.59	0.89
## 409	8792009665	4/30/2016	7174	4.59	0.33
## 410	6290855005	5/6/2016	6116	4.62	0.00
## 411	3372868164	4/18/2016	6798	4.64	1.08
## 412	6775888955	4/25/2016	6474	4.64	2.27
## 413	2873212765	4/24/2016	6873	4.68	3.00
## 414	2022484408	5/7/2016	6708	4.71	1.61
## 415	2026352035	4/29/2016	7604	4.71	0.00
## 416	6290855005	4/22/2016	6238	4.72	0.00
## 417	3372868164	4/16/2016	6905	4.73	0.00

## 418	2873212765	5/6/2016	7063	4.75	0.00
## 419	4445114986	5/2/2016	6910	4.75	2.21
## 420	6290855005	5/9/2016	6277	4.75	0.00
## 421	8583815059	5/7/2016	6117	4.77	0.00
## 422	5577150313	4/25/2016	6393	4.78	1.35
## 423	6290855005	5/5/2016	6339	4.79	0.00
## 424	6290855005	4/20/2016	6361	4.81	0.00
## 425	8378563200	5/2/2016	6064	4.81	0.63
## 426	4558609924	4/16/2016	7289	4.82	0.55
## 427	8583815059	4/28/2016	6174	4.82	0.00
## 428	1644430081	4/23/2016	6637	4.83	0.00
## 429	1644430081	5/9/2016	6643	4.83	2.39
## 430	4445114986	4/15/2016	7198	4.83	0.00
## 431	2320127002	4/20/2016	7192	4.85	0.00
## 432	3977333714	4/28/2016	7114	4.88	1.37
## 433	1644430081	5/8/2016	6724	4.89	0.00
## 434	2320127002	4/13/2016	7275	4.90	0.00
## 435	2873212765	4/22/2016	7286	4.90	0.46
## 436	4445114986	5/8/2016	7303	4.90	0.00
## 437	8378563200	4/29/2016	6175	4.90	0.25
## 438	1624580081	5/2/2016	7155	4.93	0.86
## 439	2873212765	4/25/2016	7373	4.95	0.00
## 440	2873212765	4/29/2016	7365	4.95	1.36
## 441	4702921684	4/26/2016	6108	4.95	0.07
## 442	7086361926	4/29/2016	7881	4.95	0.49
## 443	2320127002	5/7/2016	7379	4.97	0.00
## 444	2873212765	5/1/2016	7399	4.97	0.49
## 445	2873212765	5/3/2016	7412	4.98	0.06
## 446	2320127002	5/3/2016	7443	5.02	1.49
## 447	4445114986	4/27/2016	7243	5.03	2.62
## 448	3977333714	4/27/2016	7193	5.04	0.00
## 449	2873212765	5/2/2016	7525	5.06	0.00
## 450	4388161847	4/16/2016	6580	5.06	0.21
## 451	3372868164	4/23/2016	7396	5.07	1.40
## 452	2026352035	5/6/2016	8198	5.08	0.00
## 453	3372868164	4/15/2016	7451	5.08	0.00
## 454	6290855005	4/30/2016	6744	5.10	0.00
## 455	2873212765	5/12/2016	7566	5.11	0.00
## 456	3977333714	4/14/2016	7641	5.11	0.32
## 457	2873212765	4/13/2016	7618	5.12	0.00
## 458	6290855005	5/2/2016	6781	5.13	0.00
## 459	5577150313	4/27/2016	6805	5.14	1.81
## 460	4558609924	4/15/2016	7795	5.15	0.59
## 461	2347167796	4/22/2016	7804	5.16	0.56
## 462	4445114986	5/3/2016	7502	5.18	2.48
## 463	4558609924	4/29/2016	7833	5.18	1.02
## 464	1644430081	4/18/2016	7132	5.19	1.07
## 465	2873212765	5/9/2016	7726	5.19	0.00
## 466	4319703577	4/12/2016	7753	5.20	0.00
## 467	6290855005	4/18/2016	6885	5.21	0.00
## 468	4558609924	5/2/2016	7891	5.22	0.00
## 469	8378563200	5/10/2016	6582	5.22	0.66
## 470	2873212765	4/18/2016	7762	5.24	0.07
## 471	1844505072	4/14/2016	7937	5.25	0.00

## 472	3372868164	4/19/2016	7711	5.26	0.00
## 473	6775888955	4/26/2016	7091	5.27	3.48
## 474	4702921684	4/15/2016	6506	5.28	0.07
## 475	6117666160	4/30/2016	6987	5.28	0.00
## 476	4702921684	4/21/2016	6530	5.30	0.31
## 477	1624580081	4/12/2016	8163	5.31	0.00
## 478	1844505072	4/21/2016	8054	5.32	0.12
## 479	2026352035	5/11/2016	8580	5.32	0.00
## 480	2873212765	4/14/2016	7910	5.32	0.00
## 481	4319703577	5/7/2016	7937	5.33	0.19
## 482	4558609924	4/25/2016	8095	5.35	0.59
## 483	8792009665	4/29/2016	8360	5.35	0.14
## 484	4319703577	4/29/2016	7990	5.36	0.45
## 485	2873212765	4/19/2016	7948	5.37	0.00
## 486	7007744171	4/17/2016	8059	5.39	0.00
## 487	6117666160	4/17/2016	7150	5.40	0.00
## 488	6290855005	4/13/2016	7142	5.40	0.00
## 489	6290855005	4/19/2016	7142	5.40	0.00
## 490	2873212765	4/28/2016	7913	5.41	2.16
## 491	7007744171	4/23/2016	8093	5.41	0.13
## 492	3372868164	4/27/2016	7904	5.42	1.58
## 493	1624580081	4/27/2016	8367	5.44	1.11
## 494	4558609924	5/7/2016	8237	5.44	1.61
## 495	4702921684	4/19/2016	6708	5.44	0.88
## 496	2347167796	4/18/2016	8247	5.45	0.79
## 497	4319703577	4/13/2016	8204	5.50	0.53
## 498	2026352035	5/12/2016	8891	5.51	0.00
## 499	4319703577	4/30/2016	8221	5.52	0.40
## 500	6117666160	5/8/2016	7328	5.53	0.00
## 501	2873212765	4/26/2016	8242	5.54	0.12
## 502	2873212765	5/8/2016	8168	5.54	2.90
## 503	6117666160	5/7/2016	7336	5.54	0.00
## 504	1624580081	4/23/2016	8538	5.55	0.00
## 505	2873212765	5/4/2016	8278	5.56	0.00
## 506	2873212765	5/10/2016	8275	5.56	0.00
## 507	5577150313	5/2/2016	7439	5.56	1.12
## 508	4702921684	4/13/2016	6877	5.58	0.00
## 509	8053475328	4/30/2016	7135	5.59	2.99
## 510	8378563200	5/6/2016	7045	5.59	1.55
## 511	7086361926	5/5/2016	8564	5.60	1.78
## 512	2873212765	5/5/2016	8314	5.61	0.78
## 513	4702921684	5/6/2016	6943	5.63	0.08
## 514	5577150313	5/5/2016	7550	5.64	2.50
## 515	4558609924	4/24/2016	8563	5.66	0.00
## 516	7086361926	4/15/2016	8585	5.67	2.04
## 517	2873212765	4/30/2016	8452	5.68	0.33
## 518	2873212765	4/15/2016	8482	5.70	0.00
## 519	5577150313	4/23/2016	7638	5.71	1.21
## 520	4702921684	4/27/2016	7047	5.72	0.09
## 521	6117666160	4/24/2016	7623	5.76	0.00
## 522	3372868164	4/26/2016	8283	5.79	1.85
## 523	6290855005	4/14/2016	7671	5.80	0.00
## 524	1644430081	4/13/2016	8001	5.82	2.28
## 525	6290855005	5/8/2016	7706	5.83	0.00

## 526	8378563200	4/27/2016	7359	5.84	0.33
## 527	3372868164	4/17/2016	8199	5.88	1.41
## 528	4702921684	4/12/2016	7213	5.88	0.00
## 529	6290855005	4/25/2016	7802	5.90	0.68
## 530	2873212765	4/12/2016	8796	5.91	0.11
## 531	4558609924	4/18/2016	8940	5.91	0.98
## 532	1624580081	4/14/2016	9107	5.92	0.00
## 533	4702921684	5/2/2016	7245	5.92	0.38
## 534	5577150313	4/29/2016	7924	5.92	2.84
## 535	6290855005	4/17/2016	7851	5.94	1.14
## 536	6775888955	4/18/2016	8294	5.95	2.00
## 537	3977333714	4/22/2016	8911	5.96	2.33
## 538	2873212765	4/21/2016	8859	5.98	0.13
## 539	3977333714	4/12/2016	8856	5.98	3.06
## 540	4319703577	4/19/2016	8925	5.99	0.00
## 541	4319703577	4/20/2016	8954	6.01	0.00
## 542	4558609924	5/11/2016	9108	6.02	0.26
## 543	3372868164	4/14/2016	8844	6.03	0.34
## 544	4558609924	4/26/2016	9148	6.05	0.43
## 545	8378563200	4/12/2016	7626	6.05	0.83
## 546	3977333714	4/15/2016	9010	6.06	1.05
## 547	3372868164	4/21/2016	8857	6.07	1.15
## 548	5577150313	4/12/2016	8135	6.08	3.60
## 549	8253242879	4/13/2016	8053	6.10	4.17
## 550	4445114986	5/11/2016	9105	6.11	2.25
## 551	4020332650	4/12/2016	8539	6.12	0.15
## 552	7086361926	4/14/2016	9123	6.12	2.03
## 553	8877689391	5/12/2016	8064	6.12	1.82
## 554	4319703577	5/11/2016	9129	6.13	0.20
## 555	8253242879	4/16/2016	9256	6.14	0.43
## 556	7086361926	4/21/2016	9469	6.18	1.36
## 557	6117666160	4/22/2016	8206	6.20	0.00
## 558	4319703577	4/25/2016	9259	6.21	0.00
## 559	5577150313	4/20/2016	8330	6.22	4.12
## 560	3372868164	4/29/2016	9135	6.23	0.00
## 561	4319703577	5/2/2016	9261	6.24	0.00
## 562	8378563200	5/4/2016	7875	6.24	1.56
## 563	4558609924	4/28/2016	9451	6.25	0.02
## 564	2347167796	4/24/2016	9471	6.26	0.00
## 565	8253242879	4/23/2016	9282	6.26	2.09
## 566	1503960366	4/15/2016	9762	6.28	2.14
## 567	6290855005	4/16/2016	8301	6.28	0.00
## 568	5553957443	5/6/2016	9632	6.29	1.52
## 569	2873212765	4/20/2016	9202	6.30	1.51
## 570	4558609924	4/27/2016	9557	6.32	1.96
## 571	1503960366	4/21/2016	9819	6.34	1.34
## 572	2873212765	4/23/2016	9317	6.35	2.09
## 573	4558609924	4/22/2016	9601	6.35	1.37
## 574	1644430081	4/17/2016	8757	6.37	2.25
## 575	4319703577	5/10/2016	9487	6.37	0.21
## 576	4702921684	4/14/2016	7860	6.37	0.00
## 577	2347167796	4/25/2016	9482	6.38	1.27
## 578	5553957443	5/2/2016	9769	6.38	1.06
## 579	4558609924	4/17/2016	9634	6.40	0.55

## 580	1503960366	4/24/2016	10039	6.41	2.92
## 581	2022484408	5/12/2016	9117	6.41	1.28
## 582	4319703577	5/6/2016	9524	6.42	0.41
## 583	5577150313	4/14/2016	8596	6.42	3.33
## 584	8583815059	5/10/2016	8240	6.43	0.69
## 585	8583815059	4/24/2016	8286	6.46	0.15
## 586	4319703577	5/3/2016	9648	6.47	0.58
## 587	1503960366	4/17/2016	9705	6.48	3.19
## 588	7086361926	5/11/2016	9572	6.52	2.89
## 589	7086361926	4/22/2016	9753	6.53	2.87
## 590	1503960366	5/8/2016	10060	6.58	3.53
## 591	8583815059	5/2/2016	8469	6.61	0.00
## 592	2026352035	5/9/2016	10685	6.62	0.00
## 593	4702921684	5/4/2016	8161	6.62	0.34
## 594	3372868164	4/13/2016	9715	6.63	0.99
## 595	4319703577	4/26/2016	9899	6.64	0.57
## 596	2873212765	4/16/2016	9685	6.65	3.11
## 597	5577150313	5/10/2016	8869	6.65	2.56
## 598	8378563200	5/9/2016	8382	6.65	1.27
## 599	1644430081	5/10/2016	9167	6.66	0.88
## 600	6962181067	4/30/2016	10081	6.66	2.24
## 601	8583815059	4/21/2016	8538	6.66	2.63
## 602	1503960366	4/20/2016	10544	6.68	1.96
## 603	4702921684	5/9/2016	8232	6.68	0.00
## 604	2347167796	4/14/2016	10129	6.70	0.02
## 605	3977333714	4/13/2016	10035	6.71	2.03
## 606	6962181067	4/17/2016	10145	6.71	0.33
## 607	6962181067	5/4/2016	10147	6.71	0.47
## 608	7086361926	4/18/2016	9827	6.71	3.17
## 609	4388161847	4/15/2016	8758	6.73	0.00
## 610	6117666160	5/1/2016	8915	6.73	0.00
## 611	1503960366	4/14/2016	10460	6.74	2.44
## 612	6962181067	4/12/2016	10199	6.74	3.40
## 613	2347167796	4/21/2016	10080	6.75	1.85
## 614	7086361926	5/3/2016	10288	6.76	2.74
## 615	8583815059	4/22/2016	8687	6.78	0.29
## 616	8378563200	5/5/2016	8567	6.79	0.89
## 617	8583815059	5/11/2016	8701	6.79	0.37
## 618	1503960366	5/1/2016	10602	6.81	2.29
## 619	7086361926	5/2/2016	10052	6.81	3.48
## 620	4388161847	4/14/2016	8863	6.82	0.13
## 621	4558609924	4/30/2016	10319	6.82	0.47
## 622	6962181067	4/27/2016	10320	6.82	0.55
## 623	7086361926	4/25/2016	10091	6.82	3.75
## 624	2347167796	4/12/2016	10113	6.83	2.00
## 625	1644430081	4/28/2016	9405	6.84	0.20
## 626	5577150313	4/22/2016	9172	6.85	2.42
## 627	4319703577	4/14/2016	10210	6.88	0.11
## 628	5553957443	4/27/2016	10538	6.88	1.14
## 629	6962181067	4/26/2016	10433	6.90	2.58
## 630	8378563200	5/3/2016	8712	6.91	1.34
## 631	2347167796	4/15/2016	10465	6.92	0.07
## 632	4319703577	5/9/2016	10378	6.96	0.14
## 633	6962181067	5/5/2016	10524	6.96	0.99

## 634	1503960366	4/13/2016	10735	6.97	1.57
## 635	3977333714	4/17/2016	10415	6.97	0.70
## 636	4702921684	5/5/2016	8614	6.99	0.67
## 637	2347167796	4/13/2016	10352	7.01	1.66
## 638	4558609924	5/5/2016	10611	7.01	1.01
## 639	4319703577	5/4/2016	10429	7.02	0.59
## 640	3977333714	5/1/2016	10414	7.07	2.67
## 641	7086361926	4/26/2016	10387	7.07	4.16
## 642	2022484408	4/16/2016	10100	7.09	3.15
## 643	6962181067	4/22/2016	10725	7.09	1.77
## 644	4388161847	4/29/2016	9232	7.10	0.80
## 645	6962181067	4/19/2016	10742	7.10	2.10
## 646	7086361926	5/8/2016	10677	7.10	2.31
## 647	6117666160	4/27/2016	9411	7.11	0.00
## 648	6962181067	4/29/2016	10762	7.11	0.82
## 649	1644430081	5/6/2016	9787	7.12	0.82
## 650	2022484408	4/28/2016	10140	7.12	0.41
## 651	2022484408	4/27/2016	10159	7.13	1.04
## 652	4702921684	4/20/2016	8793	7.13	0.16
## 653	8253242879	4/24/2016	8905	7.13	5.60
## 654	1503960366	4/29/2016	11181	7.15	1.06
## 655	1503960366	5/4/2016	11100	7.15	2.46
## 656	8253242879	4/12/2016	9033	7.16	5.43
## 657	8877689391	4/15/2016	13422	7.17	0.05
## 658	2022484408	5/6/2016	10227	7.18	1.87
## 659	6290855005	4/15/2016	9501	7.18	0.00
## 660	2022484408	4/26/2016	10119	7.19	1.43
## 661	2022484408	4/29/2016	10245	7.19	0.48
## 662	5553957443	4/25/2016	10946	7.19	2.93
## 663	8583815059	5/8/2016	9217	7.19	0.22
## 664	1644430081	4/26/2016	9919	7.21	0.80
## 665	6117666160	4/26/2016	9543	7.21	0.00
## 666	4319703577	4/27/2016	10780	7.23	0.41
## 667	6117666160	4/29/2016	9592	7.24	0.00
## 668	8378563200	5/11/2016	9143	7.25	1.39
## 669	2347167796	4/20/2016	10999	7.27	0.68
## 670	4319703577	4/28/2016	10817	7.28	1.01
## 671	4388161847	4/26/2016	9461	7.28	0.94
## 672	2022484408	5/2/2016	10379	7.29	2.61
## 673	7086361926	4/19/2016	10688	7.29	3.53
## 674	4702921684	4/28/2016	9023	7.32	1.13
## 675	4020332650	5/4/2016	10252	7.35	0.67
## 676	8583815059	4/23/2016	9423	7.35	0.53
## 677	4388161847	5/5/2016	9603	7.38	0.63
## 678	4702921684	4/18/2016	9105	7.38	1.82
## 679	5577150313	4/18/2016	9893	7.39	4.86
## 680	8877689391	4/29/2016	9733	7.39	1.38
## 681	2022484408	5/1/2016	10538	7.40	1.94
## 682	6117666160	5/5/2016	9799	7.40	0.00
## 683	1624580081	4/18/2016	10536	7.41	2.15
## 684	7007744171	4/24/2016	11085	7.42	0.00
## 685	4702921684	4/25/2016	9167	7.43	0.49
## 686	5577150313	4/28/2016	9841	7.43	3.25
## 687	8877689391	4/23/2016	11200	7.43	0.00

## 688	6290855005	5/1/2016	9837	7.44	0.66
## 689	8378563200	4/20/2016	9388	7.44	2.23
## 690	2320127002	4/12/2016	10725	7.49	1.17
## 691	2022484408	4/14/2016	10690	7.50	2.48
## 692	2026352035	5/5/2016	12167	7.54	0.00
## 693	6962181067	4/18/2016	11404	7.54	0.83
## 694	4558609924	5/9/2016	11451	7.57	0.43
## 695	5553957443	4/12/2016	11596	7.57	1.37
## 696	2347167796	4/27/2016	11423	7.58	1.86
## 697	5553957443	5/9/2016	11611	7.58	2.13
## 698	3977333714	4/26/2016	11388	7.62	0.45
## 699	5553957443	4/22/2016	11682	7.63	1.38
## 700	5553957443	4/28/2016	11393	7.63	3.71
## 701	4702921684	5/3/2016	9454	7.67	0.00
## 702	7007744171	5/6/2016	11459	7.67	3.00
## 703	8583815059	5/9/2016	9877	7.70	5.76
## 704	1503960366	5/7/2016	11992	7.71	2.46
## 705	2026352035	4/23/2016	12357	7.71	0.00
## 706	1503960366	5/9/2016	12022	7.72	3.45
## 707	6775888955	4/20/2016	10771	7.72	3.77
## 708	3977333714	5/7/2016	11550	7.73	0.00
## 709	4388161847	4/21/2016	10055	7.73	0.37
## 710	3977333714	4/29/2016	10645	7.75	3.74
## 711	4388161847	4/28/2016	10074	7.75	1.29
## 712	5553957443	4/26/2016	11886	7.76	2.37
## 713	1503960366	5/10/2016	12207	7.77	3.35
## 714	1644430081	4/12/2016	10694	7.77	0.14
## 715	4388161847	4/12/2016	10122	7.78	0.00
## 716	3977333714	4/18/2016	11663	7.80	0.25
## 717	7086361926	4/28/2016	11584	7.80	2.79
## 718	3977333714	4/20/2016	11658	7.83	0.20
## 719	4388161847	4/19/2016	10181	7.83	1.37
## 720	4388161847	5/11/2016	10201	7.84	0.53
## 721	4388161847	5/9/2016	10218	7.86	0.34
## 722	8583815059	4/30/2016	10085	7.87	0.15
## 723	4388161847	4/24/2016	10243	7.88	1.08
## 724	4388161847	5/1/2016	10255	7.89	1.01
## 725	8253242879	4/17/2016	10204	7.91	5.43
## 726	4388161847	5/10/2016	10299	7.92	0.81
## 727	4702921684	5/11/2016	9810	7.96	0.78
## 728	2022484408	4/25/2016	11369	8.01	3.33
## 729	1644430081	4/14/2016	11037	8.02	0.36
## 730	6117666160	4/20/2016	10449	8.02	2.03
## 731	1503960366	5/6/2016	12159	8.03	1.97
## 732	2022484408	4/15/2016	11034	8.03	1.94
## 733	4702921684	4/29/2016	9930	8.05	1.06
## 734	5553957443	4/21/2016	12346	8.06	2.95
## 735	3977333714	4/23/2016	12058	8.07	0.00
## 736	7086361926	5/1/2016	12390	8.07	2.30
## 737	5577150313	4/21/2016	10830	8.09	3.65
## 738	8877689391	5/8/2016	10686	8.11	1.08
## 739	4388161847	4/20/2016	10553	8.12	1.10
## 740	6962181067	5/3/2016	12109	8.12	1.74
## 741	1503960366	4/22/2016	12764	8.13	4.76

## 742	1503960366	5/11/2016	12770	8.13	2.56
## 743	8877689391	5/7/2016	12332	8.13	0.08
## 744	8877689391	5/10/2016	10733	8.15	1.35
## 745	1503960366	4/16/2016	12669	8.16	2.71
## 746	1644430081	4/19/2016	11256	8.18	0.36
## 747	8253242879	4/27/2016	10232	8.18	6.24
## 748	8583815059	4/26/2016	10499	8.19	0.07
## 749	8877689391	5/3/2016	10818	8.21	1.39
## 750	4702921684	4/30/2016	10144	8.23	0.32
## 751	7007744171	4/14/2016	11179	8.24	2.95
## 752	5577150313	5/3/2016	11045	8.25	4.52
## 753	3977333714	5/6/2016	11677	8.28	3.11
## 754	2022484408	5/4/2016	11768	8.29	2.51
## 755	8053475328	4/22/2016	10520	8.29	6.26
## 756	7086361926	5/4/2016	10988	8.31	5.28
## 757	8877689391	5/1/2016	10930	8.32	3.13
## 758	5553957443	4/29/2016	12764	8.33	2.79
## 759	2022484408	4/12/2016	11875	8.34	3.31
## 760	7086361926	4/27/2016	11107	8.34	5.63
## 761	2022484408	5/5/2016	11895	8.35	2.79
## 762	6962181067	4/28/2016	12627	8.35	2.51
## 763	7086361926	5/6/2016	12461	8.38	3.82
## 764	5553957443	5/3/2016	12848	8.39	1.50
## 765	4388161847	5/2/2016	10096	8.40	3.77
## 766	6117666160	4/19/2016	11135	8.41	0.00
## 767	7086361926	4/12/2016	11317	8.41	5.27
## 768	4020332650	5/5/2016	11728	8.43	2.62
## 769	8877689391	4/26/2016	11101	8.43	1.76
## 770	4388161847	4/13/2016	10993	8.45	0.06
## 771	3977333714	4/25/2016	11177	8.48	5.62
## 772	7086361926	5/7/2016	12827	8.48	1.46
## 773	1503960366	4/12/2016	13162	8.50	1.88
## 774	2022484408	4/13/2016	12024	8.50	2.99
## 775	1503960366	4/28/2016	13154	8.53	3.54
## 776	2022484408	4/19/2016	11548	8.53	3.29
## 777	6962181067	5/2/2016	12912	8.54	1.20
## 778	8253242879	4/21/2016	11268	8.56	5.88
## 779	3977333714	5/5/2016	12312	8.58	1.76
## 780	1503960366	4/18/2016	13019	8.59	3.25
## 781	4388161847	4/27/2016	11193	8.61	0.70
## 782	4702921684	5/10/2016	10613	8.61	0.08
## 783	8877689391	4/18/2016	11423	8.67	2.44
## 784	6117666160	4/23/2016	11495	8.68	0.00
## 785	6962181067	5/9/2016	12342	8.72	3.90
## 786	2022484408	4/21/2016	12453	8.74	3.33
## 787	2022484408	5/3/2016	12183	8.74	3.99
## 788	6962181067	4/16/2016	13217	8.74	3.66
## 789	8877689391	4/25/2016	12986	8.74	2.37
## 790	3977333714	4/19/2016	12414	8.78	2.24
## 791	3977333714	5/10/2016	13072	8.78	0.07
## 792	1503960366	4/26/2016	13755	8.79	2.33
## 793	8877689391	4/17/2016	15118	8.87	0.00
## 794	8378563200	4/16/2016	11207	8.89	5.37
## 795	1503960366	5/5/2016	14070	8.90	2.92

## 796	2022484408	5/10/2016	12798	8.98	2.22
## 797	3977333714	4/16/2016	13459	9.00	2.03
## 798	4702921684	4/16/2016	11140	9.03	0.24
## 799	1503960366	4/23/2016	14371	9.04	2.81
## 800	8378563200	5/1/2016	11419	9.06	6.03
## 801	4558609924	4/21/2016	13743	9.08	0.42
## 802	5577150313	4/15/2016	12087	9.08	3.92
## 803	3977333714	5/8/2016	13585	9.09	0.68
## 804	4388161847	4/18/2016	11009	9.10	3.56
## 805	7086361926	5/9/2016	13566	9.11	4.26
## 806	5577150313	4/17/2016	12231	9.14	5.98
## 807	7007744171	5/2/2016	13041	9.18	4.64
## 808	7007744171	4/21/2016	13744	9.19	2.15
## 809	3977333714	4/30/2016	13238	9.20	3.69
## 810	5577150313	4/30/2016	12363	9.24	5.83
## 811	1503960366	4/30/2016	14673	9.25	3.56
## 812	6962181067	4/25/2016	13239	9.27	3.02
## 813	2022484408	5/11/2016	13272	9.32	4.18
## 814	2022484408	4/22/2016	12954	9.33	4.43
## 815	1644430081	5/3/2016	12850	9.34	0.72
## 816	4388161847	4/22/2016	12139	9.34	3.30
## 817	8583815059	5/3/2016	12015	9.37	0.00
## 818	8053475328	5/9/2016	12465	9.38	6.12
## 819	2022484408	5/9/2016	13379	9.39	2.12
## 820	8053475328	5/11/2016	12209	9.40	6.08
## 821	7086361926	4/30/2016	14560	9.41	3.12
## 822	5577150313	4/19/2016	12574	9.42	7.02
## 823	3977333714	5/4/2016	13559	9.44	1.81
## 824	4319703577	5/5/2016	13658	9.49	2.63
## 825	5553957443	5/5/2016	14331	9.51	3.43
## 826	4388161847	5/4/2016	12375	9.52	2.79
## 827	6962181067	4/20/2016	13928	9.55	4.28
## 828	8877689391	4/13/2016	15337	9.58	3.55
## 829	3977333714	5/3/2016	14335	9.59	3.32
## 830	8053475328	4/26/2016	12685	9.62	6.31
## 831	4388161847	4/30/2016	12533	9.64	0.70
## 832	7007744171	4/13/2016	12862	9.65	4.61
## 833	8053475328	4/29/2016	12315	9.65	6.17
## 834	1503960366	5/3/2016	15103	9.66	3.73
## 835	8378563200	4/22/2016	12200	9.67	4.91
## 836	8583815059	5/5/2016	12427	9.69	0.00
## 837	1503960366	5/2/2016	14727	9.71	3.21
## 838	6962181067	4/21/2016	11835	9.71	3.99
## 839	1644430081	5/7/2016	13372	9.72	3.26
## 840	8583815059	4/27/2016	12474	9.73	6.60
## 841	4388161847	5/3/2016	12727	9.79	1.13
## 842	1503960366	4/25/2016	15355	9.80	5.29
## 843	8053475328	4/27/2016	12422	9.82	6.46
## 844	8378563200	4/13/2016	12386	9.82	4.96
## 845	8378563200	4/25/2016	12405	9.84	5.05
## 846	1503960366	4/19/2016	15506	9.88	3.53
## 847	4388161847	4/25/2016	12961	9.97	0.73
## 848	5577150313	5/1/2016	13368	9.99	5.31
## 849	3977333714	4/24/2016	14112	10.00	3.27

##	850	2022484408	4/18/2016	14131	10.07	3.64
##	851	3977333714	5/9/2016	14687	10.08	0.77
##	852	7007744171	4/26/2016	15090	10.10	0.93
##	853	5553957443	4/19/2016	15482	10.11	4.28
##	854	7007744171	4/28/2016	15128	10.12	1.09
##	855	4388161847	5/6/2016	13175	10.13	2.11
##	856	4388161847	4/23/2016	13236	10.18	4.50
##	857	6962181067	5/10/2016	15448	10.21	3.47
##	858	7007744171	4/27/2016	13541	10.22	4.27
##	859	7007744171	4/22/2016	15299	10.24	4.10
##	860	2022484408	4/24/2016	13481	10.28	4.55
##	861	4702921684	4/17/2016	12692	10.29	0.96
##	862	7007744171	4/12/2016	14172	10.29	4.50
##	863	8378563200	4/19/2016	13070	10.36	5.30
##	864	4702921684	5/8/2016	12857	10.43	0.68
##	865	7007744171	4/19/2016	14194	10.48	4.41
##	866	8378563200	4/14/2016	13318	10.56	5.62
##	867	6117666160	4/15/2016	14019	10.59	0.00
##	868	7086361926	4/20/2016	14365	10.64	7.64
##	869	5577150313	4/16/2016	14269	10.66	6.64
##	870	2022484408	4/20/2016	15112	10.67	3.34
##	871	8877689391	5/5/2016	14055	10.67	5.46
##	872	5553957443	5/10/2016	16358	10.71	3.87
##	873	7086361926	5/10/2016	14433	10.79	7.11
##	874	8378563200	4/18/2016	13630	10.81	5.05
##	875	5553957443	4/15/2016	16556	10.86	4.16
##	876	7007744171	5/3/2016	14510	10.87	4.48
##	877	6117666160	4/16/2016	14450	10.91	0.58
##	878	7007744171	4/18/2016	14816	10.98	3.79
##	879	8053475328	5/6/2016	13953	11.00	9.10
##	880	3977333714	5/2/2016	16520	11.05	1.54
##	881	7007744171	5/5/2016	15010	11.10	4.33
##	882	8053475328	4/16/2016	14549	11.11	9.36
##	883	1644430081	4/16/2016	15300	11.12	4.10
##	884	5553957443	4/14/2016	17022	11.12	4.00
##	885	8053475328	5/4/2016	14581	11.15	8.82
##	886	8877689391	4/28/2016	14890	11.30	4.93
##	887	7007744171	4/20/2016	15566	11.31	4.79
##	888	8053475328	5/10/2016	14810	11.36	9.09
##	889	2347167796	4/23/2016	16901	11.37	2.78
##	890	2022484408	4/17/2016	15112	11.40	3.87
##	891	8378563200	4/15/2016	14461	11.47	4.91
##	892	8053475328	5/5/2016	14990	11.51	8.85
##	893	4702921684	5/7/2016	14370	11.65	0.37
##	894	5577150313	4/24/2016	15764	11.78	7.65
##	895	8583815059	4/29/2016	15168	11.83	3.90
##	896	8053475328	5/3/2016	15484	11.90	8.39
##	897	8378563200	4/21/2016	15148	12.01	6.90
##	898	8053475328	4/20/2016	15108	12.19	9.58
##	899	1503960366	4/27/2016	18134	12.21	6.40
##	900	4702921684	4/24/2016	15050	12.22	1.20
##	901	4702921684	4/23/2016	15126	12.27	0.76
##	902	8053475328	4/28/2016	15447	12.40	9.67
##	903	8053475328	4/19/2016	15929	12.48	9.22

## 904	8053475328	4/21/2016	16057	12.51	9.67					
## 905	8053475328	4/18/2016	17076	12.66	9.08					
## 906	8378563200	4/26/2016	16208	12.85	7.51					
## 907	2022484408	4/30/2016	18387	12.91	0.94					
## 908	1644430081	4/30/2016	18213	13.24	0.63					
## 909	6962181067	4/23/2016	20031	13.24	4.20					
## 910	7007744171	4/25/2016	18229	13.34	4.31					
## 911	8053475328	4/13/2016	16433	13.35	10.43					
## 912	8053475328	4/17/2016	18827	13.69	9.24					
## 913	8053475328	4/12/2016	18060	14.12	11.64					
## 914	7007744171	4/29/2016	20067	14.30	4.31					
## 915	4388161847	5/8/2016	17298	14.38	9.89					
## 916	6117666160	4/21/2016	19542	15.01	0.98					
## 917	2347167796	4/16/2016	22244	15.08	5.45					
## 918	8053475328	5/7/2016	19769	15.67	12.44					
## 919	8053475328	4/25/2016	20500	15.69	11.37					
## 920	8877689391	4/24/2016	16674	15.74	11.01					
## 921	8053475328	4/14/2016	20159	15.97	12.34					
## 922	8053475328	4/15/2016	20669	16.24	13.26					
## 923	8877689391	5/4/2016	18193	16.30	10.42					
## 924	8877689391	4/22/2016	18258	16.31	10.23					
## 925	8053475328	4/23/2016	22359	17.19	12.54					
## 926	8877689391	4/19/2016	18785	17.40	12.15					
## 927	4388161847	5/7/2016	22770	17.54	9.45					
## 928	8877689391	4/21/2016	19377	17.62	12.29					
## 929	8053475328	5/8/2016	22026	17.65	13.40					
## 930	8053475328	4/24/2016	22988	17.95	13.13					
## 931	8877689391	4/20/2016	19948	18.11	11.02					
## 932	8877689391	5/9/2016	20226	18.25	11.10					
## 933	8877689391	4/14/2016	21129	18.98	10.55					
## 934	8877689391	5/6/2016	21727	19.34	12.79					
## 935	8877689391	5/11/2016	21420	19.56	13.22					
## 936	8877689391	4/12/2016	23186	20.40	12.22					
## 937	8877689391	4/27/2016	23629	20.65	13.07					
## 938	8877689391	4/16/2016	29326	25.29	13.24					
## 939	8877689391	4/30/2016	27745	26.72	21.66					
## 940	1624580081	5/1/2016	36019	28.03	21.92					
##	fairly	active	distance	lightly	active	distance	sedentary	active	distance	calories
## 1		0.00		0.00		0.00		0.00		0
## 2		0.00		0.00		0.00		0.00		1347
## 3		0.00		0.00		0.00		0.00		1347
## 4		0.00		0.00		0.00		0.00		1347
## 5		0.00		0.00		0.00		0.00		1348
## 6		0.00		0.00		0.00		0.00		1348
## 7		0.00		0.00		0.00		0.00		1347
## 8		0.00		0.00		0.00		0.00		1347
## 9		0.00		0.00		0.00		0.00		1347
## 10		0.00		0.00		0.00		0.00		1347
## 11		0.00		0.00		0.00		0.00		1347
## 12		0.00		0.00		0.00		0.00		665
## 13		0.00		0.00		0.00		0.00		2064
## 14		0.00		0.00		0.00		0.00		2063
## 15		0.00		0.00		0.00		0.00		2063
## 16		0.00		0.00		0.00		0.00		2063

## 17	0.00	0.00	0.00	2064
## 18	0.00	0.00	0.00	2063
## 19	0.00	0.00	0.00	2063
## 20	0.00	0.00	0.00	2064
## 21	0.00	0.00	0.00	2063
## 22	0.00	0.00	0.00	2063
## 23	0.00	0.00	0.00	2063
## 24	0.00	0.00	0.00	2063
## 25	0.00	0.00	0.00	2063
## 26	0.00	0.00	0.00	1383
## 27	0.00	0.00	0.00	1981
## 28	0.00	0.00	0.00	1980
## 29	0.00	0.00	0.00	1980
## 30	0.00	0.00	0.00	1980
## 31	0.00	0.00	0.00	1980
## 32	0.00	0.00	0.00	1980
## 33	0.00	0.00	0.00	1980
## 34	0.00	0.00	0.00	1980
## 35	0.00	0.00	0.00	1980
## 36	0.00	0.00	0.00	1980
## 37	0.00	0.00	0.00	1980
## 38	0.00	0.00	0.00	1980
## 39	0.00	0.00	0.00	1980
## 40	0.00	0.00	0.00	1980
## 41	0.00	0.00	0.00	1776
## 42	0.00	0.00	0.00	2017
## 43	0.00	0.00	0.00	1819
## 44	0.00	0.00	0.00	1819
## 45	0.00	0.00	0.00	1496
## 46	0.00	0.00	0.00	1496
## 47	0.00	0.00	0.00	1496
## 48	0.00	0.00	0.00	1497
## 49	0.00	0.00	0.00	1496
## 50	0.00	0.00	0.00	2060
## 51	0.00	0.00	0.00	2664
## 52	0.00	0.00	0.00	2060
## 53	0.00	0.00	0.00	2060
## 54	0.00	0.00	0.00	0
## 55	0.00	0.00	0.00	1841
## 56	0.00	0.00	0.00	1841
## 57	0.00	0.00	0.00	1841
## 58	0.00	0.00	0.00	1841
## 59	0.00	0.00	0.00	1841
## 60	0.00	0.00	0.00	1841
## 61	0.00	0.00	0.00	1841
## 62	0.00	0.00	0.00	1841
## 63	0.00	0.00	0.00	1841
## 64	0.00	0.00	0.00	1557
## 65	0.00	0.00	0.00	120
## 66	0.00	0.00	0.00	1629
## 67	0.00	0.00	0.00	0
## 68	0.00	0.00	0.00	0
## 69	0.00	0.00	0.00	1688
## 70	0.00	0.00	0.00	1688

## 71	0.00	0.00	0.00	1688
## 72	0.00	0.00	0.00	1688
## 73	0.00	0.00	0.00	1688
## 74	0.00	0.00	0.00	1688
## 75	0.00	0.00	0.00	1688
## 76	0.00	0.00	0.00	1688
## 77	0.00	0.00	0.00	1688
## 78	0.00	0.00	0.00	57
## 79	0.00	0.01	0.00	1349
## 80	0.00	0.01	0.00	1990
## 81	0.00	0.01	0.00	257
## 82	0.00	0.01	0.00	1843
## 83	0.00	0.01	0.00	1635
## 84	0.00	0.02	0.00	1464
## 85	0.00	0.03	0.00	1351
## 86	0.00	0.03	0.00	403
## 87	0.00	0.04	0.00	1995
## 88	0.00	0.03	0.00	2011
## 89	0.00	0.09	0.00	1720
## 90	0.00	0.10	0.00	2093
## 91	0.00	0.11	0.00	2100
## 92	0.00	0.13	0.00	1366
## 93	0.00	0.16	0.00	1141
## 94	0.00	0.16	0.00	1721
## 95	0.00	0.17	0.00	2111
## 96	0.00	0.25	0.00	2151
## 97	0.05	0.16	0.00	1799
## 98	0.04	0.29	0.00	2207
## 99	0.00	0.41	0.00	1120
## 100	0.00	0.43	0.00	1397
## 101	0.00	0.46	0.00	1922
## 102	0.00	0.47	0.00	2220
## 103	0.00	0.13	0.00	52
## 104	0.20	0.24	0.00	1993
## 105	0.00	0.52	0.00	1214
## 106	0.00	0.52	0.00	1403
## 107	0.00	0.52	0.00	1212
## 108	0.00	0.62	0.00	1410
## 109	0.00	0.68	0.00	2221
## 110	0.00	0.78	0.00	1463
## 111	0.00	0.78	0.00	1963
## 112	0.00	0.81	0.00	1426
## 113	0.00	0.84	0.00	1593
## 114	0.00	0.84	0.00	1934
## 115	0.00	0.85	0.00	1886
## 116	0.00	0.85	0.00	1928
## 117	0.00	0.88	0.01	2140
## 118	0.00	0.18	0.00	2195
## 119	0.00	0.92	0.00	2127
## 120	0.00	0.95	0.01	1276
## 121	0.00	0.97	0.00	1344
## 122	0.00	1.03	0.00	1473
## 123	0.00	1.03	0.00	1466
## 124	0.00	1.04	0.00	2229

## 125	0.00	1.04	0.00	1962
## 126	0.00	1.12	0.01	1341
## 127	0.00	1.13	0.00	1328
## 128	0.00	1.13	0.00	2067
## 129	0.00	1.16	0.00	2351
## 130	0.00	1.16	0.00	1481
## 131	0.00	1.17	0.00	2015
## 132	0.00	1.18	0.00	1507
## 133	0.00	1.22	0.00	1494
## 134	0.00	1.24	0.00	2338
## 135	0.36	0.77	0.00	2951
## 136	0.00	1.35	0.00	2241
## 137	0.00	1.34	0.02	1334
## 138	0.00	1.37	0.00	1474
## 139	0.00	1.37	0.00	1549
## 140	0.00	1.39	0.00	1954
## 141	0.00	1.39	0.00	1974
## 142	0.24	1.05	0.00	1032
## 143	0.37	0.59	0.00	3051
## 144	0.00	1.42	0.00	1368
## 145	0.00	1.43	0.00	1988
## 146	0.24	1.14	0.00	2324
## 147	0.00	1.45	0.00	2383
## 148	0.00	1.46	0.00	2067
## 149	0.00	1.48	0.00	1589
## 150	0.40	1.10	0.00	2383
## 151	0.00	1.50	0.00	1356
## 152	0.00	1.52	0.00	1933
## 153	0.00	1.53	0.00	1370
## 154	0.62	0.15	0.00	2053
## 155	0.00	1.55	0.00	1404
## 156	0.33	1.12	0.00	1632
## 157	0.00	1.55	0.00	2297
## 158	0.00	1.58	0.00	1373
## 159	0.00	1.59	0.00	2009
## 160	0.00	1.58	0.02	1370
## 161	0.00	1.64	0.00	2044
## 162	0.00	1.66	0.02	2222
## 163	0.00	1.69	0.00	2572
## 164	0.26	1.45	0.00	1541
## 165	0.35	1.34	0.00	1529
## 166	0.00	1.76	0.01	2430
## 167	0.00	1.77	0.00	1570
## 168	0.00	1.76	0.00	1632
## 169	0.62	0.68	0.00	2319
## 170	0.20	1.60	0.00	1401
## 171	0.00	1.79	0.00	1125
## 172	1.13	0.31	0.00	2067
## 173	0.16	1.48	0.00	2280
## 174	0.78	0.34	0.00	1580
## 175	0.00	1.81	0.00	1399
## 176	0.00	1.80	0.00	1965
## 177	0.00	1.83	0.01	1402
## 178	0.03	0.83	0.00	2411

## 179	0.00	1.87	0.00	1651
## 180	0.00	1.90	0.00	1435
## 181	0.00	1.92	0.01	1393
## 182	0.00	1.92	0.01	1002
## 183	0.00	1.96	0.00	2070
## 184	0.00	1.99	0.00	2095
## 185	0.28	1.74	0.00	2188
## 186	0.00	2.04	0.00	1359
## 187	0.00	2.04	0.00	2499
## 188	0.40	1.06	0.00	741
## 189	0.00	2.06	0.00	1419
## 190	0.00	2.05	0.00	1431
## 191	0.00	2.08	0.00	1630
## 192	0.00	2.09	0.00	1237
## 193	0.00	2.16	0.00	1401
## 194	0.00	2.15	0.00	2049
## 195	0.00	2.20	0.00	2489
## 196	0.00	2.20	0.00	2113
## 197	0.00	2.22	0.00	1427
## 198	0.00	2.23	0.00	1240
## 199	0.00	2.26	0.00	1657
## 200	0.00	2.26	0.00	1902
## 201	0.00	2.27	0.00	2070
## 202	0.00	2.27	0.00	1692
## 203	0.00	2.28	0.00	1447
## 204	0.42	1.81	0.00	1610
## 205	0.00	2.30	0.00	1632
## 206	0.00	2.31	0.00	2498
## 207	0.00	2.31	0.00	1848
## 208	0.00	2.33	0.00	2685
## 209	0.00	2.34	0.00	2660
## 210	0.00	0.00	0.00	2439
## 211	0.00	2.36	0.00	1645
## 212	0.00	2.36	0.00	1966
## 213	0.00	2.37	0.00	1444
## 214	0.25	2.11	0.00	928
## 215	0.00	2.41	0.00	2413
## 216	0.20	1.99	0.00	1654
## 217	0.00	2.43	0.00	1683
## 218	0.21	1.88	0.00	1613
## 219	0.00	2.43	0.00	2443
## 220	0.00	2.46	0.00	1792
## 221	0.00	0.35	0.00	1792
## 222	0.00	2.48	0.00	1722
## 223	0.00	2.52	0.00	2051
## 224	0.00	2.54	0.00	1725
## 225	0.24	2.18	0.00	2120
## 226	0.00	2.54	0.00	2150
## 227	0.14	0.99	0.00	2489
## 228	0.27	1.89	0.00	1199
## 229	0.00	2.59	0.00	1623
## 230	0.06	1.95	0.00	2497
## 231	0.00	2.60	0.00	2638
## 232	0.00	2.60	0.00	1491

## 233	0.00	2.60	0.00	1879
## 234	0.28	2.27	0.00	2419
## 235	0.00	2.60	0.00	1470
## 236	0.30	1.16	0.00	2505
## 237	0.00	2.61	0.01	1669
## 238	0.00	2.63	0.00	2181
## 239	0.17	2.33	0.00	2645
## 240	0.00	2.65	0.00	2180
## 241	0.00	2.66	0.01	2344
## 242	0.00	2.65	0.00	1763
## 243	0.00	2.67	0.00	2194
## 244	0.00	2.68	0.00	1742
## 245	0.00	2.68	0.00	1696
## 246	0.00	2.68	0.00	1838
## 247	0.00	0.90	0.00	2505
## 248	0.00	2.68	0.00	1776
## 249	0.31	2.35	0.00	2580
## 250	0.35	2.20	0.00	1459
## 251	0.20	2.47	0.00	1880
## 252	0.00	2.77	0.00	1698
## 253	0.52	2.25	0.00	1659
## 254	0.00	2.78	0.00	1763
## 255	0.00	0.00	0.00	2516
## 256	0.00	2.80	0.00	1725
## 257	0.58	1.22	0.00	2400
## 258	0.00	2.93	0.00	1506
## 259	0.00	2.93	0.00	2149
## 260	0.00	2.94	0.00	2741
## 261	0.26	2.44	0.00	1527
## 262	0.26	2.59	0.00	1793
## 263	0.00	3.01	0.00	2203
## 264	1.06	1.35	0.00	2536
## 265	0.81	2.15	0.00	1886
## 266	0.00	3.03	0.00	2211
## 267	0.48	2.56	0.00	1814
## 268	0.30	0.89	0.00	1665
## 269	0.49	1.37	0.00	1813
## 270	0.00	3.07	0.00	1779
## 271	0.00	3.10	0.00	1521
## 272	0.00	3.10	0.00	2076
## 273	0.00	3.10	0.01	2704
## 274	0.00	3.13	0.00	2196
## 275	0.00	3.16	0.00	1718
## 276	0.00	3.17	0.00	1788
## 277	0.00	3.18	0.00	1884
## 278	0.54	2.13	0.01	2463
## 279	0.00	3.15	0.05	2828
## 280	0.00	3.22	0.00	1693
## 281	0.00	3.23	0.00	1446
## 282	0.00	3.23	0.01	1788
## 283	0.00	3.25	0.00	1856
## 284	0.00	3.26	0.00	1860
## 285	0.12	2.94	0.00	2785
## 286	0.00	3.29	0.00	1742

## 287	0.44	1.61	0.00	1722
## 288	0.00	3.31	0.00	1945
## 289	0.00	3.32	0.00	1705
## 290	0.09	2.38	0.02	1867
## 291	0.00	3.36	0.00	2247
## 292	0.44	2.75	0.00	2748
## 293	0.00	3.37	0.00	1747
## 294	0.93	1.93	0.00	2496
## 295	0.55	0.55	0.00	1897
## 296	0.00	3.38	0.00	1248
## 297	0.00	3.39	0.00	1909
## 298	0.81	0.06	0.00	2225
## 299	0.00	3.40	0.00	1724
## 300	0.00	3.42	0.00	1804
## 301	0.00	3.45	0.00	1555
## 302	0.00	3.45	0.00	2560
## 303	0.00	3.46	0.00	1842
## 304	0.99	0.54	0.00	1705
## 305	0.00	3.47	0.00	1821
## 306	0.28	2.60	0.00	1953
## 307	0.63	1.80	0.00	1829
## 308	0.00	3.49	0.00	1463
## 309	0.00	3.51	0.00	1801
## 310	0.39	3.11	0.00	1780
## 311	0.00	3.51	0.00	2246
## 312	0.24	1.81	0.00	2547
## 313	0.12	2.04	0.00	2596
## 314	0.00	3.53	0.00	2098
## 315	0.00	3.54	0.00	2281
## 316	0.00	3.54	0.00	2799
## 317	0.00	3.55	0.00	1827
## 318	0.36	3.16	0.00	1876
## 319	0.09	2.42	0.01	1946
## 320	0.00	3.58	0.00	2572
## 321	0.19	1.25	0.00	2123
## 322	0.00	3.60	0.00	1854
## 323	0.00	3.61	0.00	1740
## 324	0.28	3.26	0.00	1882
## 325	0.21	2.84	0.00	2516
## 326	0.27	2.69	0.00	1976
## 327	0.00	3.56	0.00	2189
## 328	0.00	3.68	0.00	1595
## 329	0.00	3.68	0.00	1756
## 330	0.32	1.45	0.00	2643
## 331	0.86	1.97	0.00	2507
## 332	0.00	3.72	0.00	1604
## 333	0.00	3.73	0.00	1576
## 334	0.00	3.73	0.00	2044
## 335	1.21	1.96	0.00	1718
## 336	0.00	3.75	0.00	2225
## 337	0.00	3.76	0.00	1851
## 338	0.00	3.76	0.00	1972
## 339	0.00	3.77	0.00	1593
## 340	0.00	3.77	0.00	1831

## 341	0.22	3.25	0.00	2551
## 342	0.00	3.80	0.00	1985
## 343	0.15	3.45	0.00	2750
## 344	0.25	2.08	0.00	2755
## 345	0.00	3.89	0.00	2018
## 346	0.00	3.91	0.00	1850
## 347	0.20	0.76	0.00	1505
## 348	0.33	3.58	0.00	2650
## 349	0.00	3.94	0.00	2780
## 350	0.91	1.89	0.00	1617
## 351	0.00	3.95	0.00	1649
## 352	0.00	3.95	0.00	1861
## 353	0.00	3.87	0.04	2926
## 354	0.65	2.47	0.00	3088
## 355	0.47	3.30	0.00	1762
## 356	0.00	3.94	0.00	2286
## 357	0.38	3.66	0.00	1811
## 358	1.52	1.49	0.01	1554
## 359	0.00	4.07	0.00	1658
## 360	0.00	4.06	0.00	1397
## 361	0.00	4.09	0.00	2010
## 362	1.04	3.07	0.00	2647
## 363	0.00	4.11	0.02	1467
## 364	0.00	0.00	0.00	2693
## 365	0.00	4.17	0.00	1452
## 366	0.00	4.16	0.00	2613
## 367	0.00	4.18	0.00	1852
## 368	0.00	4.18	0.00	2363
## 369	0.00	4.20	0.00	1899
## 370	0.00	4.15	0.00	3089
## 371	0.00	4.21	0.00	2069
## 372	0.00	4.18	0.03	2743
## 373	0.00	4.20	0.02	1492
## 374	0.29	1.95	0.00	2248
## 375	1.12	2.39	0.00	1889
## 376	0.54	2.40	0.00	1854
## 377	0.82	3.11	0.01	1931
## 378	1.28	2.12	0.01	1655
## 379	0.49	2.91	0.00	2884
## 380	0.00	4.33	0.00	1903
## 381	0.00	4.32	0.01	1826
## 382	0.50	2.02	0.00	2666
## 383	0.00	4.33	0.00	2687
## 384	0.00	4.35	0.00	1690
## 385	0.97	3.23	0.00	2654
## 386	0.00	3.58	0.00	2975
## 387	0.04	1.96	0.00	2291
## 388	0.00	4.40	0.01	2718
## 389	0.26	4.14	0.00	1905
## 390	0.00	4.43	0.00	2030
## 391	0.00	4.44	0.00	2346
## 392	0.31	2.65	0.00	1855
## 393	0.48	3.44	0.00	2668
## 394	0.99	3.23	0.00	2696

## 395	0.00	4.46	0.00	2703
## 396	0.00	4.37	0.00	2306
## 397	0.00	4.48	0.00	1667
## 398	0.00	4.49	0.00	1922
## 399	0.00	4.50	0.00	1947
## 400	2.39	1.77	0.00	1909
## 401	0.52	2.48	0.00	2908
## 402	0.00	4.55	0.00	1411
## 403	0.20	4.01	0.00	2085
## 404	1.19	3.23	0.00	2683
## 405	0.00	4.56	0.00	1992
## 406	0.00	4.57	0.00	2671
## 407	0.00	4.58	0.00	2432
## 408	0.19	3.49	0.02	1921
## 409	0.36	3.91	0.00	2896
## 410	0.00	4.59	0.03	2806
## 411	0.20	3.35	0.00	2014
## 412	0.46	1.90	0.00	2484
## 413	0.06	1.62	0.00	1898
## 414	0.08	3.02	0.00	1995
## 415	0.00	4.71	0.00	1692
## 416	0.00	4.72	0.00	2796
## 417	0.00	4.70	0.03	1908
## 418	0.12	4.61	0.01	1910
## 419	0.19	2.35	0.00	2336
## 420	0.00	4.73	0.02	2175
## 421	0.00	4.77	0.00	2810
## 422	0.67	2.76	0.00	3374
## 423	0.00	4.79	0.00	2682
## 424	0.00	4.80	0.01	2701
## 425	0.17	4.01	0.00	3491
## 426	0.75	3.50	0.00	1997
## 427	1.20	3.61	0.00	2757
## 428	0.58	4.25	0.00	2677
## 429	0.35	2.09	0.01	3008
## 430	0.00	4.83	0.00	2496
## 431	0.49	4.34	0.00	1922
## 432	0.29	3.22	0.00	1407
## 433	0.00	4.88	0.00	2987
## 434	0.00	4.90	0.00	2003
## 435	0.00	4.42	0.02	2241
## 436	0.25	4.65	0.00	2423
## 437	0.36	4.27	0.00	2982
## 438	0.59	3.47	0.00	1497
## 439	0.00	4.95	0.00	1907
## 440	1.41	2.18	0.00	1780
## 441	0.35	4.54	0.00	2784
## 442	0.45	4.00	0.00	2616
## 443	0.00	4.97	0.00	1972
## 444	1.04	3.44	0.00	1739
## 445	0.25	4.66	0.01	1906
## 446	0.37	3.16	0.00	1878
## 447	0.03	2.38	0.00	2361
## 448	0.42	4.62	0.00	1377

## 449	0.21	4.83	0.02	1878
## 450	0.40	4.45	0.00	3073
## 451	0.08	3.58	0.00	1995
## 452	0.00	5.08	0.00	1736
## 453	0.00	5.06	0.02	1908
## 454	0.00	5.09	0.01	2843
## 455	0.00	5.11	0.00	1431
## 456	0.97	3.82	0.00	1433
## 457	0.22	4.88	0.02	2004
## 458	0.00	5.11	0.02	2725
## 459	0.40	2.93	0.00	3294
## 460	0.84	3.73	0.00	2121
## 461	1.68	2.92	0.00	1946
## 462	0.11	2.58	0.00	2421
## 463	1.85	2.31	0.00	1918
## 464	1.67	2.45	0.00	2806
## 465	0.00	5.19	0.00	1906
## 466	0.00	0.00	0.00	2115
## 467	0.00	5.19	0.02	2766
## 468	0.00	5.22	0.00	2066
## 469	0.64	3.92	0.00	3586
## 470	0.28	4.89	0.00	1890
## 471	0.00	5.23	0.00	2130
## 472	0.00	5.24	0.02	1985
## 473	0.87	0.73	0.00	2584
## 474	0.42	4.79	0.00	2896
## 475	0.00	5.28	0.00	2275
## 476	2.05	2.94	0.00	2729
## 477	0.00	5.31	0.00	1432
## 478	0.52	4.68	0.00	2062
## 479	0.00	5.32	0.00	1698
## 480	0.00	5.32	0.00	1893
## 481	1.05	4.08	0.00	2158
## 482	0.25	4.51	0.00	2225
## 483	0.28	4.93	0.00	3101
## 484	0.79	4.12	0.00	2175
## 485	0.00	5.36	0.00	1956
## 486	0.00	5.39	0.00	2383
## 487	0.00	5.40	0.00	2225
## 488	0.00	5.39	0.01	2905
## 489	0.00	5.39	0.01	2839
## 490	0.34	2.91	0.00	1835
## 491	1.13	4.15	0.00	2284
## 492	0.63	3.19	0.01	2095
## 493	1.87	2.46	0.00	1670
## 494	1.00	2.83	0.00	1973
## 495	0.37	4.19	0.00	2812
## 496	0.86	3.79	0.00	1944
## 497	0.59	1.31	0.00	2135
## 498	0.00	5.51	0.00	1364
## 499	1.61	3.51	0.00	2092
## 500	0.00	5.53	0.00	2250
## 501	0.18	5.24	0.00	1882
## 502	0.00	2.64	0.00	2096

## 503	0.00	5.54	0.00	2469
## 504	0.00	5.54	0.01	1562
## 505	0.00	5.56	0.00	2015
## 506	0.00	5.55	0.01	1962
## 507	0.35	4.07	0.00	3014
## 508	0.00	5.58	0.00	2898
## 509	0.06	2.54	0.00	2408
## 510	0.25	3.78	0.00	3644
## 511	0.83	2.95	0.00	2386
## 512	0.80	4.03	0.00	1971
## 513	0.66	4.87	0.00	2859
## 514	0.47	2.67	0.00	3004
## 515	0.00	5.65	0.00	2173
## 516	1.11	2.53	0.00	2395
## 517	1.08	4.26	0.01	1830
## 518	0.00	5.69	0.01	2063
## 519	0.36	4.14	0.00	3152
## 520	0.80	4.78	0.00	2908
## 521	0.00	5.76	0.00	2305
## 522	0.05	3.87	0.01	2057
## 523	0.00	5.77	0.03	2952
## 524	0.90	2.64	0.00	2902
## 525	0.00	5.82	0.00	2712
## 526	0.18	5.33	0.00	3061
## 527	0.10	4.36	0.01	1964
## 528	0.00	5.85	0.00	2947
## 529	0.18	5.03	0.01	2771
## 530	0.93	4.88	0.00	1982
## 531	0.93	4.00	0.00	2116
## 532	0.00	5.91	0.01	1572
## 533	1.74	3.76	0.00	2859
## 534	0.61	2.47	0.00	3544
## 535	0.79	4.00	0.00	3171
## 536	0.77	3.17	0.00	2798
## 537	0.58	3.06	0.00	1481
## 538	0.37	5.47	0.01	1970
## 539	0.91	2.01	0.00	1450
## 540	0.00	5.99	0.00	2200
## 541	0.68	5.31	0.00	2220
## 542	1.82	3.94	0.00	2131
## 543	1.03	4.65	0.01	2065
## 544	2.03	3.59	0.00	2223
## 545	0.71	4.50	0.00	3635
## 546	1.75	3.26	0.00	1468
## 547	0.26	4.64	0.01	2124
## 548	0.38	2.10	0.00	3405
## 549	0.63	1.31	0.00	1935
## 550	1.00	2.86	0.00	2499
## 551	0.24	5.68	0.00	3654
## 552	0.33	3.66	0.00	2734
## 553	0.04	4.25	0.00	1849
## 554	0.74	5.18	0.00	2232
## 555	3.27	2.45	0.00	1880
## 556	0.30	4.51	0.00	2463

## 557	0.00	6.20	0.00	2409
## 558	0.28	5.93	0.00	2314
## 559	0.34	1.76	0.00	3192
## 560	0.00	6.22	0.01	2044
## 561	0.44	5.71	0.00	2270
## 562	0.49	4.20	0.00	3110
## 563	0.27	5.95	0.00	2185
## 564	0.00	6.26	0.00	2187
## 565	1.04	3.13	0.00	2132
## 566	1.26	2.83	0.00	1745
## 567	0.00	6.27	0.01	2783
## 568	0.54	4.23	0.00	1916
## 569	0.12	4.66	0.01	2094
## 570	0.89	3.46	0.00	2098
## 571	0.35	4.65	0.00	1775
## 572	0.23	4.02	0.01	2021
## 573	1.50	3.47	0.00	2094
## 574	0.57	3.55	0.00	3011
## 575	0.46	5.70	0.00	2260
## 576	0.00	6.37	0.00	2984
## 577	0.52	4.60	0.00	2095
## 578	0.41	4.90	0.00	1996
## 579	1.14	4.71	0.00	2117
## 580	0.21	3.28	0.00	1788
## 581	0.67	4.44	0.00	1853
## 582	0.47	5.46	0.00	2266
## 583	0.31	2.78	0.00	4022
## 584	2.01	3.72	0.00	2846
## 585	2.05	4.27	0.00	2889
## 586	1.07	4.83	0.00	2235
## 587	0.78	2.51	0.00	1728
## 588	1.39	2.23	0.00	2735
## 589	0.97	2.67	0.00	2846
## 590	0.32	2.73	0.00	1740
## 591	0.00	0.00	0.00	2894
## 592	0.00	6.60	0.00	1869
## 593	0.73	5.54	0.00	3004
## 594	0.34	5.27	0.02	2093
## 595	0.92	5.15	0.00	2236
## 596	0.02	3.51	0.01	2148
## 597	0.75	3.35	0.00	3841
## 598	0.66	4.72	0.00	3721
## 599	0.81	4.97	0.01	2799
## 600	0.76	3.67	0.00	2002
## 601	1.02	3.01	0.00	2883
## 602	0.48	4.24	0.00	1786
## 603	0.57	6.10	0.00	2990
## 604	2.74	3.94	0.00	2010
## 605	2.13	2.55	0.00	1495
## 606	0.68	5.69	0.00	2027
## 607	1.68	4.55	0.00	2086
## 608	1.22	2.31	0.00	2743
## 609	0.00	6.73	0.00	3066
## 610	0.00	6.73	0.00	2361

## 611	0.40	3.91	0.00	1776
## 612	0.83	2.51	0.00	1994
## 613	1.53	3.38	0.00	2048
## 614	0.85	3.16	0.00	2754
## 615	2.41	4.08	0.00	2944
## 616	0.16	5.74	0.00	3783
## 617	3.24	3.17	0.00	2804
## 618	1.60	2.92	0.00	1820
## 619	0.66	2.66	0.00	2754
## 620	1.07	5.62	0.00	2998
## 621	1.89	4.46	0.00	2105
## 622	2.02	4.25	0.00	2034
## 623	0.70	2.37	0.00	2752
## 624	0.62	4.20	0.00	2344
## 625	2.32	4.31	0.00	3108
## 626	0.79	3.30	0.00	3329
## 627	0.33	6.44	0.00	2302
## 628	1.00	4.74	0.00	1922
## 629	0.42	3.90	0.00	2012
## 630	1.06	4.50	0.00	3784
## 631	1.42	5.43	0.00	2133
## 632	0.56	6.25	0.00	2345
## 633	1.16	4.81	0.00	2066
## 634	0.69	4.71	0.00	1797
## 635	2.35	3.92	0.00	1529
## 636	0.22	6.09	0.00	3006
## 637	1.94	3.41	0.00	2038
## 638	0.50	5.51	0.00	2262
## 639	0.58	5.85	0.00	2282
## 640	1.98	2.41	0.00	1501
## 641	0.77	2.12	0.00	2781
## 642	0.55	3.39	0.00	2177
## 643	1.55	3.77	0.00	2086
## 644	0.89	5.42	0.00	2979
## 645	2.13	2.87	0.00	2046
## 646	1.53	3.25	0.00	2534
## 647	0.00	7.11	0.00	2576
## 648	0.48	5.81	0.00	2254
## 649	0.27	6.01	0.02	3328
## 650	1.33	5.39	0.00	2296
## 651	0.97	5.12	0.00	2463
## 652	1.23	5.73	0.00	3061
## 653	0.19	1.34	0.00	1976
## 654	0.50	5.58	0.00	1837
## 655	0.87	3.82	0.00	1819
## 656	0.14	1.59	0.00	2044
## 657	0.05	7.01	0.01	3934
## 658	0.67	4.64	0.00	2498
## 659	0.00	7.17	0.01	2896
## 660	0.66	5.11	0.00	2793
## 661	1.21	5.50	0.00	2611
## 662	0.57	3.69	0.00	2033
## 663	3.31	3.66	0.00	2940
## 664	1.72	4.69	0.00	3123

## 665	0.34	6.87	0.00	2450
## 666	1.92	4.91	0.00	2324
## 667	0.00	7.24	0.00	2560
## 668	0.59	5.27	0.00	3788
## 669	1.81	4.78	0.00	2198
## 670	0.33	5.94	0.00	2367
## 671	1.06	5.27	0.00	2929
## 672	0.34	4.33	0.00	2473
## 673	1.23	2.51	0.00	2944
## 674	0.42	5.77	0.00	3033
## 675	1.04	5.58	0.00	3879
## 676	2.03	4.75	0.00	3012
## 677	1.67	5.09	0.00	2899
## 678	1.49	4.07	0.00	3013
## 679	0.72	1.82	0.00	3625
## 680	0.17	5.79	0.00	2698
## 681	0.96	4.50	0.00	2380
## 682	0.00	7.40	0.00	2636
## 683	0.62	4.62	0.01	1604
## 684	0.00	7.42	0.00	2667
## 685	0.82	6.11	0.00	3064
## 686	1.17	3.01	0.00	3580
## 687	0.00	7.40	0.01	3891
## 688	2.75	4.00	0.02	3327
## 689	0.44	4.78	0.00	3787
## 690	0.31	6.01	0.00	2124
## 691	0.21	4.82	0.00	2312
## 692	0.00	7.54	0.00	1926
## 693	2.39	4.32	0.00	2039
## 694	1.62	5.52	0.00	2223
## 695	0.79	5.41	0.00	2026
## 696	0.40	5.32	0.00	2194
## 697	0.89	4.56	0.00	2272
## 698	4.22	2.95	0.00	1551
## 699	0.63	5.60	0.00	2105
## 700	0.75	3.17	0.00	1999
## 701	0.00	7.67	0.00	3145
## 702	0.81	3.86	0.00	2553
## 703	0.17	1.73	0.00	2947
## 704	2.12	3.13	0.00	1821
## 705	0.00	7.71	0.00	1916
## 706	0.53	3.74	0.00	1819
## 707	1.74	2.22	0.00	3727
## 708	4.13	3.59	0.00	1574
## 709	0.39	6.98	0.00	3069
## 710	1.30	2.71	0.00	1545
## 711	0.43	6.03	0.00	2969
## 712	0.93	4.46	0.00	2093
## 713	1.16	3.26	0.00	1859
## 714	2.30	5.33	0.00	3199
## 715	0.00	0.00	0.00	2955
## 716	3.73	3.82	0.00	1584
## 717	1.64	3.36	0.00	2862
## 718	4.35	3.28	0.00	1554

## 719	0.69	5.77	0.00	3015
## 720	0.79	6.53	0.00	2954
## 721	0.73	6.79	0.00	3013
## 722	1.28	6.43	0.00	3164
## 723	0.51	6.30	0.00	2885
## 724	0.68	6.20	0.00	2926
## 725	0.15	2.33	0.00	2112
## 726	0.65	6.46	0.00	3061
## 727	2.16	4.98	0.00	3069
## 728	0.22	4.46	0.00	2470
## 729	2.56	5.10	0.00	3226
## 730	0.48	5.52	0.00	2536
## 731	0.25	5.81	0.00	1896
## 732	0.31	5.78	0.00	2525
## 733	0.92	6.07	0.00	3165
## 734	2.16	2.96	0.00	2066
## 735	4.22	3.85	0.00	1638
## 736	0.90	4.85	0.00	2730
## 737	1.66	2.78	0.00	4018
## 738	0.20	6.80	0.00	2847
## 739	1.72	5.29	0.00	3083
## 740	2.04	4.33	0.00	2072
## 741	1.12	2.24	0.00	1827
## 742	1.01	4.55	0.00	1783
## 743	0.96	6.99	0.00	4142
## 744	0.46	6.28	0.00	2832
## 745	0.41	5.04	0.00	1863
## 746	2.53	5.30	0.00	3300
## 747	0.23	1.70	0.00	2008
## 748	4.22	3.89	0.00	3093
## 749	0.10	6.67	0.01	2817
## 750	2.03	5.88	0.00	3115
## 751	0.34	4.96	0.00	2668
## 752	0.15	3.57	0.00	3795
## 753	2.51	2.67	0.00	1590
## 754	0.93	4.85	0.00	2649
## 755	0.15	1.88	0.00	2655
## 756	0.12	2.90	0.00	2655
## 757	0.57	4.57	0.00	2786
## 758	0.64	4.91	0.00	2169
## 759	0.77	4.26	0.00	2390
## 760	0.18	2.53	0.00	2693
## 761	0.86	4.70	0.00	2609
## 762	0.24	5.59	0.00	2182
## 763	1.43	3.12	0.00	2924
## 764	1.20	5.68	0.00	2116
## 765	0.08	4.55	0.00	3147
## 766	0.00	8.41	0.00	2606
## 767	0.15	2.97	0.00	2772
## 768	1.68	4.04	0.07	3429
## 769	0.13	6.50	0.00	2860
## 770	0.63	3.88	0.00	3092
## 771	0.43	2.41	0.00	1570
## 772	2.33	4.68	0.00	2739

## 773	0.55	6.06	0.00	1985
## 774	0.10	5.41	0.00	2601
## 775	1.16	3.79	0.00	1898
## 776	0.24	5.00	0.00	2489
## 777	2.00	5.34	0.00	2162
## 778	0.93	1.75	0.00	2218
## 779	4.11	2.71	0.00	1618
## 780	0.64	4.71	0.00	1921
## 781	2.51	5.39	0.00	3074
## 782	1.88	6.65	0.00	3172
## 783	0.27	5.94	0.00	2761
## 784	0.00	8.68	0.00	2651
## 785	1.18	3.65	0.00	2105
## 786	1.11	4.31	0.00	3158
## 787	0.46	4.28	0.00	2752
## 788	0.19	4.88	0.00	2173
## 789	0.07	6.27	0.01	3802
## 790	2.45	3.96	0.00	1638
## 791	5.40	3.31	0.00	1630
## 792	0.92	5.54	0.00	1970
## 793	0.07	8.79	0.00	3545
## 794	1.07	2.44	0.00	3363
## 795	1.08	4.88	0.00	1959
## 796	1.21	5.56	0.00	2797
## 797	4.00	2.97	0.00	1625
## 798	1.25	7.54	0.00	3328
## 799	0.87	5.36	0.00	1949
## 800	0.56	2.47	0.00	3369
## 801	0.97	7.70	0.00	2486
## 802	1.60	3.56	0.00	4005
## 803	5.24	3.17	0.00	1633
## 804	0.40	5.14	0.00	3274
## 805	1.71	3.12	0.00	2960
## 806	0.83	2.32	0.00	4552
## 807	0.70	3.83	0.00	2642
## 808	1.87	5.17	0.00	2763
## 809	2.10	3.41	0.00	1650
## 810	0.79	2.61	0.00	4501
## 811	1.42	4.27	0.00	1947
## 812	1.68	4.46	0.10	2194
## 813	1.15	3.99	0.00	2544
## 814	0.42	4.47	0.00	2638
## 815	4.09	4.54	0.00	3324
## 816	1.11	4.92	0.00	3544
## 817	0.00	0.00	0.00	3212
## 818	0.57	2.69	0.00	2765
## 819	1.63	5.64	0.00	2709
## 820	0.28	3.04	0.00	2809
## 821	1.04	5.24	0.00	2995
## 822	0.64	1.76	0.00	3501
## 823	4.58	2.89	0.00	1628
## 824	1.41	5.45	0.00	2530
## 825	1.66	4.43	0.00	2156
## 826	0.93	5.80	0.00	3162

## 827	0.19	5.09	0.00	2174
## 828	0.38	5.64	0.00	3566
## 829	1.74	4.53	0.00	1710
## 830	0.20	3.10	0.00	2846
## 831	2.00	6.94	0.00	3283
## 832	0.56	4.48	0.00	2742
## 833	0.31	3.17	0.00	2794
## 834	1.05	4.88	0.00	1990
## 835	0.59	4.18	0.00	4044
## 836	0.00	1.18	0.00	3266
## 837	0.57	5.92	0.00	2004
## 838	2.10	3.51	0.11	2179
## 839	0.79	5.67	0.01	3404
## 840	0.27	2.87	0.00	3142
## 841	0.78	7.88	0.00	3290
## 842	0.57	3.94	0.00	2013
## 843	0.43	2.93	0.00	2852
## 844	0.65	4.21	0.00	4079
## 845	0.87	3.92	0.00	4005
## 846	1.32	5.03	0.00	2035
## 847	1.40	7.84	0.00	3288
## 848	1.44	3.24	0.00	4546
## 849	4.56	2.17	0.00	1655
## 850	0.12	6.30	0.00	2770
## 851	5.60	3.55	0.00	1667
## 852	0.94	8.23	0.00	2939
## 853	1.66	4.18	0.00	2284
## 854	0.77	8.26	0.00	2836
## 855	2.09	5.93	0.00	3425
## 856	0.32	5.35	0.00	3306
## 857	1.75	4.99	0.00	2361
## 858	0.66	5.29	0.00	2830
## 859	1.76	4.37	0.00	2889
## 860	1.15	4.58	0.00	2529
## 861	3.46	5.88	0.00	3394
## 862	0.38	5.41	0.00	2937
## 863	0.88	4.18	0.00	4092
## 864	6.21	3.54	0.00	3287
## 865	0.76	5.31	0.00	2812
## 866	1.03	3.91	0.00	4163
## 867	0.28	10.30	0.00	2865
## 868	0.45	2.54	0.00	2997
## 869	1.28	2.73	0.00	4274
## 870	1.93	5.40	0.00	2897
## 871	0.82	4.37	0.00	3052
## 872	1.61	5.20	0.00	2335
## 873	1.20	2.45	0.00	2800
## 874	0.56	5.20	0.00	4157
## 875	1.98	4.71	0.00	2254
## 876	1.02	5.36	0.00	2976
## 877	0.85	9.48	0.00	2828
## 878	2.12	5.05	0.02	2832
## 879	0.69	1.21	0.00	2859
## 880	6.48	3.02	0.00	1760

## 881	1.29	5.48	0.00	2933
## 882	0.27	1.49	0.00	2867
## 883	1.88	5.09	0.00	3493
## 884	2.45	4.67	0.00	2324
## 885	0.40	1.91	0.00	2918
## 886	0.38	5.97	0.00	3060
## 887	0.67	5.86	0.00	3096
## 888	0.42	1.85	0.00	2926
## 889	1.45	7.15	0.00	2629
## 890	0.66	6.88	0.00	2782
## 891	1.15	5.41	0.00	3666
## 892	0.45	2.21	0.00	2950
## 893	2.31	8.97	0.00	3683
## 894	2.15	1.98	0.00	4392
## 895	3.00	4.92	0.00	3513
## 896	0.93	2.59	0.00	3023
## 897	0.82	4.29	0.00	4236
## 898	0.23	2.38	0.00	3043
## 899	0.41	5.41	0.00	2159
## 900	5.12	5.88	0.00	3538
## 901	3.24	8.27	0.00	3691
## 902	0.39	2.35	0.00	3062
## 903	0.31	2.95	0.00	3114
## 904	0.25	2.58	0.00	3103
## 905	0.23	3.35	0.00	3133
## 906	0.92	4.42	0.00	3763
## 907	1.40	10.57	0.00	2732
## 908	3.14	9.46	0.00	3846
## 909	2.00	7.04	0.00	2571
## 910	1.37	7.67	0.00	3055
## 911	0.47	2.45	0.00	3140
## 912	0.80	3.64	0.00	3213
## 913	0.39	2.10	0.00	3186
## 914	2.05	7.95	0.00	3180
## 915	1.26	3.23	0.00	3934
## 916	0.40	5.62	0.00	4900
## 917	4.10	5.53	0.00	2670
## 918	0.88	2.35	0.00	3331
## 919	0.46	3.86	0.00	3403
## 920	0.01	4.69	0.00	3455
## 921	0.21	3.36	0.00	3411
## 922	0.39	2.59	0.00	3410
## 923	0.31	5.53	0.00	3477
## 924	0.03	5.97	0.05	3427
## 925	0.63	4.02	0.00	3554
## 926	0.18	5.03	0.00	3676
## 927	2.77	5.33	0.00	4022
## 928	0.42	4.89	0.00	3659
## 929	0.59	3.66	0.00	3589
## 930	1.55	3.26	0.00	3577
## 931	0.69	6.34	0.00	3679
## 932	0.80	6.24	0.05	3710
## 933	0.59	7.75	0.02	3793
## 934	0.29	6.16	0.00	4015

```
## 935          0.41          5.89          0.00      3832
## 936          0.34          7.82          0.00      3921
## 937          0.44          7.10          0.00      3808
## 938          1.21         10.71          0.00      4547
## 939          0.08          4.93          0.00      4398
## 940          4.19          1.91          0.02      2690
```

1. The data for total distance was used to determine the average minimum and maximum distance for each user.

```
activity_distance_summary <- activity_distance %>%
  group_by(id) %>%
  summarize(mean_total_distance = mean(totaldistance), min_total_distance = min(totaldistance), max_tot
view(activity_distance_summary)
```

2. The data for total minutes was used to determine the average minimum and maximum minutes for each user.

```
activity_minutes_summary <- activity_minutes %>%
  group_by(id) %>%
  summarize(mean_total_minutes = mean(totalminutes), min_total_minutes = min(totalminutes), max_total_m
view(activity_minutes_summary)
```

The data was also explored to understand some summary statistics.

1. The number of users from the dataframe was explored.

```
n_distinct(activity_distance$id)
```

```
## [1] 33
```

```
n_distinct(activity_minutes$id)
```

```
## [1] 33
```

2. The amount of observations in each dataframe was explored.

```
nrow(activity_distance)
```

```
## [1] 940
```

```
nrow(activity_minutes)
```

```
## [1] 940
```

3. Some summary statistics about each the dataframe was also explored.

```
activity_distance %>%
  select(totalsteps,
         totaldistance,
         calories) %>%
  summary()
```

```
##   totalsteps   totaldistance    calories
##  Min.   :    0   Min.   : 0.000   Min.   :    0
## 1st Qu.: 3790   1st Qu.: 2.620   1st Qu.:1828
## Median : 7406   Median : 5.245   Median :2134
## Mean   : 7638   Mean   : 5.490   Mean   :2304
## 3rd Qu.:10727   3rd Qu.: 7.713   3rd Qu.:2793
## Max.   :36019   Max.   :28.030   Max.   :4900
```



```
activity_minutes %>%
  select(totalsteps,
         totalminutes,
         calories) %>%
  summary()
```

```
##      totalsteps      totalminutes      calories
## Min.       :    0      Min.       :   2.0      Min.       :    0
## 1st Qu.: 3790      1st Qu.: 989.8      1st Qu.:1828
## Median : 7406      Median :1440.0      Median :2134
## Mean   : 7638      Mean   :1218.8      Mean   :2304
## 3rd Qu.:10727      3rd Qu.:1440.0      3rd Qu.:2793
## Max.   :36019      Max.   :1440.0      Max.   :4900
```

Step 7: Visualization of Data

The relationship between the activity distance and calorie expenditure was explored and visualized.

```
library(ggplot2)
```

```
min(activity_distance$activitydate)
```

```
## [1] "4/12/2016"
```

```
max(activity_distance$activitydate)
```

```
## [1] "5/9/2016"
```

```
mindate <- min(activity_distance$activitydate)
```

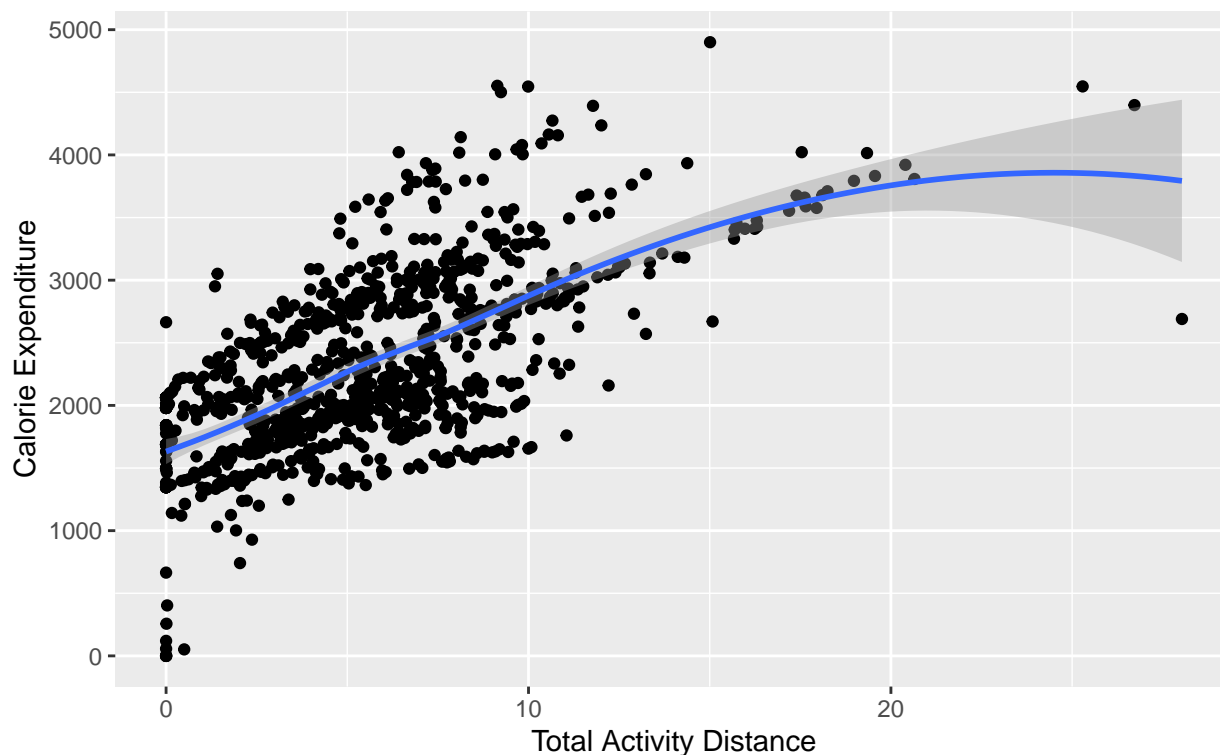
```
maxdate <- max(activity_distance$activitydate)
```

```
ggplot(data=activity_distance, aes(x=totaldistance, y=calories)) + geom_point() + geom_smooth() + labs(
```

```
## `geom_smooth()` using method = 'loess' and formula 'y ~ x'
```

Calorie Expenditure vs Activity Distance

Data from: 4/12/2016 to 5/9/2016



```
ggsave('calorie_total_activity_distance.png', width=7,  
        height=7)
```

```
## `geom_smooth()` using method = 'loess' and formula 'y ~ x'
```

The data was also analysed based on individual user.

```
ggplot(data=activity_distance, aes(x=totaldistance, y=calories)) + geom_point() + geom_smooth() + facet.
```

```
## `geom_smooth()` using method = 'loess' and formula 'y ~ x'
```

```
## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : span too small. fewer data values than degrees of freedom.
```

```
## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : pseudoinverse used at -0.02235
```

```
## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : neighborhood radius 4.0524
```

```
## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : reciprocal condition number 0
```

```
## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : There are other near singularities as well. 2.3788
```

```
## Warning in sqrt(sum.squares/one.delta): NaNs produced
```

```
## Warning in predLoess(object$y, object$x, newx = if  
## (is.null(newdata)) object$x else if (is.data.frame(newdata))  
## as.matrix(model.frame(delete.response(terms(object))), : span too small. fewer  
## data values than degrees of freedom.
```

```
## Warning in predLoess(object$y, object$x, newx = if
## (is.null(newdata)) object$x else if (is.data.frame(newdata))
## as.matrix(model.frame(delete.response(terms(object))), : pseudoinverse used at
## -0.02235

## Warning in predLoess(object$y, object$x, newx = if
## (is.null(newdata)) object$x else if (is.data.frame(newdata))
## as.matrix(model.frame(delete.response(terms(object))), : neighborhood radius
## 4.0524

## Warning in predLoess(object$y, object$x, newx = if
## (is.null(newdata)) object$x else if (is.data.frame(newdata))
## as.matrix(model.frame(delete.response(terms(object))), : reciprocal condition
## number 0

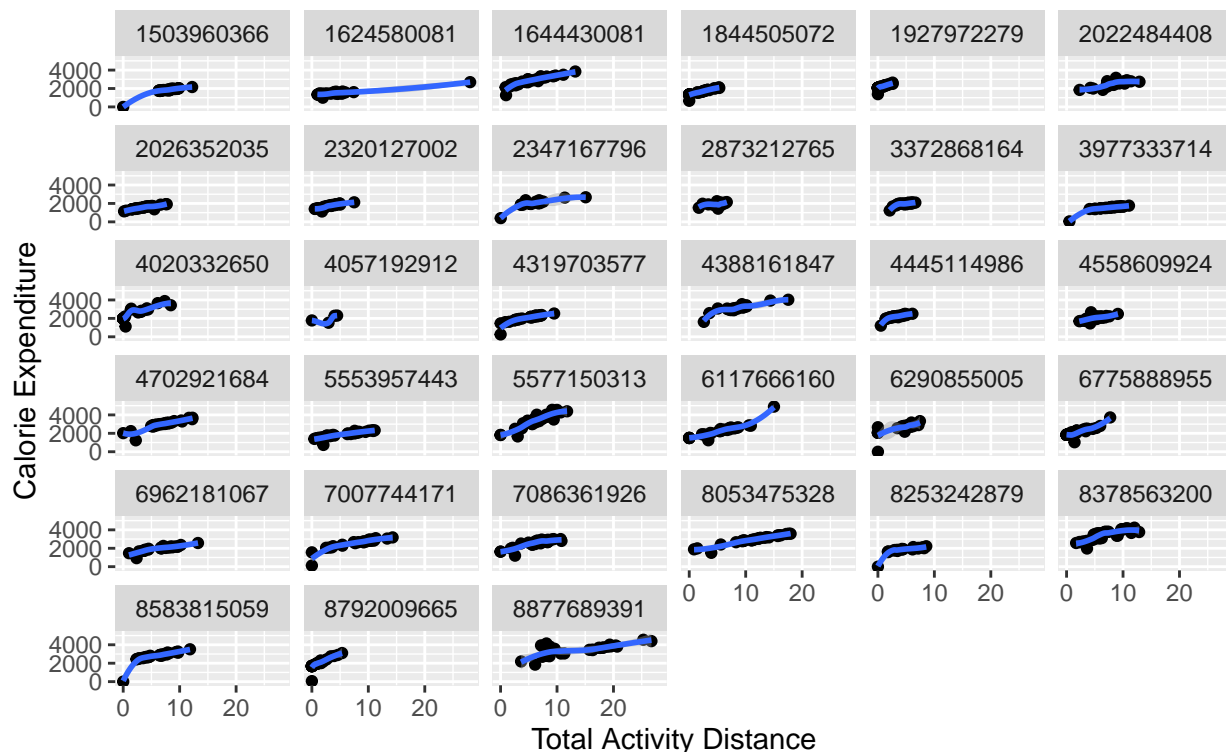
## Warning in predLoess(object$y, object$x, newx = if
## (is.null(newdata)) object$x else if (is.data.frame(newdata))
## as.matrix(model.frame(delete.response(terms(object))), : There are other near
## singularities as well. 2.3788

## Warning in stats::qt(level/2 + 0.5, pred$df): NaNs produced

## Warning in max(ids, na.rm = TRUE): no non-missing arguments to max; returning
## -Inf
```

Calorie Expenditure vs Activity Distance Per User

Data from: 4/12/2016 to 5/9/2016



```
ggsave('calorie_total_activity_distance_individual.png', width=7,
height=7)
```

```
## `geom_smooth()` using method = 'loess' and formula 'y ~ x'
## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
```

```

## parametric, : span too small. fewer data values than degrees of freedom.
## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
## parametric, : pseudoinverse used at -0.02235
## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
## parametric, : neighborhood radius 4.0524
## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
## parametric, : reciprocal condition number 0
## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =
## parametric, : There are other near singularities as well. 2.3788
## Warning in sqrt(sum.squares/one.delta): NaNs produced
## Warning in predLoess(object$y, object$x, newx = if
## (is.null(newdata)) object$x else if (is.data.frame(newdata))
## as.matrix(model.frame(delete.response(terms(object))), : span too small. fewer
## data values than degrees of freedom.
## Warning in predLoess(object$y, object$x, newx = if
## (is.null(newdata)) object$x else if (is.data.frame(newdata))
## as.matrix(model.frame(delete.response(terms(object))), : pseudoinverse used at
## -0.02235
## Warning in predLoess(object$y, object$x, newx = if
## (is.null(newdata)) object$x else if (is.data.frame(newdata))
## as.matrix(model.frame(delete.response(terms(object))), : neighborhood radius
## 4.0524
## Warning in predLoess(object$y, object$x, newx = if
## (is.null(newdata)) object$x else if (is.data.frame(newdata))
## as.matrix(model.frame(delete.response(terms(object))), : reciprocal condition
## number 0
## Warning in predLoess(object$y, object$x, newx = if
## (is.null(newdata)) object$x else if (is.data.frame(newdata))
## as.matrix(model.frame(delete.response(terms(object))), : There are other near
## singularities as well. 2.3788
## Warning in stats::qt(level/2 + 0.5, pred$df): NaNs produced
## Warning in max(ids, na.rm = TRUE): no non-missing arguments to max; returning
## -Inf

```

Based on the graph, it was found that as the total active distance increases, the calories expenditure also increased. This trend would be useful to encourage users to be more active in order to achieve their fitness goal.

To find out if very active distance is correlated with a higher calorie expenditure.

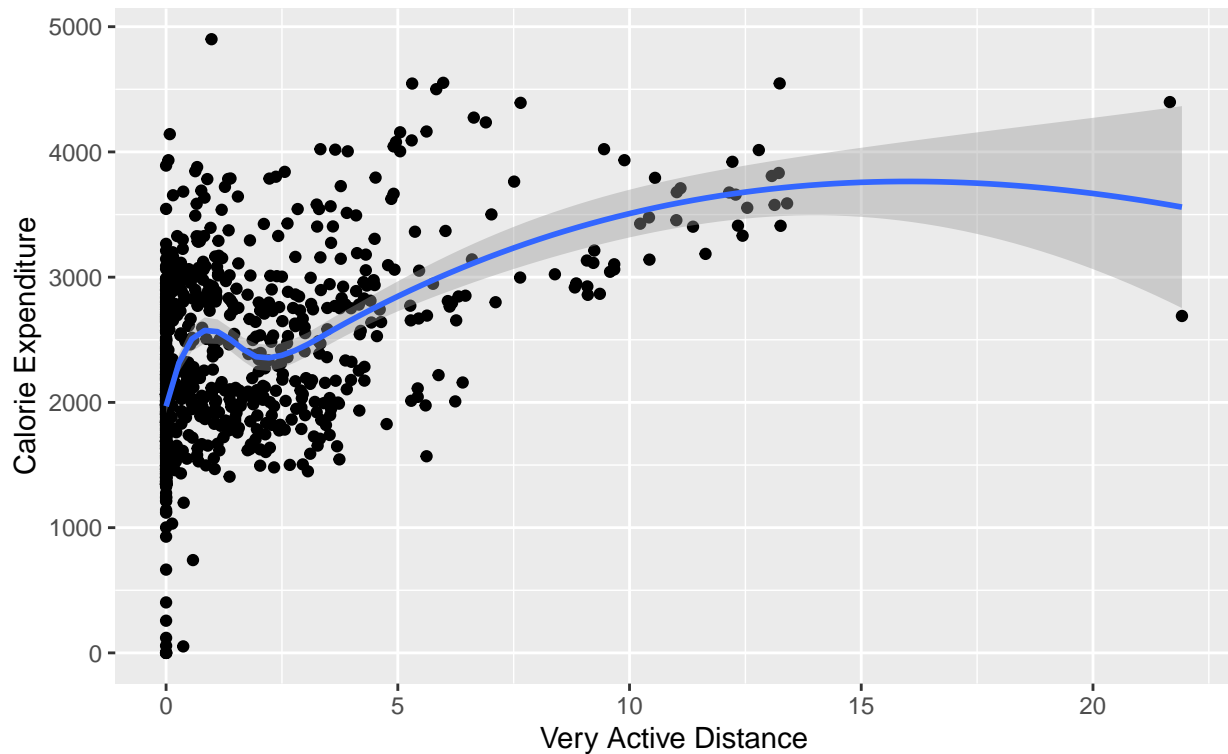
```

ggplot(data=activity_distance, aes(x=veryactivedistance, y=calories)) + geom_point() + geom_smooth() +
## `geom_smooth()` using method = 'loess' and formula 'y ~ x'

```

Calorie Expenditure vs Very Active Distance

Data from: 4/12/2016 to 5/9/2016



```
ggsave('calorie_very_active_distance.png', width=7,  
        height=7)
```

```
## `geom_smooth()` using method = 'loess' and formula 'y ~ x'
```

Based on the graph, it was found that as the very active distance increases, the calorie expenditure also increased. This trend would be useful to encourage users to be more active in order to achieve their fitness goal.

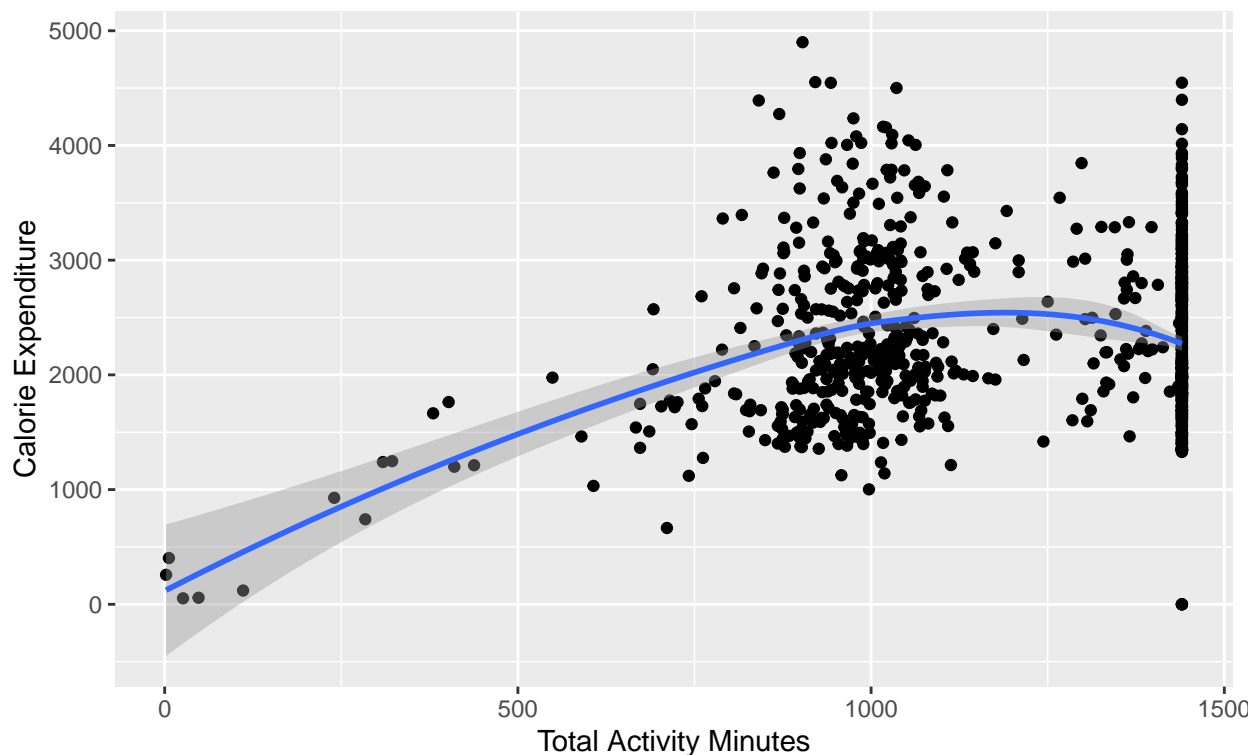
A graph was plotted to understand whether active minutes is linearly correlated with calorie expenditure.

```
ggplot(data=activity_minutes, aes(x=totalminutes, y=calories)) + geom_point() + geom_smooth() + labs(title="Calorie Expenditure vs Total Minutes")
```

```
## `geom_smooth()` using method = 'loess' and formula 'y ~ x'
```

Calorie Expenditure vs Activity Minutes

Data from: 4/12/2016 to 5/9/2016



```
ggsave('calorie_total_activity_minutes.png', width=7,  
        height=7)
```

```
## `geom_smooth()` using method = 'loess' and formula 'y ~ x'
```

The graph suggest that as total active minutes increases, calorie expenditure also increases. This trend would definitely encourage Bellabeat users to increase their active minutes throughout the day to achieve their fitness goal.

The graph also suggested that at 1480 total active minutes, the calorie expenditure ranged from 1080-4500 calories. It would be interesting to find out the reasons behind this large range of calories expenditure across different user with the same amount of total active minutes. A few possible factors that could led to this observation are the gender, age, height, weight, basal metabolism rate and duration of sleep by each individual user. To further explore this possibility, the relationship between duration of sleep and the expenditure of calories was explored.

Step 8: Relationship between Sleep Minutes and Calories Expenditure

```
sleep_day <- read.csv("sleepDay_merged.csv")
```

```
head(sleep_day)
```

```
##           Id           SleepDay TotalSleepRecords TotalMinutesAsleep  
## 1 1503960366 4/12/2016 12:00:00 AM                1                327  
## 2 1503960366 4/13/2016 12:00:00 AM                2                384  
## 3 1503960366 4/15/2016 12:00:00 AM                1                412  
## 4 1503960366 4/16/2016 12:00:00 AM                2                340  
## 5 1503960366 4/17/2016 12:00:00 AM                1                700
```

```
## 6 1503960366 4/19/2016 12:00:00 AM 1 304
## TotalTimeInBed
## 1 346
## 2 407
## 3 442
## 4 367
## 5 712
## 6 320
```

```
colnames(sleep_day)
```

```
## [1] "Id" "SleepDay" "TotalSleepRecords"
## [4] "TotalMinutesAsleep" "TotalTimeInBed"
```

```
sleep_day %>%
summary()
```

```
##      Id      SleepDay      TotalSleepRecords      TotalMinutesAsleep
## Min.   :1.504e+09   Length:413   Min.   :1.000   Min.   : 58.0
## 1st Qu.:3.977e+09   Class :character   1st Qu.:1.000   1st Qu.:361.0
## Median :4.703e+09   Mode  :character   Median :1.000   Median :433.0
## Mean   :5.001e+09               Mean   :1.119   Mean   :419.5
## 3rd Qu.:6.962e+09               3rd Qu.:1.000   3rd Qu.:490.0
## Max.   :8.792e+09               Max.   :3.000   Max.   :796.0
## TotalTimeInBed
## Min.   : 61.0
## 1st Qu.:403.0
## Median :463.0
## Mean   :458.6
## 3rd Qu.:526.0
## Max.   :961.0
```

```
n_distinct(sleep_day$Id)
```

```
## [1] 24
```

It was found that there were only 24 unique participants in the sleep duration dataframe. To find out the common participants that has both calorie expenditure and sleep duration dataframe,

```
sleep_day <- rename_with(sleep_day,tolower)
```

```
combined_sleep_activity_distance <- merge(activity_distance,sleep_day,by="id")
```

```
head(combined_sleep_activity_distance)
```

```
##      id activitydate totalsteps totaldistance veryactivedistance
## 1 1503960366 5/7/2016 11992 7.71 2.46
## 2 1503960366 5/7/2016 11992 7.71 2.46
## 3 1503960366 5/7/2016 11992 7.71 2.46
## 4 1503960366 5/7/2016 11992 7.71 2.46
## 5 1503960366 5/7/2016 11992 7.71 2.46
## 6 1503960366 5/7/2016 11992 7.71 2.46
## fairlyactivedistance lightlyactivedistance sedentaryactivedistance calories
## 1 2.12 3.13 0 1821
## 2 2.12 3.13 0 1821
## 3 2.12 3.13 0 1821
## 4 2.12 3.13 0 1821
## 5 2.12 3.13 0 1821
```

```
## 6          2.12          3.13          0      1821
##          sleepday totalsleeprecords totalminutesasleep totaltimeinbed
## 1 4/12/2016 12:00:00 AM          1          327          346
## 2 4/13/2016 12:00:00 AM          2          384          407
## 3 4/15/2016 12:00:00 AM          1          412          442
## 4 4/16/2016 12:00:00 AM          2          340          367
## 5 4/17/2016 12:00:00 AM          1          700          712
## 6 4/19/2016 12:00:00 AM          1          304          320
```

```
n_distinct(combined_sleep_activity_distance$id)
```

```
## [1] 24
```

```
combined_sleep_activity_distance %>%
  summary()
```

```
##          id          activitydate          totalsteps          totaldistance
## Min.   :1.504e+09 Length:12441 Min.    :    0 Min.    : 0.000
## 1st Qu.:3.977e+09 Class :character 1st Qu.: 4660 1st Qu.: 3.180
## Median :4.703e+09 Mode  :character Median : 8596 Median : 6.120
## Mean   :5.027e+09          Mean  : 8117 Mean   : 5.735
## 3rd Qu.:6.962e+09          3rd Qu.:11317 3rd Qu.: 7.920
## Max.   :8.792e+09          Max.   :22988 Max.   :17.950
## veryactivedistance fairlyactivedistance lightlyactivedistance
## Min.    : 0.000 Min.    :0.00000 Min.    : 0.000
## 1st Qu.: 0.000 1st Qu.:0.00000 1st Qu.: 2.370
## Median : 0.530 Median :0.40000 Median : 3.540
## Mean   : 1.399 Mean   :0.7322 Mean   : 3.542
## 3rd Qu.: 2.310 3rd Qu.:1.0000 3rd Qu.: 4.830
## Max.   :13.400 Max.   :6.4800 Max.   :10.300
## sedentaryactivedistance calories          sleepday          totalsleeprecords
## Min.    :0.0000000 Min.    :    0 Length:12441 Min.    :1.000
## 1st Qu.:0.0000000 1st Qu.:1783 Class :character 1st Qu.:1.000
## Median :0.0000000 Median :2162 Mode  :character Median :1.000
## Mean   :0.0006744 Mean   :2329          Mean   :1.121
## 3rd Qu.:0.0000000 3rd Qu.:2865          3rd Qu.:1.000
## Max.   :0.1100000 Max.   :4900          Max.   :3.000
## totalminutesasleep totaltimeinbed
## Min.    : 58.0 Min.    : 61.0
## 1st Qu.:361.0 1st Qu.:402.0
## Median :432.0 Median :463.0
## Mean   :419.4 Mean   :458.4
## 3rd Qu.:492.0 3rd Qu.:526.0
## Max.   :796.0 Max.   :961.0
```

```
combined_sleep_activity_distance %>%
  group_by(id) %>%
  summarise(mean(totalminutesasleep),sd(totalminutesasleep),mean(calories),sd(calories),cor(totalminutesasleep,calories))
```

```
## Warning in cor(totalminutesasleep, calories): the standard deviation is zero
```

```
## # A tibble: 24 x 6
```

```
##          id `mean(totalminutesasleep)` `sd(totalminutesasleep)` `mean(calories)` `sd(calories)`
##          <dbl>          <dbl>          <dbl>          <dbl>          <dbl>
## 1 1503960366          360.          98.5          1816.          347.
## 2 1644430081          294          291.          2811.          501.
## 3 1844505072          652          54.5          1573.          305.
```



```
## 4 1927972279          417          197.          2173.          218.
## 5 2026352035          506.          41.5          1541.          183.
## 6 2320127002           61           0          1724.          212.
## 7 2347167796          447.          41.6          2043.          460.
## 8 3977333714          294.          62.8          1514.          287.
## 9 4020332650          349.          132.          2386.          616.
## 10 4319703577          477.          112.          2038.          409.
## # ... with 14 more rows, and 1 more variable:
## #   `cor(totalminutesasleep, calories)` <dbl>
```

A graph was plotted to understand whether calorie expenditure is linearly correlated with the duration of sleep.

```
min(combined_sleep_activity_distance$activitydate)
```

```
## [1] "4/12/2016"
```

```
max(combined_sleep_activity_distance$activitydate)
```

```
## [1] "5/9/2016"
```

```
min_date <- min(combined_sleep_activity_distance$activitydate)
```

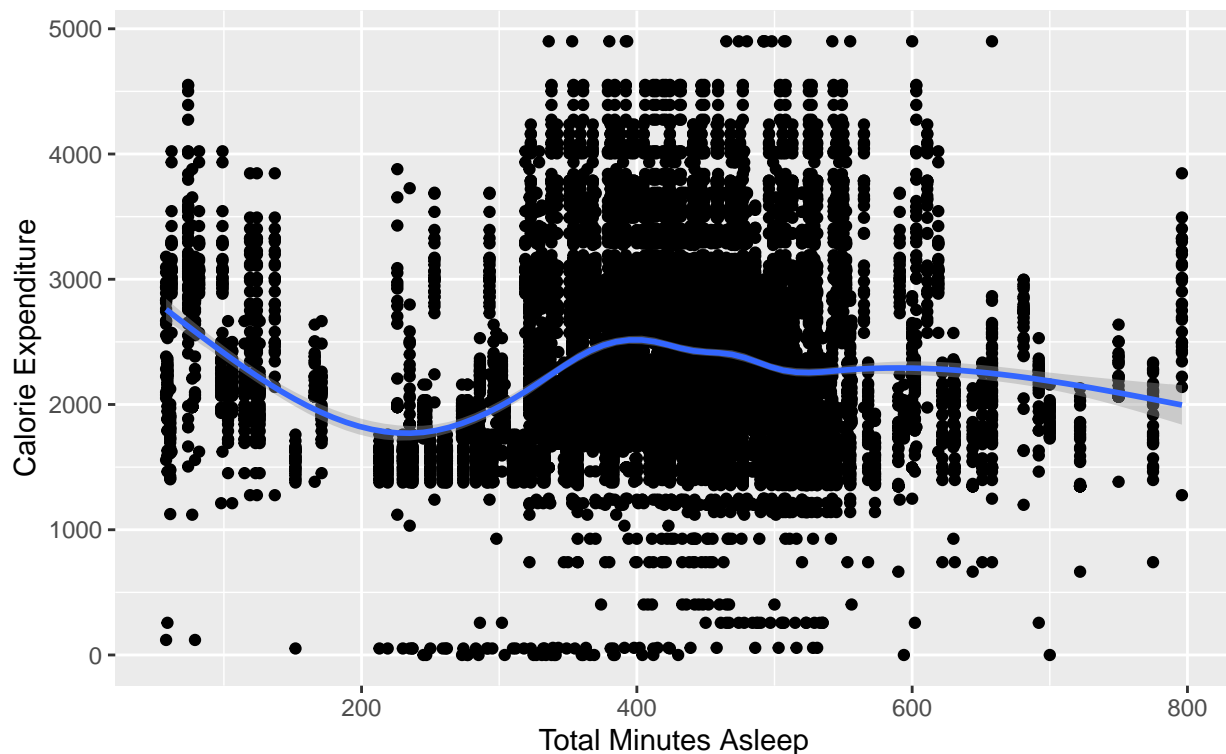
```
max_date <- max(combined_sleep_activity_distance$activitydate)
```

```
ggplot(data=combined_sleep_activity_distance, aes(x=totalminutesasleep, y=calories)) + geom_point() + g
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```

Calorie Expenditure vs Sleep Duration

Data from: 4/12/2016 to 5/9/2016



```
ggsave('calorie_total_sleep_minutes.png', width=7,
        height=7)
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```

The graph suggests that there is no clear trend between the total minutes asleep and the calories expenditure of all user. This may suggest that while sleep is important, the duration of sleep is not a sole factor that contributes towards a healthy fitness goal. Other factors such as consistency of sleep and wake time or number of sleep cycles completed could affect the sleep quality, which may affect the results.