

HW4

 Graded

Student

Sangwon Ji

Total Points

119 / 119 pts

Question 1

Q1		75 / 75 pts
1.1	a	5 / 5 pts
	<div><p>✓ - 0 pts Correct</p><p>- 1 pt Incorrect Calculation</p><p>- 2 pts Incorrect Data</p></div>	
1.2	b	5 / 5 pts
	<div><p>✓ - 0 pts Correct</p><p>- 1 pt Calculation Error</p></div>	
1.3	c	10 / 10 pts
	<div><p>✓ - 0 pts Correct</p><p>- 5 pts Missing Plots</p></div>	
1.4	d	15 / 15 pts
	<div><p>✓ - 0 pts Correct</p><p>- 5 pts Calculation Error</p><p>- 2 pts Incorrect axis</p><p>- 0 pts Click here to replace this description.</p></div>	
1.5	e	15 / 15 pts
	<div><p>✓ - 0 pts Correct</p><p>- 5 pts Calculation Error</p><p>- 2 pts Incorrect Axis</p><p>- 3 pts Missing Explanation</p></div>	
1.6	f	20 / 20 pts
	<div><p>✓ - 0 pts Correct</p><p>- 5 pts Missing Plot</p><p>- 3 pts Missing explanation</p><p>- 5 pts Missing Parametric CI</p><p>- 20 pts Missing Answer</p><p>- 5 pts Incorrect Calculation</p></div>	
1.7	g	5 / 5 pts
	<div><p>✓ - 0 pts Correct</p></div>	

Question 2

Q2

5 / 5 pts

✓ - 0 pts Correct

- 1 pt Missing Modification to Line 5

Question 3

Q3

19 / 19 pts

✓ - 0 pts Correct

- 3 pts Incorrect identified variable

- 19 pts Missing Answer

Question 4

Q4

20 / 20 pts

4.1 a

5 / 5 pts

✓ - 0 pts Correct

- 5 pts Missing Answer

4.2 b

10 / 10 pts

✓ - 0 pts Correct

- 10 pts Missing Answer

- 5 pts Partially Incorrect

4.3 c

5 / 5 pts

✓ - 0 pts Correct

- 5 pts Missing Answer

- 2.5 pts Partially Incorrect

Question 5

Late Penalty

0 / 0 pts

✓ - 0 pts On time

- 11.9 pts 1 day late (Mar 28)

- 23.8 pts 2 days late (Mar 29)

- 35.7 pts 3 days late (Mar 30)

No questions assigned to the following page.

HW4

STAT 131A Spring 2023

Bringing In the Data

In the file `fitbit.csv` we have information from a fitbit device for a single person over the year. A fitbit device is something someone wears that records information regarding her activities throughout the day: her level of activity, the number of calories burned, the amount slept, etc (the company's website is www.fitbit.com).

The data that we have here is summarize per day, so that each entry of the data corresponds to a particular date.

The following code should read in the data and print out data from the first 5 rows of the first 8 columns.

```
fitbit<-read.csv("fitbit.csv",header=TRUE)
head(fitbit[,1:8])

##           Date caloriesBurned   steps distance plans MinutesOfSedentaryActivities
## 1 01-01-2016      2.992 10.460    7,92     0                      685
## 2 01-03-2016      3.117 11.618    8,66    12                      776
## 3 01-04-2016      2.814 11.130    8,61     8                      900
## 4 01-05-2016      3.331 14.262   10,6      5                     666
## 5 01-06-2015      3.354 16.836   12,51     8                     586
## 6 01-06-2015      3.354 16.836   12,51     8                     586
##   MinutesOfLightActivity MinutesOfModerateActivity
## 1                      375                         0
## 2                      217                         59
## 3                      162                         3
## 4                      361                        21
## 5                      248                        35
## 6                      248                        35
```

Below is code to convert the `Date` variable into a standard date class used by R, and then create variables that give the day of the week and the month of the date.

```
fitbit$Date<-as.Date(as.character(fitbit$Date),format="%d-%m-%Y")
fitbit$Day<-factor(weekdays(fitbit$Date),levels=weekdays(x=as.Date(seq(7), origin="1950-01-01")))
fitbit$Month<-factor(months(fitbit$Date),levels=month.name)

fitbit

##           Date caloriesBurned   steps distance plans
## 1 2016-01-01      2.992 10.460    7,92     0
## 2 2016-03-01      3.117 11.618    8,66    12
## 3 2016-04-01      2.814 11.130    8,61     8
## 4 2016-05-01      3.331 14.262   10,6      5
## 5 2015-06-01      3.354 16.836   12,51     8
## 6 2015-06-01      3.354 16.836   12,51     8
## 7 2015-07-01      3.352 14.193   10,55    19
## 8 2015-08-01      3.453 17.497   13,02    11
## 9 2015-09-01      3.681 12.229   9,11    24
```

No questions assigned to the following page.

## 10	2015-10-01	2.712	7.951	5,91	11
## 11	2015-11-01	2.395	3.862	2,87	0
## 12	2015-12-01	3.232	16.810	12,49	14
## 13	2016-01-02	3.265	13.837	10,33	7
## 14	2016-03-02	2.897	10.450	7,76	19
## 15	2016-04-02	2.884	8.250	6,13	0
## 16	2016-05-02	2.989	13.236	9,98	12
## 17	2015-06-02	3.369	15.944	11,85	29
## 18	2015-06-02	3.369	15.944	11,85	29
## 19	2015-07-02	3.063	11.560	8,62	30
## 20	2015-08-02	2.651	5.765	4,28	8
## 21	2015-09-02	3.009	10.330	7,68	16
## 22	2015-10-02	2.809	7.424	5,52	8
## 23	2015-11-02	2.590	7.368	5,47	13
## 24	2015-12-02	3.125	10.745	8,01	10
## 25	2016-01-03	3.090	12.517	9,3	11
## 26	2016-03-03	2.864	11.478	8,69	17
## 27	2016-04-03	2.931	8.682	6,45	0
## 28	2016-05-03	3.796	18.588	14,13	16
## 29	2015-06-03	3.168	14.273	10,6	11
## 30	2015-06-03	3.168	14.273	10,6	11
## 31	2015-07-03	3.465	15.695	11,66	22
## 32	2015-08-03	3.420	15.362	11,41	16
## 33	2015-09-03	3.094	11.689	8,69	11
## 34	2015-10-03	2.322	6.813	5,06	0
## 35	2015-11-03	2.403	6.269	4,66	9
## 36	2015-12-03	3.165	10.784	8,04	14
## 37	2016-01-04	3.116	10.366	7,7	16
## 38	2016-03-04	2.996	10.650	7,97	13
## 39	2016-04-04	3.314	17.535	13,66	14
## 40	2016-05-04	3.525	16.382	12,39	16
## 41	2015-06-04	3.470	16.060	11,93	11
## 42	2015-06-04	3.470	16.060	11,93	11
## 43	2015-07-04	2.894	9.747	7,24	8
## 44	2015-08-04	2.863	9.870	7,33	20
## 45	2015-09-04	3.518	15.627	11,61	26
## 46	2015-10-04	2.319	3.991	2,97	1
## 47	2015-11-04	2.917	8.520	6,33	14
## 48	2015-12-04	2.835	10.740	8,08	11
## 49	2016-01-05	3.241	12.127	9,13	16
## 50	2016-02-05	3.110	10.434	7,75	13
## 51	2016-02-05	3.110	10.434	7,75	13
## 52	2016-03-05	2.228	3.103	2,31	1
## 53	2016-04-05	3.830	20.154	15,05	3
## 54	2016-05-05	3.649	21.913	16,4	19
## 55	2015-06-05	3.134	13.594	10,1	16
## 56	2015-06-05	3.134	13.594	10,1	16
## 57	2015-07-05	3.515	15.731	11,69	17
## 58	2015-08-05	3.326	14.502	10,78	34
## 59	2015-09-05	2.885	10.681	7,94	1
## 60	2015-10-05	2.859	9.725	7,23	6
## 61	2015-11-05	2.851	8.116	6,03	13
## 62	2015-12-05	2.872	8.531	6,36	0
## 63	2016-01-06	2.992	11.327	8,42	14

No questions assigned to the following page.

## 64	2016-02-06	3.177	12.578	9,4	0
## 65	2016-03-06	2.660	6.960	5,2	0
## 66	2016-04-06	4.112	23.286	17,84	19
## 67	2016-05-06	3.539	19.023	14,79	15
## 68	2015-06-06	3.436	15.480	11,5	11
## 69	2015-06-06	3.436	15.480	11,5	11
## 70	2015-07-06	2.699	8.391	6,23	11
## 71	2015-08-06	3.472	14.652	10,89	26
## 72	2015-09-06	2.745	7.907	5,88	0
## 73	2015-10-06	2.978	8.936	6,64	16
## 74	2015-11-06	2.820	8.268	6,14	14
## 75	2015-12-06	3.072	12.738	9,46	10
## 76	2016-01-07	3.146	11.098	8,25	15
## 77	2016-02-07	3.182	15.373	11,7	12
## 78	2016-03-07	3.220	16.699	13,4	11
## 79	2016-04-07	3.048	13.004	9,87	14
## 80	2016-05-07	3.040	9.526	7,08	2
## 81	2015-06-07	3.634	19.440	14,48	8
## 82	2015-07-07	2.740	8.326	6,19	11
## 83	2015-08-07	2.849	7.628	5,67	11
## 84	2015-09-07	2.829	9.487	7,05	17
## 85	2015-10-07	2.678	6.565	4,88	10
## 86	2015-11-07	3.690	14.489	10,77	0
## 87	2015-12-07	3.107	13.520	10,07	13
## 88	2016-01-08	3.174	12.395	9,23	2
## 89	2016-02-08	3.206	12.327	9,24	8
## 90	2016-03-08	3.083	14.068	11,26	14
## 91	2016-04-08	3.241	13.441	10,04	2
## 92	2015-06-08	3.267	13.926	10,35	21
## 93	2015-07-08	3.244	14.241	10,58	14
## 94	2015-08-08	3.168	13.877	10,31	32
## 95	2015-09-08	2.742	8.253	6,13	11
## 96	2015-10-08	2.767	7.865	5,84	15
## 97	2015-11-08	3.067	9.212	6,84	2
## 98	2015-12-08	3.801	15.884	11,83	2
## 99	2016-01-09	2.615	6.643	4,94	0
## 100	2016-02-09	2.872	10.457	7,82	14
## 101	2016-03-09	3.339	18.092	14,05	19
## 102	2016-04-09	3.038	10.216	7,59	0
## 103	2015-05-09	3.631	18.925	14,11	4
## 104	2015-06-09	3.072	11.338	8,42	28
## 105	2015-07-09	2.994	7.298	5,42	6
## 106	2015-08-09	3.109	11.433	8,49	15
## 107	2015-09-09	4.351	22.238	16,52	16
## 108	2015-10-09	2.549	8.718	6,48	10
## 109	2015-11-09	2.828	9.500	7,06	0
## 110	2015-12-09	3.062	10.026	7,45	17
## 111	2016-01-10	2.711	8.846	6,57	9
## 112	2016-02-10	2.662	9.900	7,43	21
## 113	2016-03-10	3.307	18.530	14,71	20
## 114	2016-04-10	2.304	5.634	4,19	0
## 115	2015-05-10	3.204	14.228	10,57	1
## 116	2015-06-10	2.750	7.140	5,31	12
## 117	2015-07-10	3.134	10.644	7,91	15

No questions assigned to the following page.

## 118	2015-08-10	3.139	13.655	10,15	13
## 119	2015-09-10	2.967	10.650	7,91	15
## 120	2015-10-10	2.918	12.364	9,22	0
## 121	2015-11-10	3.336	11.151	8,29	1
## 122	2015-12-10	3.044	11.868	8,84	17
## 123	2016-01-11	3.013	9.642	7,16	15
## 124	2016-02-11	2.899	8.966	6,66	14
## 125	2016-03-11	3.135	14.587	10,86	2
## 126	2016-04-11	3.419	17.422	13,38	34
## 127	2015-05-11	2.673	6.756	5,02	8
## 128	2015-06-11	3.187	15.449	11,48	22
## 129	2015-07-11	3.191	12.371	9,19	11
## 130	2015-08-11	2.857	13.535	10,08	7
## 131	2015-09-11	3.054	12.038	8,94	14
## 132	2015-10-11	2.509	5.216	3,88	1
## 133	2015-11-11	2.867	12.351	9,18	1
## 134	2015-12-11	3.082	12.381	9,22	17
## 135	2016-01-12	2.993	9.982	7,42	8
## 136	2016-02-12	2.816	8.353	6,21	19
## 137	2016-03-12	2.840	9.992	7,45	4
## 138	2016-04-12	3.179	14.475	10,92	14
## 139	2015-05-12	2.495	5.020	3,73	1
## 140	2015-06-12	3.207	11.920	8,86	11
## 141	2015-07-12	2.810	7.580	5,63	10
## 142	2015-08-12	2.055	1.883	1,4	1
## 143	2015-09-12	2.937	11.480	8,53	2
## 144	2015-10-12	2.687	6.580	4,89	10
## 145	2015-11-12	2.847	10.670	7,93	1
## 146	2015-12-12	2.766	7.157	5,32	11
## 147	2016-01-13	2.627	6.613	4,91	11
## 148	2016-02-13	3.235	13.907	10,36	0
## 149	2016-03-13	1.790	0.000	0	0
## 150	2016-04-13	3.427	17.777	13,66	20
## 151	2015-05-13	2.760	7.790	5,79	15
## 152	2015-06-13	4.083	26.444	19,65	22
## 153	2015-07-13	3.259	12.168	9,04	18
## 154	2015-08-13	3.218	11.354	8,44	8
## 155	2015-09-13	2.977	9.199	6,84	5
## 156	2015-10-13	2.698	7.015	5,21	10
## 157	2015-11-13	2.460	5.574	4,14	1
## 158	2015-12-13	2.787	7.055	5,24	2
## 159	2016-01-14	3.128	12.161	9,21	11
## 160	2016-02-14	3.289	14.183	10,54	13
## 161	2016-03-14	2.538	9.336	7,4	11
## 162	2016-04-14	3.479	19.087	14,65	17
## 163	2015-05-14	2.687	5.614	4,17	2
## 164	2015-06-14	2.789	12.335	9,16	35
## 165	2015-07-14	3.383	15.135	11,28	20
## 166	2015-08-14	3.010	11.532	8,57	4
## 167	2015-09-14	2.947	9.564	7,11	16
## 168	2015-10-14	2.621	8.103	6,02	5
## 169	2015-11-14	3.445	11.587	8,61	4
## 170	2015-12-14	2.831	9.348	6,99	18
## 171	2016-01-15	3.361	14.837	11,37	11

No questions assigned to the following page.

## 172	2016-02-15	2.751	8.453	6,28	11
## 173	2016-03-15	3.133	15.596	12,61	13
## 174	2016-04-15	3.501	16.290	12,2	12
## 175	2015-05-15	2.793	8.169	6,07	14
## 176	2015-06-15	3.234	14.137	10,5	11
## 177	2015-07-15	3.569	14.996	11,14	32
## 178	2015-08-15	2.813	6.129	4,55	3
## 179	2015-09-15	2.821	9.019	6,7	13
## 180	2015-10-15	2.698	6.962	5,17	11
## 181	2015-11-15	2.853	9.499	7,06	2
## 182	2015-12-15	2.711	8.566	6,39	15
## 183	2016-01-16	3.379	16.759	12,59	7
## 184	2016-02-16	2.927	7.995	5,98	15
## 185	2016-03-16	3.960	25.385	20,45	17
## 186	2016-04-16	3.342	14.252	10,64	6
## 187	2015-05-16	4.061	19.971	14,84	18
## 188	2015-06-16	2.952	11.568	8,66	13
## 189	2015-07-16	3.017	8.704	6,47	14
## 190	2015-08-16	2.706	6.238	4,64	3
## 191	2015-09-16	3.041	10.239	7,61	13
## 192	2015-10-16	3.295	16.478	12,3	12
## 193	2015-11-16	3.590	13.788	10,53	18
## 194	2015-12-16	2.714	9.786	7,27	20
## 195	2016-01-17	2.878	9.602	7,26	0
## 196	2016-02-17	2.783	6.707	4,98	10
## 197	2016-03-17	3.150	14.577	11,46	17
## 198	2016-04-17	2.769	8.262	6,14	3
## 199	2015-05-17	3.349	8.520	6,33	12
## 200	2015-06-17	3.352	16.813	12,52	52
## 201	2015-07-17	3.228	12.739	9,47	16
## 202	2015-08-17	3.683	15.572	11,57	9
## 203	2015-09-17	2.796	7.739	5,75	14
## 204	2015-10-17	2.871	11.603	8,62	3
## 205	2015-11-17	3.792	18.361	13,72	33
## 206	2015-12-17	2.709	8.371	6,22	18
## 207	2016-01-18	2.144	3.761	2,79	7
## 208	2016-02-18	2.804	8.109	6,1	13
## 209	2016-03-18	3.214	16.667	13,08	12
## 210	2016-04-18	3.486	19.450	15,06	18
## 211	2015-05-18	2.961	11.998	8,91	20
## 212	2015-06-18	3.425	15.217	11,31	61
## 213	2015-07-18	3.352	13.247	9,84	20
## 214	2015-08-18	3.106	10.886	8,09	19
## 215	2015-09-18	2.978	12.620	9,38	9
## 216	2015-10-18	2.899	11.429	8,49	0
## 217	2015-11-18	3.222	14.055	10,44	10
## 218	2015-12-18	2.917	9.428	7,01	10
## 219	2016-01-19	2.543	7.456	5,6	6
## 220	2016-02-19	2.815	11.971	9,23	11
## 221	2016-03-19	3.870	13.361	9,93	7
## 222	2016-04-19	3.596	17.232	13,61	17
## 223	2015-05-19	2.911	12.425	9,23	14
## 224	2015-06-19	3.090	13.158	9,78	101
## 225	2015-07-19	3.237	11.660	8,66	10

No questions assigned to the following page.

## 226	2015-08-19	3.217	12.213	9,07	6
## 227	2015-09-19	3.160	14.226	10,57	11
## 228	2015-10-19	2.581	6.293	4,68	1
## 229	2015-11-19	3.092	11.927	8,86	9
## 230	2015-12-19	3.110	13.742	10,21	6
## 231	2016-01-20	3.472	16.755	12,78	10
## 232	2016-02-20	2.960	11.371	8,45	0
## 233	2016-03-20	2.731	6.754	5,02	1
## 234	2016-04-20	3.321	16.946	12,93	25
## 235	2015-05-20	2.569	6.008	4,46	8
## 236	2015-06-20	3.699	19.311	14,35	14
## 237	2015-07-20	3.278	13.702	10,18	21
## 238	2015-08-20	3.421	12.929	9,61	4
## 239	2015-09-20	2.325	3.858	2,87	1
## 240	2015-10-20	2.672	7.269	5,4	14
## 241	2015-11-20	3.395	15.221	11,31	6
## 242	2015-12-20	3.391	15.636	11,73	2
## 243	2016-01-21	3.218	11.937	8,96	12
## 244	2016-02-21	2.038	2.190	1,63	0
## 245	2016-03-21	2.464	5.424	4,03	10
## 246	2016-04-21	3.464	19.183	14,67	24
## 247	2015-05-21	3.228	16.291	12,1	18
## 248	2015-06-21	3.385	16.186	12,03	42
## 249	2015-07-21	3.040	11.240	8,35	17
## 250	2015-08-21	3.382	16.365	12,16	5
## 251	2015-09-21	3.458	17.603	13,08	35
## 252	2015-10-21	2.406	4.471	3,32	2
## 253	2015-11-21	2.802	8.568	6,42	1
## 254	2015-12-21	3.145	12.778	9,49	15
## 255	2016-01-22	3.426	14.577	10,96	5
## 256	2016-02-22	2.594	6.592	4,93	10
## 257	2016-03-22	3.555	17.913	13,41	15
## 258	2016-04-22	3.328	12.963	9,66	10
## 259	2015-05-22	2.529	6.111	4,54	8
## 260	2015-06-22	3.088	12.713	9,48	59
## 261	2015-07-22	3.071	13.262	9,85	20
## 262	2015-08-22	3.498	17.252	12,82	15
## 263	2015-09-22	2.988	10.699	7,95	17
## 264	2015-10-22	3.410	17.913	13,31	7
## 265	2015-11-22	2.177	3.284	2,44	0
## 266	2015-12-22	2.636	7.378	5,48	12
## 267	2016-01-23	3.615	17.541	13,12	9
## 268	2016-02-23	2.841	8.624	6,41	10
## 269	2016-03-23	3.063	14.324	10,89	14
## 270	2016-04-23	2.612	6.456	4,8	6
## 271	2015-05-23	4.197	17.928	13,32	17
## 272	2015-06-23	2.823	9.132	6,79	15
## 273	2015-07-23	2.984	9.090	6,75	17
## 274	2015-08-23	3.288	14.537	10,8	3
## 275	2015-09-23	2.561	7.261	5,39	17
## 276	2015-10-23	2.511	5.431	4,04	1
## 277	2015-11-23	3.035	9.408	6,99	1
## 278	2015-12-23	1.789	0.000	0	0
## 279	2016-01-24	1.801	39.000	0,03	0

No questions assigned to the following page.

## 280	2016-02-24	2.933	8.307	6,17	12
## 281	2016-03-24	2.503	8.049	6,03	8
## 282	2016-04-24	2.863	10.413	7,73	6
## 283	2015-05-24	3.899	13.893	10,32	6
## 284	2015-06-24	3.678	20.239	15,04	25
## 285	2015-07-24	3.468	15.779	11,72	23
## 286	2015-08-24	3.215	13.404	9,96	18
## 287	2015-09-24	3.159	10.608	7,88	17
## 288	2015-10-24	2.907	11.672	8,67	0
## 289	2015-11-24	2.843	10.261	7,62	1
## 290	2015-12-24	2.573	6.452	4,79	0
## 291	2016-01-25	2.420	6.610	4,91	10
## 292	2016-02-25	2.816	7.941	5,9	9
## 293	2016-03-25	3.052	11.122	8,29	0
## 294	2016-04-25	3.175	10.499	7,8	0
## 295	2015-05-25	2.519	5.109	3,8	8
## 296	2015-06-25	3.003	11.199	8,32	28
## 297	2015-07-25	2.706	6.174	4,59	3
## 298	2015-08-25	3.063	10.940	8,13	12
## 299	2015-09-25	3.193	12.271	9,12	7
## 300	2015-10-25	3.435	14.777	10,98	0
## 301	2015-11-25	2.829	8.218	6,11	22
## 302	2015-12-25	2.808	7.837	5,82	0
## 303	2016-01-26	3.066	13.073	9,71	18
## 304	2016-02-26	2.764	8.050	5,98	9
## 305	2016-03-26	3.021	9.570	7,11	1
## 306	2016-04-26	3.357	17.226	12,97	19
## 307	2015-05-26	2.357	4.430	3,29	6
## 308	2015-06-26	3.534	20.269	15,06	4
## 309	2015-07-26	3.090	11.614	8,63	9
## 310	2015-08-26	2.928	10.032	7,45	13
## 311	2015-09-26	2.934	9.998	7,45	2
## 312	2015-10-26	2.931	9.171	6,81	9
## 313	2015-11-26	3.076	9.760	7,25	13
## 314	2015-12-26	2.626	6.504	4,83	0
## 315	2016-01-27	2.886	9.997	7,46	9
## 316	2016-02-27	3.029	9.923	7,37	5
## 317	2016-03-27	2.223	4.667	3,47	0
## 318	2016-04-27	3.631	19.784	15,51	25
## 319	2015-05-27	3.209	7.498	5,57	18
## 320	2015-06-27	3.022	11.655	8,66	10
## 321	2015-07-27	3.091	13.460	10	13
## 322	2015-08-27	3.229	14.008	10,41	6
## 323	2015-09-27	2.589	5.757	4,28	1
## 324	2015-10-27	2.867	8.807	6,54	11
## 325	2015-11-27	3.242	10.769	8	17
## 326	2015-12-27	2.604	6.444	4,84	1
## 327	2016-01-28	3.092	10.707	7,96	10
## 328	2016-02-28	2.844	9.504	7,15	2
## 329	2016-03-28	1.790	0.000	0	0
## 330	2016-04-28	4.030	25.571	19,3	15
## 331	2015-05-28	2.811	8.490	6,31	14
## 332	2015-06-28	3.237	12.314	9,15	21
## 333	2015-07-28	2.980	10.000	7,43	13

No questions assigned to the following page.

## 334	2015-08-28	3.356	12.149	9,03	11
## 335	2015-09-28	2.874	8.995	6,68	13
## 336	2015-10-28	2.470	5.623	4,18	2
## 337	2015-11-28	3.254	11.671	8,7	5
## 338	2015-12-28	2.845	7.845	5,83	2
## 339	2016-01-29	2.931	9.952	7,39	17
## 340	2016-02-29	2.612	6.847	5,09	10
## 341	2016-03-29	2.648	9.781	7,34	12
## 342	2016-04-29	3.442	17.528	13,36	15
## 343	2015-05-29	2.558	5.650	4,2	8
## 344	2015-06-29	3.142	12.586	9,35	19
## 345	2015-07-29	3.138	10.680	7,94	16
## 346	2015-08-29	3.890	19.977	14,84	26
## 347	2015-09-29	2.757	7.553	5,61	13
## 348	2015-10-29	3.109	12.910	9,59	20
## 349	2015-11-29	3.247	14.444	10,73	14
## 350	2015-12-29	3.135	12.260	9,11	11
## 351	2016-01-30	3.034	9.774	7,26	0
## 352	2016-03-30	3.768	21.383	16,69	17
## 353	2016-04-30	3.061	9.831	7,3	1
## 354	2015-05-30	4.170	21.479	15,98	16
## 355	2015-06-30	2.945	12.445	9,25	11
## 356	2015-07-30	3.246	14.105	10,48	20
## 357	2015-08-30	2.961	11.924	8,91	64
## 358	2015-09-30	2.714	6.494	4,83	11
## 359	2015-10-30	2.942	8.805	6,54	12
## 360	2015-11-30	4.012	23.313	17,32	16
## 361	2015-12-30	3.050	12.154	9,05	9
## 362	2016-01-31	2.787	6.260	4,65	0
## 363	2016-03-31	3.512	20.109	15,18	21
## 364	2015-05-31	3.533	18.995	14,11	12
## 365	2015-07-31	2.654	9.194	6,83	20
## 366	2015-08-31	3.136	10.757	7,99	15
## 367	2015-10-31	2.736	7.107	5,28	0
## 368	2015-12-31	2.856	7.801	5,8	0
## MinutesOfSedentaryActivities MinutesOfLightActivity					
## 1		685.000		375	
## 2		776.000		217	
## 3		900.000		162	
## 4		666.000		361	
## 5		586.000		248	
## 6		586.000		248	
## 7		669.000		210	
## 8		1.092		219	
## 9		689.000		421	
## 10		667.000		191	
## 11		889.000		166	
## 12		750.000		152	
## 13		601.000		339	
## 14		765.000		199	
## 15		950.000		314	
## 16		770.000		234	
## 17		640.000		214	
## 18		640.000		214	

No questions assigned to the following page.

## 19	708.000	158
## 20	544.000	245
## 21	770.000	248
## 22	801.000	179
## 23	1.279	126
## 24	634.000	174
## 25	1.034	272
## 26	749.000	167
## 27	669.000	355
## 28	599.000	275
## 29	721.000	178
## 30	721.000	178
## 31	648.000	248
## 32	683.000	226
## 33	1.043	182
## 34	1.315	75
## 35	1.430	10
## 36	774.000	201
## 37	650.000	235
## 38	754.000	227
## 39	881.000	168
## 40	684.000	333
## 41	724.000	239
## 42	724.000	239
## 43	646.000	253
## 44	793.000	186
## 45	606.000	284
## 46	1.136	163
## 47	662.000	191
## 48	1.100	146
## 49	682.000	284
## 50	718.000	243
## 51	718.000	243
## 52	1.042	155
## 53	445.000	471
## 54	701.000	287
## 55	677.000	215
## 56	677.000	215
## 57	567.000	317
## 58	520.000	250
## 59	656.000	240
## 60	988.000	268
## 61	827.000	228
## 62	723.000	325
## 63	613.000	314
## 64	563.000	388
## 65	1.105	280
## 66	561.000	451
## 67	575.000	298
## 68	520.000	246
## 69	520.000	246
## 70	877.000	136
## 71	562.000	350
## 72	654.000	287

No questions assigned to the following page.

## 73	780.000	205
## 74	776.000	145
## 75	811.000	244
## 76	720.000	247
## 77	599.000	273
## 78	791.000	158
## 79	856.000	214
## 80	564.000	370
## 81	966.000	210
## 82	1.118	217
## 83	638.000	283
## 84	1.156	152
## 85	841.000	157
## 86	525.000	280
## 87	672.000	261
## 88	567.000	405
## 89	699.000	278
## 90	824.000	167
## 91	449.000	439
## 92	701.000	265
## 93	700.000	234
## 94	609.000	206
## 95	1.137	91
## 96	1.118	204
## 97	508.000	198
## 98	962.000	248
## 99	676.000	283
## 100	847.000	181
## 101	1.120	243
## 102	535.000	390
## 103	611.000	316
## 104	806.000	228
## 105	836.000	290
## 106	561.000	236
## 107	355.000	407
## 108	976.000	65
## 109	756.000	218
## 110	803.000	204
## 111	1.167	183
## 112	1.237	156
## 113	793.000	162
## 114	921.000	92
## 115	602.000	226
## 116	785.000	220
## 117	683.000	283
## 118	985.000	285
## 119	940.000	198
## 120	1.046	234
## 121	705.000	198
## 122	1.190	170
## 123	758.000	247
## 124	802.000	235
## 125	1.013	313
## 126	674.000	290

No questions assigned to the following page.

## 127	749.000	190
## 128	676.000	205
## 129	639.000	194
## 130	1.348	44
## 131	700.000	201
## 132	1.243	175
## 133	981.000	181
## 134	1.096	212
## 135	839.000	222
## 136	732.000	219
## 137	685.000	339
## 138	664.000	291
## 139	876.000	171
## 140	593.000	352
## 141	607.000	258
## 142	1.370	70
## 143	462.000	315
## 144	1.246	104
## 145	684.000	162
## 146	605.000	290
## 147	857.000	205
## 148	551.000	357
## 149	1.440	0
## 150	696.000	276
## 151	726.000	172
## 152	549.000	429
## 153	731.000	212
## 154	694.000	366
## 155	600.000	361
## 156	1.244	130
## 157	1.209	156
## 158	690.000	248
## 159	719.000	198
## 160	617.000	374
## 161	1.288	73
## 162	711.000	221
## 163	782.000	216
## 164	1.245	88
## 165	740.000	167
## 166	572.000	301
## 167	1.118	168
## 168	1.219	215
## 169	608.000	159
## 170	827.000	179
## 171	687.000	210
## 172	1.304	124
## 173	782.000	187
## 174	467.000	427
## 175	801.000	218
## 176	642.000	305
## 177	573.000	321
## 178	635.000	256
## 179	755.000	144
## 180	1.234	115

No questions assigned to the following page.

## 181	738.000	167
## 182	898.000	137
## 183	589.000	333
## 184	802.000	231
## 185	638.000	254
## 186	675.000	323
## 187	532.000	247
## 188	734.000	189
## 189	697.000	225
## 190	688.000	267
## 191	675.000	192
## 192	643.000	304
## 193	978.000	282
## 194	1.118	159
## 195	547.000	279
## 196	913.000	174
## 197	823.000	162
## 198	1.089	302
## 199	606.000	186
## 200	709.000	202
## 201	761.000	247
## 202	515.000	472
## 203	741.000	211
## 204	732.000	236
## 205	543.000	366
## 206	1.069	146
## 207	998.000	99
## 208	1.212	143
## 209	832.000	173
## 210	860.000	190
## 211	936.000	189
## 212	641.000	280
## 213	484.000	317
## 214	639.000	292
## 215	773.000	170
## 216	962.000	269
## 217	673.000	268
## 218	1.141	220
## 219	1.215	103
## 220	865.000	179
## 221	530.000	418
## 222	1.002	262
## 223	827.000	186
## 224	715.000	171
## 225	680.000	286
## 226	421.000	381
## 227	669.000	291
## 228	854.000	226
## 229	726.000	305
## 230	579.000	357
## 231	551.000	331
## 232	457.000	327
## 233	564.000	315
## 234	762.000	238

No questions assigned to the following page.

## 235	783.000	214
## 236	519.000	291
## 237	708.000	246
## 238	565.000	425
## 239	1.255	185
## 240	1.290	105
## 241	464.000	316
## 242	550.000	316
## 243	699.000	254
## 244	954.000	93
## 245	1.047	193
## 246	723.000	218
## 247	616.000	237
## 248	637.000	229
## 249	732.000	208
## 250	461.000	329
## 251	1.053	223
## 252	1.134	165
## 253	1.174	249
## 254	664.000	313
## 255	519.000	391
## 256	1.234	155
## 257	593.000	382
## 258	404.000	436
## 259	820.000	190
## 260	631.000	225
## 261	1.093	166
## 262	481.000	382
## 263	655.000	252
## 264	1.053	210
## 265	1.269	98
## 266	838.000	176
## 267	570.000	358
## 268	739.000	193
## 269	669.000	222
## 270	782.000	305
## 271	533.000	262
## 272	777.000	223
## 273	719.000	234
## 274	518.000	345
## 275	908.000	135
## 276	678.000	166
## 277	682.000	295
## 278	1.440	0
## 279	1.076	5
## 280	762.000	195
## 281	1.090	123
## 282	700.000	269
## 283	641.000	222
## 284	621.000	292
## 285	618.000	346
## 286	685.000	192
## 287	1.107	177
## 288	663.000	222

No questions assigned to the following page.

## 289	1.182	210
## 290	1.217	223
## 291	1.270	93
## 292	878.000	142
## 293	599.000	386
## 294	661.000	430
## 295	861.000	200
## 296	737.000	227
## 297	677.000	231
## 298	697.000	199
## 299	548.000	323
## 300	597.000	302
## 301	1.142	155
## 302	663.000	332
## 303	790.000	166
## 304	1.203	177
## 305	879.000	395
## 306	751.000	185
## 307	1.269	156
## 308	720.000	218
## 309	503.000	301
## 310	757.000	175
## 311	782.000	327
## 312	767.000	273
## 313	1.130	214
## 314	588.000	282
## 315	759.000	164
## 316	1.124	184
## 317	889.000	114
## 318	694.000	151
## 319	692.000	196
## 320	670.000	220
## 321	822.000	190
## 322	544.000	334
## 323	800.000	270
## 324	810.000	224
## 325	725.000	222
## 326	746.000	252
## 327	753.000	262
## 328	687.000	283
## 329	1.440	0
## 330	606.000	293
## 331	771.000	212
## 332	601.000	290
## 333	803.000	230
## 334	1.051	369
## 335	826.000	171
## 336	779.000	170
## 337	643.000	375
## 338	686.000	337
## 339	760.000	233
## 340	731.000	206
## 341	1.230	139
## 342	594.000	239

No questions assigned to the following page.

## 343	789.000	208	
## 344	735.000	234	
## 345	634.000	322	
## 346	648.000	395	
## 347	789.000	163	
## 348	1.091	258	
## 349	618.000	258	
## 350	636.000	375	
## 351	519.000	357	
## 352	641.000	384	
## 353	561.000	414	
## 354	503.000	230	
## 355	635.000	200	
## 356	718.000	225	
## 357	1.421	0	
## 358	711.000	208	
## 359	821.000	170	
## 360	550.000	389	
## 361	617.000	276	
## 362	671.000	298	
## 363	629.000	302	
## 364	660.000	269	
## 365	784.000	198	
## 366	1.187	145	
## 367	510.000	277	
## 368	577.000	362	
## MinutesOfModerateActivity MinutesOfIntenseActivity activityCalories			
## 1	0	0	1.558
## 2	59	29	1.584
## 3	3	54	1.176
## 4	21	41	1.937
## 5	35	70	1.862
## 6	35	70	1.862
## 7	47	70	1.782
## 8	54	45	1.673
## 9	17	16	2.200
## 10	40	9	1.126
## 11	0	0	661.000
## 12	9	97	1.618
## 13	15	36	1.841
## 14	35	26	1.292
## 15	7	1	1.335
## 16	8	38	1.477
## 17	15	93	1.827
## 18	15	93	1.827
## 19	25	67	1.419
## 20	6	6	1.039
## 21	16	15	1.369
## 22	43	25	1.206
## 23	22	13	777.000
## 24	48	62	1.559
## 25	9	49	1.566
## 26	5	45	1.219
## 27	0	0	1.437

No questions assigned to the following page.

## 28	49	79	2.360
## 29	16	89	1.592
## 30	16	89	1.592
## 31	63	54	1.947
## 32	65	54	1.883
## 33	50	51	1.530
## 34	41	9	667.000
## 35	0	0	37.000
## 36	25	68	1.600
## 37	53	30	1.590
## 38	31	30	1.420
## 39	8	102	1.731
## 40	10	55	2.075
## 41	38	70	1.939
## 42	38	70	1.939
## 43	22	19	1.337
## 44	28	32	1.225
## 45	50	55	2.063
## 46	0	0	645.000
## 47	43	24	1.294
## 48	39	52	1.271
## 49	47	28	1.760
## 50	42	29	1.544
## 51	42	29	1.544
## 52	0	0	572.000
## 53	28	45	2.580
## 54	29	90	2.249
## 55	36	52	1.583
## 56	36	52	1.583
## 57	52	55	2.111
## 58	41	59	1.838
## 59	15	30	1.356
## 60	24	14	1.378
## 61	37	8	1.258
## 62	0	0	1.354
## 63	5	32	1.530
## 64	10	11	1.784
## 65	0	0	1.103
## 66	28	67	2.850
## 67	8	85	2.112
## 68	78	42	1.927
## 69	78	42	1.927
## 70	36	30	1.082
## 71	42	20	2.079
## 72	0	0	1.217
## 73	46	27	1.383
## 74	75	22	1.218
## 75	45	35	1.579
## 76	53	30	1.630
## 77	10	62	1.729
## 78	9	97	1.664
## 79	3	58	1.472
## 80	13	10	1.604
## 81	28	130	2.155

No questions assigned to the following page.

## 82	10	3	1.106
## 83	11	8	1.297
## 84	40	28	1.197
## 85	27	20	1.009
## 86	52	68	2.285
## 87	13	50	1.603
## 88	7	8	1.812
## 89	28	30	1.680
## 90	8	65	1.469
## 91	0	0	1.874
## 92	63	29	1.785
## 93	22	59	1.662
## 94	57	51	1.638
## 95	16	29	763.000
## 96	32	13	1.178
## 97	27	53	1.510
## 98	25	123	2.393
## 99	0	0	1.093
## 100	15	41	1.252
## 101	8	69	1.833
## 102	0	0	1.607
## 103	61	60	2.248
## 104	43	31	1.494
## 105	10	1	1.322
## 106	40	35	1.564
## 107	87	85	3.181
## 108	0	0	258.000
## 109	28	13	1.225
## 110	29	38	1.449
## 111	36	29	1.197
## 112	6	41	1.098
## 113	21	100	1.766
## 114	41	4	659.000
## 115	14	77	1.719
## 116	20	4	1.081
## 117	36	17	1.606
## 118	8	23	1.617
## 119	38	42	1.421
## 120	29	32	1.423
## 121	40	79	1.799
## 122	26	54	1.411
## 123	44	24	1.472
## 124	21	20	1.299
## 125	14	38	1.726
## 126	14	61	1.928
## 127	23	4	962.000
## 128	39	64	1.676
## 129	46	60	1.589
## 130	4	14	347.000
## 131	44	57	1.530
## 132	17	5	878.000
## 133	66	24	1.353
## 134	30	52	1.503
## 135	30	26	1.387

No questions assigned to the following page.

## 136	17	26	1.187
## 137	0	13	1.438
## 138	10	47	1.696
## 139	0	0	736.000
## 140	34	11	1.777
## 141	16	0	1.201
## 142	0	0	287.000
## 143	8	13	1.481
## 144	57	33	1.059
## 145	17	61	1.228
## 146	0	0	1.216
## 147	13	3	1.020
## 148	15	15	1.813
## 149	0	0	0.000
## 150	10	80	1.967
## 151	34	18	1.094
## 152	56	56	2.818
## 153	52	60	1.725
## 154	4	10	1.718
## 155	15	8	1.564
## 156	37	29	1.036
## 157	8	16	778.000
## 158	19	6	1.182
## 159	34	60	1.560
## 160	45	12	1.941
## 161	4	50	850.000
## 162	12	96	1.954
## 163	13	1	983.000
## 164	10	93	1.209
## 165	47	87	1.813
## 166	26	10	1.542
## 167	43	46	1.355
## 168	4	2	1.017
## 169	41	103	1.953
## 170	22	42	1.229
## 171	58	71	1.917
## 172	8	4	589.000
## 173	3	77	1.557
## 174	25	11	2.166
## 175	8	7	1.092
## 176	8	51	1.756
## 177	50	54	2.155
## 178	8	1	1.159
## 179	72	25	1.247
## 180	57	28	1.075
## 181	28	44	1.219
## 182	28	33	1.038
## 183	23	59	1.977
## 184	34	16	1.347
## 185	17	124	2.556
## 186	60	18	1.947
## 187	101	118	2.700
## 188	17	54	1.352
## 189	31	29	1.392

No questions assigned to the following page.

## 190	0	0	1.084
## 191	35	46	1.464
## 192	8	43	1.833
## 193	31	61	1.990
## 194	29	28	1.110
## 195	4	15	1.314
## 196	36	19	1.131
## 197	10	81	1.553
## 198	0	0	1.266
## 199	46	73	1.766
## 200	2	110	1.809
## 201	47	47	1.733
## 202	33	14	2.362
## 203	17	10	1.140
## 204	38	22	1.384
## 205	73	42	2.462
## 206	31	24	1.050
## 207	5	3	467.000
## 208	42	33	1.146
## 209	9	90	1.647
## 210	6	98	1.926
## 211	18	51	1.371
## 212	44	59	1.974
## 213	31	47	1.910
## 214	27	20	1.578
## 215	59	39	1.419
## 216	8	17	1.390
## 217	53	27	1.771
## 218	43	21	1.331
## 219	22	35	881.000
## 220	3	51	1.234
## 221	38	50	2.548
## 222	4	88	2.085
## 223	18	54	1.351
## 224	30	66	1.511
## 225	5	53	1.703
## 226	13	8	1.834
## 227	35	41	1.736
## 228	0	0	956.000
## 229	21	37	1.650
## 230	15	22	1.734
## 231	24	51	2.073
## 232	14	19	1.533
## 233	0	0	1.237
## 234	5	67	1.795
## 235	15	2	939.000
## 236	55	93	2.348
## 237	48	43	1.775
## 238	25	18	2.070
## 239	0	0	700.000
## 240	22	23	791.000
## 241	40	58	2.004
## 242	56	23	1.973
## 243	57	32	1.729

No questions assigned to the following page.

## 244	0	0	351.000
## 245	7	2	859.000
## 246	7	97	1.964
## 247	48	52	1.766
## 248	52	75	1.921
## 249	52	24	1.438
## 250	45	16	1.950
## 251	56	67	1.912
## 252	0	0	686.000
## 253	3	14	1.209
## 254	42	6	1.678
## 255	34	22	2.110
## 256	23	14	958.000
## 257	22	55	2.243
## 258	14	10	2.020
## 259	14	5	882.000
## 260	24	44	1.533
## 261	33	70	1.495
## 262	19	42	2.164
## 263	32	21	1.471
## 264	39	75	1.851
## 265	3	8	477.000
## 266	33	12	1.044
## 267	50	45	2.286
## 268	36	25	1.220
## 269	10	59	1.542
## 270	0	0	1.135
## 271	79	132	2.880
## 272	32	15	1.236
## 273	23	23	1.349
## 274	19	47	1.937
## 275	14	18	869.000
## 276	9	13	808.000
## 277	31	14	1.552
## 278	0	0	0.000
## 279	0	0	16.000
## 280	25	37	1.305
## 281	3	24	817.000
## 282	28	24	1.411
## 283	33	140	2.502
## 284	37	95	2.292
## 285	48	21	2.073
## 286	38	71	1.648
## 287	63	52	1.600
## 288	48	29	1.401
## 289	2	46	1.262
## 290	0	0	962.000
## 291	24	26	756.000
## 292	47	32	1.184
## 293	9	0	1.646
## 294	9	4	1.805
## 295	0	0	847.000
## 296	36	20	1.419
## 297	13	4	1.046

No questions assigned to the following page.

## 298	52	50	1.530
## 299	34	24	1.799
## 300	57	39	1.943
## 301	50	22	1.177
## 302	0	0	1.311
## 303	52	61	1.521
## 304	40	20	1.150
## 305	0	0	1.587
## 306	16	95	1.798
## 307	0	0	644.000
## 308	54	99	2.078
## 309	2	40	1.573
## 310	45	45	1.328
## 311	0	0	1.431
## 312	30	7	1.414
## 313	61	30	1.502
## 314	0	0	1.089
## 315	52	28	1.291
## 316	25	44	1.306
## 317	20	2	588.000
## 318	26	128	2.070
## 319	64	50	1.676
## 320	28	53	1.491
## 321	29	64	1.527
## 322	18	35	1.828
## 323	0	0	1.033
## 324	29	12	1.275
## 325	60	42	1.711
## 326	0	0	1.030
## 327	57	18	1.592
## 328	10	1	1.322
## 329	0	0	0.000
## 330	42	129	2.711
## 331	8	13	1.148
## 332	25	51	1.750
## 333	44	11	1.370
## 334	9	11	1.861
## 335	45	33	1.290
## 336	19	3	817.000
## 337	7	15	1.776
## 338	0	0	1.359
## 339	30	26	1.400
## 340	20	1	1.023
## 341	6	39	1.009
## 342	8	82	1.931
## 343	0	0	890.000
## 344	35	49	1.579
## 345	21	4	1.628
## 346	23	74	2.540
## 347	54	15	1.146
## 348	24	20	1.519
## 349	39	51	1.821
## 350	3	26	1.718
## 351	16	2	1.641

No questions assigned to the following page.

## 352	23	57	2.417		
## 353	0	0	1.651		
## 354	55	153	2.794		
## 355	18	58	1.393		
## 356	60	44	1.727		
## 357	0	0	0.000		
## 358	26	5	1.092		
## 359	51	29	1.264		
## 360	67	75	2.743		
## 361	6	45	1.567		
## 362	0	0	1.277		
## 363	35	63	2.107		
## 364	86	43	2.092		
## 365	7	0	914.000		
## 366	43	65	1.532		
## 367	0	0	1.162		
## 368	0	0	1.394		
##	MinutesOfSleep	MinutesOfBeingAwake	NumberOfAwakings	MinutesOfRest	Day
## 1	278	15	14	295	Friday
## 2	420	31	26	451	Tuesday
## 3	337	51	23	388	Friday
## 4	347	41	20	388	Sunday
## 5	426	54	33	495	Monday
## 6	426	54	27	495	Monday
## 7	370	26	14	444	Wednesday
## 8	0	0	0	0	Saturday
## 9	125	13	9	141	Tuesday
## 10	403	45	27	448	Thursday
## 11	319	15	7	334	Sunday
## 12	275	31	14	306	Tuesday
## 13	316	39	19	355	Saturday
## 14	327	34	22	361	Wednesday
## 15	78	6	3	85	Saturday
## 16	314	34	23	348	Monday
## 17	430	41	26	484	Tuesday
## 18	430	41	19	484	Tuesday
## 19	455	21	13	482	Thursday
## 20	529	78	38	607	Sunday
## 21	316	46	20	366	Wednesday
## 22	431	39	28	470	Friday
## 23	0	0	0	0	Monday
## 24	398	44	33	442	Wednesday
## 25	0	0	0	0	Sunday
## 26	420	45	28	465	Thursday
## 27	315	45	23	360	Sunday
## 28	377	33	18	410	Tuesday
## 29	376	46	30	436	Wednesday
## 30	376	46	34	436	Wednesday
## 31	311	19	11	333	Friday
## 32	294	42	18	351	Monday
## 33	0	0	0	0	Thursday
## 34	0	0	0	0	Saturday
## 35	0	0	0	0	Tuesday
## 36	271	37	21	308	Thursday

No questions assigned to the following page.

## 37	380	52	31	432	Monday
## 38	157	10	5	167	Friday
## 39	184	29	16	214	Monday
## 40	406	21	8	427	Wednesday
## 41	312	44	25	369	Thursday
## 42	312	44	29	369	Thursday
## 43	550	44	19	594	Saturday
## 44	303	27	16	336	Tuesday
## 45	452	26	18	489	Friday
## 46	108	7	5	115	Sunday
## 47	345	41	21	386	Wednesday
## 48	0	0	0	0	Friday
## 49	297	31	19	328	Tuesday
## 50	401	18	14	420	Friday
## 51	401	18	14	420	Friday
## 52	302	23	15	325	Saturday
## 53	425	25	8	450	Tuesday
## 54	280	35	15	315	Thursday
## 55	388	21	15	415	Friday
## 56	388	21	14	415	Friday
## 57	368	57	27	431	Sunday
## 58	553	31	20	592	Wednesday
## 59	479	32	21	512	Saturday
## 60	78	3	2	81	Monday
## 61	383	47	28	431	Thursday
## 62	268	8	4	276	Saturday
## 63	354	43	22	397	Wednesday
## 64	350	29	19	380	Saturday
## 65	0	0	0	0	Sunday
## 66	267	34	15	302	Wednesday
## 67	370	42	22	412	Friday
## 68	409	56	34	468	Saturday
## 69	409	56	30	468	Saturday
## 70	250	19	13	282	Monday
## 71	402	22	12	427	Thursday
## 72	382	30	18	414	Sunday
## 73	397	66	35	463	Tuesday
## 74	391	23	11	414	Friday
## 75	196	19	7	215	Sunday
## 76	336	16	8	352	Thursday
## 77	316	15	7	331	Sunday
## 78	348	39	23	387	Monday
## 79	359	14	7	373	Thursday
## 80	502	57	31	563	Saturday
## 81	54	18	3	87	Sunday
## 82	76	10	7	92	Tuesday
## 83	192	22	12	230	Friday
## 84	0	0	0	0	Monday
## 85	387	17	8	404	Wednesday
## 86	231	26	15	257	Saturday
## 87	232	11	6	243	Monday
## 88	306	17	10	323	Friday
## 89	376	50	30	426	Monday
## 90	267	31	18	299	Tuesday

No questions assigned to the following page.

## 91	379	46	24	425	Friday
## 92	347	45	21	401	Monday
## 93	360	39	18	425	Wednesday
## 94	487	27	17	518	Saturday
## 95	153	8	9	163	Tuesday
## 96	0	0	0	0	Thursday
## 97	526	30	17	556	Sunday
## 98	0	0	0	0	Tuesday
## 99	396	29	10	425	Saturday
## 100	342	41	21	383	Tuesday
## 101	0	0	0	0	Wednesday
## 102	507	18	10	525	Saturday
## 103	384	26	23	417	Saturday
## 104	290	33	14	332	Tuesday
## 105	248	12	7	261	Thursday
## 106	544	39	24	583	Sunday
## 107	393	61	33	468	Wednesday
## 108	407	65	33	472	Friday
## 109	369	62	37	440	Monday
## 110	318	38	31	369	Wednesday
## 111	0	0	0	0	Sunday
## 112	0	0	0	0	Wednesday
## 113	334	29	18	364	Thursday
## 114	306	35	22	341	Sunday
## 115	454	35	21	491	Sunday
## 116	379	24	14	411	Wednesday
## 117	410	52	27	463	Friday
## 118	77	0	0	77	Monday
## 119	226	12	8	249	Thursday
## 120	92	7	6	99	Saturday
## 121	291	46	26	337	Tuesday
## 122	0	0	0	0	Thursday
## 123	327	18	11	345	Monday
## 124	333	22	15	355	Thursday
## 125	0	0	0	0	Friday
## 126	407	50	26	457	Monday
## 127	387	46	25	436	Monday
## 128	394	29	17	436	Thursday
## 129	465	31	16	501	Saturday
## 130	80	2	5	92	Tuesday
## 131	249	31	15	287	Friday
## 132	0	0	0	0	Sunday
## 133	143	8	5	151	Wednesday
## 134	0	0	0	0	Friday
## 135	254	36	18	290	Tuesday
## 136	322	26	14	348	Friday
## 137	275	13	10	288	Saturday
## 138	354	37	21	391	Tuesday
## 139	311	31	21	350	Tuesday
## 140	421	23	13	448	Friday
## 141	406	22	17	435	Sunday
## 142	0	0	0	0	Wednesday
## 143	525	72	45	603	Saturday
## 144	0	0	0	0	Monday

No questions assigned to the following page.

## 145	503	50	31	553 Thursday
## 146	464	58	35	522 Saturday
## 147	423	13	7	436 Wednesday
## 148	448	55	29	503 Saturday
## 149	0	0	0	0 Sunday
## 150	365	65	31	430 Wednesday
## 151	407	65	44	491 Wednesday
## 152	169	20	11	196 Saturday
## 153	347	29	15	385 Monday
## 154	263	33	17	297 Thursday
## 155	414	61	34	480 Sunday
## 156	0	0	0	0 Tuesday
## 157	0	0	0	0 Friday
## 158	279	21	20	303 Sunday
## 159	345	29	19	374 Thursday
## 160	264	28	20	293 Sunday
## 161	0	0	0	0 Monday
## 162	278	26	18	304 Thursday
## 163	405	47	31	457 Thursday
## 164	0	0	0	0 Sunday
## 165	362	24	14	393 Tuesday
## 166	219	15	11	237 Friday
## 167	0	0	0	0 Monday
## 168	0	0	0	0 Wednesday
## 169	524	32	14	556 Saturday
## 170	321	39	21	361 Monday
## 171	391	39	22	430 Friday
## 172	0	0	0	0 Monday
## 173	356	14	5	370 Tuesday
## 174	396	50	20	446 Friday
## 175	381	28	12	415 Friday
## 176	412	17	9	436 Monday
## 177	418	20	11	438 Wednesday
## 178	551	42	27	593 Saturday
## 179	426	17	11	444 Tuesday
## 180	0	0	0	0 Thursday
## 181	269	36	21	307 Sunday
## 182	242	12	6	254 Tuesday
## 183	400	41	27	441 Saturday
## 184	305	27	16	334 Tuesday
## 185	368	46	22	414 Wednesday
## 186	404	67	25	471 Saturday
## 187	269	34	16	306 Saturday
## 188	379	49	30	438 Tuesday
## 189	411	31	11	451 Thursday
## 190	429	34	16	465 Sunday
## 191	423	40	27	478 Wednesday
## 192	326	29	16	355 Friday
## 193	0	0	0	0 Monday
## 194	102	4	2	106 Wednesday
## 195	434	31	26	466 Sunday
## 196	309	12	7	321 Wednesday
## 197	388	14	10	402 Thursday
## 198	0	0	0	0 Sunday

No questions assigned to the following page.

## 199	452	26	18	507	Sunday
## 200	373	47	23	427	Wednesday
## 201	304	28	16	338	Friday
## 202	263	7	13	285	Monday
## 203	407	41	29	457	Thursday
## 204	444	57	33	505	Saturday
## 205	378	32	23	410	Tuesday
## 206	161	9	4	170	Thursday
## 207	325	11	5	336	Monday
## 208	0	0	0	0	Thursday
## 209	223	33	17	256	Friday
## 210	307	28	12	335	Monday
## 211	269	17	11	291	Monday
## 212	360	51	26	416	Thursday
## 213	343	50	24	398	Saturday
## 214	445	75	38	526	Tuesday
## 215	393	58	30	452	Friday
## 216	142	9	6	151	Sunday
## 217	424	31	24	462	Wednesday
## 218	0	0	0	0	Friday
## 219	0	0	0	0	Tuesday
## 220	317	17	9	334	Friday
## 221	435	49	31	484	Saturday
## 222	0	0	0	0	Tuesday
## 223	167	9	8	180	Tuesday
## 224	358	42	22	401	Friday
## 225	368	18	10	391	Sunday
## 226	212	33	15	247	Wednesday
## 227	396	35	24	433	Saturday
## 228	347	45	29	393	Monday
## 229	353	33	26	386	Thursday
## 230	440	42	22	482	Saturday
## 231	468	37	24	507	Wednesday
## 232	383	35	31	419	Saturday
## 233	383	35	23	427	Sunday
## 234	411	31	17	442	Wednesday
## 235	368	50	27	420	Wednesday
## 236	415	48	29	468	Saturday
## 237	380	34	24	420	Monday
## 238	324	22	13	354	Thursday
## 239	0	0	0	0	Sunday
## 240	0	0	0	0	Tuesday
## 241	444	46	25	490	Friday
## 242	339	48	28	387	Sunday
## 243	336	55	30	391	Thursday
## 244	347	45	32	393	Sunday
## 245	224	20	13	244	Monday
## 246	341	27	17	368	Thursday
## 247	386	30	22	420	Thursday
## 248	464	39	24	503	Sunday
## 249	322	41	13	363	Tuesday
## 250	465	60	33	525	Friday
## 251	0	0	0	0	Monday
## 252	0	0	0	0	Wednesday

No questions assigned to the following page.

## 253	0	0	0	0 Saturday
## 254	388	16	10	404 Monday
## 255	458	63	36	521 Friday
## 256	0	0	0	0 Monday
## 257	274	35	26	319 Tuesday
## 258	430	62	39	492 Friday
## 259	351	46	26	399 Friday
## 260	388	54	28	444 Monday
## 261	0	0	0	0 Wednesday
## 262	440	33	23	476 Saturday
## 263	395	35	17	430 Tuesday
## 264	136	21	10	157 Thursday
## 265	0	0	0	0 Sunday
## 266	419	19	11	438 Tuesday
## 267	339	47	28	386 Saturday
## 268	243	23	9	266 Tuesday
## 269	391	27	13	418 Wednesday
## 270	305	42	28	348 Saturday
## 271	314	32	26	353 Saturday
## 272	449	24	15	480 Tuesday
## 273	472	29	16	519 Thursday
## 274	518	28	19	549 Sunday
## 275	420	36	17	456 Wednesday
## 276	209	14	6	223 Friday
## 277	244	32	16	276 Monday
## 278	0	0	0	0 Wednesday
## 279	342	48	31	390 Sunday
## 280	437	22	9	459 Wednesday
## 281	254	32	13	286 Thursday
## 282	375	56	31	431 Sunday
## 283	432	35	24	469 Sunday
## 284	357	29	15	395 Wednesday
## 285	292	23	16	343 Friday
## 286	375	49	33	446 Monday
## 287	0	0	0	0 Thursday
## 288	365	19	14	384 Saturday
## 289	0	0	0	0 Tuesday
## 290	0	0	0	0 Thursday
## 291	0	0	0	0 Monday
## 292	382	35	21	417 Thursday
## 293	204	10	5	214 Friday
## 294	237	28	14	265 Monday
## 295	224	24	19	270 Monday
## 296	379	38	21	420 Thursday
## 297	304	47	21	357 Saturday
## 298	326	13	6	339 Tuesday
## 299	434	35	16	469 Friday
## 300	151	16	10	167 Sunday
## 301	69	2	1	71 Wednesday
## 302	308	49	27	357 Friday
## 303	357	35	22	392 Tuesday
## 304	0	0	0	0 Friday
## 305	64	5	4	69 Saturday
## 306	360	20	10	380 Tuesday

No questions assigned to the following page.

## 307	0	0	0	0	Tuesday
## 308	332	16	7	349	Friday
## 309	419	51	25	480	Sunday
## 310	397	21	14	437	Wednesday
## 311	359	54	30	414	Saturday
## 312	226	24	15	250	Monday
## 313	0	0	0	0	Thursday
## 314	488	46	27	534	Saturday
## 315	328	37	21	365	Wednesday
## 316	0	0	0	0	Saturday
## 317	457	54	35	512	Sunday
## 318	361	49	27	410	Wednesday
## 319	389	39	28	430	Wednesday
## 320	413	38	19	454	Saturday
## 321	172	6	7	185	Monday
## 322	497	47	37	549	Thursday
## 323	265	20	10	285	Sunday
## 324	405	44	23	449	Tuesday
## 325	325	22	17	348	Friday
## 326	326	39	24	365	Sunday
## 327	385	41	27	427	Thursday
## 328	262	33	16	295	Sunday
## 329	0	0	0	0	Monday
## 330	374	56	34	430	Thursday
## 331	381	24	17	412	Thursday
## 332	438	45	22	488	Sunday
## 333	303	48	31	356	Tuesday
## 334	0	0	0	0	Friday
## 335	411	38	23	450	Monday
## 336	276	28	14	304	Wednesday
## 337	404	43	32	448	Saturday
## 338	207	31	18	238	Monday
## 339	248	32	20	280	Friday
## 340	166	14	7	180	Monday
## 341	0	0	0	0	Tuesday
## 342	348	20	9	368	Friday
## 343	417	66	32	486	Friday
## 344	277	42	15	320	Monday
## 345	368	29	23	406	Wednesday
## 346	234	5	8	250	Saturday
## 347	309	39	26	348	Tuesday
## 348	0	0	0	0	Thursday
## 349	328	33	22	362	Sunday
## 350	242	10	6	252	Tuesday
## 351	410	26	14	436	Saturday
## 352	321	40	21	361	Wednesday
## 353	454	48	27	502	Saturday
## 354	464	35	26	503	Saturday
## 355	291	22	17	317	Tuesday
## 356	389	36	19	433	Thursday
## 357	52	6	3	69	Sunday
## 358	477	27	16	504	Wednesday
## 359	155	8	5	163	Friday
## 360	352	37	24	397	Monday

No questions assigned to the following page.

## 361	448	58	33	506	Wednesday
## 362	424	48	28	473	Sunday
## 363	319	25	15	344	Thursday
## 364	328	53	25	382	Sunday
## 365	415	39	31	467	Friday
## 366	0	0	0	0	Monday
## 367	383	41	23	424	Saturday
## 368	541	31	13	572	Thursday
##	Month				
## 1	January				
## 2	March				
## 3	April				
## 4	May				
## 5	June				
## 6	June				
## 7	July				
## 8	August				
## 9	September				
## 10	October				
## 11	November				
## 12	December				
## 13	January				
## 14	March				
## 15	April				
## 16	May				
## 17	June				
## 18	June				
## 19	July				
## 20	August				
## 21	September				
## 22	October				
## 23	November				
## 24	December				
## 25	January				
## 26	March				
## 27	April				
## 28	May				
## 29	June				
## 30	June				
## 31	July				
## 32	August				
## 33	September				
## 34	October				
## 35	November				
## 36	December				
## 37	January				
## 38	March				
## 39	April				
## 40	May				
## 41	June				
## 42	June				
## 43	July				
## 44	August				
## 45	September				

No questions assigned to the following page.

```
## 46    October
## 47    November
## 48    December
## 49    January
## 50    February
## 51    February
## 52    March
## 53    April
## 54    May
## 55    June
## 56    June
## 57    July
## 58    August
## 59    September
## 60    October
## 61    November
## 62    December
## 63    January
## 64    February
## 65    March
## 66    April
## 67    May
## 68    June
## 69    June
## 70    July
## 71    August
## 72    September
## 73    October
## 74    November
## 75    December
## 76    January
## 77    February
## 78    March
## 79    April
## 80    May
## 81    June
## 82    July
## 83    August
## 84    September
## 85    October
## 86    November
## 87    December
## 88    January
## 89    February
## 90    March
## 91    April
## 92    June
## 93    July
## 94    August
## 95    September
## 96    October
## 97    November
## 98    December
## 99    January
```

No questions assigned to the following page.

```
## 100 February
## 101 March
## 102 April
## 103 May
## 104 June
## 105 July
## 106 August
## 107 September
## 108 October
## 109 November
## 110 December
## 111 January
## 112 February
## 113 March
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## 116 June
## 117 July
## 118 August
## 119 September
## 120 October
## 121 November
## 122 December
## 123 January
## 124 February
## 125 March
## 126 April
## 127 May
## 128 June
## 129 July
## 130 August
## 131 September
## 132 October
## 133 November
## 134 December
## 135 January
## 136 February
## 137 March
## 138 April
## 139 May
## 140 June
## 141 July
## 142 August
## 143 September
## 144 October
## 145 November
## 146 December
## 147 January
## 148 February
## 149 March
## 150 April
## 151 May
## 152 June
## 153 July
```

No questions assigned to the following page.

```
## 154 August
## 155 September
## 156 October
## 157 November
## 158 December
## 159 January
## 160 February
## 161 March
## 162 April
## 163 May
## 164 June
## 165 July
## 166 August
## 167 September
## 168 October
## 169 November
## 170 December
## 171 January
## 172 February
## 173 March
## 174 April
## 175 May
## 176 June
## 177 July
## 178 August
## 179 September
## 180 October
## 181 November
## 182 December
## 183 January
## 184 February
## 185 March
## 186 April
## 187 May
## 188 June
## 189 July
## 190 August
## 191 September
## 192 October
## 193 November
## 194 December
## 195 January
## 196 February
## 197 March
## 198 April
## 199 May
## 200 June
## 201 July
## 202 August
## 203 September
## 204 October
## 205 November
## 206 December
## 207 January
```

No questions assigned to the following page.

```
## 208 February
## 209 March
## 210 April
## 211 May
## 212 June
## 213 July
## 214 August
## 215 September
## 216 October
## 217 November
## 218 December
## 219 January
## 220 February
## 221 March
## 222 April
## 223 May
## 224 June
## 225 July
## 226 August
## 227 September
## 228 October
## 229 November
## 230 December
## 231 January
## 232 February
## 233 March
## 234 April
## 235 May
## 236 June
## 237 July
## 238 August
## 239 September
## 240 October
## 241 November
## 242 December
## 243 January
## 244 February
## 245 March
## 246 April
## 247 May
## 248 June
## 249 July
## 250 August
## 251 September
## 252 October
## 253 November
## 254 December
## 255 January
## 256 February
## 257 March
## 258 April
## 259 May
## 260 June
## 261 July
```

No questions assigned to the following page.

```
## 262 August
## 263 September
## 264 October
## 265 November
## 266 December
## 267 January
## 268 February
## 269 March
## 270 April
## 271 May
## 272 June
## 273 July
## 274 August
## 275 September
## 276 October
## 277 November
## 278 December
## 279 January
## 280 February
## 281 March
## 282 April
## 283 May
## 284 June
## 285 July
## 286 August
## 287 September
## 288 October
## 289 November
## 290 December
## 291 January
## 292 February
## 293 March
## 294 April
## 295 May
## 296 June
## 297 July
## 298 August
## 299 September
## 300 October
## 301 November
## 302 December
## 303 January
## 304 February
## 305 March
## 306 April
## 307 May
## 308 June
## 309 July
## 310 August
## 311 September
## 312 October
## 313 November
## 314 December
## 315 January
```

No questions assigned to the following page.

```
## 316 February
## 317 March
## 318 April
## 319 May
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## 321 July
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## 326 December
## 327 January
## 328 February
## 329 March
## 330 April
## 331 May
## 332 June
## 333 July
## 334 August
## 335 September
## 336 October
## 337 November
## 338 December
## 339 January
## 340 February
## 341 March
## 342 April
## 343 May
## 344 June
## 345 July
## 346 August
## 347 September
## 348 October
## 349 November
## 350 December
## 351 January
## 352 March
## 353 April
## 354 May
## 355 June
## 356 July
## 357 August
## 358 September
## 359 October
## 360 November
## 361 December
## 362 January
## 363 March
## 364 May
## 365 July
## 366 August
## 367 October
## 368 December
```

Question assigned to the following page: [1.1](#)

Notice how we explicitly give the function `factor` the levels to expect. This allows us to define what order they will be in, so we can force them to be in a proper order for days/months (to save on typing and possible typos, we have used built in functions in R to find the names of months and weeks in the right order, but you could have just typed them out too).

Question 1

a (5 points) Many of the variables in the fitbit data set quantify the number of minutes spent doing activities, including sleeping. In principle, we might assume that these minutes should cover the whole day. However, the device might have been turned off or taken off at some point.

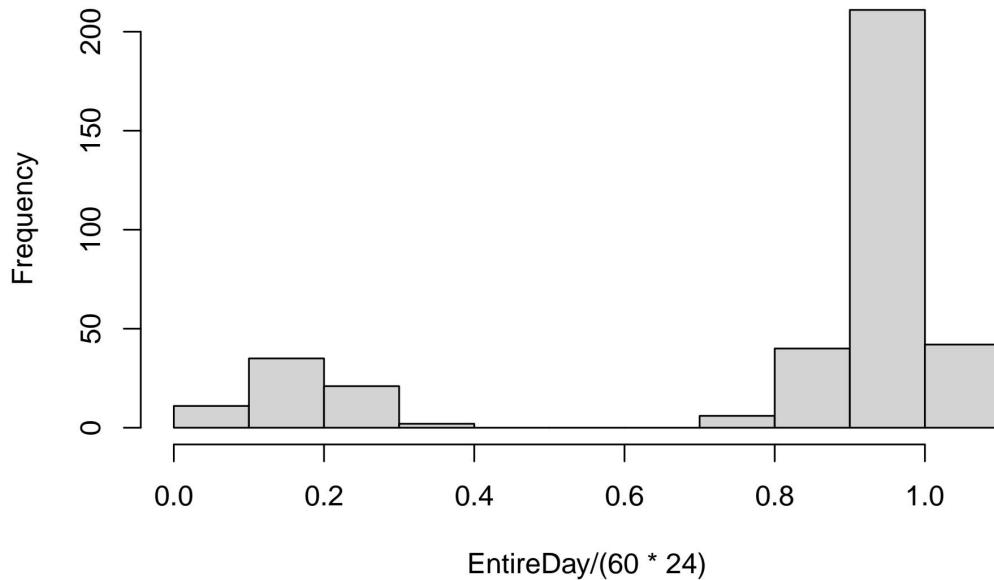
Let's consider this question. Look at the following variables: `MinutesOfSleep`, `MinutesOfLightActivity`, `MinutesOfModerateActivity`, `MinutesOfSedentaryActivities`, and `MinutesOfIntenseActivity`. How well do these sum up to cover the entire day?

```
# code to evaluate the total number of minutes
EntireDay <- fitbit$MinutesOfSleep + fitbit$MinutesOfLightActivity + fitbit$MinutesOfModerateActivity +
summary(EntireDay)

##      Min. 1st Qu. Median    Mean 3rd Qu.    Max.
##      1.44 1251.75 1357.50 1154.84 1407.25 1501.00

# code to view if it has sum up to cover the entire day
hist(EntireDay / (60 * 24))
```

Histogram of EntireDay/(60 * 24)



My answer is that through the histogram, you can see that there is variance in the chart, where there is a day when it's concentrated, while there is a day that isn't recorded that well.

Questions assigned to the following page: [1.1](#), [1.2](#), and [1.3](#)

There are times that the sum of minutes go over the sum of minutes in a day.

b (5 points) Going forward, we are going to consider the question of whether the amount of sedentary activity is predictive of the minutes of sleep per night. We are going to first normalize our data, so that both of these quantities are measured out of the total amount of minutes recorded in the day with the device. To do this, calculate the total number of minutes recorded each day in the five variables from part (a); call this variable `totMinutes`. Then make new variables `pctAsleep` and `pctSedentary` that are variables that give Sedentary or Asleep minutes as a percentage of all tracked minutes. Print out a `summary` of each of these two variables to show that your code was successful worked.

```
#code to make new variables as percent of total minutes
totMinutes = EntireDay
pctAsleep <- fitbit$MinutesOfSleep / totMinutes
pctSedentary <- fitbit$MinutesOfSedentaryActivities / totMinutes
# Then uncomment these commands to show you were successful:
summary(pctAsleep)
```

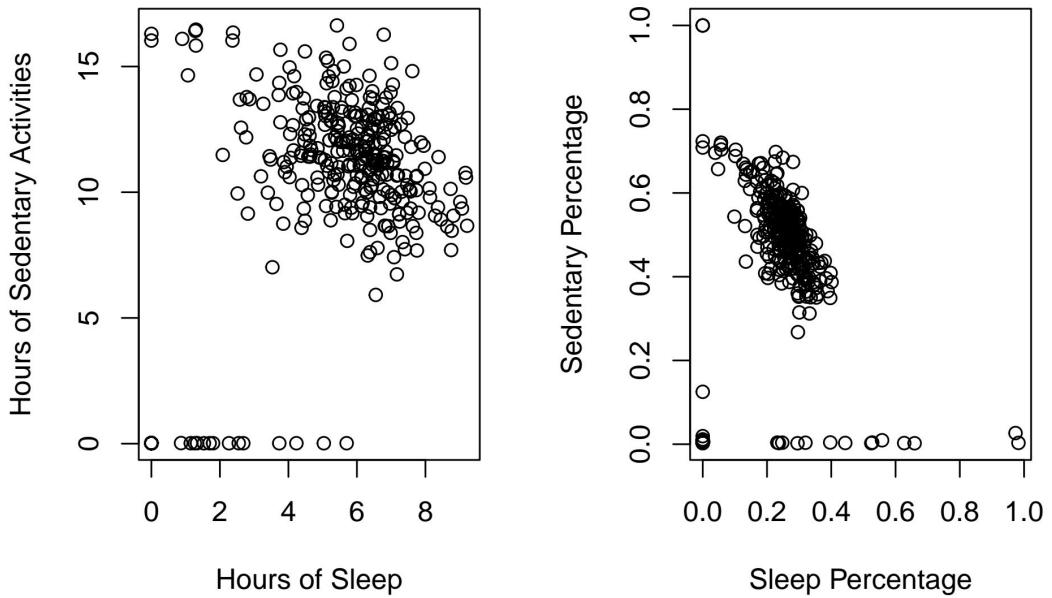
```
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.00000 0.1938 0.2489 0.2267 0.2935 0.9825
summary(pctSedentary)
```

```
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
## 0.002275 0.396158 0.486914 0.422188 0.552060 1.000000
```

c (10 points) Make a plot of `MinutesOfSleep` against `MinutesOfSedentaryActivites` and another plot of `pctAsleep` against `pctSedentary`. For the minutes plot, convert the minutes into hours. Make these plots side-by-side, either by using `par(mfrow= ...)` or something else like `patchwork` if you are using `ggplot`. Label the two plots appropriately. Comment on the affect of converting them to percentages.

```
# code to plot the two plots side-by-side
par(mfrow = c(1,2))
plot(fitbit$MinutesOfSleep / 60, fitbit$MinutesOfSedentaryActivities/ 60,
      xlab = "Hours of Sleep", ylab = "Hours of Sedentary Activities")
plot(pctAsleep, pctSedentary,
      xlab = "Sleep Percentage", ylab= "Sedentary Percentage")
```

Questions assigned to the following page: [1.3](#) and [1.4](#)



My answer is that compared to the plot of just the hours, showing percentage option seems to have more narrowed, clustered dataset and hours plot seems to have more wider and spreaded dataset.

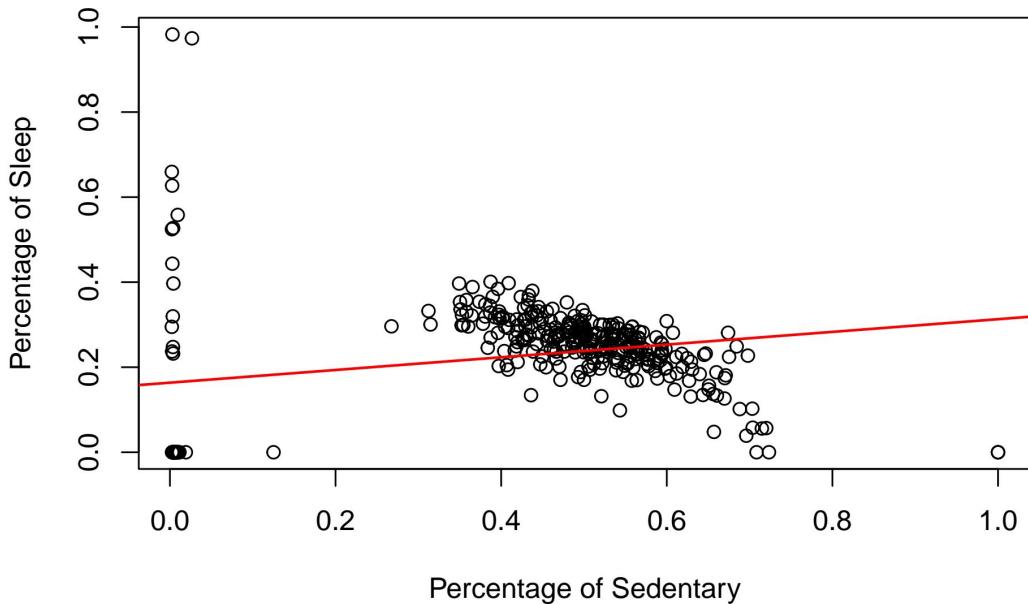
d (15 points) Plot the variable `pctAsleep` against `pctSedentary` like above, only now draw in the least squares regression line. Also print out the coefficients of the lines. Interpret the line and plots; be specific to this data – e.g. as you increase percent of time spent in sedentary minutes by 10%, how is `pctAsleep` predicted to change?

```
# Code here for plot with regression line
regression <- lm(pctAsleep ~ pctSedentary)
regression.coeff <- regression$coefficients
regression.coeff

## (Intercept) pctSedentary
## 0.1636420 0.1492903

plot(pctSedentary, pctAsleep,
     xlab = "Percentage of Sedentary", ylab = "Percentage of Sleep")
abline(regression.coeff[1], regression.coeff[2], col = "red", lwd = 1.5)
```

Questions assigned to the following page: [1.4](#) and [1.5](#)



> My answer is that they are positively correlated to each other. If you increase the percent of time spent in sedentary minutes by 10%, the pct Sedentary is to be increased by about 1.493 percent.

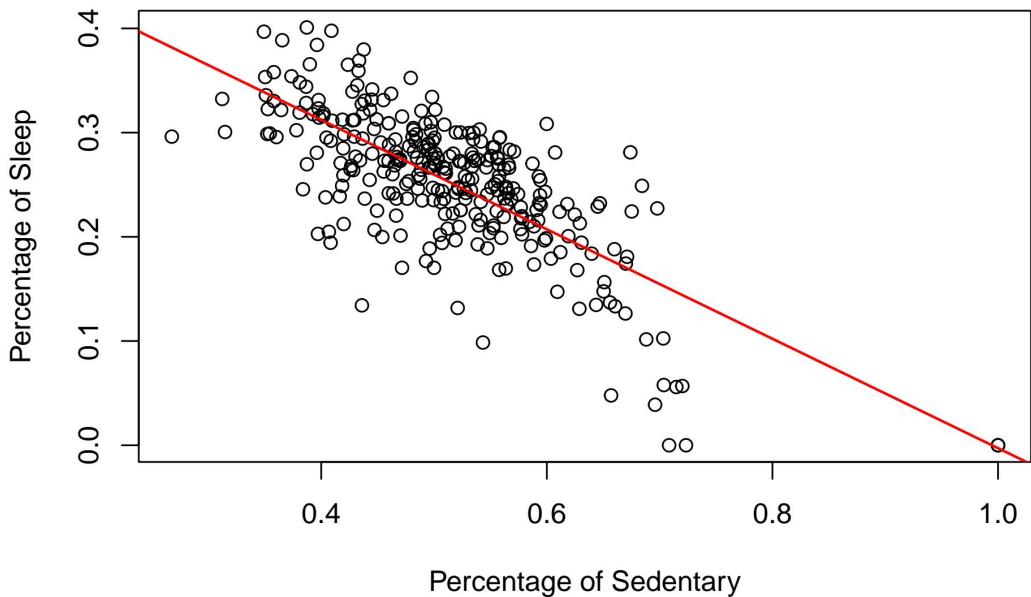
e (15 points) We might consider the effect of the (practically) zero levels of sedentary activity on our analysis. Remove these points from the above analysis in d, and compare the results to that found in d, and draw conclusions as to the effect of these data points. What conclusion would you draw as to whether they should be included in the analysis?

```
# Code here for plot with regression line removing zero sedentary
newregression <- lm(pctAsleep[pctSedentary >= 0.2] ~ pctSedentary[pctSedentary >= 0.2])
regression.coef <- newregression$coefficients
regression.coef

##                               (Intercept) pctSedentary[pctSedentary >= 0.2]
##                               0.5221875                  -0.5250148

plot(pctSedentary[pctSedentary >= 0.2], pctAsleep[pctSedentary >= 0.2],
     xlab = "Percentage of Sedentary", ylab = "Percentage of Sleep")
abline(regression.coef[1], regression.coef[2], col ="red", lwd = 1.5)
```

Questions assigned to the following page: [1.5](#) and [1.6](#)



My answer is that compared to d, the regression line of e seems to be better. The points removed should be the outliers that are existing for the plot of d, which makes the plot of e better as it's less influenced by such outliers, having less outliers just by visual as well.

f (20 points) Create bootstrap confidence intervals as well as parametric confidence intervals for the coefficients of the regression you found in e. (you can use the function from Question 3). Plot the resulting confidence intervals and compare them.

```
# Code here bootstrap and parametric confidence intervals
bootstrapLM <- function(y, x, repetitions, confidence.level = 0.95) {
  stat.obs <- coef(lm(y ~ x))
  bootFun <- function() {
    sampled <- sample(1:length(y), size = length(y),
                      replace = TRUE)
    coef(lm(y[sampled] ~ x[sampled]))
  }
  stat.boot <- replicate(repetitions, bootFun())
  nm <- deparse(substitute(x))
  row.names(stat.boot)[2] <- nm
  level <- 1 - confidence.level
  confidence.interval <- apply(stat.boot, 1, quantile,
                                probs = c(level/2, 1 - level/2))
  return(list(confidence.interval = cbind(lower = confidence.interval[1,
], estimate = stat.obs, upper = confidence.interval[2,
]), bootStats = stat.boot))
}
```

Question assigned to the following page: [1.6](#)

```

}

pctAsleepremove <- pctAsleep[pctSedentary >= 0.2]
pctSedentaryremove <- pctSedentary[pctSedentary >= 0.2]
boot <- bootstrapLM(pctAsleepremove, pctSedentaryremove, repetitions = 10000)
permuted <- boot$confidence.interval
newconf <- confint(newregression)

bootCI <- rbind(c(lower = newconf[2,1], estimate = uname(coef(newregression)[2]),
                    upper = newconf[2,2]), permuted [2,])
bootCI

##           lower   estimate      upper
## [1,] -0.5782944 -0.5250148 -0.4717353
## [2,] -0.5872889 -0.5250148 -0.4611669

bootCIO <- rbind(c(lower = newconf[1,1], estimate = uname(coef(newregression)[1]),
                    upper = newconf[1,2]), permuted [1,])
bootCIO

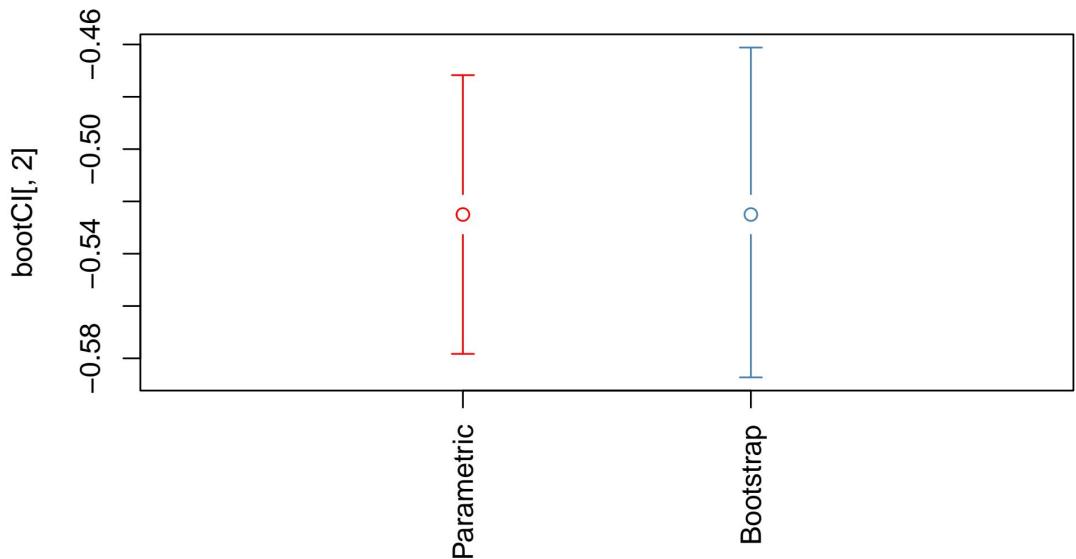
##           lower   estimate      upper
## [1,] 0.4943745 0.5221875 0.5500004
## [2,] 0.4900351 0.5221875 0.5541357

par(mar=c(8,4,4,1))
plotCI(bootCI[,2], ui = bootCI[,3], li = bootCI[,1], main = "Difference in Confidence intervals in the :
    col = c("red", "steelblue"), xaxt = "n", xlim = c(0,3))
axis(1, at=c(1,2), labels= c("Parametric", "Bootstrap"), las = 2)

```

Question assigned to the following page: [1.6](#)

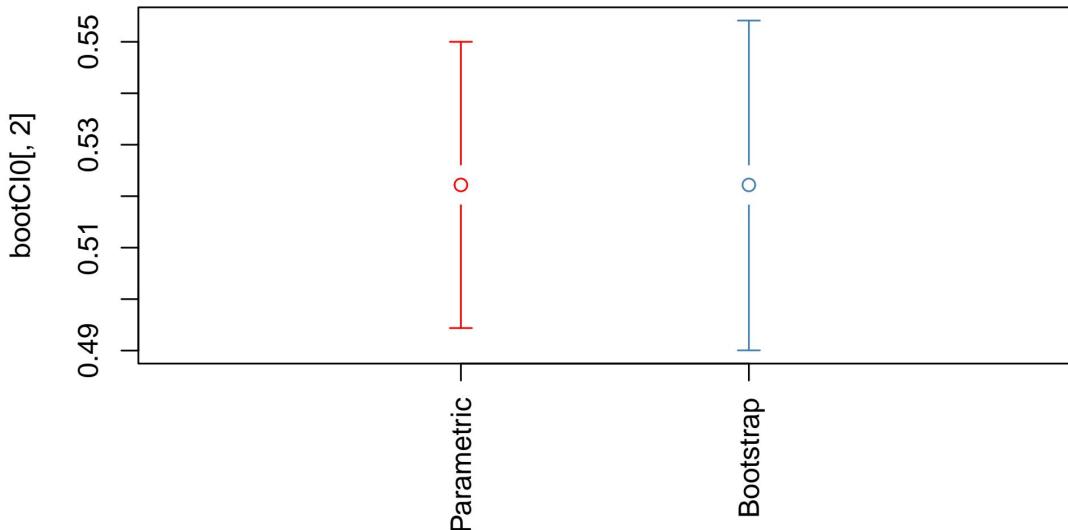
Difference in Confidence intervals in the slope



```
par(mar=c(8,4,4,1))
plotCI(bootCI0[,2], ui = bootCI0[,3], li = bootCI0[,1], main = "Difference in Confidence intervals in t"
       col = c("red", "steelblue"), xaxt = "n", xlim = c(0,3))
axis(1, at=c(1,2), labels= c("Parametric", "Bootstrap"), las = 2)
```

Questions assigned to the following page: [1.7](#), [2](#), and [1.6](#)

Difference in Confidence intervals in the intercept



> My answer is that there are no big differences among Parametric and Bootstrap. But the difference that stands out is that the how wide it is, that Bootstrap seems to be wider than those of Parametric.

g (5 points) We've seen that we do not always have all of the minutes of a day recorded. What affect could these missing minutes have on our above analysis? Be specific. A good idea is to first try to think of extreme examples of what could be happening in those minutes that might change your conclusion, so you can think about why not having that data might be a problem for your interpretation of the relationship between of sedentary activity and sleep levels. Then try to think of the best case scenario where lacking your data would not affect your results. Then return to the actual data (i.e. real life) and think how plausible it is to be worried about this problem.

My answer is that the missing minutes would bring about an huge increase on sleeping, since it's not working while it's sleeping. We have to put the missing minutes into account when calculating. Thinking of the real life, we have to be worried about this problem. Thinking of in the aspect of proportion, we would want to account the missing minutes into a fixed proportion of the actual minutes of sleep and sedentary, but that is not happening.

Question 2 (5 points)

The code below changes the dataset to convert the minutes to percentages of the total, like you were asked to do in the last problem, in addition to other changes. Describe what lines 3-5 do. You may need to look at the help of the function `gsub` and `abbreviate`.

```
totalNumberOfMinutes <- fitbit$MinutesOfSleep + fitbit$MinutesOfLightActivity + fitbit$MinutesOfModerateActivity  
absoluteMinNames<-c("MinutesOfSedentaryActivities", "MinutesOfLightActivity",  
"MinutesOfModerateActivity" , "MinutesOfIntenseActivity" , "activityCalories", "MinutesOfSleep",  
"MinutesOfBeingAwake" , "NumberOfAwakings", "MinutesOfRest") #LINE 2
```

Questions assigned to the following page: [2](#) and [3](#)

```
fitbit[,absoluteMinNames] <- fitbit[,absoluteMinNames]/totalNumberOfMinutes #LINE 3  
names(fitbit) <- gsub("Minutes", "pctMin", names(fitbit)) #LINE 4  
names(fitbit) <- abbreviate(names(fitbit), 10) #LINE 5
```

My answer is starting from LINE 3, it will first take the subset of fitbit by the list made in LINE 2 then it will divide the values of these columns by the totalNumberOfMinutes to get the percentage, the ratio. LINE 4, it will change the following names that include the “Minutes” into “pctMin” for the all names in the fitbit dataset. LINE 5, Using the abbreviate, strings at least minilength characters. It will take all the vector of names in the fitbit dataset and will shorten the character numbers to the minimum length of the character, which is 10 given.

For the rest of the problems, use this modified data frame.

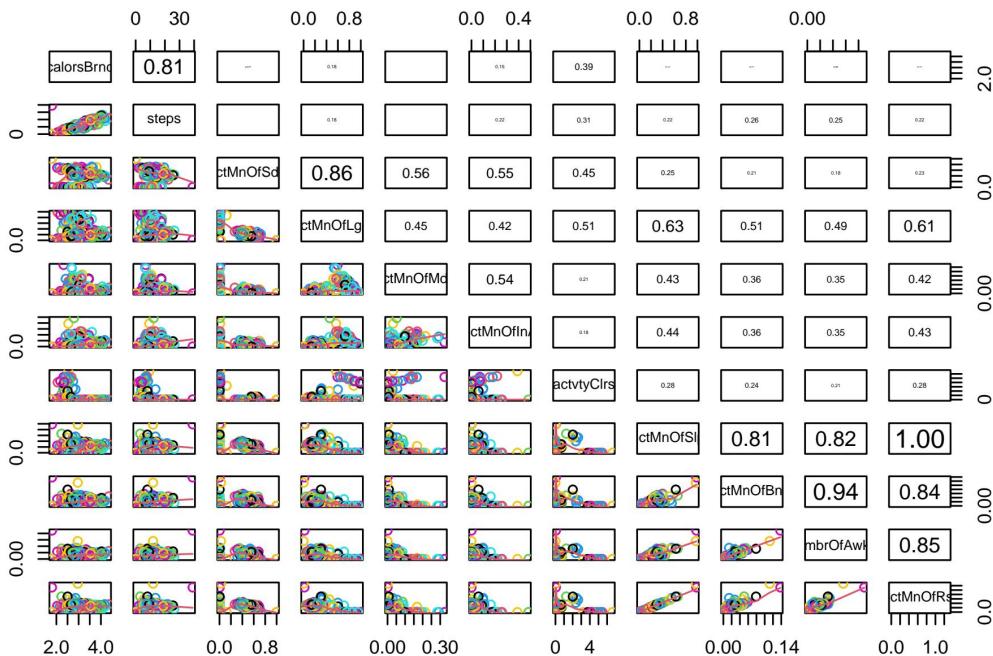
Question 3 (10 points)

Create a pairs plot of the continuous variables in the dataset, except for `distance` and `plans`, and color code by points by the day of the week. We have defined the colors for you to use for the different weeks in the following chunk with the vector `colWeek`.

No questions assigned to the following page.

No questions assigned to the following page.

Questions assigned to the following page: [4.1](#) and [3](#)



Comment which variables appear to have a strong pairwise relationship with `calorsBrnd`.

My answer is that looking at the first row, for the calories burned, The variable that appears to have the most strongest pairwise relationship is steps, that has a value of 0.81.

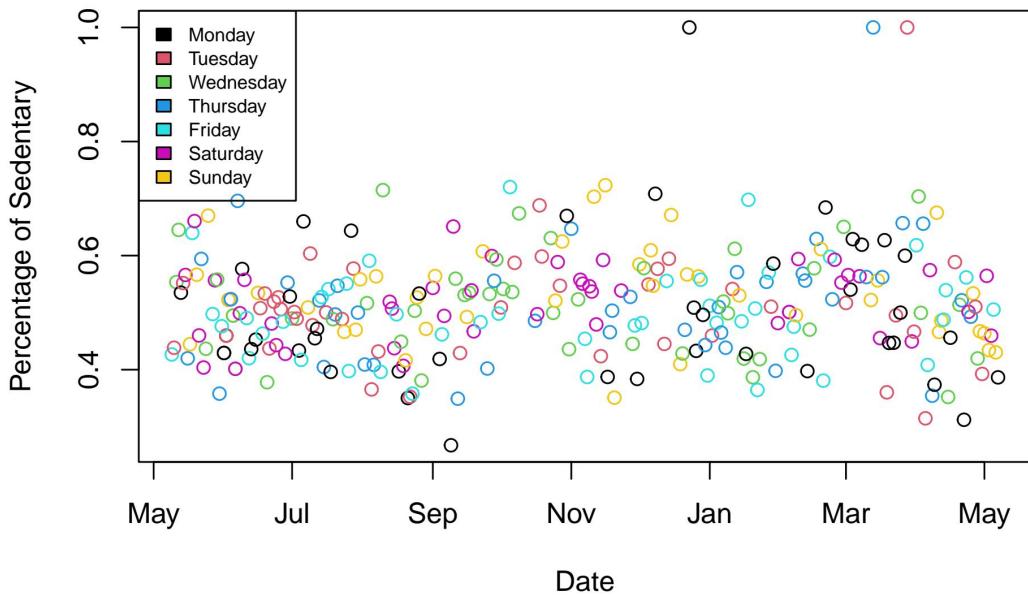
Question 4

- (a) (5 points) Plot the percent of sedentary activity as a function of `Date`, making sure you have removed the (practically) zero values (as you did in 4e). Color the points according the day of the week and give a legend.

```
# code to plot sedentary against date
zeroval <- subset(fitbit, pctMnOfSdA >= 0.2)

plot(zeroval$date, zeroval$pctMnOfSdA,
     xlab = "Date", ylab = "Percentage of Sedentary", col = colWeek[fitbit$Day])
legend(x = "topleft", legend = c("Monday", "Tuesday", "Wednesday", "Thursday", "Friday", "Saturday", "Sunday"))
```

Questions assigned to the following page: [4.1](#) and [4.2](#)



- (b) (10 points) Draw loess lines for each day of the week that fit the percent of sedentary activity as a function of date. The loess lines should all be on the same plot. Note that you will need to do `as.numeric` for the `fitbit$Date` object for loess to convert it from a date to a number for fitting the loess line.

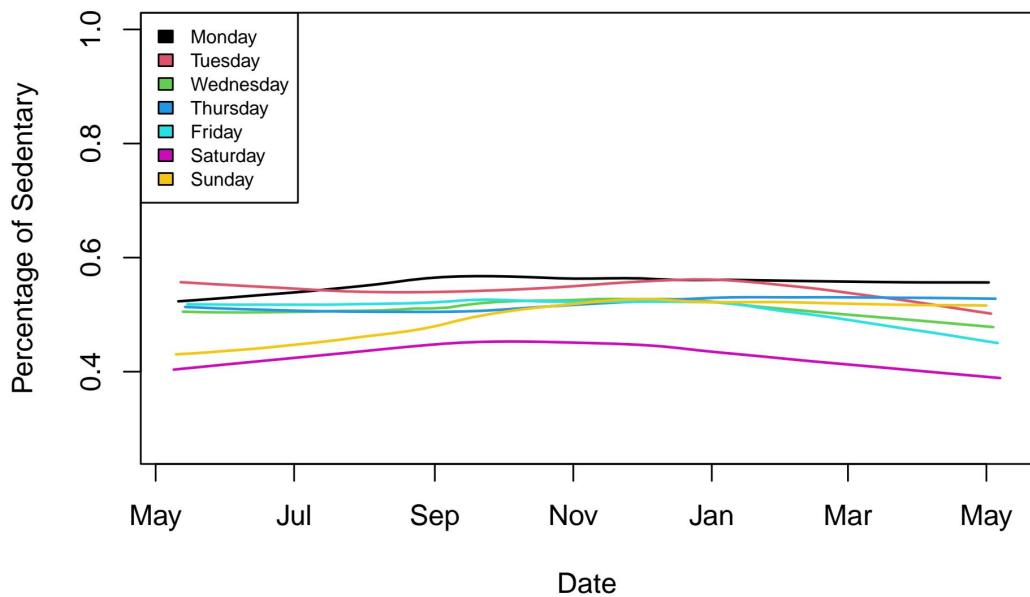
Color each line by the day of the week, as in the previous plot, and include a legend. Use either a for-loop or the `by` function to do this.

The first line of your code should set up a blank plot. Do this by reusing your code from (a) above (i.e. that plots sedentary against the data), but include the argument `type="n"` in your plot command. This instructs R to set up the axes, etc. but not actually plot the points (it could also be interesting to draw the loess lines *with* the points as well, but for this assignment draw just the lines).

```
# code to plot loess lines
plot(zeroval$date, zeroval$pctMnOfSdA,
      xlab = "Date", ylab = "Percentage of Sedentary", col= colWeek[fitbit$Day], type= "n")
fitbit$date = as.numeric(fitbit$date)

for (i in c("Monday", "Tuesday", "Wednesday", "Thursday", "Friday", "Saturday" , "Sunday")) {
  fit = zeroval[zeroval$Day == i,]
  lines(loess.smooth(fit$date, fit$pctMnOfSdA), col=colWeek[i], lwd = 1.5)
}
legend(x ="topleft", legend = c("Monday", "Tuesday", "Wednesday", "Thursday", "Friday", "Saturday" , "Su
```

Questions assigned to the following page: [4.2](#) and [4.3](#)



(c) (5 points) Comment on whether there are any differences due to the day of the week.

My answer is that there is a difference between the day of the week. Overall, looking at the flow of the graph, what's visible is that the trend isn't consistent for the percentage of Sedentary's. Just comparing the order, Tuesday seemed to have the highest percentage among the days, however, the flow changes and at the end, the highest one is that of Monday. Overall, going through the rank changes and it isn't consistent but changing, where we can conclude that there is a difference between the day of the week.