Lab7

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1. Generate a sequence of random integers between 20 and 30 without replacement, and you want to stop the sequence once a value of 27 is generated. Please use a while loop and an if statement to accomplish this.

```
set.seed(2023)
x<- 0
stop<- FALSE
while(stop == FALSE){
    x<-sample(20:30,1,replace = FALSE)
    print(x)
    if(x == 27){
        stop <- TRUE
    }
}
## [1] 24
## [1] 28
## [1] 27</pre>
```

2. Write a program that reads in a list of numbers (6, 7, 4, 3, 1, 6, 7, 4, 9).

```
listt<-c(6, 7, 4, 3, 1, 6, 7, 4, 9)
even_sum = 0

#(a) calculate the sum of the even numbers using a "for" loop and "if"
condition.
for(i in 1:length(listt)){
   if(listt[i] %%2 == 0){
      even_sum <- even_sum + listt[i]
   }
}
#(b) print out "The sum of even numbers is" with the sum of even numbers.
print(paste("The sum of even numbers is ",even_sum))
## [1] "The sum of even numbers is 20"</pre>
```

3. Download the data set boombust.csv and save it to whatever directory you are using for this course. The goal is to write a for-loop to create a new column at the end of the matrix that contains the sum of each row.

```
boom<-read.csv("/Users/itagakikouki/stat123/lab7/boombust.csv")
head(boom)</pre>
```

```
##
                   Name Projection Ceiling Floor Bust Boom Ownership Optimal
## 1
          Jalen Brunson
                              36.1
                                      41.9 30.2 7.2 62.1
                                                                 35.3
                                                                         32.1
            Enes Kanter
                              40.3
                                      46.6 34.0 10.1 58.1
                                                                 24.9
                                                                         21.1
## 2
## 3
        Josh Richardson
                              30.0
                                      35.3 24.7 11.9 46.5
                                                                 26.2
                                                                         30.4
## 4
           De'Aaron Fox
                              44.7
                                      51.2 38.2 18.4 44.6
                                                                 19.7
                                                                         17.5
## 5
                              47.3
                                      54.1 40.6 19.5 44.6
            LaMelo Ball
                                                                 17.3
                                                                         18.1
## 6 Kristaps Porzingis
                              43.4
                                      50.1 36.7 20.1 43.2
                                                                 26.7
                                                                         27.4
##
     Leverage
## 1
         -3.2
## 2
         -3.8
## 3
          4.2
         -2.2
## 4
## 5
          0.8
## 6
          0.7
dim(boom)
## [1] 233
#(a) Create a matrix that contains only the numerical values and name it nums
nums<- as.matrix(boom[, 2:9])</pre>
head(nums)
##
        Projection Ceiling Floor Bust Boom Ownership Optimal Leverage
## [1,]
              36.1
                      41.9 30.2 7.2 62.1
                                                 35.3
                                                         32.1
                                                                  -3.2
## [2,]
              40.3
                      46.6 34.0 10.1 58.1
                                                 24.9
                                                         21.1
                                                                  -3.8
## [3,]
              30.0
                      35.3 24.7 11.9 46.5
                                                 26.2
                                                         30.4
                                                                   4.2
              44.7
                      51.2 38.2 18.4 44.6
                                                 19.7
                                                         17.5
## [4,]
                                                                  -2.2
## [5,]
              47.3
                      54.1 40.6 19.5 44.6
                                                 17.3
                                                         18.1
                                                                   0.8
## [6,]
              43.4
                      50.1 36.7 20.1 43.2
                                                 26.7
                                                         27.4
                                                                   0.7
#(b) Create a new column of zeros at the end of nums by using: nums =
cbind(nums, rep(0, Length(nums[,1]))).
#length(nums[,1]) means how many rows there are
nums = cbind(nums, rep(0, length(nums[,1])))
head(nums)
##
        Projection Ceiling Floor Bust Boom Ownership Optimal Leverage
## [1,]
              36.1
                      41.9 30.2 7.2 62.1
                                                 35.3
                                                         32.1
                                                                  -3.2 0
## [2,]
              40.3
                      46.6 34.0 10.1 58.1
                                                 24.9
                                                         21.1
                                                                  -3.80
## [3,]
              30.0
                      35.3 24.7 11.9 46.5
                                                         30.4
                                                                   4.2 0
                                                 26.2
## [4,]
              44.7
                      51.2 38.2 18.4 44.6
                                                 19.7
                                                         17.5
                                                                  -2.2 0
              47.3
                      54.1 40.6 19.5 44.6
                                                 17.3
## [5,]
                                                         18.1
                                                                   0.8 0
## [6,]
              43.4
                      50.1 36.7 20.1 43.2
                                                 26.7
                                                         27.4
                                                                   0.7 0
#(c) Write a for-loop that calculates the sum (for each row) of the first
through eighth columns of nums and saves the sum in the nineth column of
nums. ie.
#When i = 1 sum all of colums of first row
for(i in 1:length(nums[ ,1])){
```

```
nums[i,9] = sum(nums[i, 1:8])
}
#(d) Print out the nums matrix.
print(nums)
          Projection Ceiling Floor Bust Boom Ownership Optimal Leverage
##
    [1,]
                36.1
                       41.9 30.2
                                    7.2 62.1
                                                  35.3
                                                          32.1
                                                                   -3.2
241.7
##
               40.3
                       46.6 34.0 10.1 58.1
                                                  24.9
                                                          21.1
                                                                   -3.8
    [2,]
231.3
                30.0
                       35.3 24.7 11.9 46.5
                                                  26.2
                                                          30.4
                                                                    4.2
##
    [3,]
209.2
                       51.2 38.2 18.4 44.6
                                                  19.7
##
               44.7
                                                          17.5
                                                                   -2.2
     [4,]
232.1
                                   19.5 44.6
                       54.1 40.6
##
               47.3
                                                  17.3
                                                          18.1
                                                                    0.8
    [5,]
242.3
                       50.1 36.7
##
               43.4
                                   20.1 43.2
                                                  26.7
                                                          27.4
                                                                    0.7
    [6,]
248.3
##
                53.4
                       60.5
                             46.4 22.3 42.3
                                                  23.4
                                                          23.8
                                                                    0.4
     [7,]
272.5
##
                31.2
                       36.9
                             25.5 16.4 41.7
                                                  12.1
                                                           6.7
                                                                   -5.4
     [8,]
165.1
                       51.4 38.1 21.2 41.5
##
     [9,]
               44.8
                                                  21.9
                                                          20.5
                                                                   -1.4
238.0
                25.8
                       31.0 20.6 14.1 41.1
                                                  15.2
                                                          13.7
                                                                   -1.5
## [10,]
160.0
## [11,]
               37.3
                       44.1
                             30.4 22.8 40.5
                                                  27.5
                                                          17.4
                                                                  -10.1
209.9
## [12,]
                33.8
                       39.5
                             28.0 18.6 39.2
                                                  16.9
                                                          17.5
                                                                    0.6
194.1
## [13,]
                57.2
                       64.7
                             49.7
                                   27.2 38.6
                                                  25.1
                                                          24.9
                                                                   -0.2
287.2
## [14,]
                27.1
                       32.2 22.1 15.0 38.3
                                                  30.4
                                                          16.4
                                                                  -14.0
167.5
                       50.2 37.2 24.2 36.9
## [15,]
               43.7
                                                  17.9
                                                          19.6
                                                                    1.7
231.4
## [16,]
                            26.4 18.9 36.5
                                                  28.8
                                                                  -17.2
                31.9
                       37.4
                                                          11.6
174.3
## [17,]
               49.9
                       57.1
                             42.8 27.6 36.3
                                                  14.4
                                                          12.8
                                                                   -1.6
239.3
                             23.0 20.0 34.9
                                                           5.2
## [18,]
                28.5
                       33.9
                                                   1.0
                                                                    4.2
150.7
## [19,]
                             42.2 32.5 31.8
               49.4
                       56.7
                                                  13.3
                                                          10.6
                                                                   -2.7
233.8
               46.4
                       53.2 39.6 31.1 31.1
                                                  22.9
                                                          20.9
                                                                   -2.0
## [20,]
243.2
## [21,]
                            36.1 29.3 31.1
                                                   5.5
                                                                   -0.2
               42.6
                       49.1
                                                           5.3
198.8
## [22,]
                27.7
                       33.0 22.3 22.3 30.9
                                                   3.7
                                                           4.9
                                                                    1.2
146.0
```

## [23,] 202.5	35.8	41.7	29.8	27.8 29.0	22.2	19.2	-3.0	
## [24,] 223.0	40.0	46.2	33.8	29.7 28.9	25.0	22.2	-2.8	
## [25,]	38.8	44.8	32.8	28.6 28.8	16.3	15.4	-0.9	
204.6 ## [26,]	23.0	27.8	18.1	20.6 28.3	4.8	4.6	-0.2	
127.0 ## [27,]	25.8	30.9	20.7	23.1 27.7	14.9	10.9	-4.0	
150.0 ## [28,]	37.8	43.9	31.7	30.8 27.3	14.9	14.8	-0.1	
201.1								
## [29,] 204.1	42.3	48.7	35.8	33.7 26.4	1.7	8.6	6.9	
## [30,] 209.9	44.7	51.3	38.2	34.8 26.1	9.9	7.4	-2.5	
## [31,] 229.1	49.8	57.0	42.7	38.7 25.7	9.3	7.6	-1.7	
## [32,]	29.4	34.8	24.0	28.0 25.3	7.2	7.3	0.1	
156.1 ## [33,]	21.5	26.2	16.7	22.6 25.2	2.5	2.8	0.3	
117.8 ## [34,]	39.7	46.1	33.3	36.8 23.7	3.5	4.2	0.7	
188.0 ## [35,]	22.2	26.8	17.6	22.7 23.7	2.5	2.2	-0.3	
117.4 ## [36,]	31.8	37.5	26.1	32.4 23.4	3.3	4.7	1.4	
160.6 ## [37,]	24.2	29.4	19.0	28.3 23.3	1.9	7.1	5.2	
138.4 ## [38,]	23.8	28.5	19.1	24.3 23.3	19.3	12.4	-6.9	
143.8 ## [39,]	47.3	54.0	40.7	38.9 23.3	9.8	10.9	1.1	
226.0		2.00		2012 2013				
## [40,] 189.7	35.6	41.5	29.8	33.5 23.3	15.8	13.0	-2.8	
## [41,] 134.7	26.1	31.1	21.0	27.4 23.1	2.5	3.0	0.5	
## [42,]	33.3	39.1	27.5	33.6 23.0	1.8	2.2	0.4	
160.9 ## [43,]	31.6	37.2	26.0	32.7 22.6	8.3	10.9	2.6	
171.9 ## [44,]	35.3	41.1	29.5	34.7 22.1	12.9	8.6	-4.3	
179.9 ## [45,]	24.2	20 1	10 2	27.0 21.8	12.5	9.8	-2.7	
## [45,] 141.0	Z4 • Z	Z7.1	19.3	27.0 21.0	12.3	3.0	-2./	
## [46,] 154.7	29.0	34.3	23.7	31.3 21.6	8.8	7.4	-1.4	
## [47,] 207.1	42.5	48.9	36.1	39.8 21.4	13.5	9.2	-4.3	
207.1								

## [48,] 177.7	36.3	42.3	30.4	36.5 21.4	4.7	5.4	0.7
## [49,] 158.7	31.8	37.6	26.0	36.5 20.8	1.7	3.0	1.3
## [50,] 147.2	27.8	32.8	22.7	30.1 20.8	8.7	6.5	-2.2
## [51,] 117.1	20.0	24.6	15.4	26.5 19.8	11.9	5.4	-6.5
## [52,] 167.4	33.8	39.5	28.1	37.2 19.6	3.1	4.6	1.5
## [53,] 144.9	28.8	34.2	23.4	34.7 19.6	0.7	2.1	1.4
## [54,] 133.7	24.4	29.2	19.5	30.6 19.0	7.1	5.5	-1.6
## [55,] 145.9	27.5	32.7	22.4	33.5 18.8	5.0	5.5	0.5
## [56,] 183.0	36.5	42.4	30.6	39.5 18.8	6.0	7.6	1.6
## [57,] 150.9	30.0	35.3	24.7	35.3 18.6	2.3	3.5	1.2
## [58,] 146.2	28.0	33.1	22.9	33.3 18.5	2.9	5.2	2.3
## [59,] 156.9	30.6	36.0	25.1	37.1 18.3	3.3	4.9	1.6
## [60,] 163.2	33.1	39.0	27.2	40.6 18.3	0.3	2.5	2.2
## [61,] 214.8	45.2	51.8	38.6	45.3 18.3	4.9	7.8	2.9
## [62,] 120.9	21.4	26.0	16.8	28.5 18.2	5.9	5.0	-0.9
## [63,] 156.3	31.4	37.2	25.7	39.8 18.0	1.8	2.1	0.3
	21.7	26.3	17.1	29.3 17.8	12.5	6.7	-5.8
## [65,] 176.3	32.8	38.5	27.1	39.8 17.7	11.4	10.2	-1.2
## [66,] 157.5	31.2	36.6	25.7	38.4 17.2	4.5	4.2	-0.3
## [67,] 110.5	19.5	23.9	15.1	28.3 17.1	2.2	3.3	1.1
## [68,] 185.2	38.6	45.1	32.1	46.6 17.0	3.1	2.9	-0.2
## [69,] 157.3	31.1	36.5	25.7	38.7 16.9	2.2	4.2	2.0
## [70,] 169.8	33.5	39.1	27.9	40.4 16.9	6.6	6.0	-0.6
## [71,] 128.0	22.7	27.7	17.7	34.9 16.8	0.5	4.1	3.6
## [72,] 122.7	22.2	26.9	17.5	31.7 16.8	2.3	3.8	1.5

## [73,] 132.9	25.6	30.7	20.5	36.5 16.6	0.7	1.5	0.8
## [74,]	27.3	32.7	22.0	39.3 15.9	1.3	3.2	1.9
143.6 ## [75,]	19.4	24.0	14.8	32.0 15.8	2.1	2.9	0.8
111.8 ## [76,]	26.2	31.3	21.1	37.7 15.8	0.7	2.9	2.2
137.9 ## [77,]	38.0	44.0	31.9	45.3 15.7	6.1	7.6	1.5
190.1 ## [78,]	41.8	48.2	35.5	48.1 15.7	5.9	5.9	0.0
201.1 ## [79,]	23.7	28.5	18.8	36.4 15.1	6.7	8.4	1.7
139.3 ## [80,]	22.1	26.8	17.4	34.5 14.7	5.3	3.9	-1.4
123.3 ## [81,]	39.2	45.3	33.2	47.7 14.5	1.1	3.9	2.8
187.7 ## [82,]	31.9	37.4	26.4	43.7 14.4	7.4	8.2	0.8
170.2 ## [83,]	19.8	24.2	15.5	31.2 14.4	1.3	2.9	1.6
110.9 ## [84,]	22.3	27.1	17.6	35.8 14.3	3.4	4.6	1.2
126.3 ## [85,]	20.4	24.9	15.9	33.2 14.3	0.1	0.9	0.8
110.5 ## [86,]	20.5	25.0	16.0	32.7 14.3	0.2	1.2	1.0
110.9 ## [87,]	24.0	28.8	19.2	36.8 14.1	8.2	6.8	-1.4
136.5 ## [88,]	20.5	25.4	15.6	38.8 13.8	0.8	2.0	1.2
118.1 ## [89,]	24.9	29.9	19.9	39.5 13.7	6.1	8.1	2.0
144.1 ## [90,]	30.1	35.5	24.8	43.3 13.6	1.3	4.3	3.0
155.9 ## [91,]			20.0	39.3 13.4	1.5	2.3	
132.0 ## [92,]				44.1 13.0			1.1
148.4 ## [93,]	23.7			40.8 12.5	1.3	2.8	1.5
130.1							
## [94,] 139.7	26.0			43.6 12.3	1.9	2.9	1.0
## [95,] 148.5	26.8	31.9	21.7	43.9 12.2	7.4	6.0	-1.4
## [96,] 106.2	19.1	23.5	14.7	35.5 12.2	0.1	0.6	0.5
## [97,] 129.9	23.8	28.6	19.0	40.2 12.1	3.8	3.1	-0.7

## [98,] 105.4	17.9	22.4	13.4	37.2	11.9	0.3	1.3	1.0
## [99,] 143.2	25.2	30.2	20.1	45.3	11.2	2.6	5.6	3.0
## [100,] 135.4	23.7	28.5	18.8	43.7	11.1	1.5	4.8	3.3
## [101,] 118.4	20.7	25.2	16.2	39.2	10.9	3.0	3.1	0.1
## [102,] 117.6	21.1	25.5	16.6	39.9	10.7	1.1	1.9	0.8
## [103,] 112.7	20.0	24.6	15.5	40.7	10.7	0.3	0.6	0.3
## [104,] 111.4	19.5	24.1	15.0	41.1	10.5	0.1	0.6	0.5
## [105,] 120.2	20.3	25.4	15.2	47.4	10.5	0.1	0.7	0.6
## [106,] 121.5	21.2	26.1	16.4	44.7	10.5	0.1	1.3	1.2
## [107,] 172.8	32.8	38.4	27.2	52.4	10.2	2.8	5.9	3.1
## [108,] 135.3	24.5	29.4	19.6	46.4	10.0	1.0	2.7	1.7
## [109,] 171.3	33.3	38.9	27.6	54.4	9.7	2.2	3.7	1.5
## [110,] 109.3	19.0	23.3	14.6	41.3	9.3	0.3	0.9	0.6
## [111,] 136.0	25.1	30.2	20.0	50.6	9.1	0.1	0.5	0.4
## [112,] 134.7	23.1	27.8	18.4	46.6	9.0	4.3	4.9	0.6
## [113,] 118.0	19.4	23.7	15.0	41.7	9.0	7.1	4.6	-2.5
## [114,] 113.3	19.8	24.2	15.5	44.3	8.1	0.1	0.7	0.6
## [115,] 154.1	28.6	34.2	23.1	57.4	8.0	0.5	1.4	0.9
## [116,] 135.0	24.3	29.3	19.3	52.6	7.9	0.1	0.8	0.7
## [117,] 116.2	16.8	21.9	11.8	53.9	7.6	0.2	2.1	1.9
## [118,] 105.2	16.4	20.6	12.1	46.0	6.9	0.1	1.6	1.5
## [119,] 107.7	17.6	21.9	13.2	47.1	6.9	0.1	0.5	0.4
## [120,] 171.7	32.0	37.7	26.3	62.3	6.8	0.6	3.3	2.7
## [121,] 121.5	20.6	25.2	15.9	53.3	6.3	0.1	0.1	0.0
## [122,] 116.6	17.8	22.3	13.4	51.0	6.1	0.7	3.0	2.3
110.0								

## [123,]	19.1	23.4	14.7	51.7	5.5	0.3	1.6	1.3
117.6 ## [124,]	19.4	24 1	116	57.5	E 1	0.1	0.2	0.1
121.4	19.4	24.1	14.0	37.3	J.4	0.1	0.2	0.1
## [125,]	19.8	24.2	15.4	55.4	4.8	0.1	1.1	1.0
121.8	44 -		40.4					
## [126,] 107.7	16.5	20.6	12.4	51.0	4.6	0.6	1.3	0.7
## [127,]	22.9	27.5	18.2	60.7	4.3	1.7	3.4	1.7
140.4								
## [128,]	18.0	22.4	13.5	58.3	4.2	0.1	0.8	0.7
118.0 ## [129,]	15.2	19.6	10.8	58.7	4.0	0.1	0.2	0.1
108.7	2312	23.0	20.0	30.7		0.1	··-	0.1
## [130,]	15.2	19.3	11.2	53.4	4.0	0.1	0.1	0.0
103.3 ## [131,]	20.4	2/1 0	15 0	60.1	2 0	0.7	2.4	1.7
129.9	20.4	24.0	13.9	00.1	3.3	0.7	2.4	1.7
## [132,]	18.7	23.2	14.2	61.7	3.7	0.1	0.5	0.4
122.5	10 5	22.7	14.3	F0 3	2.6	0.1	0.5	0.4
## [133,] 118.3	18.5	22.7	14.3	58.2	3.6	0.1	0.5	0.4
## [134,]	16.8	21.7	12.0	66.1	3.5	0.1	0.4	0.3
120.9								
## [135,] 106.2	15.2	19.1	11.3	56.7	2.9	0.3	0.5	0.2
## [136,]	16.4	20.4	12.4	57.7	2.9	0.1	0.5	0.4
110.8								
## [137,]	14.6	18.5	10.7	58.0	2.7	0.1	0.3	0.2
105.1 ## [138,]	15.9	20.0	11 Q	63.5	2 /	0.1	0.4	0.3
114.4	13.5	20.0	11.0	05.5	2.4	0.1	0.4	0.5
## [139,]	17.8	22.0	13.5	65.4	2.4	0.1	0.1	0.0
121.3	14.7	10 7	10 (CE 0	1 0	0 1	0.4	0.2
## [140,] 112.5	14./	10./	10.0	65.8	1.9	0.1	0.4	0.3
## [141,]	16.5	20.8	12.2	69.6	1.9	0.1	0.1	0.0
121.2								
## [142,] 115.0	15.4	19.5	11.3	66.7	1.9	0.1	0.1	0.0
## [143,]	14.1	18.0	10.2	64.3	1.7	0.1	0.5	0.4
109.3								
## [144,]	14.9	18.9	10.9	67.5	1.6	0.1	0.1	0.0
114.0 ## [145,]	13.5	17 <i>4</i>	9 7	65.2	1 5	0.1	0.1	0.0
107.5	13.3	1 /•	J.,	03.2	1.3	0.1	0.1	0.0
## [146,]	14.1	18.5	9.6	74.6	1.5	0.1	0.1	0.0
118.5 ## [147,]	14.2	19 0	10 2	66 0	1.5	0.1	0.2	0.1
## [147,] 111.2	14.4	10.0	10.3	00.0	1.5	0.1	0.2	0.1

## [148,]	16.6	20.8	12.5	72.1	1.4	0.1	0.4	0.3
124.2 ## [149,]	13.7	17.4	10.0	67.9	1.1	0.1	0.1	0.0
110.3	23.7	_, ,	20.0	0,12		0.1	0.1	0.0
## [150,]	13.0	16.6	9.3	69.5	0.9	0.1	0.1	0.0
109.5 ## [151,]	12.8	16.6	0 1	72.5	0 0	0.1	0.1	0.0
112.1	12.0	10.0	9.1	12.5	0.5	0.1	0.1	0.0
## [152,]	13.5	17.1	9.8	69.2	0.9	0.2	0.7	0.5
111.9	42.5	47.0		74 7	0 0	0.1	0.4	0.0
## [153,] 113.2	13.5	17.2	9.7	71.7	0.9	0.1	0.1	0.0
## [154,]	13.0	16.6	9.4	69.5	0.9	0.1	0.2	0.1
109.8								
## [155,] 113.3	12.2	16.1	8.3	75.7	0.8	0.1	0.1	0.0
## [156,]	12.9	16.6	9.2	72.8	0.7	0.1	0.1	0.0
112.4								
## [157,]	11.7	15.3	8.2	77.6	0.4	0.1	0.1	0.0
113.4 ## [158,]	12.3	15.9	8 7	79.2	a 1	0.1	0.1	0.0
116.7	12.5	13.5	0.7	73.2	0.4	0.1	0.1	0.0
## [159,]	13.5	17.4	9.5	82.3	0.4	0.1	0.1	0.0
123.3	11 4	15 1	7 7	90.6	0.4	0.1	0 1	0.0
## [160,] 115.4	11.4	15.1	7.7	80.6	0.4	0.1	0.1	0.0
## [161,]	9.9	13.7	6.1	84.9	0.3	0.1	0.1	0.0
115.1								
## [162,] 114.8	10.2	14.0	6.4	83.7	0.3	0.1	0.1	0.0
## [163,]	11.4	14.7	8.0	81.4	0.2	0.1	0.1	0.0
115.9								
## [164,]	12.5	16.0	8.9	85.2	0.2	0.1	0.1	0.0
123.0 ## [165,]	8.8	12.6	5.1	89.4	0.1	0.1	0.1	0.0
116.2					• • •			
	9.4	12.8	6.1	89.7	0.1	0.1	0.1	0.0
118.3 ## [167,]	9.6	13 3	5.8	90.2	a 1	0.1	0.1	0.0
119.2	J.0	13.3	5.0	30.2	0.1	0.1	0.1	0.0
## [168,]	8.5	12.4	4.6	89.5	0.1	0.1	0.1	0.0
115.3	11 1	14.0	7 -	01 2	0 1	0.1	0 0	0.1
## [169,] 125.2	11.1	14.8	7.5	91.3	0.1	0.1	0.2	0.1
## [170,]	9.2	12.4	5.9	91.3	0.0	0.1	0.2	0.1
119.2					_			
## [171,] NA	1.2	3.3	-1.0	100.0	0.0	NA	NA	0.0
## [172,]	1.1	3.2	-1.0	100.0	0.0	NA	NA	0.0
NA								

## [173,]	1.3	3.8	-1.2	100.0	0.0	0.1	0.1	0.0
104.1 ## [174,]	7.4	10.5	4.2	96.5	0.0	0.1	0.1	0.0
118.8 ## [175,]	4.5	7.4	1.5	99.5	0.0	0.1	0.1	0.0
113.1								
## [176,] 118.8	9.9	13.1	6.7	88.9	0.0	0.1	0.1	0.0
## [177,] 104.4	1.4	4.0	-1.2	100.0	0.0	0.1	0.1	0.0
## [178,] NA	0.7	2.1	-0.7	100.0	0.0	NA	NA	0.0
## [179,] 119.0	9.3	12.6	6.1	90.8	0.0	0.1	0.1	0.0
## [180,] 113.1	4.3	6.6	2.0	100.0	0.0	0.1	0.1	0.0
## [181,] 104.8	1.5	4.3	-1.2	100.0	0.0	0.1	0.1	0.0
## [182,] 122.7	9.4	12.7	6.1	94.3	0.0	0.1	0.1	0.0
## [183,] NA	1.2	3.4	-1.0	100.0	0.0	NA	NA	0.0
## [184,] 105.6	1.9	5.4	-1.5	99.6	0.0	0.1	0.1	0.0
## [185,] NA	0.7	2.2	-0.7	100.0	0.0	NA	NA	0.0
## [186,] 116.7	6.7	10.1	3.3	96.4	0.0	0.1	0.1	0.0
## [187,] 109.9	3.2	5.6	0.9	100.0	0.0	0.1	0.1	0.0
## [188,]	7.7	10.9	4.6	95.7	0.0	0.1	0.1	0.0
119.1 ## [189,]	1.6	4.4	-1.2	100.0	0.0	NA	NA	0.0
NA ## [190,]	1.8	4.9	-1.4	99.9	0.0	0.1	0.1	0.0
	4.6	7.9	1.4	99.0	0.0	0.1	0.1	0.0
113.1 ## [192,]	1.2	3.4	-1.0	100.0	0.0	0.1	0.1	0.0
103.8 ## [193,]	2.0	5.6	-1.6	99.5	0.0	0.1	0.1	0.0
105.7 ## [194,]	9.1	12.5	5.7	90.7	0.0	0.1	0.1	0.0
118.2 ## [195,]	9.0	12.0	6.0	95.8	0.0	0.1	0.1	0.0
123.0								
## [196,] 117.6	6.4			98.2		0.1	0.1	0.0
## [197,] 111.9	4.1	7.1	1.0	99.5	0.0	0.1	0.1	0.0

## [198,]	1.7	<i>1</i> .9	-1 5	99.8	0.0	0.1	0.1	0.0
105.1	1.7	4.7	-1.5	JJ.0	0.0	0.1	0.1	0.0
## [199,]	1.9	5.1	-1.4	99.8	0.0	0.1	0.1	0.0
105.6 ## [200,] 104.9	1.6	4.3	-1.2	100.0	0.0	0.1	0.1	0.0
## [201,] 120.7	8.9	12.3	5.5	93.8	0.0	0.1	0.1	0.0
## [202,] 110.5	3.7	7.1	0.3	99.2	0.0	0.1	0.1	0.0
## [203,] 109.2	3.1	6.2	0.0	99.7	0.0	0.1	0.1	0.0
## [204,] 107.6	2.5	5.4	-0.4	99.9	0.0	0.1	0.1	0.0
## [205,] 123.4	10.0	13.4	6.6	93.2	0.0	0.1	0.1	0.0
## [206,] NA	1.0	3.0	-1.0	100.0	0.0	NA	NA	0.0
## [207,] 104.2	1.3	4.0	-1.3	100.0	0.0	0.1	0.1	0.0
## [208,] NA	0.8	2.2	-0.6	100.0	0.0	NA	NA	0.0
## [209,] 122.5	8.9	12.2	5.7	95.5	0.0	0.1	0.1	0.0
## [210,] 104.2	1.3	3.7	-1.0	100.0	0.0	0.1	0.1	0.0
## [211,] NA	1.2	3.6	-1.2	100.0	0.0	NA	NA	0.0
## [212,] 120.1	9.0	12.1	5.9	92.9	0.0	0.1	0.1	0.0
## [213,] NA	1.0	3.0	-1.0	100.0	0.0	NA	NA	0.0
## [214,] NA	0.3	3.6	-2.9	100.0	0.0	NA	NA	0.0
## [215,] 115.9	6.2	9.7	2.8	97.0	0.0	0.1	0.1	0.0
## [216,] 102.6	1.3	5.8	-3.2	98.5	0.0	0.1	0.1	0.0
## [217,] 104.7	1.5	4.0	-1.0	100.0	0.0	0.1	0.1	0.0
## [218,] 118.4	8.4	11.8	5.1	92.9	0.0	0.1	0.1	0.0
## [219,]	2.1	5.7	-1.5	99.7	0.0	0.1	0.1	0.0
106.2 ## [220,]	7.5	10.6	4.3	96.2	0.0	0.1	0.1	0.0
118.8 ## [221,]	4.4	7.7	1.1	99.2	0.0	0.1	0.1	0.0
112.6 ## [222,] 114.8	5.0	8.2	1.9	99.5	0.0	0.1	0.1	0.0

## [223,] 123.6	9.6	13.1	6.1 94.6	0.0	0.1	0.1	0.0
## [224,] 104.4	1.4	4.1	-1.3 100.0	0.0	0.1	0.1	0.0
## [225,] 103.8	1.2	3.5	-1.1 100.0	0.0	0.1	0.1	0.0
## [226,] 108.3	2.9	6.4	-0.6 99.4	0.0	0.1	0.1	0.0
## [227,] NA	0.7	2.5	-1.1 100.0	0.0	NA	NA	0.0
## [228,] 103.9	1.2	3.6	-1.1 100.0	0.0	0.1	0.1	0.0
## [229,] 120.3	8.0	11.0	5.0 96.1	0.0	0.1	0.1	0.0
## [230,] 104.5	1.4	4.1	-1.2 100.0	0.0	0.1	0.1	0.0
## [231,] 114.3	5.3	8.9	1.8 98.1	0.0	0.1	0.1	0.0
## [232,]	1.6	4.7	-1.4 99.9	0.0	0.1	0.1	0.0
105.0 ## [233,] 104.9	1.6	4.7	-1.5 99.9	0.0	0.1	0.1	0.0

4. Loops in R are notoriously slow. While loops are incredibly important to master from a theoretical sense, when working with large data sets we should always try to use the apply family of functions to increase efficiency. You have learned about sapply and lapply in class, but until you learn how to write your own functions, sapply and lapply can be fairly limited. Today we will take a quick look at the power of the apply() function, which allows us to perform functions on 2 dimensional objects like matrices and dataframes. The apply() function has 3 main parameters: apply(X = , MARGIN = , FUN =). The only difference between apply() and sapply() is the MARGIN parameter which tells R whether you want to calculate something on the rows (MARGIN = 1) or the columns (MARGIN = 2)

```
#(a) Create a matrix that contains only the numerical values of boombust.csv
and name it names.
names<- as.matrix(boom[,2:9])</pre>
#(b) Create a new column at the end of names (similarly to how you were shown
in 3c).
names<- cbind(names, rep(0, length(names[,1])))</pre>
head(nums)
        Projection Ceiling Floor Bust Boom Ownership Optimal Leverage
##
                                                                   -3.2 241.7
## [1,]
              36.1
                      41.9 30.2 7.2 62.1
                                                  35.3
                                                          32.1
              40.3
                      46.6 34.0 10.1 58.1
                                                  24.9
                                                                   -3.8 231.3
## [2,]
                                                          21.1
## [3,]
              30.0
                       35.3 24.7 11.9 46.5
                                                 26.2
                                                          30.4
                                                                    4.2 209.2
## [4,]
              44.7
                       51.2 38.2 18.4 44.6
                                                 19.7
                                                          17.5
                                                                   -2.2 232.1
## [5,]
              47.3
                       54.1 40.6 19.5 44.6
                                                 17.3
                                                          18.1
                                                                    0.8 242.3
                      50.1 36.7 20.1 43.2
                                                                    0.7 248.3
              43.4
                                                 26.7
                                                          27.4
## [6,]
```

#(c) Use apply() to fill this new column with the sum of each row for columns 1-9. Hints: in the apply() function you should set X=names[, 1:9] and FUN =sum. You cab set MARGIN equal to one.

names[,9]<- apply(X= names[,1:8], MARGIN = 1, FUN = sum)</pre>

#(d) Print out names

print(names)

## ## [1,]	Projection 36.1	_		Bust 7.2			-	_	
241.7 ## [2,] 231.3	40.3	46.6	34.0	10.1	58.1	24.9	21.1	-3.8	
## [3,] 209.2	30.0	35.3	24.7	11.9	46.5	26.2	30.4	4.2	
## [4,] 232.1	44.7	51.2	38.2	18.4	44.6	19.7	17.5	-2.2	
## [5,] 242.3	47.3	54.1	40.6	19.5	44.6	17.3	18.1	0.8	
## [6,] 248.3	43.4	50.1	36.7	20.1	43.2	26.7	27.4	0.7	
## [7,] 272.5	53.4	60.5	46.4	22.3	42.3	23.4	23.8	0.4	
## [8,] 165.1	31.2	36.9	25.5	16.4	41.7	12.1	6.7	-5.4	
## [9,] 238.0	44.8	51.4	38.1	21.2	41.5	21.9	20.5	-1.4	
## [10,] 160.0	25.8	31.0	20.6	14.1	41.1	15.2	13.7	-1.5	
## [11,] 209.9	37.3	44.1	30.4	22.8	40.5	27.5	17.4	-10.1	
## [12,] 194.1	33.8	39.5	28.0	18.6	39.2	16.9	17.5	0.6	
## [13,] 287.2	57.2	64.7	49.7	27.2	38.6	25.1	24.9	-0.2	
## [14,] 167.5	27.1	32.2	22.1	15.0	38.3	30.4	16.4	-14.0	
## [15,] 231.4	43.7	50.2	37.2	24.2	36.9	17.9	19.6	1.7	
## [16,] 174.3	31.9	37.4	26.4	18.9	36.5	28.8	11.6	-17.2	
## [17,] 239.3	49.9	57.1	42.8	27.6	36.3	14.4	12.8	-1.6	
## [18,] 150.7	28.5	33.9	23.0	20.0	34.9	1.0	5.2	4.2	
## [19,] 233.8	49.4	56.7	42.2	32.5	31.8	13.3	10.6	-2.7	
## [20,] 243.2	46.4	53.2	39.6	31.1	31.1	22.9	20.9	-2.0	

## [21,] 198.8	42.6	49.1	36.1	29.3 31.1	5.5	5.3	-0.2
## [22,] 146.0	27.7	33.0	22.3	22.3 30.9	3.7	4.9	1.2
## [23,]	35.8	41.7	29.8	27.8 29.0	22.2	19.2	-3.0
202.5 ## [24,]	40.0	46.2	33.8	29.7 28.9	25.0	22.2	-2.8
223.0 ## [25,]	38.8	44.8	32.8	28.6 28.8	16.3	15.4	-0.9
204.6	22.0	27.0	10 1	20 6 20 2	4.0	4.6	0.2
## [26,] 127.0	23.0	27.8	18.1	20.6 28.3	4.8	4.6	-0.2
## [27,] 150.0	25.8	30.9	20.7	23.1 27.7	14.9	10.9	-4.0
## [28,] 201.1	37.8	43.9	31.7	30.8 27.3	14.9	14.8	-0.1
## [29,]	42.3	48.7	35.8	33.7 26.4	1.7	8.6	6.9
204.1 ## [30,]	44.7	51.3	38.2	34.8 26.1	9.9	7.4	-2.5
209.9 ## [31,]	49.8	57.0	42.7	38.7 25.7	9.3	7.6	-1.7
229.1 ## [32,]	29.4	34.8	24.0	28.0 25.3	7.2	7.3	0.1
156.1 ## [33,]	21.5	26. 2	16 7	22.6 25.2	2.5	2.8	0.3
117.8							
## [34,] 188.0	39.7	46.1	33.3	36.8 23.7	3.5	4.2	0.7
## [35,]	22.2	26.8	17.6	22.7 23.7	2.5	2.2	-0.3
117.4 ## [36,]	31.8	37.5	26.1	32.4 23.4	3.3	4.7	1.4
160.6 ## [37,]	24.2	29.4	19.0	28.3 23.3	1.9	7.1	5.2
138.4 ## [38,]	23.8	28.5	19.1	24.3 23.3	19.3	12.4	-6.9
143.8		E4 0	10.7	38.9 23.3	9.8	10.9	1.1
## [39,] 226.0	47.3	54.0	40.7	30.9 23.3	9.0	10.9	1.1
## [40,] 189.7	35.6	41.5	29.8	33.5 23.3	15.8	13.0	-2.8
## [41,]	26.1	31.1	21.0	27.4 23.1	2.5	3.0	0.5
134.7 ## [42,]	33.3	39.1	27.5	33.6 23.0	1.8	2.2	0.4
160.9 ## [43,]	31.6	37.2	26.0	32.7 22.6	8.3	10.9	2.6
171.9 ## [44,]	35.3	41.1	29.5	34.7 22.1	12.9	8.6	-4.3
179.9 ## [45,]				27.0 21.8			
## [45,] 141.0	24.2	2J,1	13.3	27.0 21.8	12.3	3.0	-2./

## [46,] 154.7	29.0	34.3	23.7	31.3 21.6	8.8	7.4	-1.4	
## [47,]	42.5	48.9	36.1	39.8 21.4	13.5	9.2	-4.3	
207.1 ## [48,]	36.3	42.3	30.4	36.5 21.4	4.7	5.4	0.7	
177.7 ## [49,]	31.8	37.6	26.0	36.5 20.8	1.7	3.0	1.3	
158.7 ## [50,]	27.8	32.8	22.7	30.1 20.8	8.7	6.5	-2.2	
147.2	20.0	24.6	15 4	26 F 10 9	11 0	Г 4	С. Г	
## [51,] 117.1	20.0	24.6	15.4	26.5 19.8	11.9	5.4	-6.5	
## [52,] 167.4	33.8	39.5	28.1	37.2 19.6	3.1	4.6	1.5	
## [53,] 144.9	28.8	34.2	23.4	34.7 19.6	0.7	2.1	1.4	
## [54,] 133.7	24.4	29.2	19.5	30.6 19.0	7.1	5.5	-1.6	
## [55,]	27.5	32.7	22.4	33.5 18.8	5.0	5.5	0.5	
145.9 ## [56,]	36.5	42.4	30.6	39.5 18.8	6.0	7.6	1.6	
183.0 ## [57,]	30.0	35.3	24.7	35.3 18.6	2.3	3.5	1.2	
150.9 ## [58,]	28.0	33.1	22.9	33.3 18.5	2.9	5.2	2.3	
146.2 ## [59,]	30.6	36.0	25.1	37.1 18.3	3.3	4.9	1.6	
156.9 ## [60,]	33.1	39.0	27.2	40.6 18.3	0.3	2.5	2.2	
163.2 ## [61,]	45.2	51.8	38.6	45.3 18.3	4.9	7.8	2.9	
214.8 ## [62,]	21.4	26.0		28.5 18.2	5.9	5.0	-0.9	
120.9								
## [63,] 156.3	31.4	37.2	25.7	39.8 18.0	1.8	2.1	0.3	
## [64,] 125.6	21.7	26.3	17.1	29.3 17.8	12.5	6.7	-5.8	
## [65,]	32.8	38.5	27.1	39.8 17.7	11.4	10.2	-1.2	
176.3 ## [66,]	31.2	36.6	25.7	38.4 17.2	4.5	4.2	-0.3	
157.5 ## [67,]	19.5	23.9	15.1	28.3 17.1	2.2	3.3	1.1	
110.5 ## [68,]	38.6	45.1	32.1	46.6 17.0	3.1	2.9	-0.2	
185.2 ## [69,]	31.1			38.7 16.9	2.2		2.0	
157.3								
## [70,] 169.8	33.5	39.1	27.9	40.4 16.9	6.6	6.0	-0.6	

## [71,] 128.0	22.7	27.7	17.7	34.9 16.8	0.5	4.1	3.6
## [72,] 122.7	22.2	26.9	17.5	31.7 16.8	2.3	3.8	1.5
## [73,]	25.6	30.7	20.5	36.5 16.6	0.7	1.5	0.8
132.9 ## [74,]	27.3	32.7	22.0	39.3 15.9	1.3	3.2	1.9
143.6 ## [75,]	19.4	24.0	14.8	32.0 15.8	2.1	2.9	0.8
111.8 ## [76,]	26.2	31.3	21.1	37.7 15.8	0.7	2.9	2.2
137.9 ## [77,]	38.0	44.0	31.9	45.3 15.7	6.1	7.6	1.5
190.1 ## [78,]	41.8	48.2	35.5	48.1 15.7	5.9	5.9	0.0
201.1 ## [79,]	23.7			36.4 15.1	6.7	8.4	1.7
139.3		26.8				3.9	-1.4
## [80,] 123.3	22.1			34.5 14.7	5.3		
## [81,] 187.7	39.2			47.7 14.5	1.1	3.9	2.8
## [82,] 170.2	31.9	37.4	26.4	43.7 14.4	7.4	8.2	0.8
## [83,] 110.9	19.8	24.2	15.5	31.2 14.4	1.3	2.9	1.6
## [84,] 126.3	22.3	27.1	17.6	35.8 14.3	3.4	4.6	1.2
## [85,] 110.5	20.4	24.9	15.9	33.2 14.3	0.1	0.9	0.8
## [86,]	20.5	25.0	16.0	32.7 14.3	0.2	1.2	1.0
110.9 ## [87,]	24.0	28.8	19.2	36.8 14.1	8.2	6.8	-1.4
136.5 ## [88,]	20.5	25.4	15.6	38.8 13.8	0.8	2.0	1.2
118.1 ## [89,]	24.9	29.9	19.9	39.5 13.7	6.1	8.1	2.0
144.1 ## [90,]	30.1	35.5	24.8	43.3 13.6	1.3	4.3	3.0
155.9 ## [91,]	24.9	29.8	20.0	39.3 13.4	1.5	2.3	0.8
132.0 ## [92,]	29.1			44.1 13.0	0.9	2.0	1.1
148.4							
## [93,] 130.1	23.7			40.8 12.5	1.3	2.8	1.5
## [94,] 139.7	26.0			43.6 12.3		2.9	1.0
## [95,] 148.5	26.8	31.9	21.7	43.9 12.2	7.4	6.0	-1.4

## [96,] 106.2	19.1	23.5	14.7	35.5	12.2	0.1	0.6	0.5
## [97,]	23.8	28.6	19.0	40.2	12.1	3.8	3.1	-0.7
129.9 ## [98,]	17.9	22.4	13.4	37.2	11.9	0.3	1.3	1.0
105.4 ## [99,]	25.2	30.2	20.1	45.3	11.2	2.6	5.6	3.0
143.2	22.7	20 E	10 0	43.7	11 1	1 5	4 0	2 2
## [100,] 135.4	23.7	20.5	10.0	43.7 .	11.1	1.5	4.8	3.3
## [101,] 118.4	20.7	25.2	16.2	39.2	10.9	3.0	3.1	0.1
## [102,] 117.6	21.1	25.5	16.6	39.9	10.7	1.1	1.9	0.8
## [103,] 112.7	20.0	24.6	15.5	40.7	10.7	0.3	0.6	0.3
## [104,]	19.5	24.1	15.0	41.1	10.5	0.1	0.6	0.5
111.4 ## [105,]	20.3	25.4	15.2	47.4	10.5	0.1	0.7	0.6
120.2 ## [106,]	21.2	26.1	16.4	44.7	10.5	0.1	1.3	1.2
121.5 ## [107,]	32.8	38.4	27.2	52.4	10.2	2.8	5.9	3.1
172.8 ## [108,]	24.5	29.4	19.6	46.4	10.0	1.0	2.7	1.7
135.3 ## [109,]	33.3	38.9	27.6	54.4	9.7	2.2	3.7	1.5
171.3								
## [110,] 109.3	19.0	23.3	14.6	41.3	9.3	0.3	0.9	0.6
## [111,]	25.1	30.2	20.0	50.6	9.1	0.1	0.5	0.4
136.0 ## [112,]	23.1	27.8	10 /	46.6	0 0	4.3	4.9	0.6
## [112,] 134.7	23.1	27.0	10.4	40.0	9.0	4.3	4.9	0.0
## [113,]	19.4	23.7	15.0	41.7	9.0	7.1	4.6	-2.5
118.0 ## [114,]	19.8	24.2	15.5	44.3	8.1	0.1	0.7	0.6
113.3 ## [115,]	28.6	34.2	23.1	57.4	8.0	0.5	1.4	0.9
154.1 ## [116,]	24.3	29.3	19.3	52.6	7.9	0.1	0.8	0.7
135.0	44.0	24.0	44.0	== 0				
## [117,] 116.2	16.8	21.9	11.8	53.9	7.6	0.2	2.1	1.9
## [118,] 105.2	16.4	20.6	12.1	46.0	6.9	0.1	1.6	1.5
## [119,]	17.6	21.9	13.2	47.1	6.9	0.1	0.5	0.4
107.7 ## [120,]	32.0	37.7	26.3	62.3	6.8	0.6	3.3	2.7
171.7								

## [121,] 121.5	20.6	25.2	15.9	53.3	6.3	0.1	0.1	0.0
## [122,]	17.8	22.3	13.4	51.0	6.1	0.7	3.0	2.3
116.6 ## [123,]	19.1	22 /	14.7	51 7	5 5	0.3	1.6	1.3
117.6	19.1	23.4	14.7	31.7	ر. ر	0.5	1.0	1.3
## [124,] 121.4	19.4	24.1	14.6	57.5	5.4	0.1	0.2	0.1
## [125,]	19.8	24.2	15.4	55.4	4.8	0.1	1.1	1.0
121.8	16 5	20. 6	12 4	F1 0	4.6	0.6	1 2	0.7
## [126,] 107.7	16.5	20.6	12.4	51.0	4.6	0.6	1.3	0.7
## [127,]	22.9	27.5	18.2	60.7	4.3	1.7	3.4	1.7
140.4 ## [128,]	18.0	22.4	13.5	58.3	4.2	0.1	0.8	0.7
118.0								
## [129,] 108.7	15.2	19.6	10.8	58.7	4.0	0.1	0.2	0.1
## [130,]	15.2	19.3	11.2	53.4	4.0	0.1	0.1	0.0
103.3 ## [131,]	20.4	24.8	15.9	60.1	3.9	0.7	2.4	1.7
129.9	20.4	24.0	13.3	00.1	3.3	0.7	2.4	1.7
## [132,] 122.5	18.7	23.2	14.2	61.7	3.7	0.1	0.5	0.4
## [133,]	18.5	22.7	14.3	58.2	3.6	0.1	0.5	0.4
118.3	16.8	21.7	12 0	66.1	3.5	0.1	0.4	0.3
## [134,] 120.9	10.0	21.7	12.0	00.1	3.3	0.1	0.4	0.5
## [135,]	15.2	19.1	11.3	56.7	2.9	0.3	0.5	0.2
106.2 ## [136,]	16.4	20 1	12.4	57 7	2 9	0.1	0.5	0.4
110.8	10.4	20.4	12.4	37.7	2.5	0.1	0.5	0.4
## [137,]	14.6	18.5	10.7	58.0	2.7	0.1	0.3	0.2
105.1 ## [138,]	15.9	20.0	11.8	63.5	2.4	0.1	0.4	0.3
114.4	47.0	22.0	42.5	c = . 4	2.4	0.4	0.4	0.0
## [139,] 121.3	17.8	22.0	13.5	65.4	2.4	0.1	0.1	0.0
## [140,]	14.7	18.7	10.6	65.8	1.9	0.1	0.4	0.3
112.5 ## [141,]	16.5	20.8	12.2	69.6	1.9	0.1	0.1	0.0
121.2	_0.5							
## [142,] 115.0	15.4	19.5	11.3	66.7	1.9	0.1	0.1	0.0
## [143,]	14.1	18.0	10.2	64.3	1.7	0.1	0.5	0.4
109.3	14.0	10 0	10.0	67.5	1 6	0.1	A 1	0.0
## [144,] 114.0	14.9	18.9	10.9	07.5	1.0	Ø.1	0.1	0.0
## [145,]	13.5	17.4	9.7	65.2	1.5	0.1	0.1	0.0
107.5								

## [146,]	14.1	18.5	9.6	74.6	1.5	0.1	0.1	0.0
118.5 ## [147,]	14.2	18.0	10.3	66.8	1.5	0.1	0.2	0.1
111.2 ## [148,]	16.6	20.8	12.5	72 1	1 /	0.1	0.4	0.3
124.2	10.0	20.0	12.5	/2.1	1.4	0.1	0.4	0.5
## [149,] 110.3	13.7	17.4	10.0	67.9	1.1	0.1	0.1	0.0
## [150,]	13.0	16.6	9.3	69.5	0.9	0.1	0.1	0.0
109.5 ## [151,]	12.8	16.6	0 1	72.5	0 0	0.1	0.1	0.0
112.1	12.0	10.0	9.1	72.5	0.9	0.1	0.1	0.0
## [152,] 111.9	13.5	17.1	9.8	69.2	0.9	0.2	0.7	0.5
## [153,]	13.5	17.2	9.7	71.7	0.9	0.1	0.1	0.0
113.2	12.0	16.6	0.4	CO F	0.0	0.1	0.2	0 1
## [154,] 109.8	13.0	16.6	9.4	69.5	0.9	0.1	0.2	0.1
## [155,]	12.2	16.1	8.3	75.7	0.8	0.1	0.1	0.0
113.3 ## [156,]	12.9	16.6	9.2	72.8	0.7	0.1	0.1	0.0
112.4							_	
## [157,] 113.4	11.7	15.3	8.2	77.6	0.4	0.1	0.1	0.0
## [158,]	12.3	15.9	8.7	79.2	0.4	0.1	0.1	0.0
116.7 ## [159,]	13.5	17.4	9.5	82.3	0.4	0.1	0.1	0.0
123.3								
## [160,] 115.4	11.4	15.1	7.7	80.6	0.4	0.1	0.1	0.0
## [161,]	9.9	13.7	6.1	84.9	0.3	0.1	0.1	0.0
115.1 ## [162,]	10.2	1/1 0	6.4	83 7	0.3	0.1	0.1	0.0
114.8	10.2	14.0	0.4	65.7	0.5	0.1	0.1	0.0
## [163,] 115.9	11.4	14.7	8.0	81.4	0.2	0.1	0.1	0.0
## [164,]	12.5	16.0	8.9	85.2	0.2	0.1	0.1	0.0
123.0 ## [165,]	8.8	12.6	5.1	89.4	0.1	0.1	0.1	0.0
116.2	0.0					0.1		
## [166,] 118.3	9.4	12.8	6.1	89.7	0.1	0.1	0.1	0.0
## [167,]	9.6	13.3	5.8	90.2	0.1	0.1	0.1	0.0
119.2	0 5	12 /	1.6	90 F	0 1	0.1	0 1	0.0
## [168,] 115.3	8.5	12.4	4.6	٥٤.5	0.1	0.1	0.1	0.0
## [169,]	11.1	14.8	7.5	91.3	0.1	0.1	0.2	0.1
125.2 ## [170,]	9.2	12.4	5.9	91.3	0.0	0.1	0.2	0.1
119.2								

## [171,] NA	1.2	3.3	-1.0 100.0	0.0	NA	NA	0.0
## [172,]	1.1	3.2	-1.0 100.0	0.0	NA	NA	0.0
NA ## [173,]	1.3	3.8	-1.2 100.0	0.0	0.1	0.1	0.0
104.1 ## [174,]	7.4	10.5	4.2 96.5	0.0	0.1	0.1	0.0
118.8 ## [175,]	4.5	7.4	1.5 99.5	0.0	0.1	0.1	0.0
113.1							
## [176,] 118.8	9.9	13.1	6.7 88.9	0.0	0.1	0.1	0.0
## [177,] 104.4	1.4	4.0	-1.2 100.0	0.0	0.1	0.1	0.0
## [178,] NA	0.7	2.1	-0.7 100.0	0.0	NA	NA	0.0
## [179,]	9.3	12.6	6.1 90.8	0.0	0.1	0.1	0.0
119.0 ## [180,]	4.3	6.6	2.0 100.0	0.0	0.1	0.1	0.0
113.1 ## [181,]	1.5	4.3	-1.2 100.0	0.0	0.1	0.1	0.0
104.8 ## [182,]	9.4	12.7	6.1 94.3	0.0	0.1	0.1	0.0
122.7 ## [183,]	1.2	3.4	-1.0 100.0	0.0	NA	NA	0.0
NA							
## [184,] 105.6	1.9	5.4	-1.5 99.6	0.0	0.1	0.1	0.0
## [185,] NA	0.7	2.2	-0.7 100.0	0.0	NA	NA	0.0
## [186,] 116.7	6.7	10.1	3.3 96.4	0.0	0.1	0.1	0.0
## [187,]	3.2	5.6	0.9 100.0	0.0	0.1	0.1	0.0
109.9 ## [188,]	7.7	10.9	4.6 95.7	0.0	0.1	0.1	0.0
119.1 ## [189,]	1.6	4.4	-1.2 100.0	0.0	NA	NA	0.0
NA ## [190,]	1.8	4.9	-1.4 99.9	0.0	0.1	0.1	0.0
105.4							
## [191,] 113.1	4.6	7.9	1.4 99.0	0.0	0.1	0.1	0.0
## [192,] 103.8	1.2	3.4	-1.0 100.0	0.0	0.1	0.1	0.0
## [193,] 105.7	2.0	5.6	-1.6 99.5	0.0	0.1	0.1	0.0
## [194,]	9.1	12.5	5.7 90.7	0.0	0.1	0.1	0.0
118.2 ## [195,] 123.0	9.0	12.0	6.0 95.8	0.0	0.1	0.1	0.0

## [196,] 117.6	6.4	9.4	3.4	98.2	0.0	0.1	0.1	0.0
## [197,]	4.1	7.1	1.0	99.5	0.0	0.1	0.1	0.0
111.9 ## [198,]	1.7	4.9	-1.5	99.8	0.0	0.1	0.1	0.0
105.1								
## [199,] 105.6	1.9	5.1	-1.4	99.8	0.0	0.1	0.1	0.0
## [200,]	1.6	4.3	-1.2	100.0	0.0	0.1	0.1	0.0
104.9 ## [201,]	8.9	12.3	5.5	93.8	0.0	0.1	0.1	0.0
120.7 ## [202,]	3.7	7.1	0.3	99.2	0.0	0.1	0.1	0.0
110.5								
## [203,] 109.2	3.1	6.2	0.0	99.7	0.0	0.1	0.1	0.0
## [204,]	2.5	5.4	-0.4	99.9	0.0	0.1	0.1	0.0
107.6 ## [205,] 123.4	10.0	13.4	6.6	93.2	0.0	0.1	0.1	0.0
## [206,] NA	1.0	3.0	-1.0	100.0	0.0	NA	NA	0.0
## [207,] 104.2	1.3	4.0	-1.3	100.0	0.0	0.1	0.1	0.0
## [208,] NA	0.8	2.2	-0.6	100.0	0.0	NA	NA	0.0
## [209,]	8.9	12.2	5.7	95.5	0.0	0.1	0.1	0.0
122.5 ## [210,]	1.3	3.7	-1.0	100.0	0.0	0.1	0.1	0.0
104.2 ## [211,]	1.2	3.6	-1.2	100.0	0.0	NA	NA	0.0
NA ## [212,]	9.0	12.1	5.9	92.9	0.0	0.1	0.1	0.0
120.1								
## [213,] NA	1.0	3.0	-1.0	100.0	0.0	NA	NA	0.0
## [214,] NA	0.3	3.6	-2.9	100.0	0.0	NA	NA	0.0
## [215,]	6.2	9.7	2.8	97.0	0.0	0.1	0.1	0.0
115.9 ## [216,]	1.3	5.8	-3.2	98.5	0.0	0.1	0.1	0.0
102.6 ## [217,]	1.5	4.0	-1.0	100.0	0.0	0.1	0.1	0.0
104.7 ## [218,]	8.4	11.8	5.1	92.9	0.0	0.1	0.1	0.0
118.4 ## [219,]	2.1	5.7	-1.5	99.7	0.0	0.1	0.1	0.0
106.2								
## [220,] 118.8	7.5	10.6	4.3	96.2	0.0	0.1	0.1	0.0

## [221,] 112.6	4.4	7.7	1.1	99.2	0.0	0.1	0.1	0.0
## [222,] 114.8	5.0	8.2	1.9	99.5	0.0	0.1	0.1	0.0
## [223,] 123.6	9.6	13.1	6.1	94.6	0.0	0.1	0.1	0.0
## [224,] 104.4	1.4	4.1	-1.3	100.0	0.0	0.1	0.1	0.0
## [225,] 103.8	1.2	3.5	-1.1	100.0	0.0	0.1	0.1	0.0
## [226,] 108.3	2.9	6.4	-0.6	99.4	0.0	0.1	0.1	0.0
## [227,] NA	0.7	2.5	-1.1	100.0	0.0	NA	NA	0.0
## [228,] 103.9	1.2	3.6	-1.1	100.0	0.0	0.1	0.1	0.0
## [229,] 120.3	8.0	11.0	5.0	96.1	0.0	0.1	0.1	0.0
## [230,] 104.5	1.4	4.1	-1.2	100.0	0.0	0.1	0.1	0.0
## [231,] 114.3	5.3	8.9	1.8	98.1	0.0	0.1	0.1	0.0
## [232,] 105.0	1.6	4.7	-1.4	99.9	0.0	0.1	0.1	0.0
## [233,] 104.9	1.6	4.7	-1.5	99.9	0.0	0.1	0.1	0.0