Case Study I - Ramen

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Load the data in the following way:

```
load("/Users/hadleydixon/Desktop/HADLEY/USF_BSDS100/BSDS100_CaseStudies/BSDS100_CaseStud
y1/ramen.RData")
```

1) (5 pts) How many different brands are reviewed in the data set? Do you recognize any of them?

There are 355 different brands. No, we don't recognize any of them.

```
length(unique(ramen$Brand))
```

```
## [1] 355
```

2) (5 pts) What years do we have "top ten" data from? (Hint: This will require turning the Top Ten column into a string column)

We have "top ten" data from 2012, 2013, 2014, 2015, and 2016.

```
Top.Ten <- ramen$Top.Ten
Top.Ten.String <- as.character(Top.Ten)
no.blank <- Top.Ten.String[Top.Ten.String != ""]
```

3) (5 pts) Which ramen brands are from the United States (hint: beware of abbreviations!)?

The ramen brands from the United States are as follows:

```
Country <- ramen$Country
ramen$Brand[Country == "USA" | Country == "United States"]
```

```
##   [1] Nissin                    Yamachan
##   [3] Yamachan                  Jackpot Teriyaki
##   [5] Yamachan                  Lipton
##   [7] Nissin                    Nissin
##   [9] Nissin                    Pringles
##  [11] Myojo                     Daifuku
##  [13] Dream Kitchen             Dr. McDougall's
##  [15] Shirakiku                 Mama Pat's
##  [17] Mama Pat's                Mama Pat's
##  [19] Mama Pat's                Goku-Uma
##  [21] Gefen                     Nissin
##  [23] Nissin                    Nissin
##  [25] Goku-Uma                  Nissin
##  [27] Goku-Uma                  Nissin
##  [29] Shirakiku                 Dream Kitchen
##  [31] Farmer's Heart            Goku-Uma
##  [33] Nongshim                  Dream Kitchen
##  [35] Nissin                    Maruchan
##  [37] Roland                    Maruchan
##  [39] Nongshim                  Maruchan
##  [41] Maruchan                  Dream Kitchen
##  [43] Maruchan                  Maruchan
##  [45] Maruchan                  Roland
##  [47] Nongshim                  Maruchan
##  [49] Nongshim                  Koyo
##  [51] Maruchan                  Nongshim
##  [53] Nongshim                  Nissin
##  [55] IbuRamen                  Nissin
##  [57] Nissin                    Fortune
##  [59] Nissin                    Nissin
##  [61] IbuRamen                  Thai Smile
##  [63] Nissin                    Nissin
##  [65] Sapporo Ichiban           Nissin
##  [67] IbuRamen                  Myojo
##  [69] Nissin                    Nissin
##  [71] Nongshim                  Myojo
##  [73] Nissin                    Crystal Noodle
##  [75] Thai Smile                Nissin
##  [77] Nissin                    Authentically Asian
##  [79] Thai Smile                Myojo
##  [81] Maruchan                  Nongshim
##  [83] One Dish Asia             Nongshim
##  [85] Nissin                    Nongshim
##  [87] Thai Pavilion             Nongshim
##  [89] Nissin                    Nongshim
##  [91] Nissin                    Maruchan
##  [93] Maruchan                  Nongshim
##  [95] Nissin                    Osaka Ramen
##  [97] Nissin                    Annie Chun's
##  [99] Snapdragon                Miracle Noodle
## [101] Nongshim                  Lotus Foods
## [103] Lotus Foods               Lotus Foods
```

```
## [105] Sakura Noodle           Shirakiku
## [107] Sakura Noodle           Sakura Noodle
## [109] Sakura Noodle           Sakura Noodle
## [111] Thai Kitchen            Thai Kitchen
## [113] Nissin                  Annie Chun's
## [115] Thai Pavilion           Nissin
## [117] Nissin                  Nongshim
## [119] Koyo                    Nissin
## [121] Komforte Chockolates    Nissin
## [123] Myojo                   Thai Pavilion
## [125] Nissin                  Tasty Bite
## [127] Tasty Bite              Tasty Bite
## [129] Tasty Bite              Tasty Bite
## [131] Tasty Bite              Star Anise Foods
## [133] Myojo                   Nissin
## [135] Maruchan                Nissin
## [137] Tradition               Maruchan
## [139] Nissin                  Maruchan
## [141] Maruchan                Nissin
## [143] Sun Noodle              Sun Noodle
## [145] Sun Noodle              S&S
## [147] Sun Noodle              Sun Noodle
## [149] Sun Noodle              Sun Noodle
## [151] Annie Chun's            Annie Chun's
## [153] Annie Chun's            Annie Chun's
## [155] Annie Chun's            Annie Chun's
## [157] Annie Chun's            Annie Chun's
## [159] Nongshim                Nissin
## [161] Maruchan                Right Foods
## [163] Maruchan                Yamachan
## [165] Maruchan                Nongshim
## [167] Maruchan                Maruchan
## [169] Shirakiku               Maruchan
## [171] Maruchan                Nissin
## [173] Sapporo Ichiban         Tradition
## [175] Maruchan                Yamachan
## [177] Yamachan                Yamachan
## [179] Yamachan                Yamachan
## [181] Yamachan                Yamachan
## [183] Nissin                  Nongshim
## [185] Nongshim                Nissin
## [187] Tradition               Nissin
## [189] Nissin                  Nissin
## [191] Nissin                  Nongshim
## [193] Nongshim                Nissin
## [195] Nongshim                Nongshim
## [197] Nissin                  Thai Kitchen
## [199] Nissin                  Nongshim
## [201] Nongshim                Nongshim
## [203] Nongshim                Sapporo Ichiban
## [205] Hosoonyi                Nissin
## [207] Maruchan                Nongshim
```

```
## [209] Nissin                          Nissin
## [211] Nissin                          Nissin
## [213] Nissin                          Nissin
## [215] Nissin                          Nissin
## [217] Nissin                          Nissin
## [219] Nissin                          Maruchan
## [221] Nissin                          Thai Kitchen
## [223] Nissin                          Nissin
## [225] Maruchan                        Maruchan
## [227] Thai Kitchen                    Thai Kitchen
## [229] Koyo                            Koyo
## [231] Maruchan                        Nissin
## [233] Sapporo Ichiban                 Annie Chun's
## [235] Thai Kitchen                    Tradition
## [237] Mexi-Ramen                      Maruchan
## [239] Thai Kitchen                    Thai Kitchen
## [241] Annie Chun's                    Gefen
## [243] Thai Kitchen                    Koyo
## [245] Maruchan                        Gefen
## [247] Nissin                          Nissin
## [249] Gefen                           Koyo
## [251] Nongshim                        Maruchan
## [253] Chikara                         Sapporo Ichiban
## [255] Sapporo Ichiban                 Maruchan
## [257] Maruchan                        Nissin
## [259] US Canning                      Nissin
## [261] Nissin                          Nissin
## [263] Tayho                           Nissin
## [265] Nissin                          Maruchan
## [267] Maruchan                        Nissin
## [269] Maruchan                        Nissin
## [271] Nissin                          Nissin
## [273] Maruchan                        Nissin
## [275] Nissin                          Maruchan
## [277] Maruchan                        Maruchan
## [279] Tradition                       Fortune
## [281] Nissin                          Nissin
## [283] Nissin                          Nissin
## [285] Nissin                          Nissin
## [287] Nongshim                        Fortune
## [289] Fortune                         Fu Chang Chinese Noodle Company
## [291] Nissin                          Nissin
## [293] Nissin                          Maruchan
## [295] Maruchan                        Maruchan
## [297] Maruchan                        Nongshim
## [299] Maruchan                        Nissin
## [301] Sapporo Ichiban                 Sapporo Ichiban
## [303] Nongshim                        Nongshim
## [305] Nongshim                        Nongshim
## [307] Nongshim                        Nissin
## [309] Koyo                            Maruchan
## [311] Nissin                          Sapporo Ichiban
```

```
## [313] Nissin                    Nissin
## [315] Teriyaki Time             Maruchan
## [317] Maruchan                  Maruchan
## [319] Nissin                    Sapporo Ichiban
## [321] Maruchan                  Nissin
## [323] Smack                     Westbrae
## 355 Levels: 1 To 3 Noodles 7 Select 7 Select/Nissin A-One ... Zow Zow
```

4) (5 pts) Has any brand of ramen won the #1 slot in the Top Ten Ramens list more than once? Which brand(s)?

Yes, there are 2 brands of ramen that have won the #1 slot in the Top Ten Ramen List more than once. These brands are Prima Taste and MyKuali.

```
ramen$Brand[(substr(ramen$Top.Ten, 7,8)) == "1"]
```

```
## [1] Prima Taste MyKuali    MyKuali    Prima Taste Indomie
## 355 Levels: 1 To 3 Noodles 7 Select 7 Select/Nissin A-One ... Zow Zow
```

5) (8 pts) Which brand has the highest average star rating? If there is a tie, report multiple brands.

The brand with the highest average star rating is ChoripDong, with a 5 stars average rating.

```
averages <- aggregate(ramen$Stars, by = list(ramen$Brand), FUN = mean)
averages$Group.1[which.max(averages$x)]
```

```
## [1] ChoripDong
## 355 Levels: 1 To 3 Noodles 7 Select 7 Select/Nissin A-One ... Zow Zow
```

```
max(averages$x, na.rm = TRUE)
```

```
## [1] 5
```

6) (8 pts) Is the way a ramen is packaged related to which country it is from?

The highest packaging in a pack is from South Korea. The highest packaging in a tray, cup, can. The highest packaging in a box is from Japan and Malaysia. The Highest packaging in a bowl is from Japan. Only US makes ramen in a Bar packaging. Only the US makes ramen in a can packaging, so if we see that packaging in the data set we can conclude that the brand is from the US.

```
table(ramen$Country, ramen$Style)
```

```
##
##                 Bar Bowl Box Can Cup Pack Tray
##    Australia      0   0    0   0   0   17    5    0
##    Bangladesh     0   0    0   0   0    0    7    0
##    Brazil         0   0    0   0   0    2    3    0
##    Cambodia       0   0    0   0   0    0    5    0
##    Canada         0   0    8   0   0   17   16    0
##    China          1   0   45   0   0   16   98    9
##    Colombia       0   0    0   0   0    3    3    0
##    Dubai          0   0    0   0   0    0    3    0
##    Estonia        0   0    0   0   0    0    2    0
##    Fiji           0   0    0   0   0    0    4    0
##    Finland        0   0    0   0   0    0    3    0
##    Germany        0   0    0   0   0   11   16    0
##    Ghana          0   0    0   0   0    0    2    0
##    Holland        0   0    0   0   0    0    4    0
##    Hong Kong      0   0   30   0   0   38   67    2
##    Hungary        0   0    0   0   0    0    9    0
##    India          0   0    0   0   0    3   28    0
##    Indonesia      0   0    0   1   0   21  104    0
##    Japan          0   0  126   2   0   49  155   20
##    Malaysia       0   0    8   2   0   21  125    0
##    Mexico         0   0    0   0   0   15   10    0
##    Myanmar        0   0    0   0   0    3   11    0
##    Nepal          0   0    0   0   0    0   14    0
##    Netherlands    0   0    0   0   0    3   12    0
##    Nigeria        0   0    0   0   0    0    1    0
##    Pakistan       0   0    0   0   0    0    9    0
##    Philippines    0   0   10   0   0    4   33    0
##    Poland         0   0    0   0   0    0    4    0
##    Sarawak        0   0    0   0   0    0    3    0
##    Singapore      0   0   13   0   0   27   69    0
##    South Korea    0   0   68   0   0   40  183   18
##    Sweden         0   0    0   0   0    0    3    0
##    Taiwan         1   0   37   0   0    2  181    3
##    Thailand       0   0   44   0   0   48   97    2
##    UK             0   0    2   0   0   32   35    0
##    United States  0   0    0   0   0    0    1    0
##    USA            0   1   70   1   1   70  128   52
##    Vietnam        0   0   20   0   0    8   78    2
```

7) (8 pts) What is the average, maximum, and minimum rating for ramens from the US? What about for ramens from Singapore? Based on your findings, which country do you expect to land in the Top Ten more often? Check your prediction.

For the United States ratings, the average is 3.457043, the maximum is 5, and the minimum is 0. For Singapore ratings, the mean is 4.126147, the maximum is 5, and the minimum is 2. From this, I expect Singapore to land in the Top Ten more often. Our prediction is correct.

```
mean(ramen$Stars[ramen$Country == "USA" | ramen$Country == "UnitedStates"]) # 3.457043
```

```
## [1] 3.457043
```

```
max(ramen$Stars[ramen$Country == "USA" | ramen$Country == "UnitedStates"]) # 5
```

```
## [1] 5
```

```
min(ramen$Stars[ramen$Country == "USA" | ramen$Country == "UnitedStates"]) # 0
```

```
## [1] 0
```

```
mean(ramen$Stars[ramen$Country == "Singapore"]) # 4.126147
```

```
## [1] 4.126147
```

```
max(ramen$Stars[ramen$Country == "Singapore"]) # 5
```

```
## [1] 5
```

```
min(ramen$Stars[ramen$Country == "Singapore"]) # 2
```

```
## [1] 2
```

```
# Check my prediction
Top.Ten[ramen$Country == "Singapore"]
```

```
##    [1]
##    [9]
##   [17]
##   [25]
##   [33]
##   [41] 2016 #1  2016 #8            2016 #5
##   [49]
##   [57]
##   [65]
##   [73]
##   [81]
##   [89]          2014 #8                        2013 #1  2013 #2          2012 #10
##   [97]
##  [105]
## 38 Levels:  2012 #1 2012 #10 2012 #2 2012 #3 2012 #4 2012 #5 ... 2016 #9
```

```
Top.Ten[ramen$Country == "USA" | ramen$Country == "UnitedStates"]
```

```
##    [1]
##   [10]
##   [19]
##   [28]
##   [37]
##   [46]
##   [55]
##   [64]
##   [73]
##   [82]
##   [91]
## [100]
## [109]
## [118]
## [127]
## [136]
## [145]
## [154]
## [163]                           2013 #4
## [172]
## [181]
## [190]
## [199]
## [208]
## [217]
## [226]
## [235]
## [244]
## [253]
## [262]
## [271]
## [280]
## [289]
## [298]
## [307]
## [316]
## 38 Levels:  2012 #1 2012 #10 2012 #2 2012 #3 2012 #4 2012 #5 ... 2016 #9
```

8) (8 pts) Which country makes the most ramen? Which country makes the best ramen? How did you define "best"? Why? Was the country that makes the best ramen also the country that makes the most ramen?

Japan makes the most ramen.

```
table.country.brand <- table(ramen$Country, ramen$Brand)

rowSums(table.country.brand, na.rm=TRUE)
```

```
##           Australia      Bangladesh       Brazil      Cambodia        Canada
##                  22               7            5             5            41
##               China        Colombia        Dubai       Estonia          Fiji
##                 169               6            3             2             4
##             Finland         Germany        Ghana       Holland     Hong Kong
##                   3              27            2             4           137
##             Hungary           India    Indonesia         Japan      Malaysia
##                   9              31          126           352           156
##              Mexico         Myanmar        Nepal   Netherlands       Nigeria
##                  25              14           14            15             1
##            Pakistan     Philippines       Poland       Sarawak     Singapore
##                   9              47            4             3           109
##         South Korea          Sweden       Taiwan      Thailand            UK
##                 309               3          224           191            69
## United States             USA         Vietnam
##                   1             323          108
```

We defined "best" as the countries whose brands have appeared in the Top Ten more than once. The countries which make the "best" ramen are Singapore, Malaysia, and Japan.

```
Topten.twice <- ramen$Brand[(substr(ramen$Top.Ten, 7,8)) == "1"]
Topten.twice
```

```
## [1] Prima Taste MyKuali     MyKuali      Prima Taste Indomie
## 355 Levels: 1 To 3 Noodles 7 Select 7 Select/Nissin A-One ... Zow Zow
```

```
ramen$Country[which(ramen$Brand == "Prima Taste" | ramen$Brand == "MyKuali")]
```

```
##  [1] Malaysia  Malaysia  Japan     Malaysia  Japan     Singapore Malaysia
##  [8] Malaysia  Malaysia  Malaysia  Malaysia  Malaysia  Singapore Malaysia
## [15] Malaysia  Singapore Singapore Singapore Malaysia  Malaysia  Malaysia
## [22] Malaysia  Malaysia  Malaysia  Malaysia  Malaysia  Malaysia  Singapore
## [29] Malaysia  Singapore Singapore
## 38 Levels: Australia Bangladesh Brazil Cambodia Canada China Colombia ... Vietnam
```

9) (8 pts) How many ramens are considered spicy as part of their variety (hint, don't forget that "spicy" and "Spicy" are both spicy)? Are spicy ramens typically rated higher than non-spicy ramens?

SKIPPED

10) (10 pts) Based on this data set, what effect does saltiness have on ramen ratings?

Based on this data set, the higher salt percentage, the better rating of ramen.

```
plot(ramen$perc_salt, ramen$Stars)
```
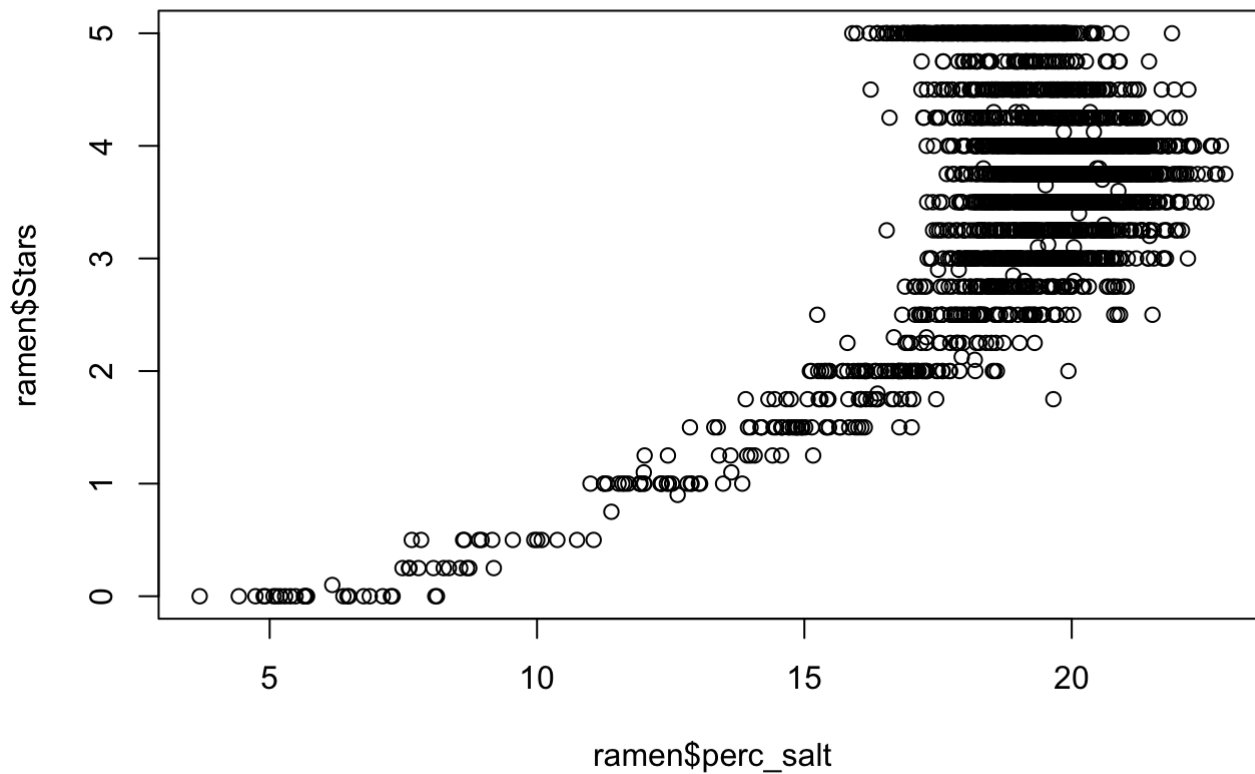
11) (10 pts) Are there certain styles, countries, brands, or flavors of ramen that tend to use more or less salt?

Brazil uses the most salt, while Canada and the Netherlands use the most salt. There is relatively no difference in salt content between styles. However the can style seems to sit at the bottom of the range.

```
boxplot(ramen$perc_salt ~ ramen$Country, horizontal = TRUE, las = 1, ylab = "", xlab =
"Percent Salt")
```
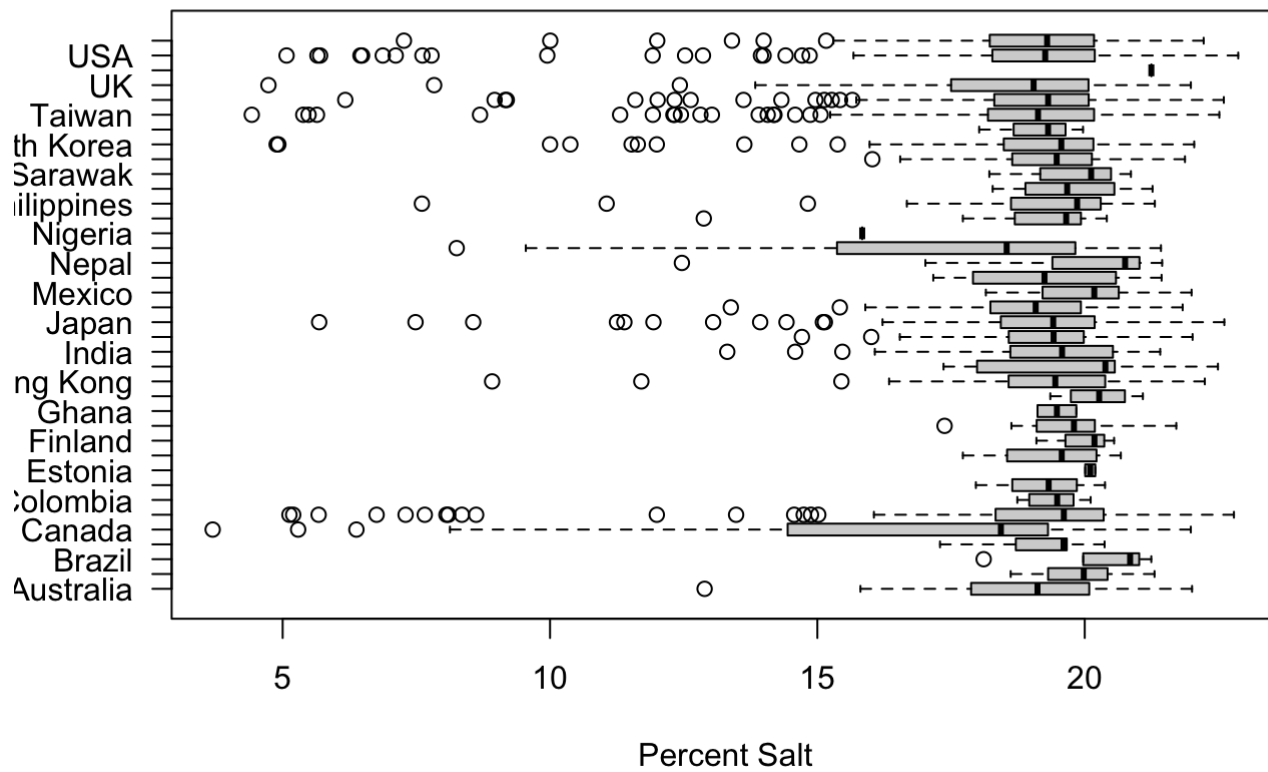
Percent Salt

```
boxplot(ramen$perc_salt ~ ramen$Style, horizontal = TRUE, las = 1, ylab = "", xlab = "Pe
rcent Salt")
```
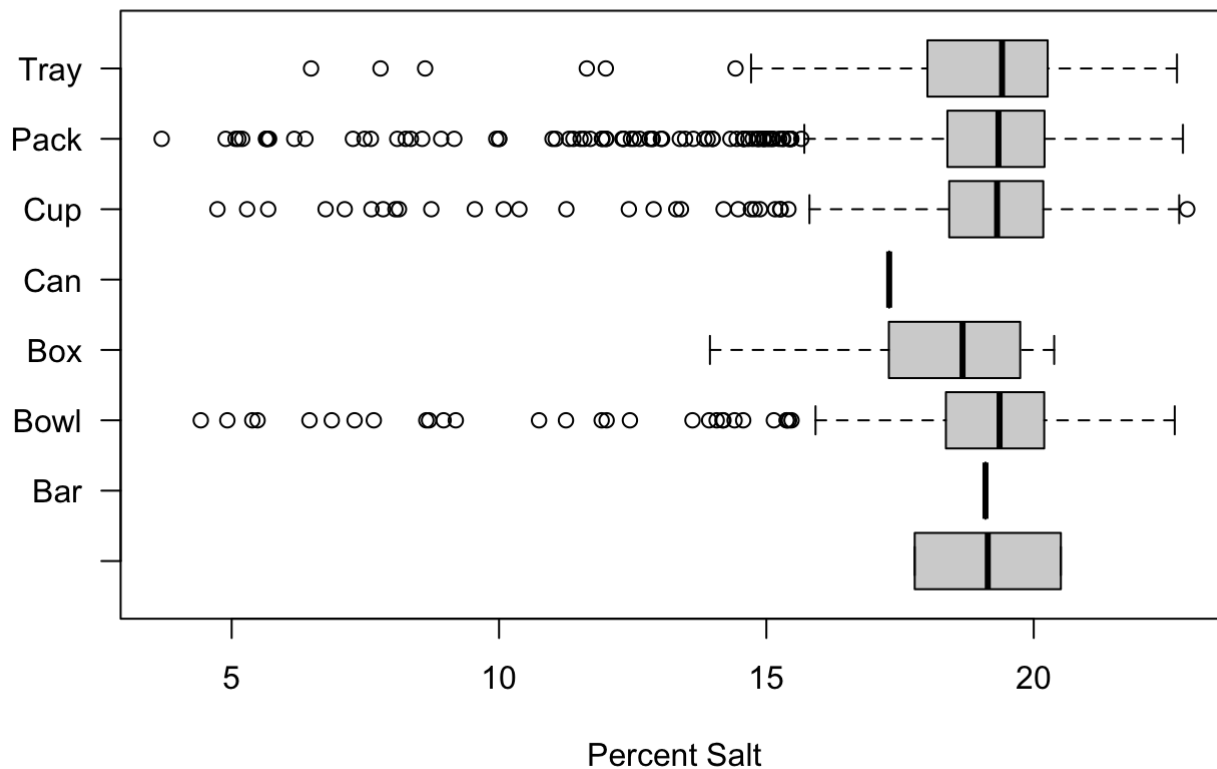
12) [Open Ended] (10 pts) You have been hired by a new ramen start up, Roamin' Ramen. They want to better understand the ramen market and ask you to break down ramen into 5 collections of "similar" ramens. How do you go about it? Discuss what you find.

The most efficient way to break down the ramen data is to split it into 5 collections of styles. These collections are based in frequencies. Precisely, the 5 styles are (1) Bowl, (2) Cup, (3) Pack, (4) Tray, and (5) Miscellaneous (which includes Bar, Box, and Can).

```
plot(ramen$Style)
```
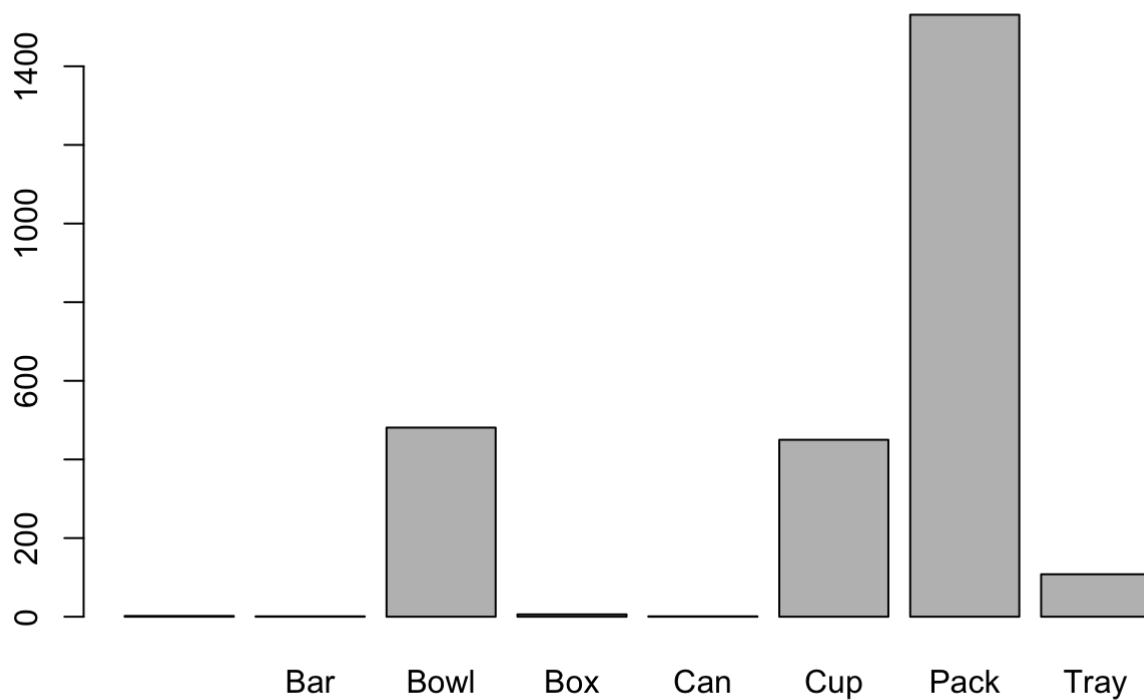
13) [Open Ended] (10 pts) Roamin' Ramen wants to make the next Top Ten Ramen winner. What recommendations do you have for them based on this data set? Be sure to use the columns provided, and generate your own ideas by examining the Variety column. Support your assertions with statistics (like mean, min, max or others you prefer) and at least one plot.

Note: Variety anhalysis is no longer necessary

Our recommendations for Roamin' Ramen is to create a ramen which has a salt content of between 15.90 and 21.87 percent of the total ramen contents. We see by looking at the graph that the vast majority of 5 star ratings are given to ramens whose salt contents sit between this range, with an average of 18.43 percent salt. This evidence, along with the conclusion from question (10), that the higher salt percentage, the better rating of ramen, supports our suggestion.

```
plot(ramen$Stars, ramen$perc_salt)
```
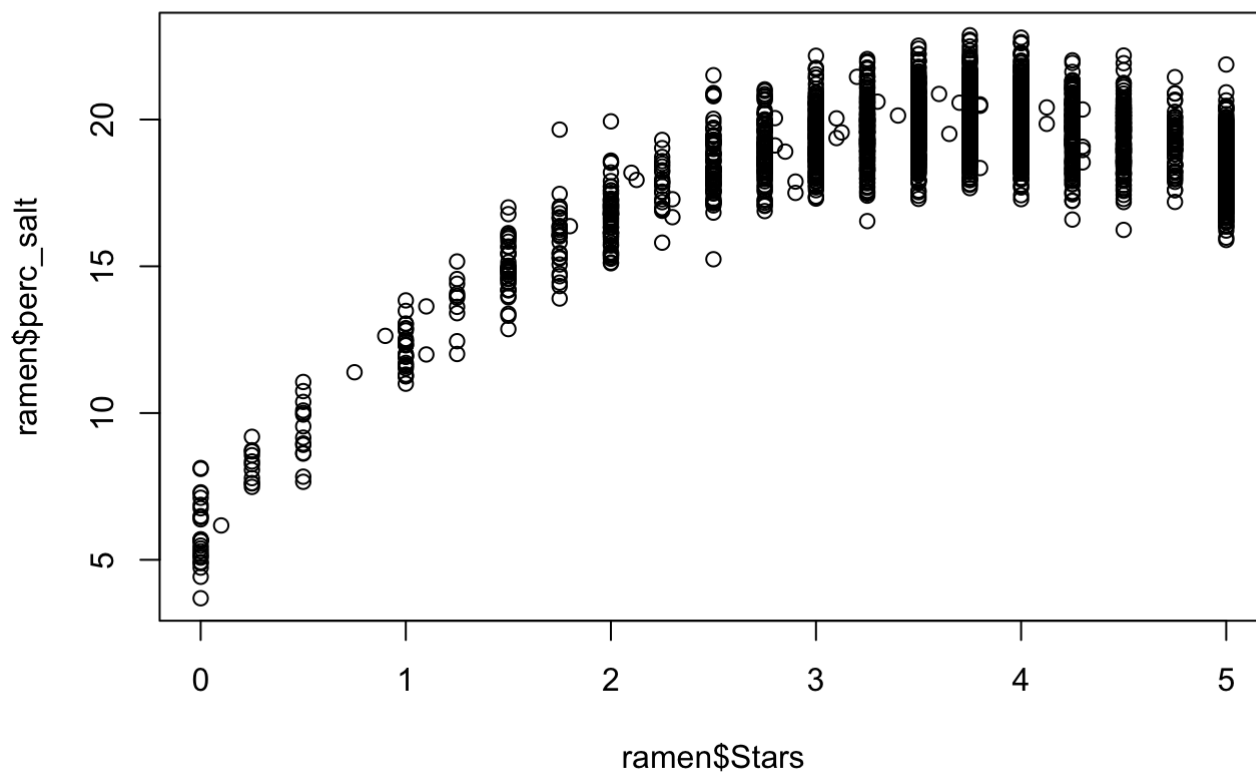
```
summary(ramen$perc_salt[which(ramen$Stars == 5)])
```

```
##     Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    15.90   17.76   18.43   18.43   19.14   21.87
```