class09

Whitney Tran (PID:A16781338)

Here we analyze a candy dataset from the 538 website. This is a CSV file from their GitHub repository.

Data Import

```
candy <- read.csv("candy-data.txt", row.names=1)
head(candy)
```

	chocolate	fruity	caramel	peanutyalmondy	nougat	crispedricewafer
100 Grand	1	0	1	0	0	1
3 Musketeers	1	0	0	0	1	0
One dime	0	0	0	0	0	0
One quarter	0	0	0	0	0	0
Air Heads	0	1	0	0	0	0
Almond Joy	1	0	0	1	0	0

	hard	bar	pluribus	sugarpercent	pricepercent	winpercent
100 Grand	0	1	0	0.732	0.860	66.97173
3 Musketeers	0	1	0	0.604	0.511	67.60294
One dime	0	0	0	0.011	0.116	32.26109
One quarter	0	0	0	0.011	0.511	46.11650
Air Heads	0	0	0	0.906	0.511	52.34146
Almond Joy	0	1	0	0.465	0.767	50.34755

Q1. How many different candy types are in this dataset?

```
nrow(candy)
```

[1] 85

Q2. How many fruity candy are in the dataset?

```
sum(candy$fruity)
```

[1] 38

Q3. What is your favorite candy in the dataset and what is it's winpercent value?

```
candy["Twix", ]$winpercent
```

[1] 81.64291

Q4. What is the winpercent value for "Kit Kat"?

```
candy["Kit Kat", ]$winpercent
```

[1] 76.7686

Q5. What is the winpercent value for "Tootsie Roll Snack Bars"?

```
candy["Tootsie Roll Snack Bars", ]$winpercent
```

[1] 49.6535

Q. What is the least liked candy in the dataset - lowest winpercent?

```
inds <- order(candy$winpercent)
candy[inds,]
```

	chocolate	fruity	caramel	peanutyalmondy	nougat
Nik L Nip	0	1	0	0	0
Boston Baked Beans	0	0	0	1	0
Chiclets	0	1	0	0	0
Super Bubble	0	1	0	0	0
Jawbusters	0	1	0	0	0
Root Beer Barrels	0	0	0	0	0
Sugar Daddy	0	0	1	0	0
One dime	0	0	0	0	0
Sugar Babies	0	0	1	0	0
Haribo Happy Cola	0	0	0	0	0
Caramel Apple Pops	0	1	1	0	0

Strawberry bon bons	0	1	0	0	0
Sixlets	1	0	0	0	0
Ring pop	0	1	0	0	0
Chewey Lemonhead Fruit Mix	0	1	0	0	0
Red vines	0	1	0	0	0
Pixie Sticks	0	0	0	0	0
Nestle Smarties	1	0	0	0	0
Candy Corn	0	0	0	0	0
Charleston Chew	1	0	0	0	1
Warheads	0	1	0	0	0
Lemonhead	0	1	0	0	0
Fun Dip	0	1	0	0	0
Now & Later	0	1	0	0	0
Dum Dums	0	1	0	0	0
Pop Rocks	0	1	0	0	0
Laffy Taffy	0	1	0	0	0
Werther's Original Caramel	0	0	1	0	0
Haribo Twin Snakes	0	1	0	0	0
Dots	0	1	0	0	0
Runts	0	1	0	0	0
Tootsie Roll Juniors	1	0	0	0	0
Fruit Chews	0	1	0	0	0
Welch's Fruit Snacks	0	1	0	0	0
Twizzlers	0	1	0	0	0
Tootsie Roll Midgies	1	0	0	0	0
Smarties candy	0	1	0	0	0
One quarter	0	0	0	0	0
Payday	0	0	0	1	1
Mike & Ike	0	1	0	0	0
Gobstopper	0	1	0	0	0
Trolli Sour Bites	0	1	0	0	0
Mounds	1	0	0	0	0
Tootsie Pop	1	1	0	0	0
Whoppers	1	0	0	0	0
Tootsie Roll Snack Bars	1	0	0	0	0
Almond Joy	1	0	0	1	0
Haribo Sour Bears	0	1	0	0	0
Air Heads	0	1	0	0	0
Sour Patch Tricksters	0	1	0	0	0
Lifesavers big ring gummies	0	1	0	0	0
Mr Good Bar	1	0	0	1	0
Swedish Fish	0	1	0	0	0
Milk Duds	1	0	1	0	0

Skittles wildberry	0	1	0	0	0
Nerds	0	1	0	0	0
Hershey's Kisses	1	0	0	0	0
Hershey's Milk Chocolate	1	0	0	0	0
Baby Ruth	1	0	1	1	1
Haribo Gold Bears	0	1	0	0	0
Junior Mints	1	0	0	0	0
Hershey's Special Dark	1	0	0	0	0
Snickers Crisper	1	0	1	1	0
Sour Patch Kids	0	1	0	0	0
Milky Way Midnight	1	0	1	0	1
Hershey's Krackel	1	0	0	0	0
Skittles original	0	1	0	0	0
Milky Way Simply Caramel	1	0	1	0	0
Rolo	1	0	1	0	0
Nestle Crunch	1	0	0	0	0
M&M's	1	0	0	0	0
100 Grand	1	0	1	0	0
Starburst	0	1	0	0	0
3 Musketeers	1	0	0	0	1
Peanut M&Ms	1	0	0	1	0
Nestle Butterfinger	1	0	0	1	0
Peanut butter M&M's	1	0	0	1	0
Reese's stuffed with pieces	1	0	0	1	0
Milky Way	1	0	1	0	1
Reese's pieces	1	0	0	1	0
Snickers	1	0	1	1	1
Kit Kat	1	0	0	0	0
Twix	1	0	1	0	0
Reese's Miniatures	1	0	0	1	0
Reese's Peanut Butter cup	1	0	0	1	0

	crispedricewafer	hard	bar	pluribus	sugarpercent
Nik L Nip	0	0	0	1	0.197
Boston Baked Beans	0	0	0	1	0.313
Chiclets	0	0	0	1	0.046
Super Bubble	0	0	0	0	0.162
Jawbusters	0	1	0	1	0.093
Root Beer Barrels	0	1	0	1	0.732
Sugar Daddy	0	0	0	0	0.418
One dime	0	0	0	0	0.011
Sugar Babies	0	0	0	1	0.965
Haribo Happy Cola	0	0	0	1	0.465
Caramel Apple Pops	0	0	0	0	0.604

Strawberry bon bons	0	1	0	1	0.569
Sixlets	0	0	0	1	0.220
Ring pop	0	1	0	0	0.732
Chewey Lemonhead Fruit Mix	0	0	0	1	0.732
Red vines	0	0	0	1	0.581
Pixie Sticks	0	0	0	1	0.093
Nestle Smarties	0	0	0	1	0.267
Candy Corn	0	0	0	1	0.906
Charleston Chew	0	0	1	0	0.604
Warheads	0	1	0	0	0.093
Lemonhead	0	1	0	0	0.046
Fun Dip	0	1	0	0	0.732
Now & Later	0	0	0	1	0.220
Dum Dums	0	1	0	0	0.732
Pop Rocks	0	1	0	1	0.604
Laffy Taffy	0	0	0	0	0.220
Werther's Original Caramel	0	1	0	0	0.186
Haribo Twin Snakes	0	0	0	1	0.465
Dots	0	0	0	1	0.732
Runts	0	1	0	1	0.872
Tootsie Roll Juniors	0	0	0	0	0.313
Fruit Chews	0	0	0	1	0.127
Welch's Fruit Snacks	0	0	0	1	0.313
Twizzlers	0	0	0	0	0.220
Tootsie Roll Midgies	0	0	0	1	0.174
Smarties candy	0	1	0	1	0.267
One quarter	0	0	0	0	0.011
Payday	0	0	1	0	0.465
Mike & Ike	0	0	0	1	0.872
Gobstopper	0	1	0	1	0.906
Trolli Sour Bites	0	0	0	1	0.313
Mounds	0	0	1	0	0.313
Tootsie Pop	0	1	0	0	0.604
Whoppers	1	0	0	1	0.872
Tootsie Roll Snack Bars	0	0	1	0	0.465
Almond Joy	0	0	1	0	0.465
Haribo Sour Bears	0	0	0	1	0.465
Air Heads	0	0	0	0	0.906
Sour Patch Tricksters	0	0	0	1	0.069
Lifesavers big ring gummies	0	0	0	0	0.267
Mr Good Bar	0	0	1	0	0.313
Swedish Fish	0	0	0	1	0.604
Milk Duds	0	0	0	1	0.302

Skittles wildberry	0	0	0	1	0.941
Nerds	0	1	0	1	0.848
Hershey's Kisses	0	0	0	1	0.127
Hershey's Milk Chocolate	0	0	1	0	0.430
Baby Ruth	0	0	1	0	0.604
Haribo Gold Bears	0	0	0	1	0.465
Junior Mints	0	0	0	1	0.197
Hershey's Special Dark	0	0	1	0	0.430
Snickers Crisper	1	0	1	0	0.604
Sour Patch Kids	0	0	0	1	0.069
Milky Way Midnight	0	0	1	0	0.732
Hershey's Krackel	1	0	1	0	0.430
Skittles original	0	0	0	1	0.941
Milky Way Simply Caramel	0	0	1	0	0.965
Rolo	0	0	0	1	0.860
Nestle Crunch	1	0	1	0	0.313
M&M's	0	0	0	1	0.825
100 Grand	1	0	1	0	0.732
Starburst	0	0	0	1	0.151
3 Musketeers	0	0	1	0	0.604
Peanut M&Ms	0	0	0	1	0.593
Nestle Butterfinger	0	0	1	0	0.604
Peanut butter M&M's	0	0	0	1	0.825
Reese's stuffed with pieces	0	0	0	0	0.988
Milky Way	0	0	1	0	0.604
Reese's pieces	0	0	0	1	0.406
Snickers	0	0	1	0	0.546
Kit Kat	1	0	1	0	0.313
Twix	1	0	1	0	0.546
Reese's Miniatures	0	0	0	0	0.034
Reese's Peanut Butter cup	0	0	0	0	0.720

	pricepercent	winpercent
Nik L Nip	0.976	22.44534
Boston Baked Beans	0.511	23.41782
Chiclets	0.325	24.52499
Super Bubble	0.116	27.30386
Jawbusters	0.511	28.12744
Root Beer Barrels	0.069	29.70369
Sugar Daddy	0.325	32.23100
One dime	0.116	32.26109
Sugar Babies	0.767	33.43755
Haribo Happy Cola	0.465	34.15896
Caramel Apple Pops	0.325	34.51768

Strawberry bon bons	0.058	34.57899
Sixlets	0.081	34.72200
Ring pop	0.965	35.29076
Chewey Lemonhead Fruit Mix	0.511	36.01763
Red vines	0.116	37.34852
Pixie Sticks	0.023	37.72234
Nestle Smarties	0.976	37.88719
Candy Corn	0.325	38.01096
Charleston Chew	0.511	38.97504
Warheads	0.116	39.01190
Lemonhead	0.104	39.14106
Fun Dip	0.325	39.18550
Now & Later	0.325	39.44680
Dum Dums	0.034	39.46056
Pop Rocks	0.837	41.26551
Laffy Taffy	0.116	41.38956
Werther's Original Caramel	0.267	41.90431
Haribo Twin Snakes	0.465	42.17877
Dots	0.511	42.27208
Runts	0.279	42.84914
Tootsie Roll Juniors	0.511	43.06890
Fruit Chews	0.034	43.08892
Welch's Fruit Snacks	0.313	44.37552
Twizzlers	0.116	45.46628
Tootsie Roll Midgies	0.011	45.73675
Smarties candy	0.116	45.99583
One quarter	0.511	46.11650
Payday	0.767	46.29660
Mike & Ike	0.325	46.41172
Gobstopper	0.453	46.78335
Trolli Sour Bites	0.255	47.17323
Mounds	0.860	47.82975
Tootsie Pop	0.325	48.98265
Whoppers	0.848	49.52411
Tootsie Roll Snack Bars	0.325	49.65350
Almond Joy	0.767	50.34755
Haribo Sour Bears	0.465	51.41243
Air Heads	0.511	52.34146
Sour Patch Tricksters	0.116	52.82595
Lifesavers big ring gummies	0.279	52.91139
Mr Good Bar	0.918	54.52645
Swedish Fish	0.755	54.86111
Milk Duds	0.511	55.06407

```
Skittles wildberry                 0.220   55.10370
Nerds                              0.325   55.35405
Hershey's Kisses                   0.093   55.37545
Hershey's Milk Chocolate           0.918   56.49050
Baby Ruth                          0.767   56.91455
Haribo Gold Bears                  0.465   57.11974
Junior Mints                       0.511   57.21925
Hershey's Special Dark             0.918   59.23612
Snickers Crisper                   0.651   59.52925
Sour Patch Kids                    0.116   59.86400
Milky Way Midnight                 0.441   60.80070
Hershey's Krackel                  0.918   62.28448
Skittles original                  0.220   63.08514
Milky Way Simply Caramel           0.860   64.35334
Rolo                               0.860   65.71629
Nestle Crunch                      0.767   66.47068
M&M's                              0.651   66.57458
100 Grand                          0.860   66.97173
Starburst                          0.220   67.03763
3 Musketeers                       0.511   67.60294
Peanut M&Ms                        0.651   69.48379
Nestle Butterfinger                0.767   70.73564
Peanut butter M&M's                0.651   71.46505
Reese's stuffed with pieces        0.651   72.88790
Milky Way                          0.651   73.09956
Reese's pieces                     0.651   73.43499
Snickers                           0.651   76.67378
Kit Kat                            0.511   76.76860
Twix                               0.906   81.64291
Reese's Miniatures                 0.279   81.86626
Reese's Peanut Butter cup          0.651   84.18029
```

```r
#install.packages("skimr")
```

```r
library("skimr")
skim(candy)
```

Table 1: Data summary

Name	candy
Number of rows	85

8

Number of columns		12
Column type frequency: numeric		12
Group variables		None

Variable type: numeric

skim_variable	n_missing	complete_rate	mean	sd	p0	p25	p50	p75	p100	hist
chocolate	0	1	0.44	0.50	0.00	0.00	0.00	1.00	1.00	
fruity	0	1	0.45	0.50	0.00	0.00	0.00	1.00	1.00	
caramel	0	1	0.16	0.37	0.00	0.00	0.00	0.00	1.00	
peanutyalmondy	0	1	0.16	0.37	0.00	0.00	0.00	0.00	1.00	
nougat	0	1	0.08	0.28	0.00	0.00	0.00	0.00	1.00	
crispedricewafer	0	1	0.08	0.28	0.00	0.00	0.00	0.00	1.00	
hard	0	1	0.18	0.38	0.00	0.00	0.00	0.00	1.00	
bar	0	1	0.25	0.43	0.00	0.00	0.00	0.00	1.00	
pluribus	0	1	0.52	0.50	0.00	0.00	1.00	1.00	1.00	
sugarpercent	0	1	0.48	0.28	0.01	0.22	0.47	0.73	0.99	
pricepercent	0	1	0.47	0.29	0.01	0.26	0.47	0.65	0.98	
winpercent	0	1	50.32	14.71	22.45	39.14	47.83	59.86	84.18	

Q6. Is there any variable/column that looks to be on a different scale to the majority of the other columns in the dataset?

- the winpercent is on a different scale.

Q7. What do you think a zero and one represent for the candy$chocolate column?

- The zero and one represents if it is true/false in terms of chocolate.

Q8. Plot a histogram of winpercent values

```
hist(candy$winpercent, breaks=8)
```

Histogram of candy$winpercent
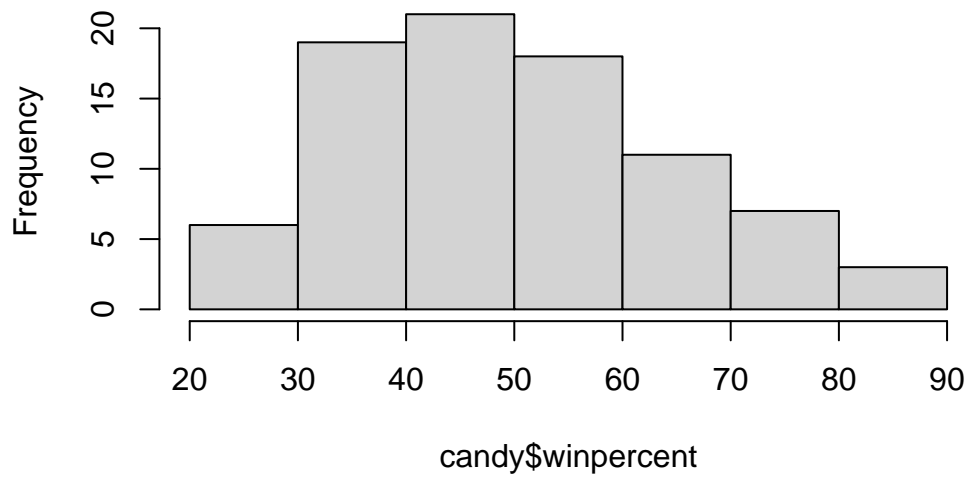
Q9. Is the distribution of winpercent values symmetrical?

- The distribution of winpercent values is not symmetrical.

  Q10. Is the center of the distribution above or below 50%?

- The center of distribution is below 50%.

  Q11. On average is chocolate candy higher or lower ranked than fruit candy?

```r
mean(candy$winpercent[as.logical(candy$chocolate)])
```

```
[1] 60.92153
```

```r
mean(candy$winpercent[as.logical(candy$fruity)])
```

```
[1] 44.11974
```

- Chocolate is higher ranked than fruit candy.

  Q12. Is this difference statistically significant?

```
t.test(candy$winpercent[as.logical(candy$chocolate)],candy$winpercent[as.logical(candy$fru
```

```
    Welch Two Sample t-test

data:  candy$winpercent[as.logical(candy$chocolate)] and candy$winpercent[as.logical(candy$f
t = 6.2582, df = 68.882, p-value = 2.871e-08
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 11.44563 22.15795
sample estimates:
mean of x mean of y
 60.92153  44.11974
```

- They are statistically significant.

Q13. What are the five least liked candy types in this set?

```
head(candy[order(candy$winpercent),],n=5)
```

	chocolate	fruity	caramel	peanutyalmondy	nougat
Nik L Nip	0	1	0	0	0
Boston Baked Beans	0	0	0	1	0
Chiclets	0	1	0	0	0
Super Bubble	0	1	0	0	0
Jawbusters	0	1	0	0	0

	crispedricewafer	hard	bar	pluribus	sugarpercent	pricepercent
Nik L Nip	0	0	0	1	0.197	0.976
Boston Baked Beans	0	0	0	1	0.313	0.511
Chiclets	0	0	0	1	0.046	0.325
Super Bubble	0	0	0	0	0.162	0.116
Jawbusters	0	1	0	1	0.093	0.511

	winpercent
Nik L Nip	22.44534
Boston Baked Beans	23.41782
Chiclets	24.52499
Super Bubble	27.30386
Jawbusters	28.12744

Q14. What are the top 5 all time favorite candy types out of this set?

```
tail(candy[order(candy$winpercent),], n=5)
```

```
                        chocolate fruity caramel peanutyalmondy nougat
Snickers                        1      0       1              1      1
Kit Kat                         1      0       0              0      0
Twix                            1      0       1              0      0
Reese's Miniatures              1      0       0              1      0
Reese's Peanut Butter cup       1      0       0              1      0
                        crispedricewafer hard bar pluribus sugarpercent
Snickers                               0    0   1        0        0.546
Kit Kat                                1    0   1        0        0.313
Twix                                   1    0   1        0        0.546
Reese's Miniatures                     0    0   0        0        0.034
Reese's Peanut Butter cup              0    0   0        0        0.720
                        pricepercent winpercent
Snickers                       0.651   76.67378
Kit Kat                        0.511   76.76860
Twix                           0.906   81.64291
Reese's Miniatures             0.279   81.86626
Reese's Peanut Butter cup      0.651   84.18029
```

Q15. Make a first barplot of candy ranking based on winpercent values.

```
library(ggplot2)

ggplot(candy) +
  aes(winpercent, rownames(candy)) +
  geom_col()
```

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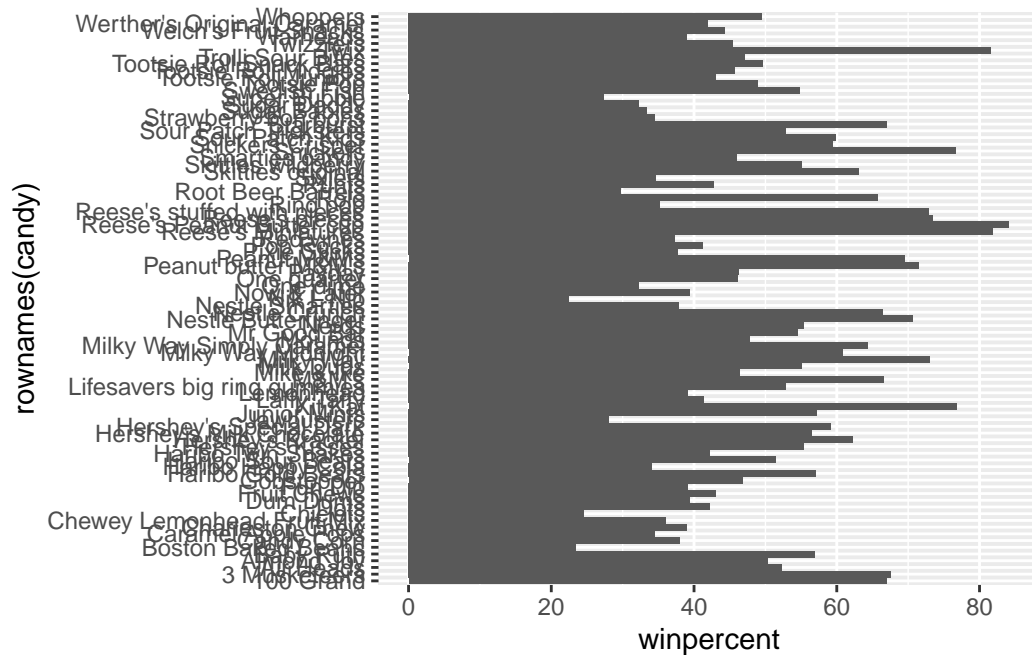
Q16. This is quite ugly, use the reorder() function to get the bars sorted by winpercent?

```
ggplot(candy) +
  aes(winpercent, reorder(rownames(candy),winpercent)) +
  geom_col() +
  labs(x="Win Percent", y=NULL)
```
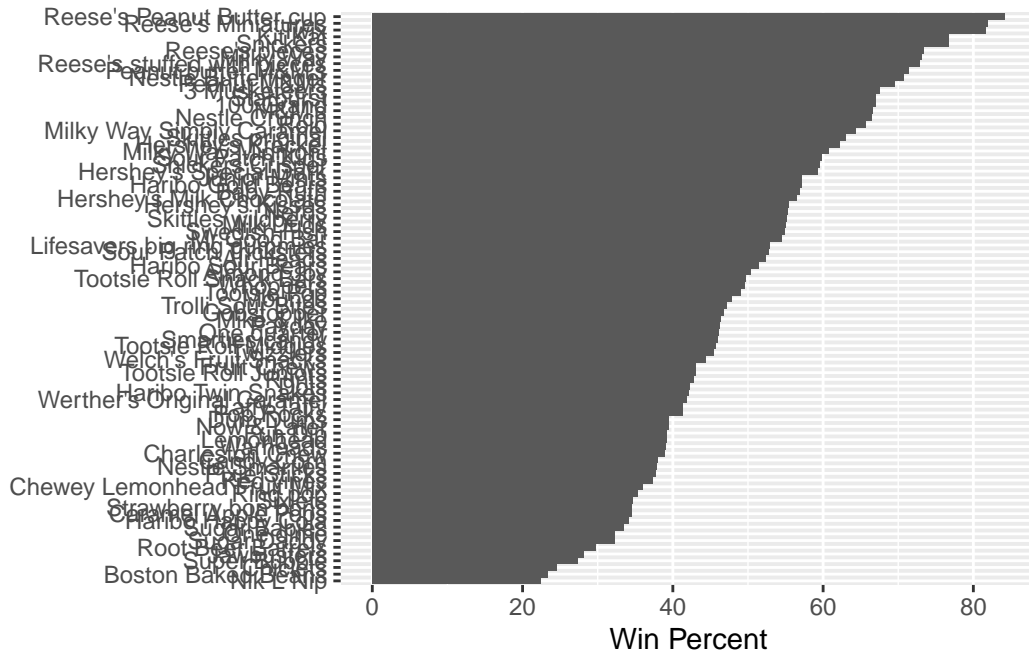
```
ggsave('barplot1.png', width=7, height=10)
```

```
#![](barplot1.png)
```

You can insert any image using this markdown syntax.

Add some color to our ggplot. We neede to make a custom color vector.

```
#start with all black vector of coors
my_cols = rep("black", nrow(candy))
my_cols[as.logical(candy$choclate)] = "chocolate"
my_cols[as.logical(candy$bar)] = "brown"
my_cols[as.logical(candy$fruity)] = "red"


ggplot(candy) +
  aes(winpercent, reorder(rownames(candy),winpercent)) +
  geom_col(fill=my_cols) +
  labs(x="Win Percent", y=NULL)
```
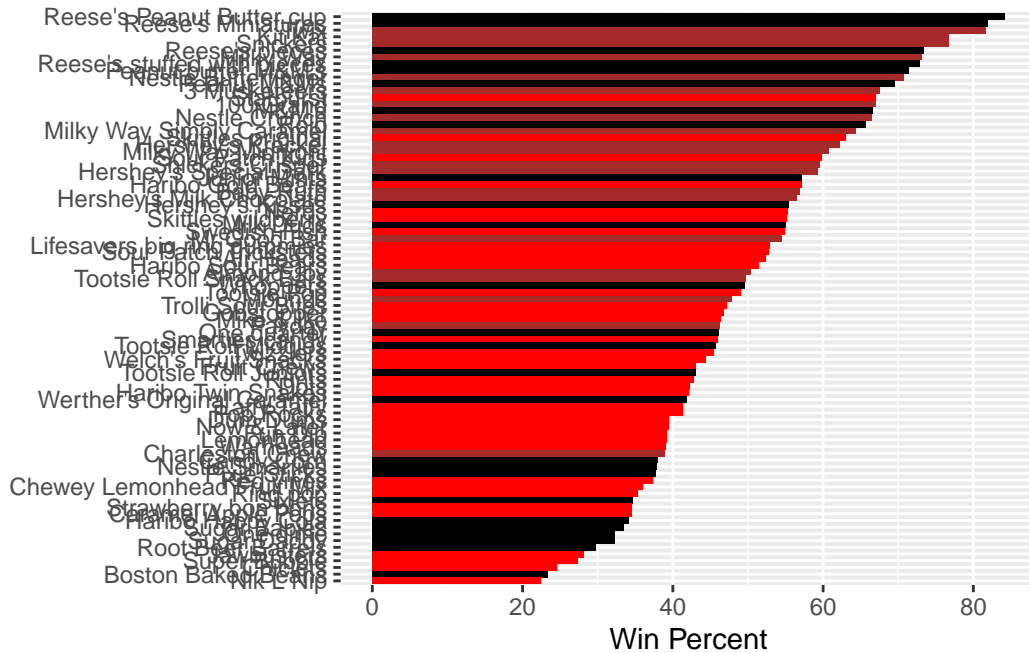
Q17. What is the worst ranked chocolate candy?

- Charleston Chew

Q18. What is the best ranked fruity candy?

- skittles

#Taking a look at pricepercent

```
candy$pricepercent
```

```
 [1] 0.860 0.511 0.116 0.511 0.511 0.767 0.767 0.511 0.325 0.325 0.511 0.511
[13] 0.325 0.511 0.034 0.034 0.325 0.453 0.465 0.465 0.465 0.465 0.093 0.918
[25] 0.918 0.918 0.511 0.511 0.511 0.116 0.104 0.279 0.651 0.651 0.325 0.511
[37] 0.651 0.441 0.860 0.860 0.918 0.325 0.767 0.767 0.976 0.325 0.767 0.651
[49] 0.023 0.837 0.116 0.279 0.651 0.651 0.651 0.965 0.860 0.069 0.279 0.081
[61] 0.220 0.220 0.976 0.116 0.651 0.651 0.116 0.116 0.220 0.058 0.767 0.325
[73] 0.116 0.755 0.325 0.511 0.011 0.325 0.255 0.906 0.116 0.116 0.313 0.267
[85] 0.848
```

If we want to see what is a good candy to buy in terms of win percent and pricepercent we can plot these two variables ad then see the best candy for the least amount of money.

```
ggplot(candy) +
  aes(winpercent, pricepercent, label=rownames(candy)) +
  geom_point(col=my_cols) +
  geom_text()
```
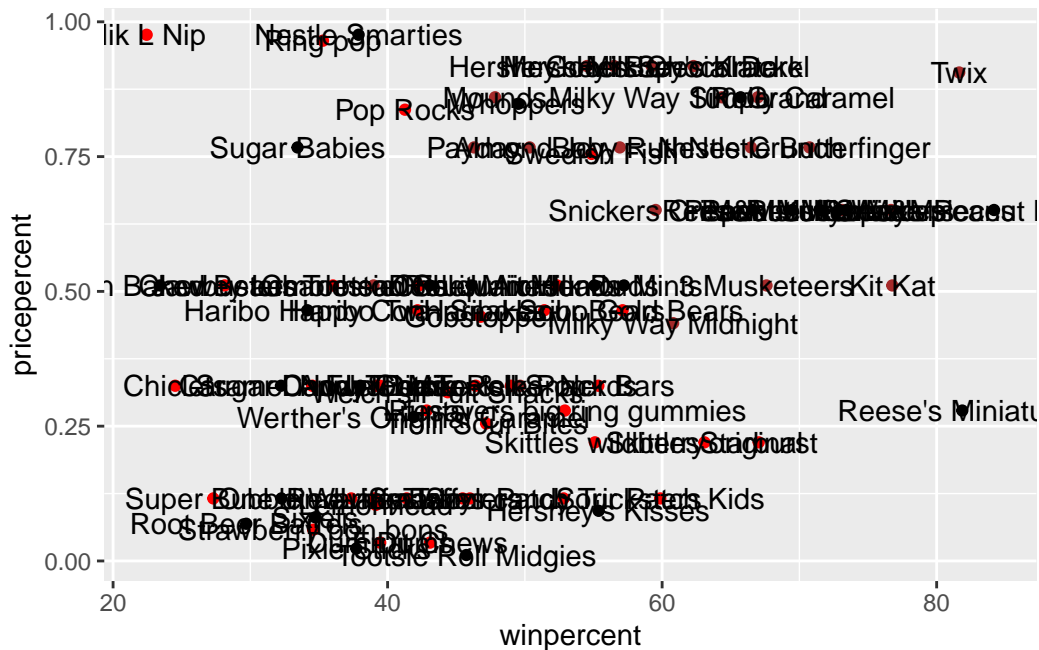

To avoid the overplotting of all these abels we can use an add on package called ggrepel.

```
#install.packages("ggrepel")
```

```
library(ggrepel)

ggplot(candy) +
  aes(winpercent, pricepercent, label=rownames(candy)) +
  geom_point(col=my_cols) +
  geom_text_repel(max.overlaps=10, col=my_cols)
```

```
Warning: ggrepel: 50 unlabeled data points (too many overlaps). Consider
increasing max.overlaps
```
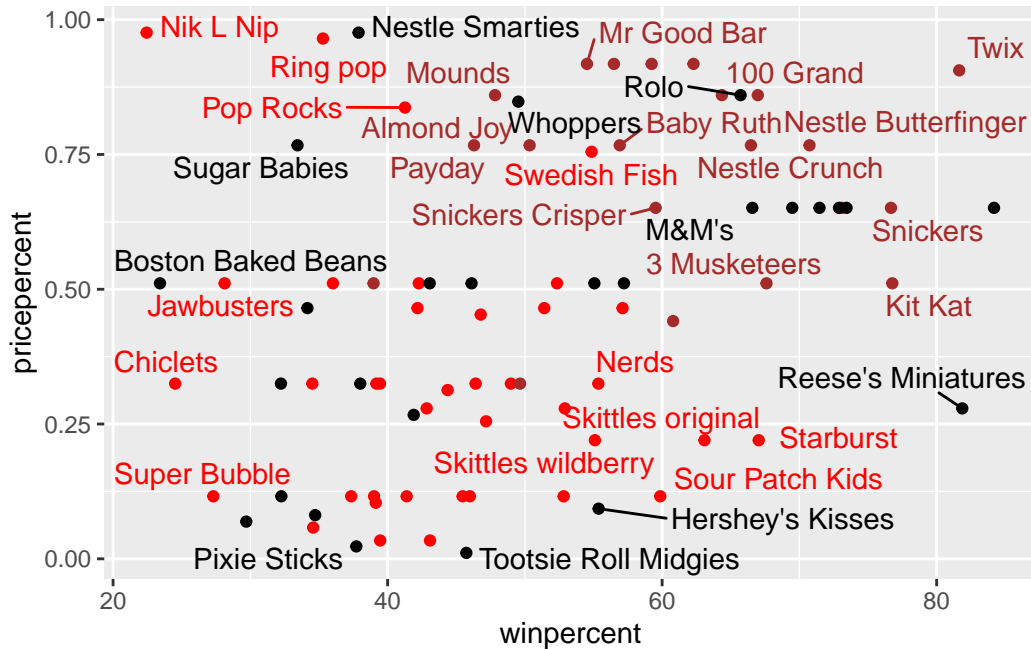
Q19. Which candy type is the highest ranked in terms of winpercent for the least money - i.e. offers the most bang for your buck?

- I would say Reese's Miniatures offer the most bang for your buck.

Q20. What are the top 5 most expensive candy types in the dataset and of these which is the least popular?

```
ord <- order(candy$pricepercent, decreasing=TRUE)
head(candy[ord, c(11,12)], n=5)
```

	pricepercent	winpercent
Nik L Nip	0.976	22.44534
Nestle Smarties	0.976	37.88719
Ring pop	0.965	35.29076
Hershey's Krackel	0.918	62.28448
Hershey's Milk Chocolate	0.918	56.49050

- Nik L Nip, Ring pop, Nestle Smarties, Hersheys Krackel, Hersheys Milk Chocolate
- Nik L Nip is the least popular

#5 Exploring the correlation structure

```
#install.packages("corrplot")
```

```
library(corrplot)
```

corrplot 0.92 loaded

```
cij<- cor(candy)
```

```
corrplot(cij)
```
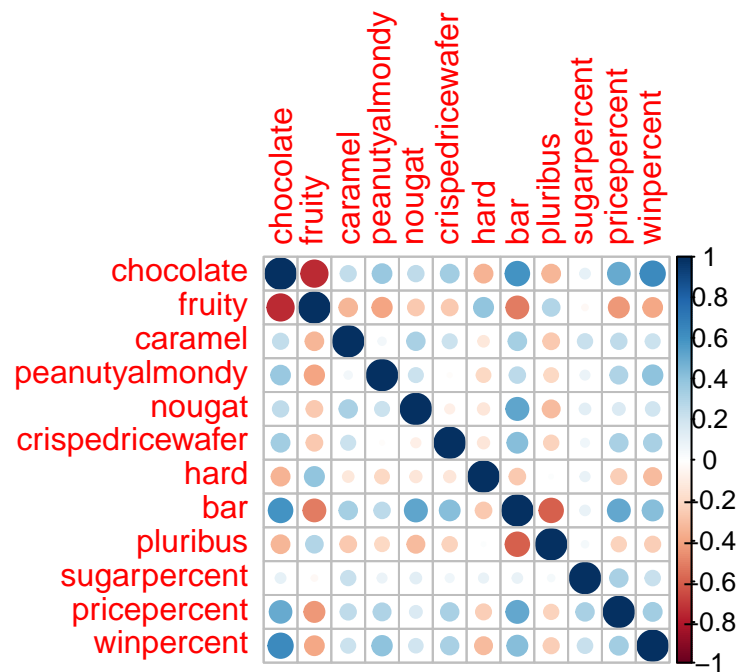

Q22. Examining this plot what two variables are anti-correlated (i.e. have minus values)?

- fruit and chocolate are anti-correlated.

  Q23. Similarly, what two variables are most positively correlated?

- chocolate and bar are most positively correlated.

#On to PCA

The main function for this is called `prcomp()` and here we know we need to scale our data with the `scale=TRUE` argument.

```
pca <- prcomp(candy, scale=TRUE)
summary(pca)
```

```
Importance of components:
                          PC1    PC2    PC3     PC4    PC5     PC6     PC7
Standard deviation     2.0788 1.1378 1.1092 1.07533 0.9518 0.81923 0.81530
Proportion of Variance 0.3601 0.1079 0.1025 0.09636 0.0755 0.05593 0.05539
Cumulative Proportion  0.3601 0.4680 0.5705 0.66688 0.7424 0.79830 0.85369
                          PC8     PC9    PC10    PC11    PC12
Standard deviation     0.74530 0.67824 0.62349 0.43974 0.39760
Proportion of Variance 0.04629 0.03833 0.03239 0.01611 0.01317
Cumulative Proportion  0.89998 0.93832 0.97071 0.98683 1.00000
```

Plot my main PCA score plot with ggplot.

```
#Make a new data frame with our PCA results and candy data
my_data <- cbind(candy, pca$x[,1:3])
```

```
ggplot(my_data) +
  aes(PC1, PC2, label=rownames(candy)) +
  geom_point(col=my_cols) +
  geom_text_repel(col=my_cols) +
  labs(x="PC1", y="PC2")
```
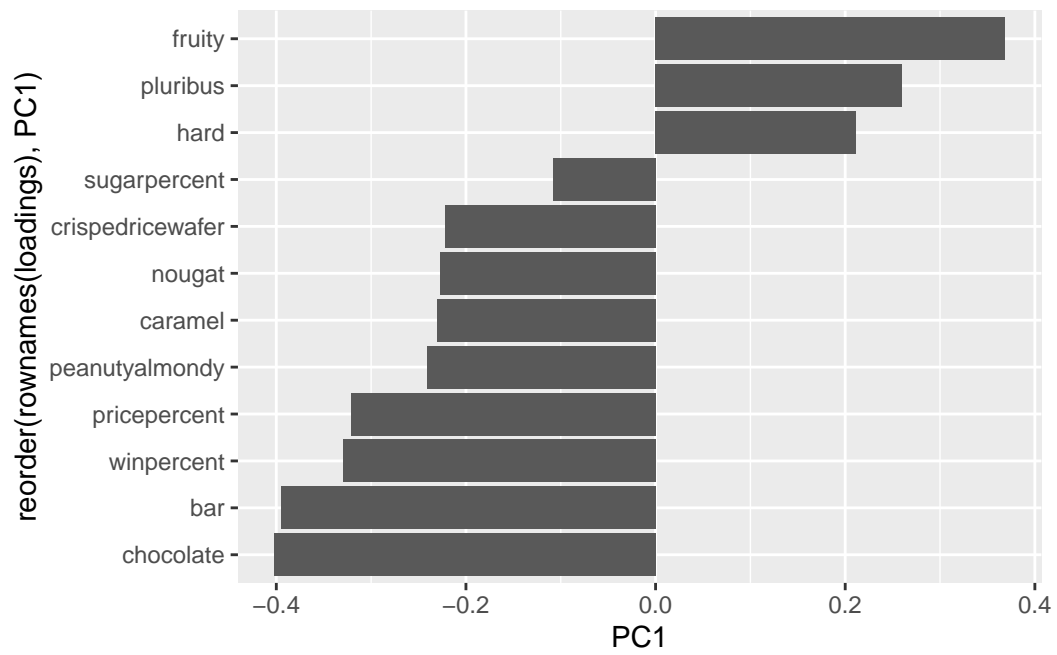
```
Warning: ggrepel: 48 unlabeled data points (too many overlaps). Consider
increasing max.overlaps
```
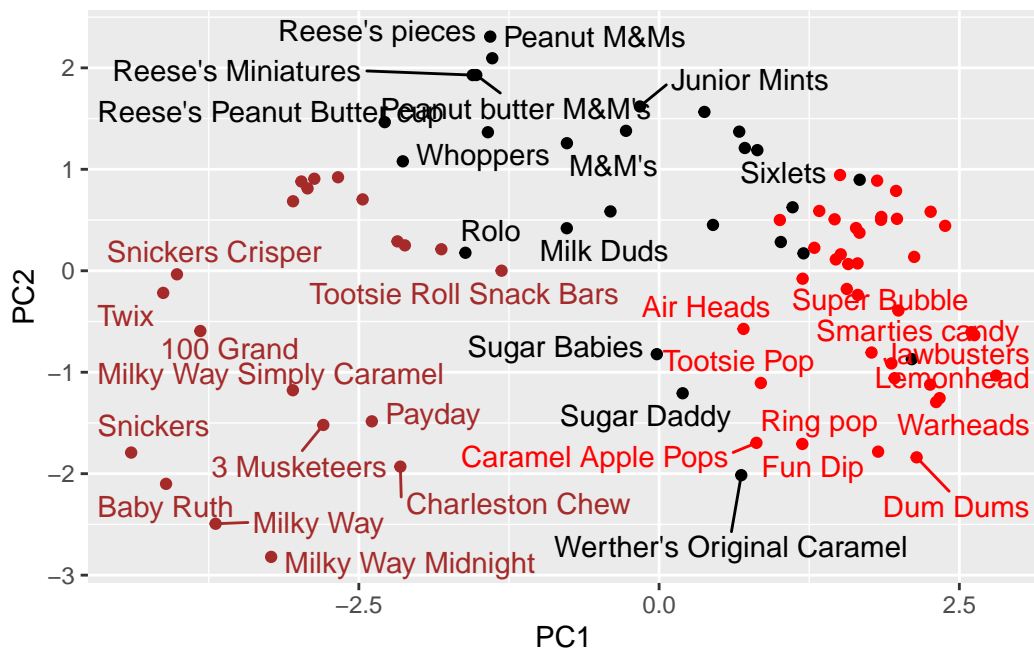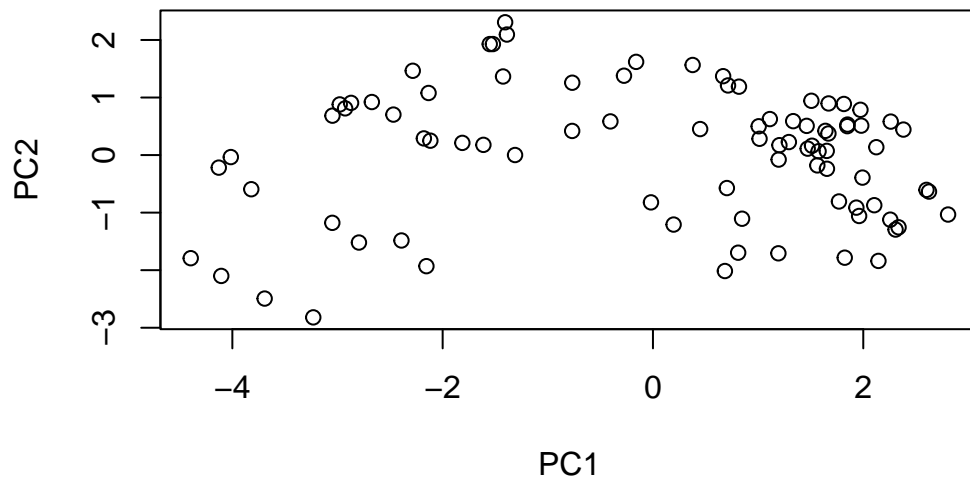
loadings plot

```
loadings <- as.data.frame(pca$rotation)

ggplot(loadings) +
  aes(PC1, reorder(rownames(loadings), PC1)) +
  geom_col()
```
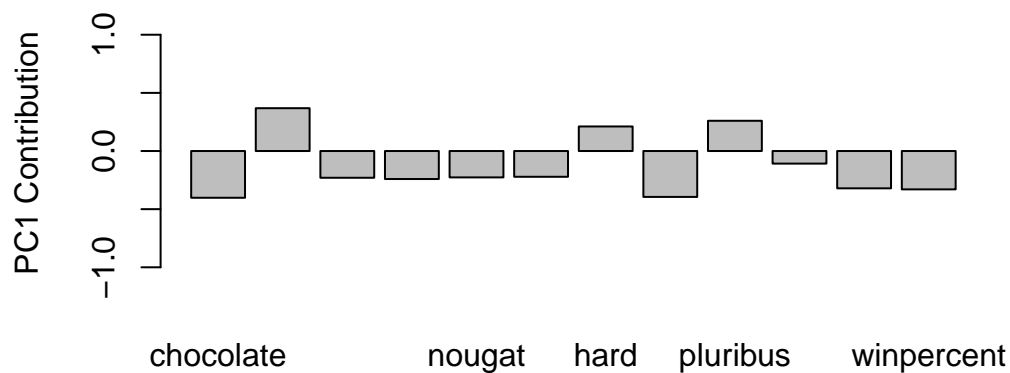
```
plot(pca$x[,1:2])
```

```
par(mar=c(8,4,2,2))
barplot(pca$rotation[,1], as=2, ylab="PC1 Contribution")
```

Warning in axis(if (horiz) 2 else 1, at = at.l, labels = names.arg, lty =
axis.lty, : "as" is not a graphical parameter

Warning in title(main = main, sub = sub, xlab = xlab, ylab = ylab, ...): "as"
is not a graphical parameter

Warning in axis(if (horiz) 1 else 2, cex.axis = cex.axis, ...): "as" is not a
graphical parameter

Q24. What original variables are picked up strongly by PC1 in the positive direction? Do these make sense to you?

- Variables such as fruity, hard, and pluribus are picked up strongly by PC1 in the positive direction. This makes sense if chocolate is normally well-liked, but people who like fruity, hard, and pluribus will influence the data.