class 10 - Halloween mini project

Benjamin Lee

```
candy_file <- "https://raw.githubusercontent.com/fivethirtyeight/data/master/candy-power-r

candy = read.csv(candy_file, 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 types are in the dataset?

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

```
[1] 38
```

Winpercent

The most interesting variable in the dataset is ‘winpercent’. for a given candy this value is the percentage of people who prefer this candy over another randomly chosen candy

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

```
rownames(candy)
```

```
 [1] "100 Grand"                   "3 Musketeers"
 [3] "One dime"                    "One quarter"
 [5] "Air Heads"                   "Almond Joy"
 [7] "Baby Ruth"                   "Boston Baked Beans"
 [9] "Candy Corn"                  "Caramel Apple Pops"
[11] "Charleston Chew"             "Chewey Lemonhead Fruit Mix"
[13] "Chiclets"                    "Dots"
[15] "Dum Dums"                    "Fruit Chews"
[17] "Fun Dip"                     "Gobstopper"
[19] "Haribo Gold Bears"           "Haribo Happy Cola"
[21] "Haribo Sour Bears"           "Haribo Twin Snakes"
[23] "HersheyÕs Kisses"            "HersheyÕs Krackel"
[25] "HersheyÕs Milk Chocolate"    "HersheyÕs Special Dark"
[27] "Jawbusters"                  "Junior Mints"
[29] "Kit Kat"                     "Laffy Taffy"
[31] "Lemonhead"                   "Lifesavers big ring gummies"
[33] "Peanut butter M&MÕs"         "M&MÕs"
[35] "Mike & Ike"                  "Milk Duds"
[37] "Milky Way"                   "Milky Way Midnight"
[39] "Milky Way Simply Caramel"    "Mounds"
[41] "Mr Good Bar"                 "Nerds"
[43] "Nestle Butterfinger"         "Nestle Crunch"
[45] "Nik L Nip"                   "Now & Later"
[47] "Payday"                      "Peanut M&Ms"
[49] "Pixie Sticks"                "Pop Rocks"
[51] "Red vines"                   "ReeseÕs Miniatures"
[53] "ReeseÕs Peanut Butter cup"   "ReeseÕs pieces"
[55] "ReeseÕs stuffed with pieces" "Ring pop"
[57] "Rolo"                        "Root Beer Barrels"
[59] "Runts"                       "Sixlets"
[61] "Skittles original"           "Skittles wildberry"
[63] "Nestle Smarties"             "Smarties candy"
[65] "Snickers"                    "Snickers Crisper"
```

```
[67] "Sour Patch Kids"                 "Sour Patch Tricksters"
[69] "Starburst"                       "Strawberry bon bons"
[71] "Sugar Babies"                    "Sugar Daddy"
[73] "Super Bubble"                    "Swedish Fish"
[75] "Tootsie Pop"                     "Tootsie Roll Juniors"
[77] "Tootsie Roll Midgies"            "Tootsie Roll Snack Bars"
[79] "Trolli Sour Bites"               "Twix"
[81] "Twizzlers"                       "Warheads"
[83] "WelchÕs Fruit Snacks"            "WertherÕs Original Caramel"
[85] "Whoppers"
```

```
candy["Sour Patch Kids", ]$winpercent
```

```
[1] 59.864
```

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
```

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

Table 1: Data summary

Name	candy
Number of rows	85
Number of columns	12
Column type frequency:	
numeric	12

Table 1: Data summary

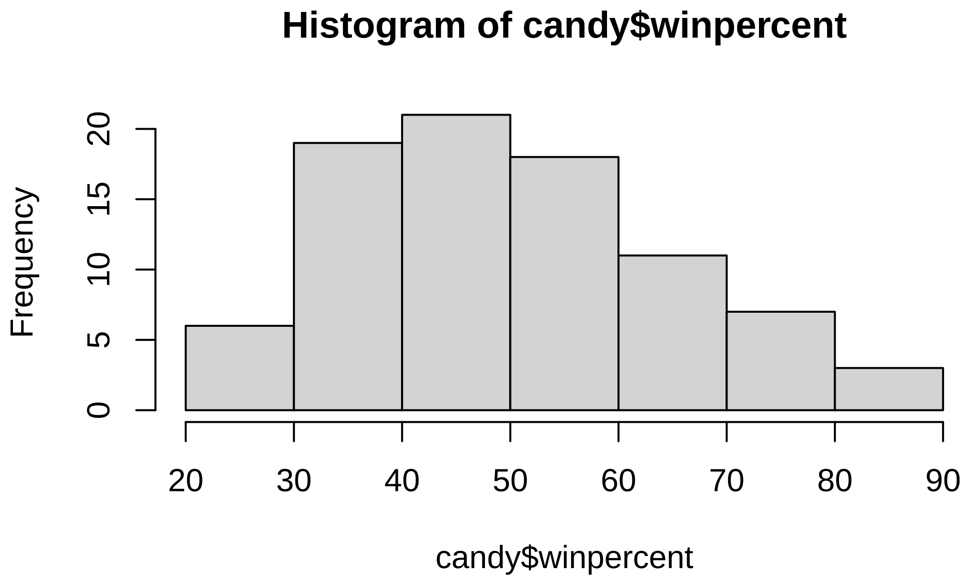
Group variables	None

Variable type: numeric

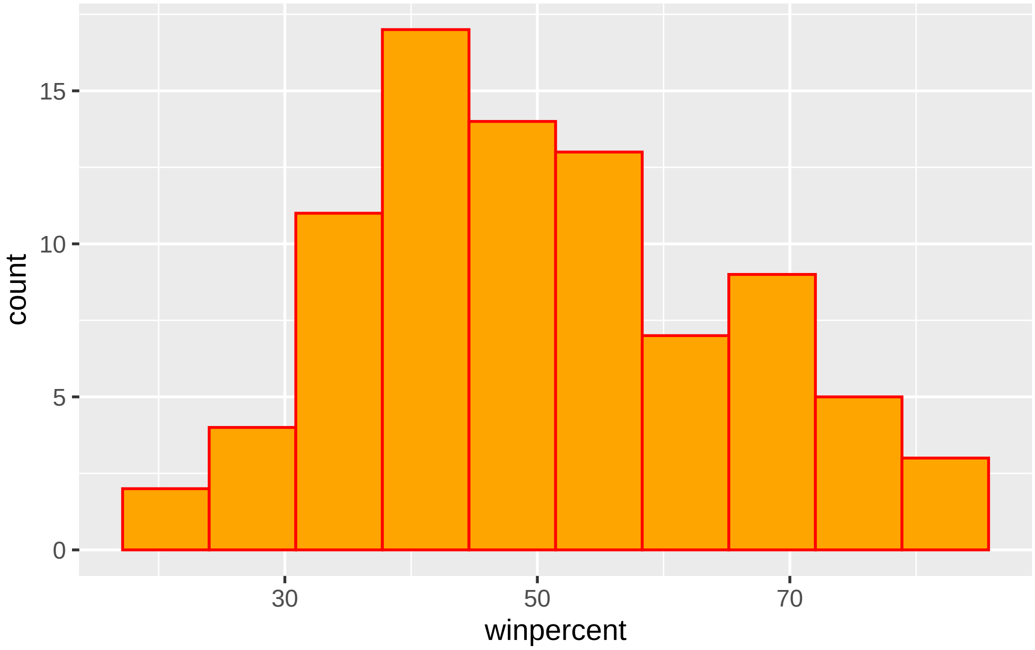
skim_variable	n_missing	complete_rate	mean	sd	p0	p25	p50	p75	p100	hist
chocolate	0	1	0.44	0.50	0.00	0.00	0.00	1.00	1.00	
fruity	0	1	0.45	0.50	0.00	0.00	0.00	1.00	1.00	
caramel	0	1	0.16	0.37	0.00	0.00	0.00	0.00	1.00	
peanutyalmondy	0	1	0.16	0.37	0.00	0.00	0.00	0.00	1.00	
nougat	0	1	0.08	0.28	0.00	0.00	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	

Q8. Plot a histogram of winpercent values

```
hist(candy$winpercent)
```



```
library(ggplot2)
ggplot(candy) +
  aes(winpercent) +
  geom_histogram(bins = 10, col ="red", fill="orange")
```



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

```
chocolate.inds <- as.logical(candy$chocolate)
choc.win <- candy[chocolate.inds,]$winpercent

fruity.inds <- as.logical(candy$fruity)
fruity.win <- candy[fruity.inds,]$winpercent

mean(choc.win)
```

```
[1] 60.92153
```

```
mean(fruity.win)
```

```
[1] 44.11974
```

Q12. Is this difference statistically significant?

```
t.test(choc.win, fruity.win)
```

```
    Welch Two Sample t-test

data:  choc.win and fruity.win
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 
```

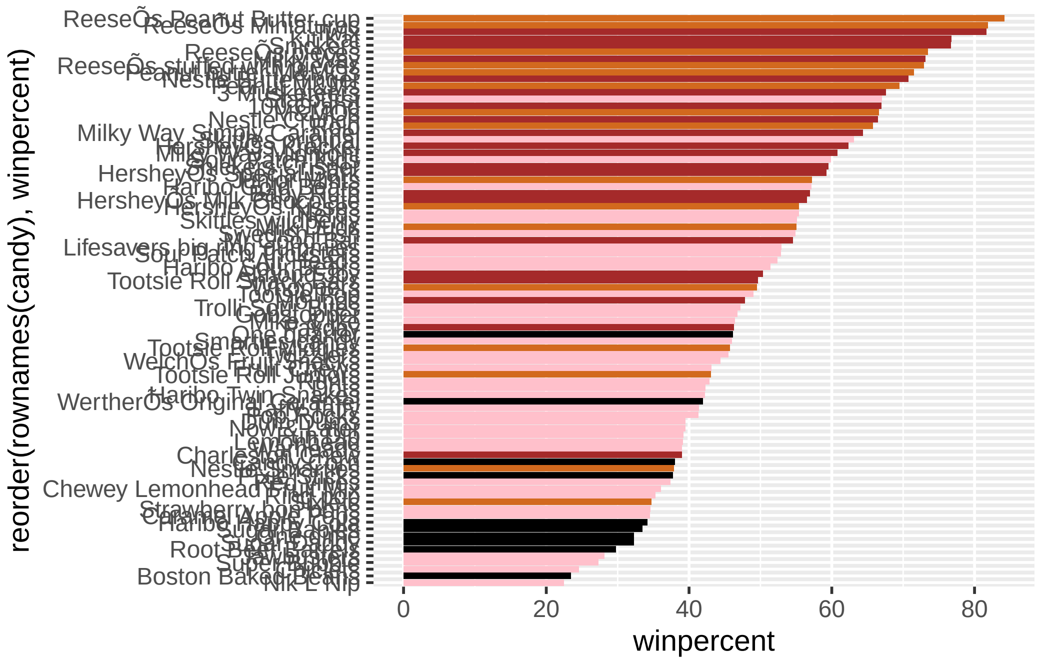
3. Candy ranking

First setup some colors for different candy types

```
my_cols = rep("black", nrow(candy))
my_cols[as.logical(candy$chocolate)] = "chocolate"
my_cols[as.logical(candy$bar)] = "brown"
my_cols[as.logical(candy$fruity)] = "pink"
my_cols
```

```
 [1] "brown"     "brown"     "black"     "black"     "pink"      "brown"    
 [7] "brown"     "black"     "black"     "pink"      "brown"     "pink"     
[13] "pink"      "pink"      "pink"      "pink"      "pink"      "pink"     
[19] "pink"      "black"     "pink"      "pink"      "chocolate" "brown"    
[25] "brown"     "brown"     "pink"      "chocolate" "brown"     "pink"     
[31] "pink"      "pink"      "chocolate" "chocolate" "pink"      "chocolate"
[37] "brown"     "brown"     "brown"     "brown"     "brown"     "pink"     
[43] "brown"     "brown"     "pink"      "pink"      "brown"     "chocolate"
[49] "black"     "pink"      "pink"      "chocolate" "chocolate" "chocolate"
[55] "chocolate" "pink"      "chocolate" "black"     "pink"      "chocolate"
[61] "pink"      "pink"      "chocolate" "pink"      "brown"     "brown"    
[67] "pink"      "pink"      "pink"      "pink"      "black"     "black"    
[73] "pink"      "pink"      "pink"      "chocolate" "chocolate" "brown"    
[79] "pink"      "brown"     "pink"      "pink"      "pink"      "black"    
[85] "chocolate"
```

```
ggplot(candy) +
  aes(winpercent, reorder(rownames(candy), winpercent)) +
  geom_col(fill = my_cols)
```



```
ggsave("tmp.png")
```

```
Saving 5.5 x 3.5 in image
```

Now, for the first time, using this plot we can answer questions like: > Q17. What is the worst ranked chocolate candy? > Q18. What is the best ranked fruity candy?

##4. Taking a look at pricepercent

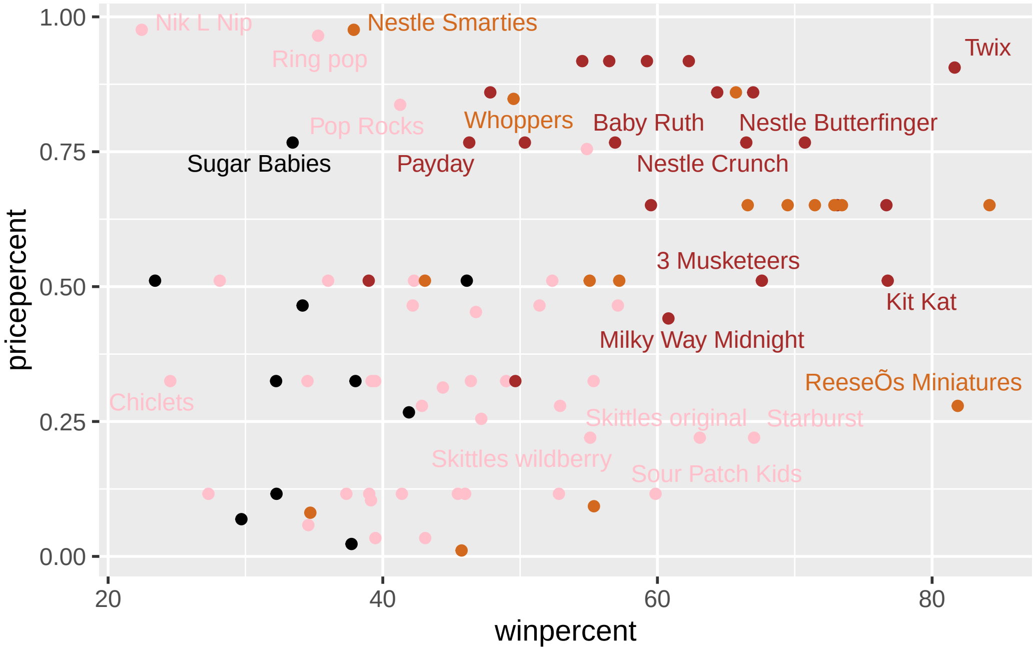
What is the best (most liked in terms of 'winpercent') for the money (in terms of 'pricepercent')?

To answer this I will make a plot of winpercent vs pricepercent

```
library(ggrepel)

# How about a plot of price vs win
ggplot(candy) +
  aes(winpercent, pricepercent, label=rownames(candy)) +
  geom_point(col=my_cols) +
  geom_text_repel(col=my_cols, size=3.3, max.overlaps = 5)
```

```
Warning: ggrepel: 65 unlabeled data points (too many overlaps). Consider
increasing max.overlaps
```

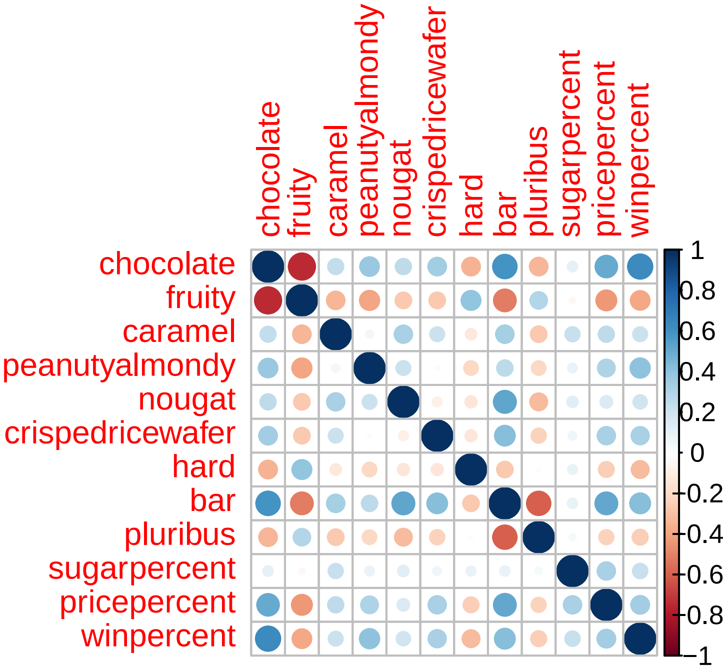


5. Exploring the correlation structure

```
library(corrplot)
```

```
corrplot 0.92 loaded
```

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


chocolate
fruity
caramel
peanutyalmondy
nougat
crispedricewafer
hard
bar
pluribus
sugarpercent
pricepercent
winpercent
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1