Quiz 3

Your name here

Suppose that we have a hypothetical dataset as in the following table [imagine that we have already sorted it in some way]. Answer the following questions.

Y	X	Z
1	1	1
1	1	1
0	1	1
0	1	0
1	2	0
0	2	0
1	2	0
0	2	1
0	3	1
0	3	1
1	3	0
0	3	0

```
data <- tribble(
  ~Y,~X,~Z,
  1,1,1,
  1,1,1,
  0,1,1,
  0,1,0,
  1,2,0,
  0,2,0,
  1,2,0,
  0,2,1,
  0,3,1,
  0,3,1,
  1,3,0,
  0,3,0,
)
```

Lets follow the three topics that we learned in the past couple lectures.

1. Figure out the **conditional distribution** of Y given the predictors
2. Figure out what your predition of Y will be given a value of your predictors based on a particular classifer, here **Bayes Classifier**.

3. Why does your classifier would work? Figure out the mathematical justification behind this approach.

Conditional Distribution

1. What are the possible values for Y here?

Answer:

2. What is the conditional distribution of Y given $X = 3$? In other words, what is the probability for every possible value of Y for the subgroup with $X = 3$?

Answer:

3. Lets verify your results not only for $X = 3$, but for every subgroup using `prop.table()` with `margins` option.

Bayes Classifier

4. Based on your results above, what is your prediction of Y if $X = 3$?

Answer:

5. Based on your results above, what is your prediction of Y if $X = 1$?

Answer:

Why use Bayes Classifier?

6. For $X = 3$, if you use $Y = 0$ as your prediction, what is the chance that you will make an error?

Answer:

7. For $X = 3$, if you use $Y = 1$ as your prediction, what is the chance that you will make an error?

Answer: