Homework 1 - GVPT 729A

Answer the following questions

# 1 Method of MLE

Find the Maximum Likelihood Estimate for $\pi$.

- The probability model of the binomial distribution is:

$$f(y|n,\pi) = \binom{n}{y}\pi^y(1-\pi)^{n-y}. \tag{1}$$

- Step 1: Write down the likelihood function (I did this step for you):

$$\mathcal{L}(\pi|y,n) = p(y|n,\pi) = \binom{n}{y}\pi^y(1-\pi)^{n-y} \tag{2}$$

- Step 2: Take the log and reduce.
- Step 3: Maximize and find the most likely value for $\pi$ (Start with the log-likelihood and take the derivative with respect to the parameter).

# 2 R

Include your code. Report results only where you see *Report your results.* printed.

## 2.1

The maximizing function we used in class used the "seq" function to generate a sequence from .01 to .99 in increments of .01.

```
#this command
p.seq<-seq(0.01, 0.99, 0.01)
```

- How would you change the code to create a sequence from .01 to .99 in increments of .1?
- How would you get R to print the first ten items in the sequence you just created? (look at subsetting)

## 2.2

The csv file located at this link: https://vincentarelbundock.github.io/Rdatasets/csv/datasets/presidents.csv contains self-reported votes in the 1992 U.S. presidential election. Additional documentation is available at this link

- Read the data in to R using read.csv command
- Create a cross tab that shows vote choice (rows) by party identification (columns). *Report your results.*
- Use the prop.table command to get the column percentages. *Report your results*.