

Practice Problems on Prediction

1. When can loops make our code easier and/or simpler?
2. Take a look at the code below.

```
n <- 100
for (i in 1:n) {
  print(i^2)
}
```

What values does `i` take on? What will be the first value printed? Second? Last?

3. Take a look at the code below.

```
x <- c(4, 7, 2, 1)
for (i in 1:length(x)) {
  print(x[i]*2)
}
```

What values does `i` take on? What will be the first value printed? Second? Last?

4. Take a look at the code below.

```
x <- c(4, 7, 2, 1)
z <- rep(NA, length(x))
for (i in 1:length(x)) {
  z[i] <- x[i]*2
}
```

What values does `i` take on? What will be the first value printed (trick question)? What does the vector `z` look like before running the loop? After?

5. Calculate the mean ideology for Republicans from the 100th to the 113th Congress.
 - (a) Load the `nominate.csv` data set.
 - (b) Use the `subset` function to subset out Republicans (i.e., `party == "Republican"`) into a differently named data set (maybe `nominate_r`).
 - (c) Create a vector `congresses` that contains each congress in the data set (i.e., 100 to 113).
 - (d) Create a holder `means_r` that is the same length as the vector `congresses`. We will later fill this vector with the means for the Republicans in each Congress.

- (e) Create a loop that takes `i` from 1 to the number of congresses (i.e., maybe `length(congresses)?`).
- (f) Inside the loop, replace the `i`th value of `means_r` with the mean of `ideology_score` for the `congresses[i]`th Congress.

Repeat parts (b) through (f) for Democrats.

6. Go to the Huffington Post's [Pollster](#) and look at the current and past polling averages for the Republican candidates. This is comparable to the figure at the top of page 121 in *QSS*. Who seems most likely to win? Least likely?
7. Now go to the [PredictWise](#) page for the GOP nomination. Scroll down to the bottom and look at the betting data from Betfair, PredictIt, and Bookie. The amounts between \$0.00 and \$1.00 represent the market price for a contract that pays \$1 if the candidate wins and \$0 if the candidate loses. This is informative, because if a candidate's contract is worth \$0.33, we'd expect them to win about 33% of the time. This happens because of supply and demand—in equilibrium $\$1 \times (\text{chance of winning}) = (\text{market price})$. Why do you think the polls and betting markets diverge? Which do you think is more accurate?