Homework 2

Problem 1

Description of experiment: Bresnan et al. (2007) find that, of 2360 dative constructions (n) in a large corpus of American English, all of which were either prepositional or double-object, 501 were prepositional (x). The null hypothesis is the assumption that prepositional and double-object dative constructions are equiprobable (p = 0.5).

p = 0.2122881

95 percent confidence interval:
0.1959431, 0.2293504

Statistical significance at α = 0.05:
The test is statistically significant as the probability of the null hypothesis (p = 0.5) is greater than the maximum of the 95% confidence interval (p = 0.2293504).

R code:

```
> 501+1859
[1] 2360
> binom.test(501,2360, p=0.5)

        Exact binomial test

data:  501 and 2360
number of successes = 501, number of
trials = 2360, p-value < 2.2e-16
alternative hypothesis: true probability of success is not equal to 0.5
95 percent confidence interval:
 0.1959431 0.2293504
sample estimates:
probability of success
            0.2122881
```

Problem 2

Stanford Wins: 943

NLP4J Wins: 1016

p = 0.481368

$95 percent confidence interval:
0.459029, 0.503763

Statistical significance at α = 0.05:
There is no statistically significant difference between the taggers at α = 0.05 as the probability of the null hypothesis (p = 0.5) is within the 95% confidence interval (p = 0.459029, 0.503763).

R Code:

```
> StanfordWins <- length(mydata1[which((mydata1$Stanford.tag == mydata1$gold.tag) &
(mydata1$NLP4J.tag != mydata1$gold.tag)), c("Stanford.tag")])
> NLP4JWins <- length(mydata1[which((mydata1$Stanford.tag != mydata1$gold.tag) &
(mydata1$NLP4J.tag == mydata1$gold.tag)), c("Stanford.tag")])
> StanfordWins
[1] 943
> NLP4JWins
[1] 1016
> StanfordWins+NLP4JWins
[1] 1959
> binom.test(943, 1959, p = 0.5)

        Exact binomial test

data:  943 and 1959
number of successes = 943, number of
trials = 1959, p-value = 0.1038
alternative hypothesis: true probability of success is not equal to 0.5
95 percent confidence interval:
 0.459029 0.503763
sample estimates:
probability of success
             0.481368
```