HW2

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Q1

```
x<-501
n<-501+1859
binom.test(x,n,p=0.5)
```

```
##
##  Exact binomial test
##
## data:  x and n
## 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
```

Out of 2360 sample sentences featuring the dative, 501 were prepositional dative constructions. When $p = .5$, we can say with 95% confidence that the true probability of the prepositional dative occurring is between around .2 and .23. When $\alpha = .05$, the test is significant.

Q2

```
PTB <- read.table("PTB.tsv", header=T, comment.char="")
true <- PTB$gold.tag

x1 <- sum(true == PTB$Stanford.tag & true != PTB$NLP4J.tag)
x2 <- sum(true == PTB$NLP4J.tag & true != PTB$Stanford.tag)

x0<-min(x1, x2)
n0<-sum(x1, x2)
binom.test(x0,n0,p=.5)
```

```
##
##  Exact binomial test
##
```

```
## data:  x0 and n0
## 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
```

The Stanford tagger wins 943 times. The NLP4J tagger wins 1016 times. No tagger performs significantly better since $p = .48 > \alpha = .05$.