STA312Exam2TakeHomePortion

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Question 1

Permutation Tests (using the prostate data from the faraway package):

```
library(faraway)
prostate <- faraway::prostate
```

Part a

Conduct a 5% significance permutation test to determine whether $y = lpsa$ is correlated with $x = lcp$.

The following code helps us to conduct a permutation test on the varaible lcp

```
lm1 <- lm(lpsa~lcp, data = prostate)
# Compute the original F statistic
forg <- summary(lm1)$fstat
# Initialize the p-value
pval=0
# Create the for loop
for (i in 1:4000){
  # Fit the model with the permuting
  lmnew <- lm(lpsa~sample(lcp), data = prostate)
  # Find out whether the F stistic is bigger
  if(summary(lmnew)$fstat > forg){
    # if bigger, add it to the p value
    pval=pval+1/4000
  }
}
# return the p-value
pval
```

```
## [1] 0
```

From the p-value the permutation test gave us which is 0, we know that *lpsa* is correlated to *lcp*.