Question:
Makers of generic drugs are required by the FDA to show that the extent of absorption of their drug in blood does not differ significantly from the "brand-name" drug that they imitate. To show this, 20 healthy nonsmoking male subjects are selected. For each subject, one of the two drugs is randomly chosen and given first. Then after a washout period, the other drug is given. In both the cases, the absorption of the drug in the blood is measured. The dataset stored in the file medicine.txt gives the measurements taken on 20 subjects. Do the drugs differ significantly in absorption?

Report:
Based on the question, I find that they are two independent samples (two different drugs). And I want to find is there any relationship between these two samples. So I choose "Chi-Square test of Homogeneity" to solve this question.

Ho: two different drugs have the same satisfaction distributions.
H1: two distributions are different.
Null distribution: Chi-Square test with 19 degrees of freedom.
The **expression of p-value**: $P\{X^2>X^2_{obs}\}$
First I load the data into R.

```
mydata = read.table("F:\\6313 statistic for DS\\project\\5\\medicine.txt")
brandname = mydata$V2[2:21]
generic = mydata$V3[2:21]
```

And then I make a matrix with 2 variables and 20 subjects.

```
brandname<-matrix(brandname,    nrow = 1, ncol = 20 )
generic<-matrix(generic, nrow=1, ncol=20)
xmat<-rbind(brandname,generic)
xmat<-apply(xmat,1,as.numeric)
```

Now I have the matrix and now I will calculate P-value by using the function below:

```
chisq.test(xmat)
```

The answer is shown as:

```
        Pearson's Chi-squared test

data:  xmat
X-squared = 4699.4, df = 19, p-value < 2.2e-16
```

Because P-value is too small, normally, a=0.05 or 0.1 which must bigger than the p-value.

So that I reject H0 and accept H1.
So these two drugs don’t differ significantly in absorption.