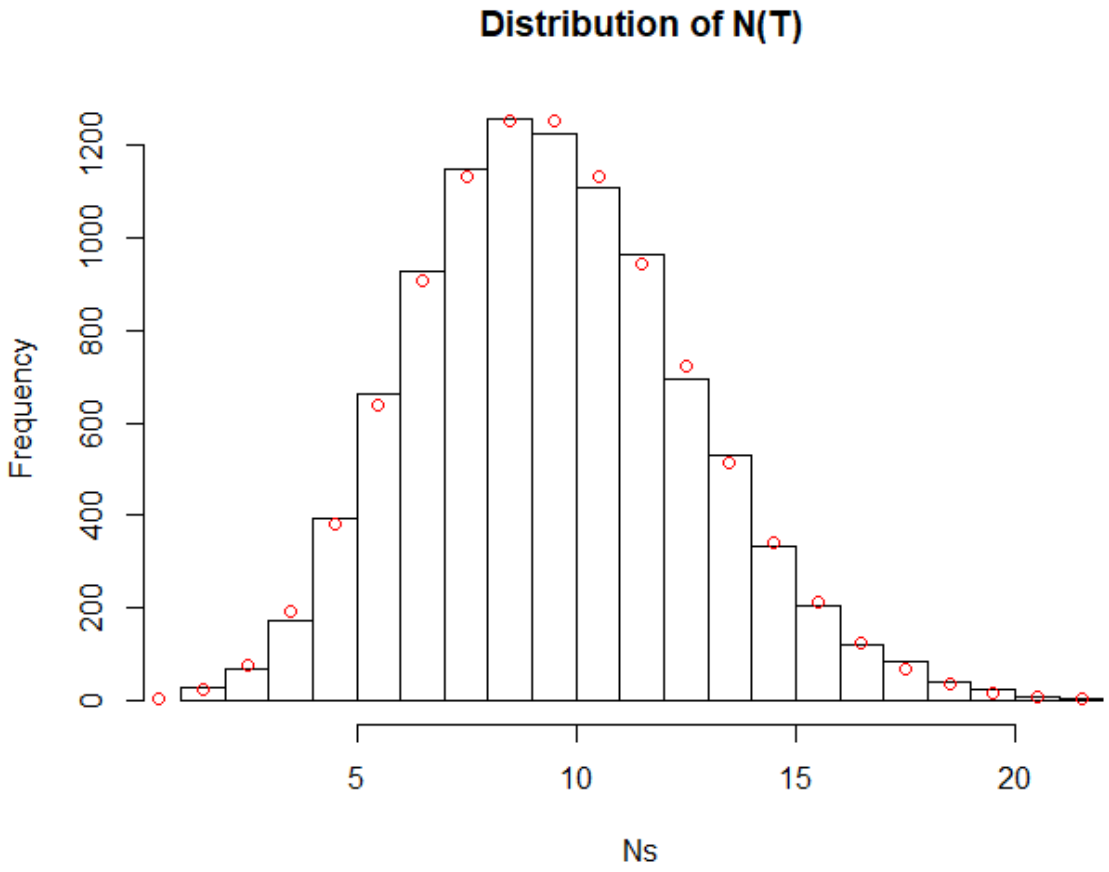
```
#---------------parameters------------
n1=10000    #size of the sample
l1=1      #
T1=10     #

#---------------simulation of N(T)-----
Ns=rep(-1,n1)
for (i in (1:n1))
{
  k=0
  t=0
  while (t<T1)
  {
    t=t+rexp(1,l1) #generate the Exp-distributed random variables
    k=k+1
  }
  Ns[i]=k-1
}

#---------------distribution of N(T)-----
> table(Ns)
Ns
   1    2    3    4    5    6    7    8    9   10   11   12   13
   4   23   67  173  393  664  926 1148 1258 1225 1108  965  696
  14   15   16   17   18   19   20   21   22
 529  334  204  119   84   42   23   10    5
> hist(Ns,main="Distribution of N(T)") #histogram of the sample
> l2=mean(Ns)                          #sample mean value
> s2=sd(Ns)                            #sample standard deviation
> minv=min(Ns)
> maxv=max(Ns)

 #distribution function for Poisson distribution
> points(x=minv:maxv-0.5,y= n1*dpois(minv:maxv,lambda=l2),col="red")
```




```
 #Chi-square test for goodness of fit
> tb.emp<-table(Ns)                  # table with empirical frequencies
> fr.emp<-c()                        # vector of empirical frequencies
> len=length(tb.emp)-2
> for(i in 2: (len+1)) fr.emp[i-1]<-tb.emp[[i]]
> fr.emp[1]<-fr.emp[1]+tb.emp[[1]]
> fr.emp[len]<-fr.emp[len]+tb.emp[[len+2]]

## vector of fitted (expected) frequencies
> fr.ex<-n1*(dpois((minv+1):(maxv-1),lambda=l2))
> fr.ex[1]=fr.ex[1]+sum(n1*dpois(0:minv,lambda=l2))
> fr.ex[len]=fr.ex[len]+n1*ppois(q=maxv-1,lower.tail=FALSE,lambda = l2)

> sum(fr.ex)  # check: must be equal n1
[1] 10000
>
> test1<-chisq.test(fr.emp,p=fr.ex,rescale.p=TRUE)
#p-value=  0.7544. Therefore, we have made the correct assumption
```