AMS 394 Homework 3

1. Use the d_logret_6stock data set to answer the questions.
   (1) Perform a t-test for Intel with the null hypothesis the mean of its return is zero and reach a conclusion with significance level $\alpha = 0.05$.
   (2) Perform a Wilcoxon signed-rank test for Intel with the null hypothesis that the mean of its return is zero and reach a conclusion with significance level $\alpha = 0.05$.
   (3) Perform a two sample t-test to conclude if the mean returns of Pfizer and Intel are same or not and reach a conclusion with significance level $\alpha = 0.05$.
   (4) Perform a two-sample Wilcoxon test to conclude if the mean returns of Pfizer and Intel are the same or not and reach a conclusion with significance level $\alpha = 0.05$.
   (5) Compare the variance of returns for Pfizer and Intel.

2. In an effort to link cold environments with hypertension in humans, a preliminary experiment was conducted to investigate the effect of cold on hypertension in rats. Two random samples of 6 rats each were exposed to different environments. One sample of rats were held in a normal environment at 26°C. The other sample was held in a cold 5°C environment. Blood pressures and heart rates were measured for rats for both groups. The blood pressure for the 12 rats are shown in the accompanying table. Do the data provide sufficient evidence to indicate that rats exposed to a 5°C environment have a higher mean blood pressure than rats exposed to a 26°C environment? Test with significance level $\alpha = 0.05$.

	26°C		5°C
Rat	Blood Pressure	Rat	Blood Pressure
1	152	7	384
2	157	8	369
3	179	9	354
4	185	10	367
5	178	11	375
6	149	12	423

3. To determine whether glaucoma affects the corneal thickness, measurements were made in 8 people affected by glaucoma in one eye but not in the other. The corneal thickness (in microns) were as follows:

Person	1	2	3	4	5	6	7	8
Eye affected	488	478	480	426	440	410	458	460
Eye not affected	484	478	492	444	436	398	464	476

(1)According to the data, can you conclude, at the significance level $\alpha = 0.10$, that the corneal thickness is not equal for affected versus unaffected eyes? Please write the entire R code to check the assumptions necessary and to perform the test.
(2)Calculate a 90% confidence interval for the mean difference in thickness.

4. Over then past 5 years, the mean time for a warehouse to fill a buyers order has been 25 minutes. Officials of the company believe that the length of time has increased recently, either due to a change in the workforce or due to a change in customer purchasing policies. The processing time (in minutes) was recorded for a random sample of 15 orders processed over the past month.

28 25 27 31 10 26 30 15 55 12 24 32 28 42 38

(1)check the normality of the data
(2)Please test the research hypothesis at the significance level $\alpha = 0.05$.