Instructions:
Be verbose. Explain clearly your reasoning, methods, and results in your written work. Write clear code that is well documented. With 99% certainty, you cannot write too many code comments.

Written answers are worth 8 points. Code is worth 2 points. 10 points total.

1. When finished, respond to the questions in Sakai as "done." We will record your grade there.
2. In your code repository, create a folder called "Week05."
3. In that folder, include
   a. a document (preferably a PDF) with your responses.
   b. Slides for presenting your results.
   c. All code
   d. A README file with instructions for us to run your code

Everything must be checked into your repository by 8am Sunday 10/8. A pull will be done at that time. Documents and code checked in after the instructors pull will not be graded.

Data for problems can be found in CSV files with this document in the class repository.

Problem 1:
Use the data in problem1.csv. Fit a Normal Distribution and a Generalized T distribution to this data. Calculate the VaR and ES for both fitted distributions.

Overlay the graphs the distribution PDFs, VaR, and ES values. What do you notice? Explain the differences.

Problem 2:
In your main repository, create a Library for risk management. Create modules, classes, packages, etc as you see fit. Include all the functionality we have discussed so far in class. Make sure it includes
   1. Covariance estimation techniques.
   2. Non PSD fixes for correlation matrices
   3. Simulation Methods
   4. VaR calculation methods (all discussed)
   5. ES calculation

Create a test suite and show that each function performs as expected.

Problem 3:
Use your repository from #2.

Using Portfolio.csv and DailyPrices.csv. Assume the expected return on all stocks is 0.

This file contains the stock holdings of 3 portfolios. You own each of these portfolios.

Fit a Generalized T model to each stock and calculate the VaR and ES of each portfolio as well as your total VaR and ES. Compare the results from this to your VaR form Problem 3 from Week 4.