COMPUTER ASSIGNMENT 1

Portfolio Insurance with Options

Data
Download the development of a stock of your own choice during a period that is sufficiently long to cover different market conditions,
Here are three examples of sources:

Nasdaq (Nasdaq Stock Market) <http://quotes.nasdaq.com/asp/MasterDataEntry.asp?page=charting>

NYSE (New York Stock Exchange) <nyse.com> You can use the nasdaq address above.

Stockholmsbörsen <http://www.nasdaqomxnordic.com/historiska_kurser>

The Assignment
You shall insure the holding of a stock by buying a (European) put with an appropriately chosen strike price, K, and time to maturity, T. In order to facilitate comparisons with the development of the stock, norm the value of the portfolio in such a way that it coincides with the value of the stock at time zero.

1 Express the portfolio value at time t, $t \leq T$, as a function of the values of the stock and the put at the time points 0 and t.
Alternatively, the portfolio value can be expressed as a function of cash and a call. Do this.

2 Write a program that calculates the development of the portfolio by using the Black-Sholes formula for a put or a call. Estimate the volatility from data and give the interest rate a realistic value.
Choose two periods that illustrate the pros and cons with portfolio insurance. Plot the values of the portfolio and the stock during these two periods.
Also, calculate the volatilities of the portfolio and the stock during the two periods.
When calculating the values of the options you need the standardized normal distribution $\Phi(x)$. It is written $normcdf(x)$ or $(1 + erf(x/sqrt(2)))/2$ in Matlab.