Mini project for Ai

**Data preparation**: Download daily price data for SPY (ETF for S&P 500 index) from Yahoo finance, google finance or Quandl. You should be able to get a pretty long history. Data should cover Date and daily close price.

Analysis:

* Compute daily return. Return is defined as ret(t) = (close(t)/close(t-1) -1)\*100
* Foe each year
  + compute annual return. Annual return is computed as the sum of all the daily returns belong to that year
  + compute annual volatility. Daily volatility is computed as standard deviation of daily returns, and annual volatility = daily volatility \* sqrt(252), where 252 is the number of business days in a year.
  + Compute the average annualized return and annual volatility of the entire return series
* Return analysis
  + Is the return time series normally distributed? Is it skewed? How much is its kurtosis?
  + Conditional on today is down (ret<0), what is expected return of tomorrow?
  + Conditional on this year is down, what is the expected return of next year?
  + Conditional on this month is down, what is the expected return of next month?
  + Does the return between 2007-01-01 to 2010-01-01 and 2010-01-01 to 2013-01-01 follow the same distribution?
    - Do they have the same mean? Test whether the difference in mean return is significant
    - Do they have the same standard deviation? Test whether the difference in return standard deviation is significant