ANLT 207
Time Series Analysis
Assignment #2

For all problems below, show your work with a PY or an IPYNB file.

1	Assume the 'robberies.csv' dataset from Brownlee Chapter 30:		
	a. Perform a Dickey-Fuller test on the series. Is the series stationary?	2	
	b. Detrend the series with a polynomial fit (up to order 3)	5	
	c. At what polynomial order does the detrended series become stationary?	3	
	d. Perform differencing on the original series to induce stationarity	4	
	e. At what order of differencing does the series become stationary?	1	
		15	pts.
2	Assume the 'champagne.csv' dataset from Brownlee Chapter 32:		
	a. Perform a Dickey-Fuller test on the series. Is the series stationary?	1	
	b. Perform seasonal differencing to eliminate seasonality	1	
	c. Is the resulting series stationary?	1	
	d. Perform a seasonal decomposition on the original series and plot the results	2	
	e. Plot a 1 year period (Jan-Dec) for only the seasonal component	5	
		10	pts.
3	Assume the 'series.csv' dataset:		
	a. Using ACF & PACF plots, estimate the ARMA(p,q) order	5	pts.
	b. Going with your answer for p, calculate the a_1 - a_p coefficients using the Yule-Walker equations (Hint: np.linalg.det(matrix) makes calculating determinants easy)	15	pts.
4	The sunspot cycle is estimated at 11 years. Based on the ACF of the "Monthly Sunspots" dataset, what is the sunspot cycle to the nearest month?	5	pts.