# Financial Mathematics 2019

# Assignment

### Prediction of Stock Prices

You are expected to submit your python notebook and the outputs of you code for the tasks below will be accessed.

1. Go on the **YAHOO** FINANCE website and download **daily**, **historical prices** of the **Hong Kong Exchanges and Clearing Limited (HKXCY)** for the period **January 01, 2018** to **December 31, 2018**.
   (**Note:** *the default name of the data file should be* **HKXCY.csv**)

2. Make a new dataframe with only the columns: **Open**, **High**, **Low**, and **Close**. Use this dataframe as your dataset for the remaining tasks below.

3. Use ScikitLearn's **MinMaxScaler()** function to normalise your data to be between -1 and 1

4. Split your data into **training** and **testing** at a proportion of your choice. Justify why you used such a proportion.

5. Using a **rolling window** (look-back) of 10, create a labelled training and testing sets, and reshape these sets to have the format the sizes of [**samples, timesteps, features**].

6. Train and test a **Stateful** LSTM model. State your final training and testing losses.

7. Super-imposed on each other, plot the training, the predictions on the training, the testing and the predictions on the testing data in one figure.

8. (*Bonus points*) Repeat 7 using the actual prices of the stock instead of the normalised values used in 7 above.
   (**Hint:** *this involves using the inverse of* **MinMaxScaler()**)