Assignment (20%)

Due: 6th May 2019, 9 am

Learning Outcomes

1. Apply programming concepts to solve business problems
2. Describe the logic and flows of given programs
3. Predict the output of a program
4. Write programs with common programming practices
5. Identify and fix logical and runtime errors in programs

Background

As a layman in HK stock market, Ken lost most of his share investments dramatically during the financial tsunami. Ken has started thinking of a better way to invest on stocks. After doing some researches on the web, Ken has finally realized that he needs a share analyzer to provide some financial indicators before making a stock purchasing decision. In this assignment, you are asked to develop a VBA program to analyze stock pricing information. It can be treated as an investment analyzer. The VBA investment analyzer can access stock pricing information from the Internet (e.g., https://www.quandl.com) and perform basic analysis on them in order to facilitate the investment decision making process.

This program provides simple moving average (SMA) for 10-, 20-, 50-,100- and 250- days, and also provides graphs plotting among trading days. The program can compute a Golden Cross indicator for all shares being considered so the user may have some ideas for his/her purchasing decisions.

The following statement can download stock pricing information of CKH Holdings from https://www.quandl.com.

```
Application.Workbooks.Open("https://www.quandl.com/api/v3/datasets/HKEX/00001.csv?api_key=1YnjPZgaqTtVq3cwQERs")
```

After executing the statement, an Excel file will be created and it will contain the following information.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Date	Nominal Price	Net Change	Change (%)	Bid	Ask	P/E(x)	High	Low	Previous Close	Share Volume (000)	Turnover (000)	Lot Size
2	4/4/2019	85.6			85.6	85.65		85.9	85.05	85.95	5065	433193	
3	3/4/2019	85.95			85.85	85.95		86.3	84.85	85	7568	648747	
4	2/4/2019	85			85	85.05		85.3	83.55	84.1	6339	535399	
5	1/4/2019	84.1			84.05	84.1		84.15	82.6	82.45	7300	610499	
6	29/3/2019	82.45			82.45	82.5		83.15	82.15	82.5	6947	574096	
7	28/3/2019	82.5			82.35	82.5		82.5	81.2	82.1	7635	626003	
8	27/3/2019	82.1			82.1	82.2		82.7	82.05	83	7568	622596	
9	26/3/2019	83			82.95	83		84.05	82.2	82.95	4977	413038	
10	25/3/2019	82.95			82.9	82.95		83.75	82.4	83.8	7995	663670	
11	22/3/2019	83.8			83.75	83.8		84.65	82.85	81.6	13478	1124179	
12	21/3/2019	81.6			81.6	81.75		83.5	81.6	82.5	12224	1009254	
13	20/3/2019	82.5			82.5	82.55		83.3	80.3	80.45	12420	1018144	
14	19/3/2019	80.45			80.4	80.45		81.15	80.2	80.95	7374	593781	
15	18/3/2019	80.95			80.95	81		81.1	80.1	80.9	8473	682346	
16	15/3/2019	80.9			80.9	80.95		81.75	80.05	80.3	6655	539628	
17	14/3/2019	80.3			80.3	80.4		80.65	79.8	80	4008	322032	
18	13/3/2019	80			79.95	80		80.55	79.6	80.4	4552	364416	
19	12/3/2019	80.4			80.4	80.5		80.95	80	79.75	5218	420084	
20	11/3/2019	79.75			79.75	79.8		80.1	79	79.9	6346	505361	
21	8/3/2019	79.9			79.85	79.9		80.6	79.8	81.4	7393	592041	
22	7/3/2019	81.4			81.3	81.4		82.25	81.2	81.85	5387	439076	
23	6/3/2019	81.85			81.85	82		82.15	81.6	82	4286	350957	
24	5/3/2019	82			82	82.1		83.15	82	83.7	6162	507106	
25	4/3/2019	83.7			83.5	83.7		84.4	83.25	83.5	5493	460184	
26	1/3/2019	83.5			83.5	83.6		84	83.05	83.55	4605	384836	
27	28/2/2019	83.55			83.45	83.55		84.3	83.15	84.7	5997	501530	
28	27/2/2019	84.7			84.6	84.7		84.85	83.3	83.35	8487	717037	
29	26/2/2019	83.35			83.3	83.35		83.7	82.15	82.25	7220	601677	

CKH Holdings. (00001) from quandl.com

In the program, you are required to implement Simple Moving Average (SMA) for 10-, 20-, 50-, 100-, and 250-days evaluations. Pricing information including nominal price, previous close are involved in the calculations. Further information about SMA can be obtained in the following link: http://stockcharts.com/school/doku.php?id=chart_school:technical_indicators:moving_averages

Project Descriptions

There is no specific design of graphical user interface (GUI) for this assignment and students are free to come up with their own designs. The VBA program needs to include the following basic functionalities.

1. Provide a set of controls to manipulate all functionalities in the "MyAnalyzer" worksheet of an Excel file. For example, the controls for capturing the most updated data, calculating SMA, Golden Cross Indicator, and plotting graph.
2. Read stock information of all candidate stocks listed in the "MyAnalyzer" worksheet
3. Download all listed share records from quandl.com. The historical data of each stock should be stored in a separate worksheet named as its stock number (E.g. "00001" is the name of the worksheet which contains CKH Holdings' historical data). Use only one excel file to store both the "MyAnalyzer" worksheet and other stock pricing record worksheets.
4. Update the latest stock quote of the candidate stocks in the "MyAnalyzer" worksheet
5. Calculate the Simple Moving Average (SMA) in 10-, 20-, 50-, 100- and 250-days
6. Implement the Golden Cross, an uptrend Indicator, to show the situation that a short-term moving average (e.g. 20-days) of a stock's price exceeds its long-term moving average (e.g. 250-days). Your program must check the existence of this indicator (i.e. yes or no) and present with the corresponding crossing date for all stocks in the "MyAnalyzer" worksheet.
7. Plot graph (e.g. the basic chart for each candidate stock) by using a macro. You can make use of the macro recorder function to find out how to write program for creating charts.
8. Your program must provide comments (documentation) to explain the code and maintain a good programming style, i.e. choosing a meaningful variable name.

In addition to the basic functions, the VBA program will possess the following additional works:

1. Implement some additional functions in the VBA in order to help the user to have some ideas for making his/her own investment (purchasing or selling) decisions.
   For example, your additional function can be based on some financial models or technical analysis indicator such as Exponential Moving Average (EMA) and Bollinger Bands. You can also implement the best-buy index for all shares based on your own design. Typically, the index is likely to be related to a formula mixing some financial indicators such as SMA, SMM, RSI, ROC and MFI. Please note that you must indicate how to interpret your own best-buy index, i.e. the higher the number, the better to buy.
2. Provide a user-friendly interface in the program. Your "MyAnalyzer" worksheet and controls should be well-organized and convenient to use. E.g. all buttons are associated with macros; the user does not need to scroll down to the bottom of the worksheet to check his/her total investment, profit and loss, etc.

Marking Criteria

Area	Percentage
MyAnalyzer Worksheets **(Controls, Download files, update stock quotes)** Your VBA program must apply the followings: ○ A worksheet called "MyAnalyzer" to record all stocks' basic information (stock number, company name, latest stock quote), VBA buttons and macros ○ Worksheets record individual share's historical pricing information. These information can be found in the websites: **https://www.quandl.com** You may assume that the latest stock quote is the most updated record in the corresponding share record.	**25%**
Simple Moving Average (SMA) Your VBA program must implement SMA in 10-, 20-, 50-, 100- and 250-days.	**15%**
Golden Cross Indicator Your VBA program must show this indicator along with the crossing date for all stocks in the "MyAnalyzer" worksheet.	**15%**
Plotting graph Your VBA program must be able to plot graph by using macro.	**10%**
Creativity (Functionality) Your VBA program must implement additional functionality to help making investment decision.	**10%**
Creativity (GUI) Your VBA program must provide well-designed and well-organized user interface.	**5%**
Programming Style Your VBA program must provide use constant, variables, objects, functions and subroutines appropriately. The code is organized and easy to follow with proper and consistent indentation.	**10%**
Comments Your VBA program must contain comments to explain the code. All the comments must be relevant.	**10%**
Total :	**100 %**