COMP1022Q
Introduction to Computing with Excel VBA
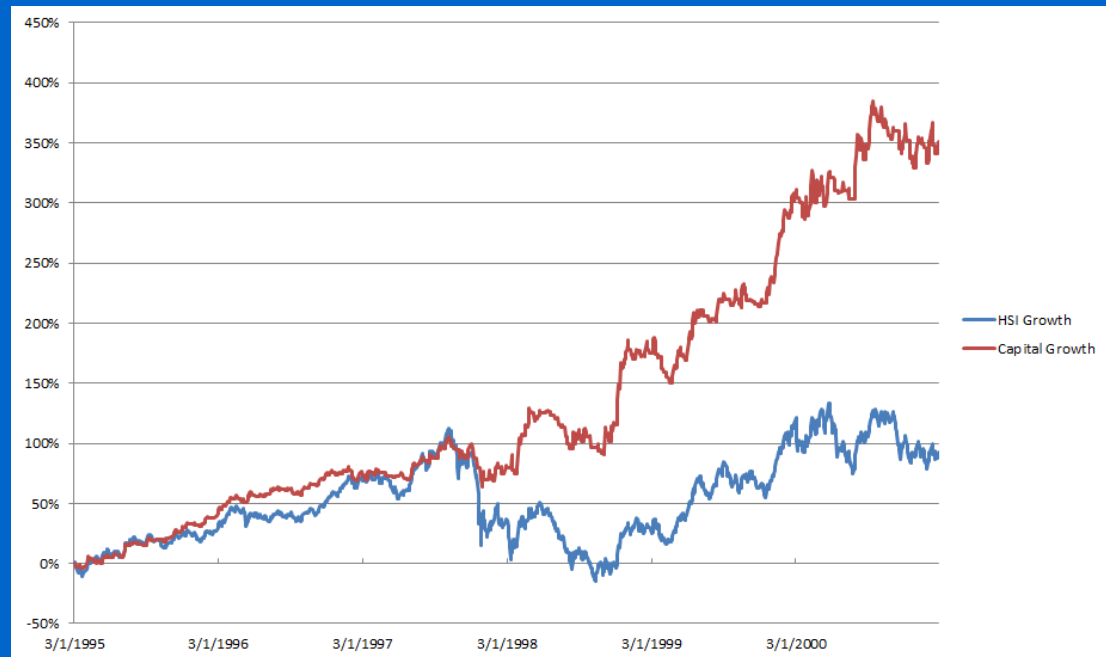
# Assignment 1
# Stock Market Prediction

David Rossiter and Gibson Lam

# Lab 1 and Lab 2 Work

- In lab 1 and lab 2 you worked on stock market prediction

- At the end of lab 2 you created a chart similar to the one shown on the right



- In this assignment you will use the techniques that you learned in those two labs to do similar work
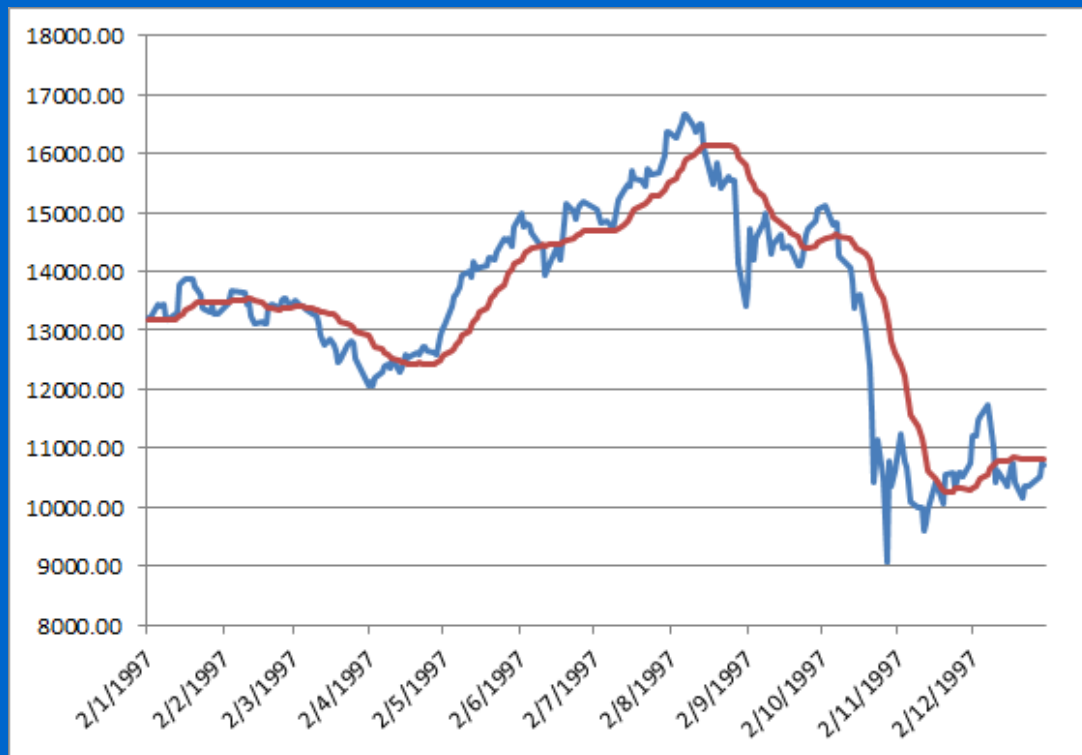
# A Reminder of The Prediction Method

- The prediction method works like this:

  1. A 'moving average' is computed for a stock over a period of time

  2. We decide to buy/sell the stock using these rules:

     - If the stock price moves above the moving average we buy it

     - If the stock price moves under the moving average we sell it

# Moving Average

- The 'moving average' is the average price of a stock
- The average is calculated by taking the average of the price of the current day and the prices of a certain number of days before the current day



Here we can see the Hang Seng Index (blue line) and its 20-day moving average (red line) during 1997

# Buying and Selling Stock

- You buy and sell a stock by comparing the values of the current price and its moving average

- For example, here is an example of buy/sell signals for the Hang Seng Index in the middle of 1997

At this point the HSI (blue) goes above the moving average (red) so we buy

Profit

At this point the HSI (blue) goes under the moving average (red) so we sell

# Calculating Moving Average in Lab 1 and Lab 2

- In the labs we used a three-day average:
  the average price = (the price of the current day
    + the price of the previous day
    + the price of the day before the previous day) / 3

| A | B | C | D |
|---|---|---|---|
| Date | Close | 3-Day Average | Sugge |
| 1/3/1995 | 7844.1 | | |
| 1/4/1995 | 7887 | | |
| 1/5/1995 | 7918.4 | =AVERAGE(B2:B4) | B |
| 1/6/1995 | 7683.3 | 7829.57 | S |
| 1/9/1995 | 7528.9 | 7710.20 | S |

- You can use any appropriate name for your columns, i.e. 'Three Day Average', 'Three Days Average', '3 Days Average', '3-Day Average' are all OK. In these instructions, we use the last one.

# Overview of The Assignment

- For the assignment, you need to do the following:
  - Instead of analyzing the Hang Seng Index you need to analyze **one particular stock** over a period of time
  - You need to complete **three analyses** for your stock:
    - a 3-day moving average
    - a 10-day moving average
    - a 25-day moving average
  - You need to make a single **summary chart** which shows the price of your stock and the growth when using each of the three moving averages
    (=four lines shown together **on one single chart**)
  - You have to arrange things appropriately in separate worksheets, and have an index worksheet containing working links to the other worksheets

# The Stock for Your Assignment

- The stock you will analyze in your assignment depends on the **last** digit of your student ID

- If the **last** digit of your student ID is

  - 0 or 1     use *0002.HK* – CLP Holdings Ltd
  - 2 or 3     use *0005.HK* – HSBC Holdings PLC
  - 4 or 5     use *0008.HK* – PCCW Ltd
  - 6 or 7     use *0013.HK* – Hutchison Whampoa Ltd
  - 8 or 9     use *0016.HK* – Sun Hung Kai Properties Ltd

- For example, if your student ID is 2345678**9** you will use 0016.HK for your stock in the assignment

- You can get the closing prices for all these stocks from the Yahoo finance web site

# Time Period for the Assignment

- The time period you need to use in your assignment is fixed to **1st January 2006** to **31st December 2012**

- There was a major financial crisis within this period!

- Possibly, that may affect the performance of your strategies

*Stock markets around the world lose half their value*

011 Yahoo! Inc.

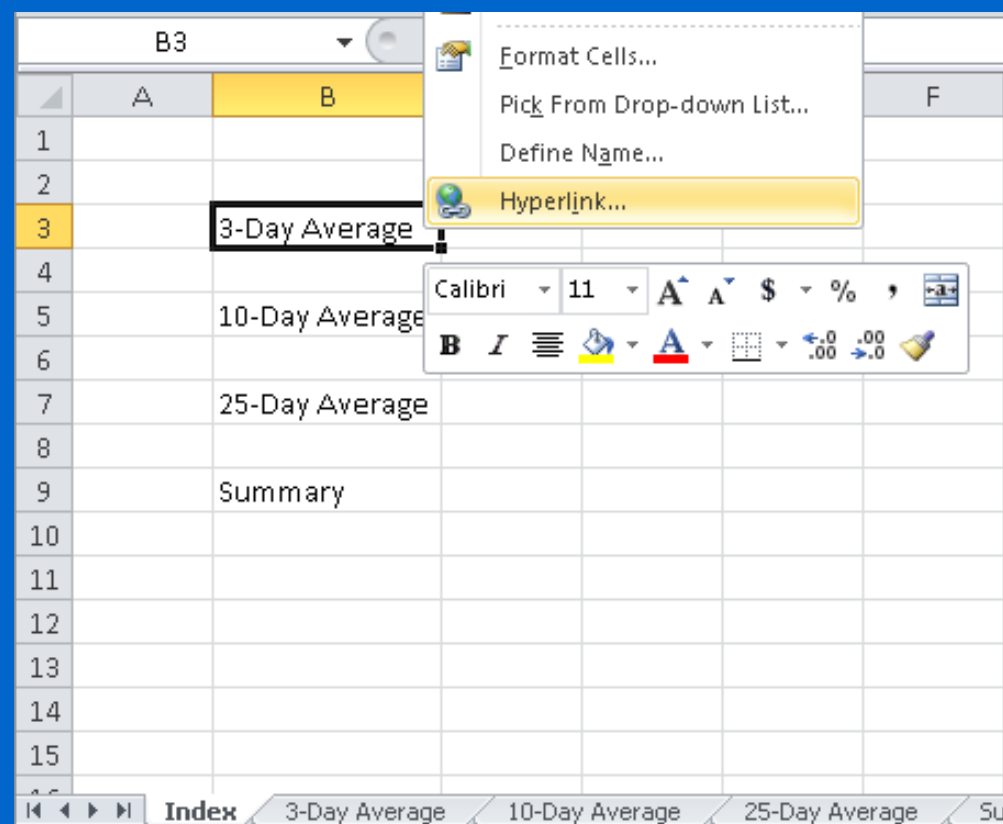| | Jul | Oct | 2006 | Apr | Jul | Oct | 2007 | Apr | Jul | Oct | 2008 | Apr | Jul | Oct | 2009 | Apr | Jul | Oct | 2010 | Apr | Jul | Oct |

# Your Excel File

- Your assignment work must be in one single Excel file
- The file must have five worksheets:

| Index | 3-Day Average | 10-Day Average | 25-Day Average | Summary |
|---|---|---|---|---|

1. An 'index' worksheet containing some brief information and links pointing to other worksheets
2. A worksheet containing the 3-day average analysis
3. A worksheet containing the 10-day average analysis
4. A worksheet containing the 25-day average analysis
5. A summary worksheet containing the results of the three main worksheets and a summary chart
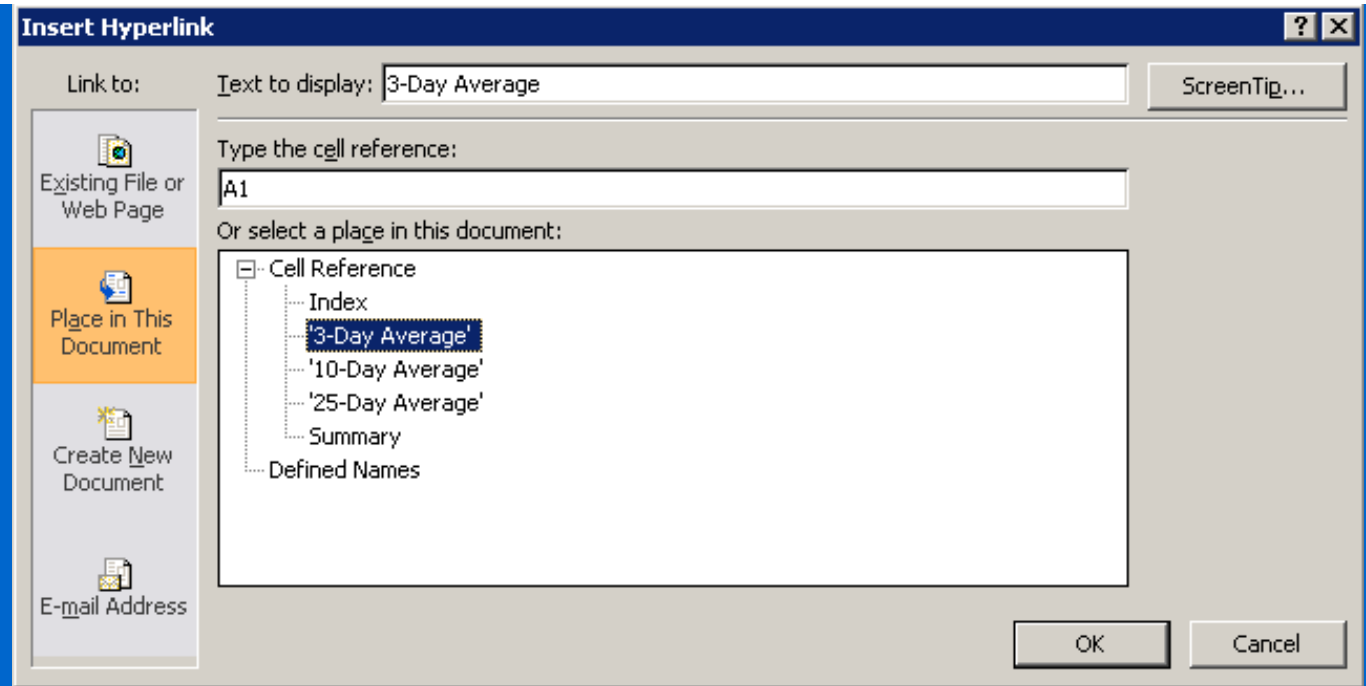
# Creating a Hyperlink 1/2

- There is more than one way to create a hyperlink, in these slides we show one method

- Go to the worksheet where you want to add a link i.e. the 'Index' worksheet

- Add some text to which you want to add a link, e.g. "3-Day Average"

- Select the text, then right click and select 'Hyperlink…'
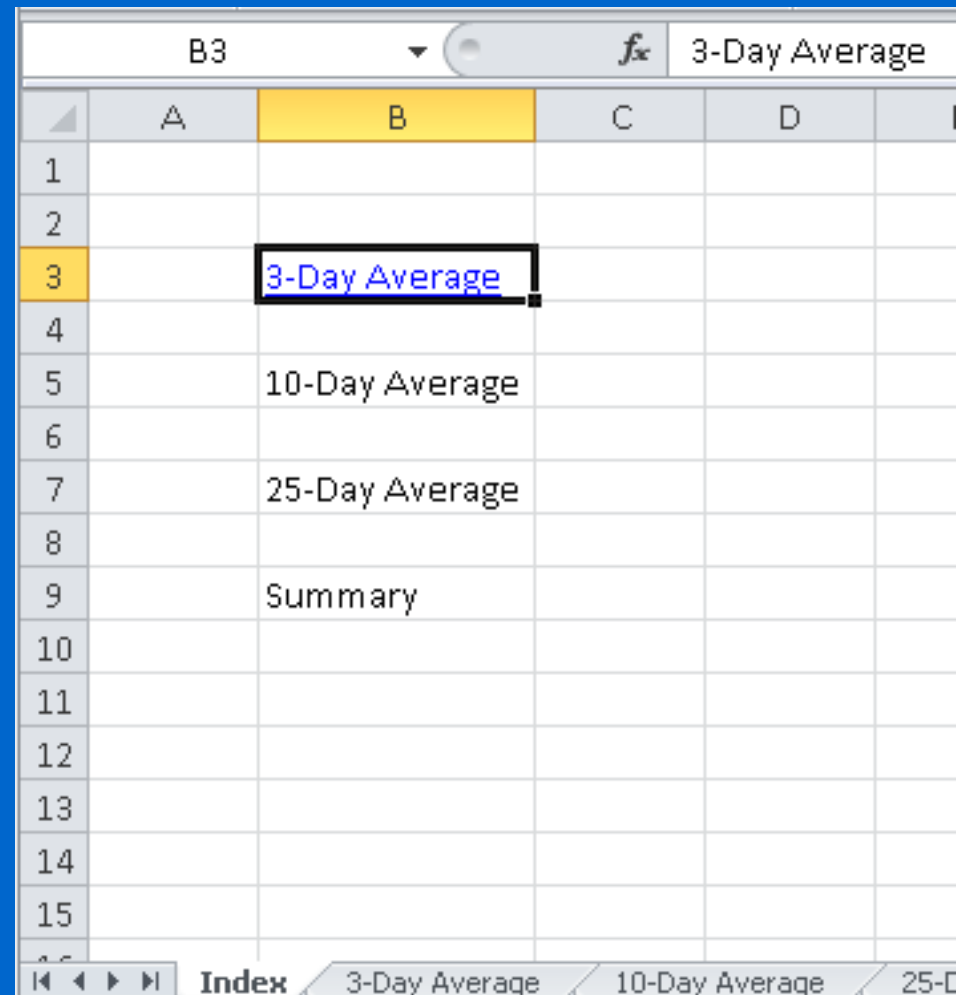
# Creating a Hyperlink 2/2



- A window will appear
- Under '**Link to:**', select '**Place in This Document**'
- Select the worksheet you want to link to e.g. **3-Day Average**
- If you want to, you can even select the exact cell you want to jump to inside the '**Type the cell reference:**' box
- For this work the default value A1 (the top left cell) is fine
- Finally, click **OK**

# Testing the Hyperlink

- You should find that the hyperlink has been created
- You can test it out by clicking on the text which you added the link to
- You should immediately 'jump' to the relevant worksheet

# The Moving Average Analyses

- You need to analyze the stock using three moving averages, with each of them in their own worksheet

- Each of these worksheets has similar column headers and similar format to your lab work, i.e.:

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| | Date | Close | 3-Day Average | Suggestion | Cash | Stock Held | Capital | Stock Growth | Capital Growth |
| | 1/2/2006 | 79.65 | | | HK$100,000 | 0 | HK$100,000 | 0% | 0% |
| | 1/3/2006 | 79.8 | | | HK$100,000 | 0 | HK$100,000 | 0% | 0% |
| | 1/4/2006 | 82.35 | 80.60 | Buy | HK$27 | 1214 | HK$100,000 | 3% | 0% |
| | 1/5/2006 | 82.95 | 81.70 | Buy | HK$27 | 1214 | HK$100,728 | 4% | 1% |

- You need to use appropriate names for the columns, for example, column C will be named "10-Day Average" or something very similar for your 10-day average analysis

- Your visual format, such as the colours and font used, don't have to be exactly the same as the lab work, but everything has to be clear and readable

# The Summary Worksheet

- Your summary worksheet must contain a table summarizing the closing prices of your stock as well as the amount earned when using each of the moving averages, like this:
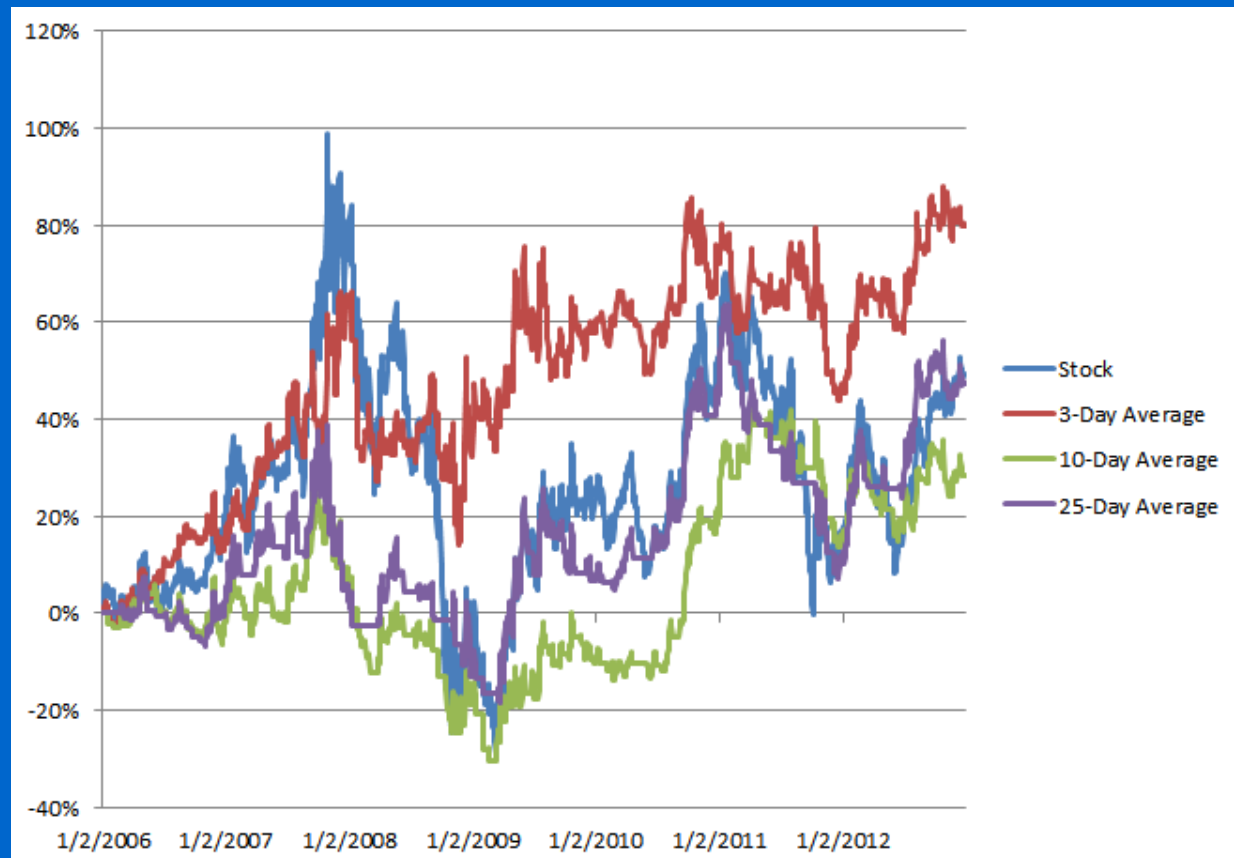
| | A | B | C | D | E |
|---|---|---|---|---|---|
| | Date ▼ | Stock ▼ | 3-Day Average ▼ | 10-Day Average ▼ | 25-Day Average ▼ |
| | 1/2/2006 | 0% | 0% | 0% | 0% |
| | 1/3/2006 | 0% | 0% | 0% | 0% |
| | 1/4/2006 | 3% | 0% | 0% | 0% |
| | 1/5/2006 | 4% | 1% | 0% | 0% |
| | 1/6/2006 | 5% | 1% | 0% | 0% |
| | 1/9/2006 | 6% | 2% | 0% | 0% |

.
.
.

| Index | 3-Day Average | 10-Day Average | 25-Day Average | **Summary** |
|---|---|---|---|---|

# The Summary Chart

- Using the summary table you need to generate a chart which compares the stock price and the performance for each of the three moving average buy/sell strategies

- This chart goes in the summary worksheet

- Here is an example chart:

# Submission

- You need to submit your Excel file using the CASS system (which you tried in the first lab) before the deadline

- The CASS system is here:

  `https://course.cse.ust.hk/cass`

- The deadline for all students is **8pm, Monday 11 March**

- **Check your work carefully** before you submit your file!

- **Submit your work early**, well before the deadline!

# Penalty for Late Submission

- If you submit your assignment after the deadline it causes us a lot of time and trouble, so please don't do that. Our policy for lateness is:

  -10 marks if you submit up to 1 hour late

    (even if you are 0.01 second late!)

  -5 marks for each further hour late, up to 12 hours

  i.e. if you submit 90 minutes late the penalty will be -15 marks

  Zero marks if you submit more than 12 hours late

# Marking Scheme Summary

- 10 marks - Worksheets

- 15 marks - Index Worksheet

- Moving Average Worksheets' Content

      15 marks - 3 day moving average worksheet content

      15 marks - 10 day moving average worksheet content

      15 marks - 25 day moving average worksheet content

- 15 marks - Summary Worksheet

- 15 marks - Graph

- So the maximum possible mark is 100 marks

# Marking Scheme - Worksheets

- Worksheets (10 marks)

| Index | 3-Day Average | 10-Day Average | 25-Day Average | Summary |
|---|---|---|---|---|

+5 marks – the Excel file has 5 worksheets, which must be given appropriate names and put in a sensible order (like above)
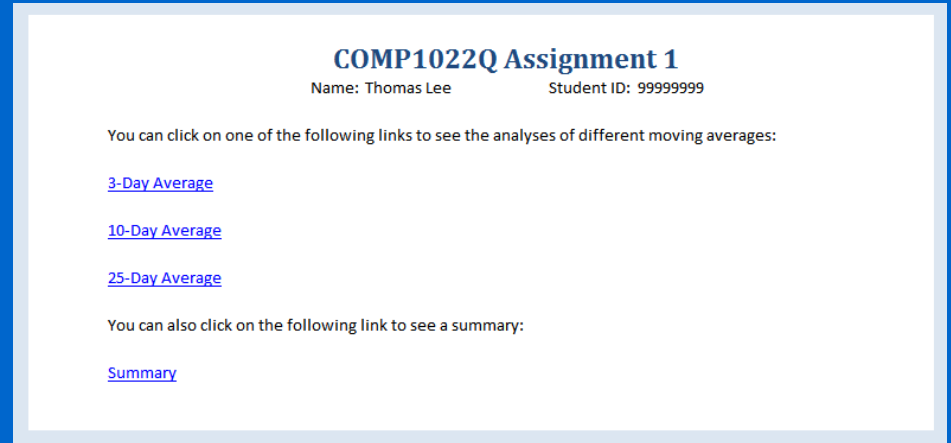
+5 marks – no unnecessary worksheets are included in the Excel file (delete any worksheets that are not part of the assignment before you submit)

# Marking Scheme – Index Worksheet

**COMP1022Q Assignment 1**
Name: Thomas Lee     Student ID: 99999999

You can click on one of the following links to see the analyses of different moving averages:

3-Day Average

10-Day Average

25-Day Average

You can also click on the following link to see a summary:

Summary

- Index worksheet (15 marks)
  - Create an 'index' worksheet which includes the following content at appropriate places

This is just an example worksheet, you need to create one which satisfies the requirements shown below

3 marks for each of these
- An appropriate title i.e. COMP1022Q Assignment 1
- Your name and student ID
- Some words explaining what the other 4 worksheets contain

6 marks (1.5 marks for each link)
- Links to the 4 other worksheets, so the user can simply click on the link to immediately go to the worksheet

# Marking Scheme –
# Moving Average Worksheets' Content

- 3 day moving average worksheet content (15 marks)
- 10 day moving average worksheet content (15 marks)
- 25 day moving average worksheet content (15 marks)

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| | Date | Close | 3-Day Average | Suggestion | Cash | Stock Held | Capital | Stock Growth | Capital Growth |
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| | 1/4/2006 | 82.35 | 80.60 | Buy | HK$27 | 1214 | HK$100,000 | 3% | 0% |
| | 1/5/2006 | 82.95 | 81.70 | Buy | HK$27 | 1214 | HK$100,728 | 4% | 1% |

- For each worksheet, start with 15 marks
- For any of the columns shown above which is/are absent, or contain incorrect content (i.e. incorrect data or incorrect formula), minus 5 marks
- For any of the columns shown above which contain inappropriate formatting (i.e. does not show % when appropriate), minus 3 marks

# Marking Scheme – Moving Average Worksheets' Content

- For any of the columns which contain inappropriate names (i.e. column C should be named "10-Day Average" or similar if the worksheet has 10-day average analysis) minus 3 marks

- Each column of each worksheet gets checked, so if, for example, the value is not shown as % in each of the worksheets, you would lose 3+3+3=9 marks

- Visual style, such as use of colour and text font, does not need to be exactly the same as shown but it has to be clear and readable

# Marking Scheme – Summary Worksheet

| Date | Stock | 3-Day Average | 10-Day Average | 25-Day Average |
|---|---|---|---|---|
| 1/2/2006 | 0% | 0% | 0% | 0% |
| 1/3/2006 | 0% | 0% | 0% | 0% |
| 1/4/2006 | 3% | 0% | 0% | 0% |
| 1/5/2006 | 4% | 1% | 0% | 0% |
| 1/6/2006 | 5% | 1% | 0% | 0% |
| 1/9/2006 | 6% | 2% | 0% | 0% |

- Summary worksheet (15 marks)
  - Start with 15 marks
  - For any of the columns shown above which is/are absent, or contain incorrect content (i.e. incorrect data or incorrect formula), minus 5 marks
  - For any of the columns shown above which contains incorrect formatting (i.e. does not show % when appropriate), minus 3 marks

# Marking Scheme – The Graph

- Graph (15 marks)

  +5 marks – graph is inside summary worksheet

  +5 marks – graph correctly shows the values of the three moving average strategies as well as your allocated stock, over time

  +5 marks – graph has correct x and y axes names i.e. the month/year goes along the x axis; % goes along the y axis