Traders Island

STRATEGY BACKTESTING

Application II

Version 2.1

Traders Island

Application II:

Spreadsheet

Version 2.1

I – Lesson 1: Moving Average Spreadsheet Application
I.1 - Overview

- The spreadsheet “Moving Average.xlsm” has been fully automated to build strategy and run strategy back-testing according to the above techniques. It performs the same functions that the platform does (and a bit more), albeit it is built in Excel © and can be downloaded on your device.
- It requires Excel © and Python 2.7 (https://www.python.org/downloads/release/python-2710/) installations. For development purposes*, you must have VBA developer up and running on Excel © Workbooks.
- The spreadsheet currently implements the following functionalities.
  - ➢ MA implementation using Excel, VBA* and Python
  - ➢ Model Testing
  - ➢ Charting
  - ➢ Step-by-Step Strategy I Implementation
  - ➢ Strategy Backtesting

  → This tutorial only covers the last two points.

* For more on the VBA code, please refer to Technical Analysis Spreadsheet Guide_MA.docx

Worksheets

The worksheets are fully automated. The “Input” worksheet, described below, serves as a control panel for all other worksheets (except “README”).

- “README”: spreadsheet overview including colour coding.
- “Input”: input data and implementation/testing buttons
- “Historical Data”: historical data set according to dates on “Input” sheet.
- “MA”: MA implementation using different methodologies/approaches.
- “Charts”: price vs indicator/oscillator (moving average here) chart.
- “Testing”: model testing as crucial parameters change.
- “Strategy Backtesting”: optimised parameters and maximised returns.
- “Strategy”: step-by-step implementation of Strategy I.

→ In the following slides, we will cover all worksheets except for “MA”, “Charts” and “Testing” as they are irrelevant for the purposes of this tutorial.

I – Lesson 1: Strategy Implementation and BackTesting Spreadsheet Application
I.3 - "README" and "Historical Data" Worksheets: Overview

"README"

- This worksheet briefly explains the functionality of each of the remaining worksheets.
- It also explains the sheet's colour coding.

"Historical Data"

- This is generated via the "Input" sheet (Yahoo! Finance feed) following the below steps.
  - Change the stock symbol in C1.
  - Update Historical Data Start and End Dates in cells C8 and C9 respectively.
  - Click <Load Historical Prices into the "Historical Data" Sheet>.
- The data on the "Historical Data" worksheet can be overwritten but make sure you follow the existing column order: Date/Open/High/Low/Close/Volume/Adj Close.

II – Lesson 2: "Input" Worksheet
II.1 – Overview and Generic Parameters I

- User input is fed into the system, excluding the "Testing" worksheet, through this worksheet.
- User input data – Generic Parameters I: These parameters are required for all functionality.

Key Cell	Parameter	Description
C1	Stock Symbol	Stock Exchange ticker
C5	Current Date	Equivalent of "Today's" date
C8	Historical Data Start Date	Start date for the complete data set
C9	Historical Data End Date	End date for the complete data set
C12	Analysis Data Start Date	Start date of analysis period
C13	Analysis Data End Date	End date of analysis period
Col E, 5 on	Holiday Dates	Market holidays for the complete data set

- A quick note on the difference between Historical and Analysis Data dates: you may prefer to experiment with parts of the data set and the whole data set (bounded by Historical Data Dates), so the Analysis Data date set allows you to extract a smaller data set from the existing one to work with.

- User input data – Generic Parameters IIA: select the checkbox(es) with the MA methodology that you would like to work with.
- Table 1: MA Calculation (Check Boxes 1)

Check Box Text	Description
SMA via Excel (Manual)	Calculate SMA using Excel formulae
EMA via Excel (Manual)	Calculate EMA using Excel Formulae
SMA VBA Function	Calculate SMA using VBA code
EMA VBA Function	Calculate EMA using VBA code
SMA Python Function	Calculate SMA using Python code
EMA Python Function	Calculate EMA using Python code

- User input data – Generic Parameters IIB: select the checkbox(es) with the MA speed improvement that you would like to work with. These functions use tools that speed up the calculation.
- Table 2: MA Speed Improvement (Check Boxes 2)

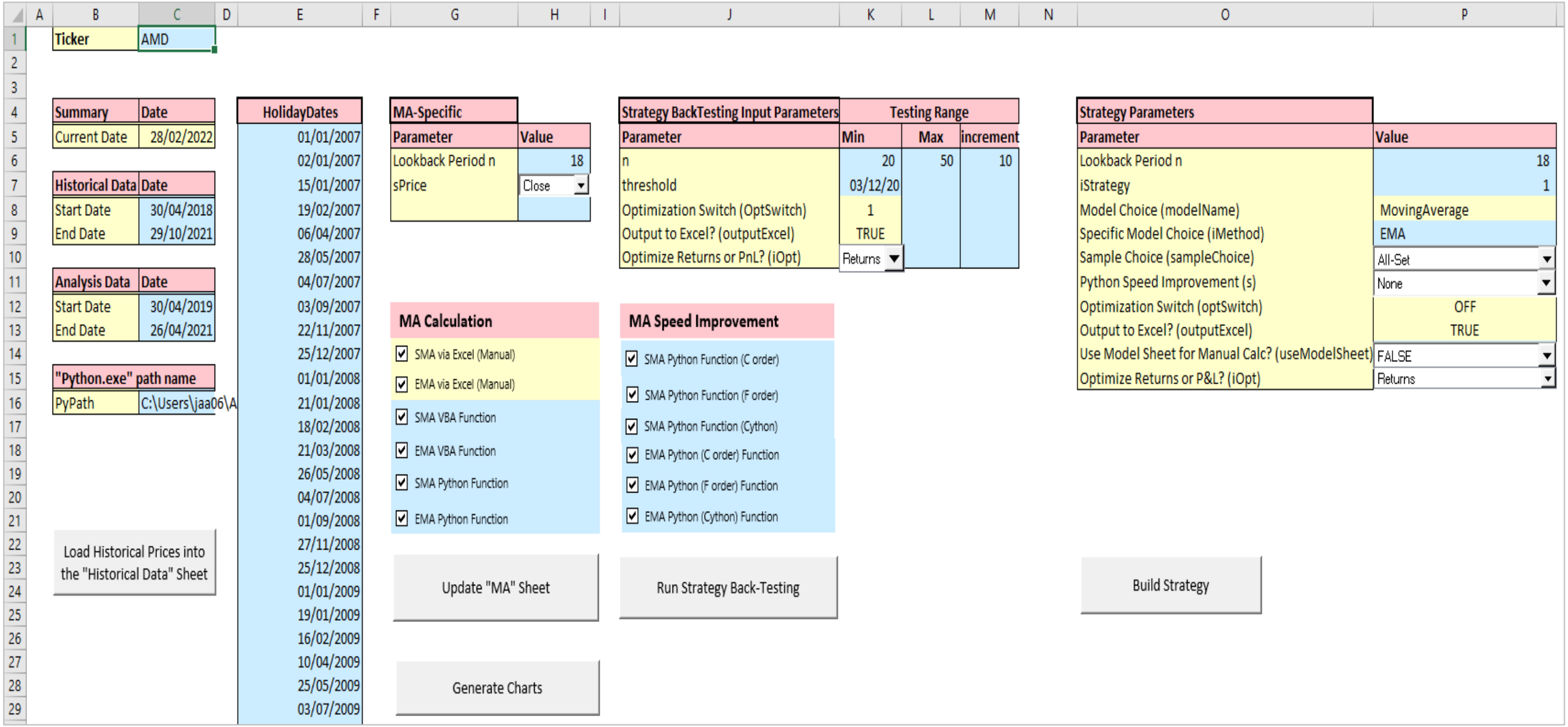
Check Box Text	Description
SMA Python Function (C order)	Calculate SMA using Python code + C compiler
SMA Python Function (F order)	Calculate SMA using Python code + Fortran compiler
SMA Python Function (Cython)	Calculate SMA using Python/Cython code
EMA Python (C order) Function	Calculate EMA using Python code + C compiler
EMA Python (F order) Function	Calculate EMA using Python code + Fortran compiler
EMA Python (Cython) Function	Calculate EMA using Python/Cython code

Generating Processes

- This worksheet is also the “door” to calling implementation and testing procedures. You can do so by clicking the corresponding buttons on the worksheet.
- For the purpose of this tutorial, only the following buttons are relevant.

Button Name	Action
<Load Historical Prices into the "Historical Data" Sheet>	Loads data from Yahoo!
<Strategy BackTesting>	Back-tests a Trading Strategy
<Build Strategy>	Step-by-step Strategy I

II – Lesson 2: "Input" Worksheet
II.5 – Screenshot



Ticker	AMD

Summary	Date
Current Date	28/02/2022

Historical Data	Date
Start Date	30/04/2018
End Date	29/10/2021

Analysis Data	Date
Start Date	30/04/2019
End Date	26/04/2021

"Python.exe" path name	
PyPath	C:\Users\jaa06\A

Load Historical Prices into the "Historical Data" Sheet

HolidayDates
01/01/2007
02/01/2007
15/01/2007
19/02/2007
06/04/2007
28/05/2007
04/07/2007
03/09/2007
22/11/2007
25/12/2007
01/01/2008
21/01/2008
18/02/2008
21/03/2008
26/05/2008
04/07/2008
01/09/2008
27/11/2008
25/12/2008
01/01/2009
19/01/2009
16/02/2009
10/04/2009
25/05/2009
03/07/2009

MA-Specific	
Parameter	Value
Lookback Period n	18
sPrice	Close

MA Calculation

- ☑ SMA via Excel (Manual)
- ☑ EMA via Excel (Manual)
- ☑ SMA VBA Function
- ☑ EMA VBA Function
- ☑ SMA Python Function
- ☑ EMA Python Function

Update "MA" Sheet

Generate Charts

Strategy BackTesting Input Parameters	Testing Range		
Parameter	Min	Max	increment
n	20	50	10
threshold	03/12/20		
Optimization Switch (OptSwitch)	1		
Output to Excel? (outputExcel)	TRUE		
Optimize Returns or PnL? (iOpt)	Returns		

MA Speed Improvement

- ☑ SMA Python Function (C order)
- ☑ SMA Python Function (F order)
- ☑ SMA Python Function (Cython)
- ☑ EMA Python (C order) Function
- ☑ EMA Python (F order) Function
- ☑ EMA Python (Cython) Function

Run Strategy Back-Testing

Strategy Parameters	
Parameter	Value
Lookback Period n	18
iStrategy	1
Model Choice (modelName)	MovingAverage
Specific Model Choice (iMethod)	EMA
Sample Choice (sampleChoice)	All-Set
Python Speed Improvement (s)	None
Optimization Switch (optSwitch)	OFF
Output to Excel? (outputExcel)	TRUE
Use Model Sheet for Manual Calc? (useModelSheet)	FALSE
Optimize Returns or P&L? (iOpt)	Returns

Build Strategy

II – Lesson 2: “Input” Worksheet
II.6 – Map

- Generic Input: you need to do the following before initiating any action
  - Enter Stock Symbol: C1
  - Enter Historical Data Start Date (Whole data set): C8
  - Enter Historical Data End Date (Whole data set): C9
  - Enter Analysis Data Start Date (Subset data set): C12
  - Enter Analysis Data End Date (Subset data set): C13
  - Enter Holiday Dates: starting E4
  - Click <Load Historical Prices into the "Historical Data" Sheet>
- Specific Input:
  - MA specific: the data in this table (H6:H7) is relevant for any procedures related to MA computation. You only need to update H7, if desired.
  - Strategy BackTesting specific: the data here (K6:M9) is relevant for strategy back-testing processes.
  - MA Calculation and MA Speed Improvement function selection: the checkboxes coinciding in Columns G:H and K allow the user to determine which functions to use.
- The following slide shows a screenshot from the “Input” worksheet. The slides to follow will explain in detail how to run implementation and testing procedures.

MA-Specific Parameters

- These parameters are specific to “MA” calculation, but you need to set the sPrice to be able to run strategy back-testing (and build the strategy sheet too).

Key Cell	Parameter	Description
H6	Lookback Period n	Moving average period
H7	sPrice	Open/High/Low/Close/Volume/Adj Close

Strategy BackTesting Input Parameters

- These parameters are specific to the strategy back-test calculation, and you need to set them before clicking <Run Strategy BackTesting>.

Key Cell	Parameter	Description
K6:M6	n	Lookback period range + increment
K7	threshold	Date dividing the data sample
K8	Optimization Switch (OptSwitch)	Fixed at 1 (ON)
K9	Output to Excel? (outputExcel)	Output intermediate results to Excel
K10	Optimise Returns or PnL? (iOpt)	Optimise using Returns or PnL

II – Lesson 2: “Input” Worksheet
II.8 - “Strategy” Worksheet Parameters

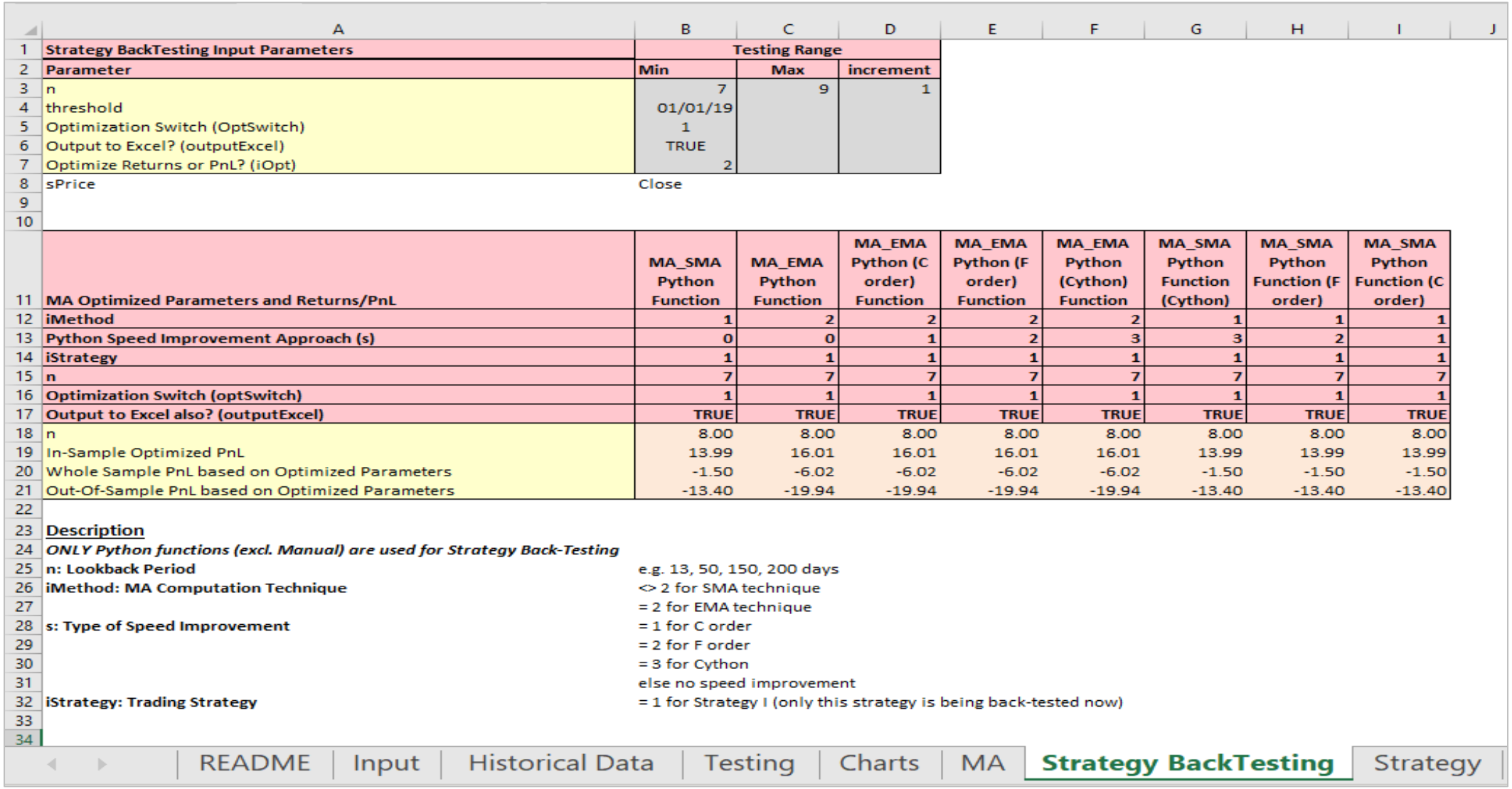
- These parameters are specific to Strategy I implementation, and you need to set them before clicking <Build Strategy>.

Key Cell	Parameter	Description
P6	Lookback Period n	MA period
P7	iStrategy	Only Strategy I is implemented
P8	Model Choice (modelName)	Type of model: MA, RSI…
P9	Specific Model Choice (iMethod)	Specific model: SMA, EMA…
P10	Sample Choice (sampleChoice)	In-, out-of- and complete sample
P11	Python Speed Improvement (s)	None, Cython, C or Fortran compiler
P12	Optimization Switch (optSwitch)	Fixed at 0 (OFF)
P13	Output to Excel? (outputExcel)	Fixed at TRUE
P14	Use Model Sheet for Manual Calc? (useModelSheet)	Uses MA values in the “MA” sheet instead of calculating from scratch
P15	Optimise Returns or P&L? (iOpt)	Redundant (no optimisation)

III – Lesson 3: “Strategy BackTesting” Worksheet
III.1 – Parameters

- As we have mentioned earlier, strategy back-testing is dependent on the type of trading strategy used. Currently, only one type of Moving Average strategy, Strategy I, is implemented and back-tested in this spreadsheet.
- In summary, the actual back-testing uses MA functions that are developed in Python, and you can test the validity of these functions’ results by running model testing through the spreadsheet. The spreadsheet acts as a user interface whereby Python code takes input from the user through, and writes back output to, the spreadsheet.
- The following slide displays a screenshot of the “Strategy BackTesting” worksheet.
  - Ranges of input parameters are displayed here according to how they are defined on the “Input” sheet.
  - The worksheet is fully automated, and it is generated through the “Input” worksheet by clicking the <Strategy BackTesting> button.
  - In the background, Python code performs optimization procedures over the three-sample data sets and gives back optimised parameters as well as the corresponding returns for each sample (table starting B11).

III – Lesson 3: "Strategy BackTesting" Worksheet
III.2 – Screenshot



	A	B	C	D	E	F	G	H	I	J
1	**Strategy BackTesting Input Parameters**	**Testing Range**								
2	**Parameter**	**Min**	**Max**	**increment**						
3	n	7	9	1						
4	threshold	01/01/19								
5	Optimization Switch (OptSwitch)	1								
6	Output to Excel? (outputExcel)	TRUE								
7	Optimize Returns or PnL? (iOpt)	2								
8	sPrice	Close								
9										
10										
11	**MA Optimized Parameters and Returns/PnL**	**MA_SMA Python Function**	**MA_EMA Python Function**	**MA_EMA Python (C order) Function**	**MA_EMA Python (F order) Function**	**MA_EMA Python (Cython) Function**	**MA_SMA Python Function (Cython)**	**MA_SMA Python Function (F order)**	**MA_SMA Python Function (C order)**	
12	**iMethod**	**1**	**2**	**2**	**2**	**2**	**1**	**1**	**1**	
13	**Python Speed Improvement Approach (s)**	**0**	**0**	**1**	**2**	**3**	**3**	**2**	**1**	
14	**iStrategy**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	
15	**n**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	
16	**Optimization Switch (optSwitch)**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	
17	**Output to Excel also? (outputExcel)**	**TRUE**	**TRUE**	**TRUE**	**TRUE**	**TRUE**	**TRUE**	**TRUE**	**TRUE**	
18	n	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	
19	In-Sample Optimized PnL	13.99	16.01	16.01	16.01	16.01	13.99	13.99	13.99	
20	Whole Sample PnL based on Optimized Parameters	-1.50	-6.02	-6.02	-6.02	-6.02	-1.50	-1.50	-1.50	
21	Out-Of-Sample PnL based on Optimized Parameters	-13.40	-19.94	-19.94	-19.94	-19.94	-13.40	-13.40	-13.40	
22										
23	**Description**									
24	***ONLY Python functions (excl. Manual) are used for Strategy Back-Testing***									
25	**n: Lookback Period**	e.g. 13, 50, 150, 200 days								
26	**iMethod: MA Computation Technique**	<> 2 for SMA technique								
27		= 2 for EMA technique								
28	**s: Type of Speed Improvement**	= 1 for C order								
29		= 2 for F order								
30		= 3 for Cython								
31		else no speed improvement								
32	**iStrategy: Trading Strategy**	= 1 for Strategy I (only this strategy is being back-tested now)								
33										
34										

README | Input | Historical Data | Testing | Charts | MA | **Strategy BackTesting** | Strategy

III – Lesson 3: “Strategy BackTesting” Worksheet
III.3 – Screenshot Description

- We have seen a screenshot of the strategy back-testing worksheet in the previous slide. There are 3 main sections in this worksheet:
  1. Input Parameters: ranges of input parameters are directly copied , by VBA code, from the “Input” worksheet to this one. You must not change the parameters on this worksheet. Any changes must be done on the “Input” worksheet (cells K6:M8 and K9).
  2. Optimised Returns and Parameters: this is the main output as given by the Python code. The data set is divided into in-sample, where parameters are optimised to produce maximised returns, all data set and out-of-sample data set to test the robustness of the optimised parameters.
     - Optimised Parameter: lookback period.
     - Optimised Returns (or PnL): for all datasets.
  3. Description: the last section on the worksheet describes other parameters on this worksheet and their permitted values.

IV – Lesson 4: “Strategy” Worksheet
IV.1 – Overview

- This worksheet illustrates in detail how Strategy I is built in the code, using the input parameters in the Strategy Parameters block (P6:P15) on the “Input” worksheet.
- The worksheet is fully automated, and it is generated through the “Input” worksheet by clicking the <Build Strategy> button.
- There are three sections in this worksheet:
  - VBA Macro Results: shows the results of implementing this strategy using VBA code.
  - Python Function Results: shows the results of implementing this strategy using Python code.
  - Manual Approach Results: shows a step-by-step implementation using Excel © formulae.
- The three different methodologies are implementing the same strategy, albeit with different tools. So, the outcome of all three approaches should be exactly the same.
- In the next few slides, we will explain inputs and outputs, and show a screenshot of the “Strategy” worksheet.

IV – Lesson 4: “Strategy” Worksheet
IV.2 – Description

- Each methodology presents the results in two tables.
- The first table illustrates the step-by-step implementation for each observation.
  - Date: observation date, the first of which is defined by the sample choice.
  - Price: e.g. “Close” on that date.
  - MA: moving average as defined by the Input parameters.
  - MA_Position: buy or sell (price crossesing MA from below/above respectively).
  - MA_Return: daily log returns.
  - MA_Strategy: return of the strategy on each observation date.
  - MA_PnL: profit or loss on the position on each observation date.
- The second (smaller) table on the right is a summary table of the final results.
  - n: the lookback period (it is there for clarity purposes).
  - MA_StrategyCumSum and MA_StrategyCumRet: show the cumulative sum and cumulative return of the strategy (refer to documentation on Strategy BackTesting in the corresponding section on the website).
  - MA_R and MA_CumPnL: show the final return and PnL of this strategy.

IV – Lesson 4: "Strategy" Worksheet
IV.3 – Screenshot

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC
1	VBA Macro Results										Python Function Results										Manual Approach Results			18					
2	Date	Close	MA	MA_Position	MA_Return	MA_Strategy	MA_PnL	n	18			Close	MA	MA_Posit	MA_Retu	MA_Strat	MA_PnL	n	18		Date	Close	MA	MA_Posit	MA_Retu	MA_Strat	MA_PnL	n	18
3	02/01/2018	10.98						MA_StrategyCumSum	.1162		2018-01-02	10.98		0				MA_Strat	0.116207		02/01/2018	10.98						MA_Strat	0.116207
4	03/01/2018	11.55			.0506			MA_StrategyCumRet	1.1232		2018-01-03	11.55		0	0.05061	0	0	MA_Strat	1.123228		03/01/2018	11.55	0		0.05061			MA_Strat	1.123228
5	04/01/2018	12.12			.0482			MA_R	.1232		2018-01-04	12.12		0	0.048172	0	0	MA_R	0.123228		04/01/2018	12.12	.0000	0	.0482	0	0	MA_R	0.123228
6	05/01/2018	11.88			-.0200			MA_CumPnL	4.0100		2018-01-05	11.88		0	-0.02	0	0	MA_CumP	4.009994		05/01/2018	11.88	.0000	.0000	-.0200	.0000	.0000	MA_CumP	4.009994
7	08/01/2018	12.28			.0331						2018-01-08	12.28		0	0.033116	0	0				08/01/2018	12.28	.0000	.0000	.0331	.0000	.0000		
8	09/01/2018	11.82			-.0382						2018-01-09	11.82		0	-0.03818	0	0				09/01/2018	11.82	.0000	.0000	-.0382	.0000	.0000		
9	10/01/2018	11.96			.0118						2018-01-10	11.96		0	0.011775	0	0				10/01/2018	11.96	.0000	.0000	.0118	.0000	.0000		
10	11/01/2018	12.14			.0149						2018-01-11	12.14		0	0.014938	0	0				11/01/2018	12.14	.0000	.0000	.0149	.0000	.0000		
11	12/01/2018	12.02			-.0099						2018-01-12	12.02		0	-0.00993	0	0				12/01/2018	12.02	.0000	.0000	-.0099	.0000	.0000		
12	16/01/2018	11.91			-.0092						2018-01-16	11.91		0	-0.00919	0	0				16/01/2018	11.91	.0000	.0000	-.0092	.0000	.0000		
13	17/01/2018	12.18			.0224						2018-01-17	12.18		0	0.022417	0	0				17/01/2018	12.18	.0000	.0000	.0224	.0000	.0000		
14	18/01/2018	12.47			.0235						2018-01-18	12.47		0	0.02353	0	0				18/01/2018	12.47	.0000	.0000	.0235	.0000	.0000		
15	19/01/2018	12.59			.0096						2018-01-19	12.59		0	0.009577	0	0				19/01/2018	12.59	.0000	.0000	.0096	.0000	.0000		
16	22/01/2018	12.65			.0048						2018-01-22	12.65		0	0.004754	0	0				22/01/2018	12.65	.0000	.0000	.0048	.0000	.0000		
17	23/01/2018	12.94			.0227						2018-01-23	12.94		0	0.022666	0	0				23/01/2018	12.94	.0000	.0000	.0227	.0000	.0000		
18	24/01/2018	12.71			-.0179						2018-01-24	12.71		0	-0.01793	0	0				24/01/2018	12.71	.0000	.0000	-.0179	.0000	.0000		
19	25/01/2018	12.41			-.0239						2018-01-25	12.41		0	-0.02389	0	0				25/01/2018	12.41	.0000	.0000	-.0239	.0000	.0000		
20	26/01/2018	12.95	12.1978	1	.0426						2018-01-26	12.95	12.19778	1	0.042593	0	0				26/01/2018	12.95	12.1978	1.0000	.0426	.0000	.0000		
21	29/01/2018	13.32	12.3159	1	.0282	.0282	.3700				2018-01-29	13.32	12.31591	1	0.028171	0.028171	0.37				29/01/2018	13.32	12.3159	1.0000	.0282	.0282	.3700		
22	30/01/2018	12.87	12.3742	1	-.0344	-.0344	-.4500				2018-01-30	12.87	12.37423	1	-0.03437	-0.03437	-0.45				30/01/2018	12.87	12.3742	1.0000	-.0344	-.0344	-.4500		
23	31/01/2018	13.74	12.5180	1	.0654	.0654	.8700				2018-01-31	13.74	12.518	1	0.065412	0.065412	0.87				31/01/2018	13.74	12.5180	1.0000	.0654	.0654	.8700		
24	01/02/2018	13.25	12.5950	1	-.0363	-.0363	-.4900				2018-02-01	13.25	12.59505	1	-0.03631	-0.03631	-0.49				01/02/2018	13.25	12.5950	1.0000	-.0363	-.0363	-.4900		
25	02/02/2018	12.45	12.5798	-1	-.0623	-.0623	-.8000				2018-02-02	12.45	12.57978	-1	-0.06228	-0.06228	-0.8				02/02/2018	12.45	12.5798	-1.0000	-.0623	-.0623	-.8000		
26	05/02/2018	11.57	12.4735	-1	-.0733	.0733	.8800				2018-02-05	11.57	12.47349	-1	-0.07331	0.073305	0.88				05/02/2018	11.57	12.4735	-1.0000	-.0733	.0733	.8800		
27	06/02/2018	11.65	12.3868	-1	.0069	-.0069	-.0800				2018-02-06	11.65	12.38681	-1	0.006891	-0.00689	-0.08				06/02/2018	11.65	12.3868	-1.0000	.0069	-.0069	-.0800		
28	07/02/2018	11.60	12.3040	-1	-.0043	.0043	.0500				2018-02-07	11.6	12.30398	-1	-0.0043	0.004301	0.049999				07/02/2018	11.6	12.3040	-1.0000	-.0043	.0043	.0500		
29	08/02/2018	11.22	12.1899	-1	-.0333	.0333	.3800				2018-02-08	11.22	12.18988	-1	-0.03331	0.033307	0.38				08/02/2018	11.22	12.1899	-1.0000	-.0333	.0333	.3800		
30	09/02/2018	11.31	12.0973	-1	.0080	-.0080	-.0900				2018-02-09	11.31	12.09726	-1	0.007989	-0.00799	-0.09				09/02/2018	11.31	12.0973	-1.0000	.0080	-.0080	-.0900		
31	12/02/2018	11.68	12.0533	-1	.0322	-.0322	-.3700				2018-02-12	11.68	12.05334	-1	0.032191	-0.03219	-0.37				12/02/2018	11.68	12.0533	-1.0000	.0322	-.0322	-.3700		
32	13/02/2018	11.78	12.0246	-1	.0085	-.0085	-.1000				2018-02-13	11.78	12.02457	-1	0.008525	-0.00853	-0.1				13/02/2018	11.78	12.0246	-1.0000	.0085	-.0085	-.1000		
33	14/02/2018	12.20	12.0430	1	.0350	-.0350	-.4200				2018-02-14	12.2	12.04303	1	0.035033	-0.03503	-0.42				14/02/2018	12.2	12.0430	1.0000	.0350	-.0350	-.4200		
34	15/02/2018	12.19	12.0585	1	-.0008	-.0008	-.0100				2018-02-15	12.19	12.0585	1	-0.00082	-0.00082	-0.01				15/02/2018	12.19	12.0585	1.0000	-.0008	-.0008	-.0100		
35	16/02/2018	11.82	12.0334	-1	-.0308	-.0308	-.3700				2018-02-16	11.82	12.0334	-1	-0.03082	-0.03082	-0.37				16/02/2018	11.82	12.0334	-1.0000	-.0308	-.0308	-.3700		
36	20/02/2018	12.02	12.0320	-1	.0168	-.0168	-.2000				2018-02-20	12.02	12.03199	-1	0.016779	-0.01678	-0.2				20/02/2018	12.02	12.0320	-1.0000	.0168	-.0168	-.2000		
37	21/02/2018	11.72	11.9991	-1	-.0253	.0253	.3000				2018-02-21	11.72	11.99915	-1	-0.02528	0.025275	0.3				21/02/2018	11.72	11.9991	-1.0000	-.0253	.0253	.3000		
38	22/02/2018	11.84	11.9824	-1	.0102	-.0102	-.1200				2018-02-22	11.84	11.98239	-1	0.010187	-0.01019	-0.12				22/02/2018	11.84	11.9824	-1.0000	.0102	-.0102	-.1200		
39	23/02/2018	12.07	11.9916	1	.0192	-.0192	-.2300				2018-02-23	12.07	11.99162	1	0.019239	-0.01924	-0.23				23/02/2018	12.07	11.9916	1.0000	.0192	-.0192	-.2300		

README | Input | Historical Data | Testing | Strategy BackTesting | **Strategy** | MA | Charts

- Strategy terminology in the software:

$$< modelName > \_Return: return_i$$

$$lsPosition_{i-1}: < modelName > \_Position$$

$$Strategy\ Return_i: < modelName > \_Strategy$$

$$< modelName > \_StrategyCumRet: e^{(\sum_i < modelName > \_StrategyCumRet)}$$

THANK YOU

Traders Island