Lesson 11
Introduction to EasyLanguage

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EasyLanguage Defined

EasyLanguage is a combination of words and punctuation used to create rules or instructions, based on market data, which TradeStation follows to perform one or more analytical tasks.

EasyLanguage is designed to use simple English-like terms that one trader would use to describe a trading idea to another trader. There are certain rules and guidelines we must follow to ensure that the EasyLanguage studies we create can be understood by and applied within TradeStation. Using the correct grammar, statement structure and punctuation is a must when creating custom EasyLanguage documents. We encourage you to follow these rules from the start to facilitate your learning curve.

Benefits of Learning EasyLanguage

- With EasyLanguage, you can translate your trading ideas into analysis techniques and strategies that TradeStation can understand and apply
- You will also have the ability to modify the EasyLanguage in analysis techniques and strategies that come “pre-built” in the TradeStation platform
- In addition, learning EasyLanguage allows you to read, understand and learn from what others have already written in EasyLanguage
- Learning EasyLanguage will provide you with a better understanding of the calculation intricacies of technical analysis and strategy trading

Available Market Data

Each bar on a chart contains a certain amount of raw data for analysis. The following is a list of the data contained in each bar of a chart, depending on the type of symbol and interval selected:

- Date
- Time
- Open
- High
- Low
- Close
- Volume
- Ticks
- Futures Open Interest
- Implied Volatility
- Option Volume
- Option Open Interest
- Fundamental Data

As you work with EasyLanguage, one of the basic principles to remember is that TradeStation calculates analysis techniques and strategies on each bar. TradeStation processes all EasyLanguage instructions from top to bottom (as written in the TradeStation Development Environment), starting from the first bar on the left side of a chart and repeating the instructions for each bar as it moves to the right.

TradeStation Development Environment

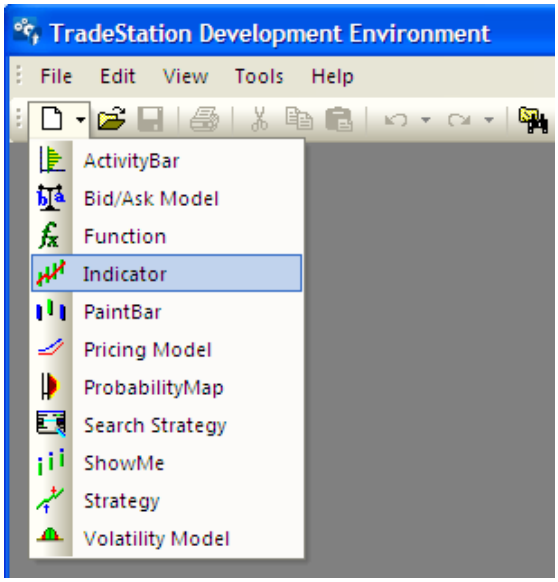
Whenever you create or modify EasyLanguage studies in TradeStation, you'll be working in the TradeStation Development Environment. Think of it as your canvas and analogous to the way you would use Microsoft Word to create and edit Word documents. The TradeStation Development Environment is a full-featured "word-processing" editor for creating and modifying EasyLanguage instructions, which allows you to communicate your trading ideas to TradeStation. New analysis techniques may be created or existing ones may be modified, including indicators and ShowMe™ and PaintBar™ studies, as well as rule-based strategies.

The TradeStation Development Environment is also conveniently designed as a stand-alone application to run independently from the TradeStation platform. A new icon, such as the one on the left, is now available when clicking **Start – All Programs** from the Windows task bar. You may also click the **EasyLanguage** icon from the TradingApp Launcher within TradeStation to launch the Development Environment.

Creating New EasyLanguage Documents

To create a new analysis technique or strategy in the TradeStation Development Environment, click on the **File – New** menu sequence and choose the type of EasyLanguage document you would like to create from the drop-down menu.

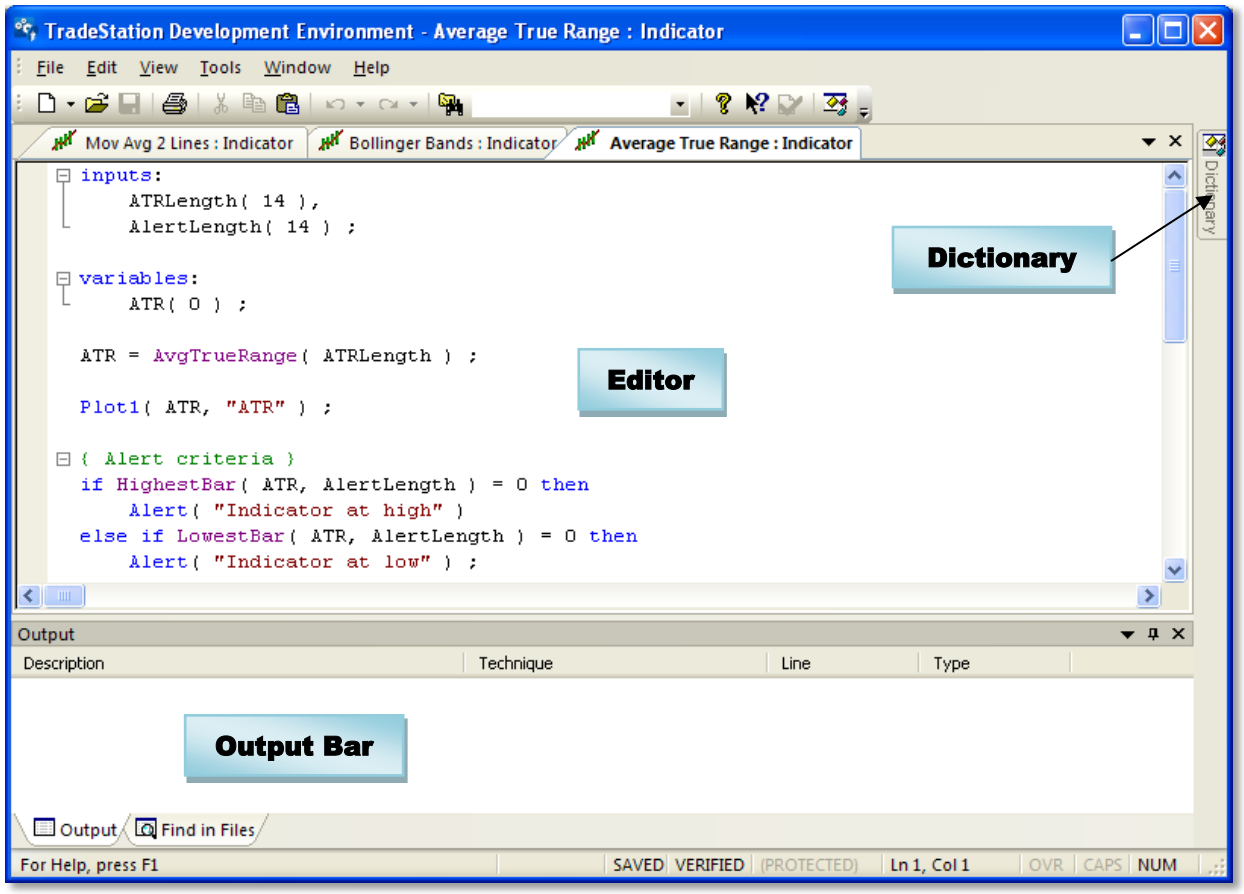
You may also click the **New** button, which is the first button displayed on the toolbar. This button has two clickable areas: clicking the white page will open the same type of EasyLanguage document used previously, while clicking the arrow will drop a menu allowing you to choose the type of EasyLanguage document you want to create.



An indicator in TradeStation may be defined as a mathematical calculation using the data from each bar, and then plotting the calculated value for each bar on the chart. Indicators are generally plotted on charts as either a line or histogram.

The three main areas of the TradeStation Development Environment are the Editor, Output Bar and Dictionary.

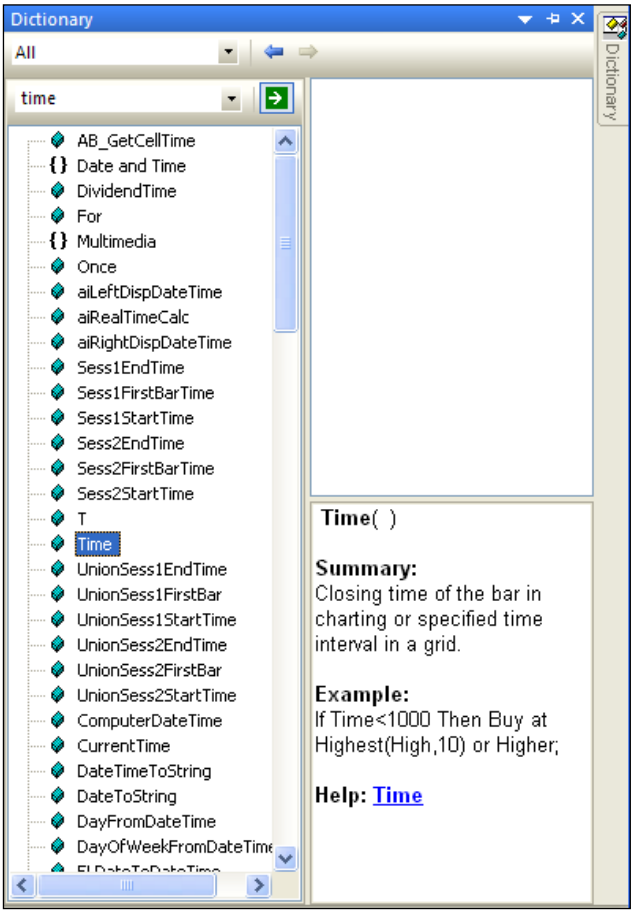
- **EasyLanguage Editor** – Is launched when a new EasyLanguage document is created or an existing one is opened.
- **EasyLanguage Output Bar** – A desktop bar that returns information about the EasyLanguage document. By default, the Output Bar is displayed at the bottom of the Development Environment.
- **EasyLanguage Dictionary** – A reference dictionary of EasyLanguage words, functions, etc. The Dictionary is displayed as a button on the right that rolls out when active.



In addition to providing common word-processing features and color-coding for various elements of EasyLanguage, the Development Environment also checks for proper syntax and grammar.

Dictionary Slide Bar

On the right side of the Development Environment, a button labeled **Dictionary** will give you access to the EasyLanguage Dictionary slide bar. The Dictionary can be a tremendous help while editing or creating strategies and analysis techniques.



Clicking any of the categories listed in the left pane will list elements from that category on the top right pane. You may also search for reserved words or functions by typing them in the **Search** field and clicking the green arrow button or pressing Enter on the keyboard. A list of all matching or related EasyLanguage reserved words or functions will appear. Highlighting one of the words will display a short summary and example in the bottom right pane.

Words and functions can be dragged and dropped directly into the EasyLanguage code. The picture on the left displays the results after searching for the word "time." The EasyLanguage Dictionary slide bar simplifies the process of searching and finding the reserved words or functions needed for your code.

EasyLanguage Output Bar

The EasyLanguage Output Bar enables you to find errors easily and quickly so you can resolve them. Verification ensures the EasyLanguage commands used to create an analysis technique or strategy follow the EasyLanguage rules. If an analysis technique or strategy contains syntax errors, these errors are recorded in the EasyLanguage Output Bar for further evaluation.

Tip: The EasyLanguage Output Bar appears docked at the bottom of the TradeStation Development Environment; however, you can also float the bar and move it to any location inside or outside the Development Environment.

EasyLanguage Expressions and Statements

Words are the basic building blocks of any language. However, becoming fluent in a language requires the proper use of groups of words to form expressions and, ultimately, statements. Statements are comprised of expressions, like the phrases in a sentence. All EasyLanguage instructions or rules consist of statements, which are like sentences in spoken language. Sentences can express one simple thought or a series of thoughts.

EasyLanguage Punctuation

A critical step in becoming fluent in EasyLanguage is to gain a thorough understanding of its punctuation. Below is a reference to the most common uses of EasyLanguage punctuation.

( ) Parentheses – Used in statement structures for syntax and also algebraically for grouping mathematical operations.

“ ” Quotes – Denote a text item (e.g., “plot name”) in EasyLanguage.

; Semicolon – Indicates the end of a statement.

: Colon – Denotes the declaration of a list.

, Comma – Separates items in a list.

[ ] Square brackets – Used to reference data from a previous bar and to displace a plot. Also used in arrays.

{ } Curly brackets – Any text between curly brackets is notation (remarks) that is not part of the EasyLanguage instructions.

// Double forward slash – Any text following a double forward slash, for the remainder of that line only, is notation (remarks) and not part of the EasyLanguage instruction.

Line returns, line spacing and paragraph indents are ignored by EasyLanguage and are generally used for improved readability of the code only; they do not affect the EasyLanguage instructions.

Plot Statements

Plot statements instruct TradeStation where to draw plots in a Chart Analysis window or what to place in a cell in a RadarScreen window. They are used for TradeStation indicators and ShowMe and PaintBar studies. An analysis technique may contain a maximum of 99 simultaneous plot statements.

Example:

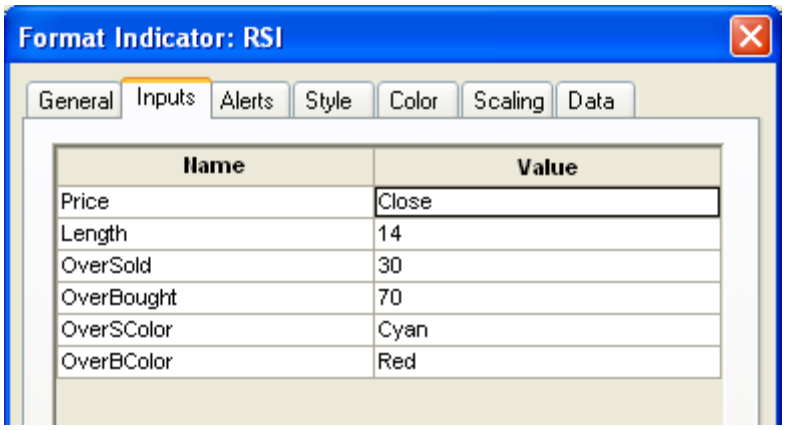
```
Plot1 (Open, “The Open”);
```

The word Plot1 in the sample plot statement above states that this is the first plot for this analysis technique. In this example, TradeStation is being instructed to place a plot at the Open for each bar. “The Open” is the *plot name* and is optional when writing a plot statement; however, assigning a name to a plot will help you identify a specific plot when formatting.

Inputs

An input is a user-editable value used in an analysis technique or strategy. It is a placeholder that allows the user to change a value from the **Inputs** tab of the **Format** dialog. This provides flexibility and efficiency when modifying analysis techniques and strategies.

The figure below shows the **Input** tab in the **Format Indicator** dialog for TradeStation's **RSI** indicator. As you can see, six inputs are specified and can be changed directly from this dialog.



So if you decided to change the **Length** used in the **RSI** calculation, or the numeric levels indicating **OverBought** and **OverSold** conditions, you could easily modify the indicator without having to return to the EasyLanguage Development Environment to do so.

Referencing Data from Previous Bars

Previously occurring prices and other values may be referenced using square brackets, [ ], immediately following the name of the value to be referenced.

Example:
The close of the bar 5 bars ago would be written:
Close[5]

Using Functions

Functions are frequently used formulas or comparisons written in EasyLanguage. They may be called for use in any analysis technique or strategy with just a few words, eliminating the need to re-create or repeatedly re-type complex formulas.

The EasyLanguage Dictionary includes hundreds of functions that you may use as you write your own EasyLanguage. Here you will find prewritten functions for RSI, ADX, DMI, Stochastic and many more. This will save you time and make your instructions more efficient.

Writing Alerts in EasyLanguage

Alerts are audiovisual or electronic notifications of specific market events as defined by the user.

- Alerts are triggered only when criteria are true on the last bar of a chart.
- The EasyLanguage instructions for the analysis technique must contain the alert criteria.
- Alerts must be "enabled" for the analysis technique, either by the default setting in the EasyLanguage Development Environment or in the **Format** dialog.

The last two bullet points above are extremely important when working with alerts, especially when writing your own into EasyLanguage documents. Because an alert is usually contingent on an event, EasyLanguage alert instructions are written using "If…then" statements.

ShowMe Studies

A ShowMe study marks each bar on a chart that meets specific criteria. These studies are used for identifying historical occurrences, as well as monitoring for current occurrences, on a chart. Generally, ShowMe studies are not used to mark all the bars on a chart but rather only those on which some condition is true.

Strategies

A trading strategy monitors the market for past and current occurrences of criteria that are position entry and exit points. These occurrences are indicated on a chart and logged for performance reporting purposes. Current occurrences of trading criteria may also be sent to the marketplace for actual execution.

EasyLanguage Order Syntax for Strategies

EasyLanguage uses four trading verbs to identify the market action to be taken in a strategy:

- Buy: establish, or add to, a long position (any existing short position will be covered before a long position is established)
- SellShort: establish, or add to, a short position (any existing long position will be liquidated before a short position is established)
- Sell: sell to liquidate a long position only
- BuyToCover: buy to cover a short position only.

EasyLanguage Seminars

EasyLanguage Boot Camp

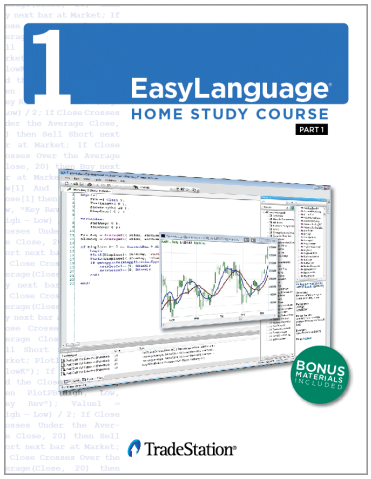
EasyLanguage Boot Camp can open up a host of possibilities in your strategy testing and trading. Whether you want to create your own strategies and techniques from scratch, modify existing ones or simply desire a fluency in EasyLanguage to better understand the work of authors and developers, this is the course for you.

EasyLanguage Boot Camp is a two-day class designed to provide a solid working knowledge of EasyLanguage, with strong emphasis on practical information you can use right away. Our instructors will guide you step by step through exercises that cover creating strategies, indicators, and ShowMe and PaintBar studies, including studies designed specifically for use with RadarScreen.

Implementing Objects in EasyLanguage

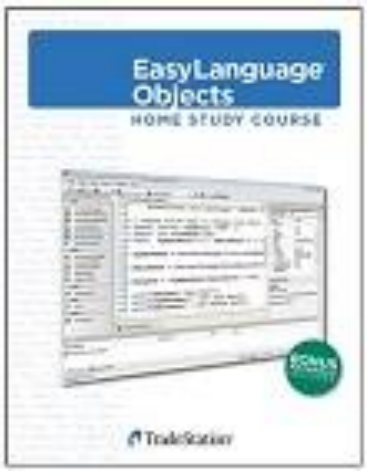
Implementing Objects in EasyLanguage is a two-day intensive online course specifically designed for experienced EasyLanguage users who want to learn how to incorporate the new EasyLanguage object features that were released with TradeStation 9.0. Learn how to access any symbol and data programmatically, place orders from an indicator, integrate Excel and build your own windows inside TradeStation.

EasyLanguage Books



EasyLanguage Home Study Course

This self-paced home study course is based on our popular EasyLanguage training classes offered live around the country. It is designed to teach you EasyLanguage programming, starting with the fundamentals and continuing through advanced topics, so that you can create your own trading indicators and strategies. The course comes with a CD containing answers to all of the course exercises and video answers for all the challenge exercises.



EasyLanguage Objects Home Study Course

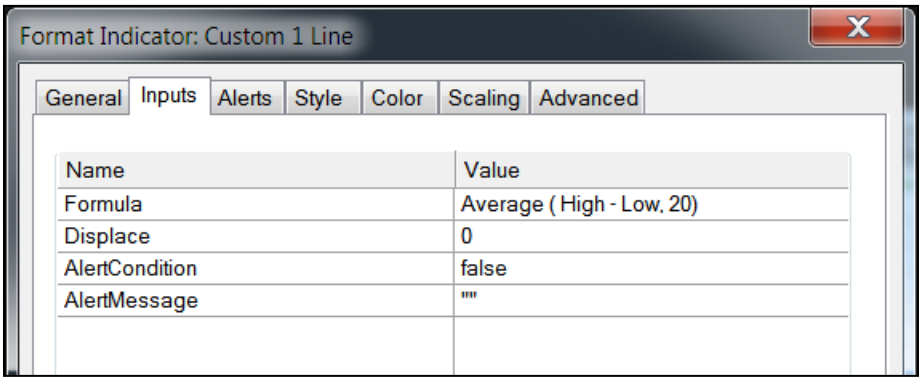
This self-paced home study course is based on our popular two-day Implementing Objects in EasyLanguage online training class. It is designed to teach you how to integrate the new EasyLanguage Objects features of TradeStation 9.0 into your EasyLanguage programming. With more than 20 new object programming examples, you will learn how to access market, account, and position data, place orders, integrate EasyLanguage with Excel, and much more. The course comes complete with EasyLanguage coding examples and sample workspaces.

Exercise 1
Using Formulas and Functions as Inputs

You may use any formula or function when formatting the inputs of any analysis technique or strategy.

Examples:

(High + Low) / 2
(Open + High + Low + Close) / 4
Open – Close
Average (Open – Close, 10)



Exercise 2
Creating an Indicator

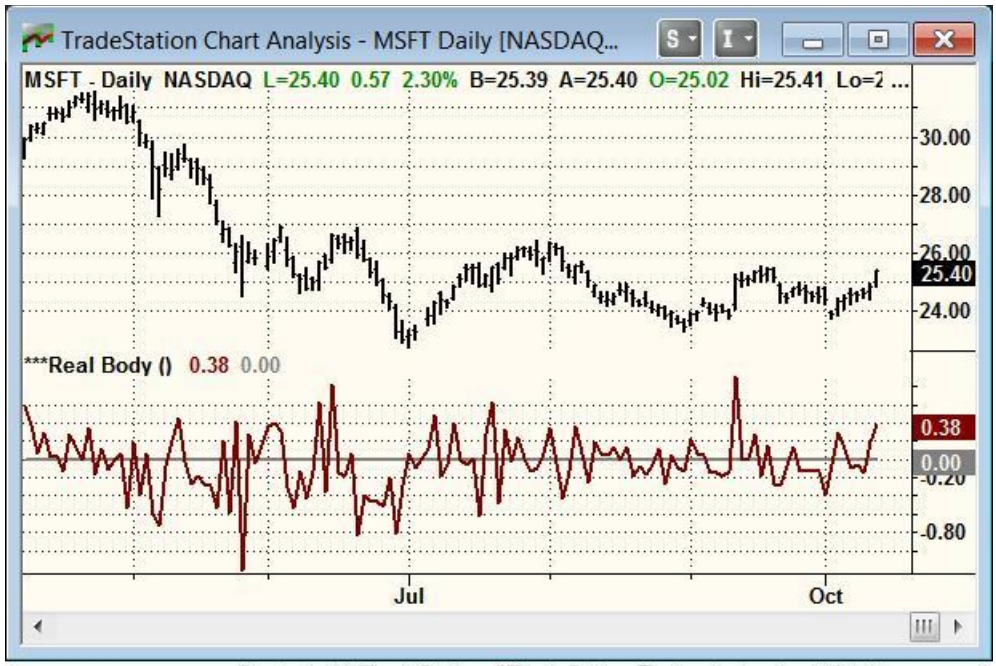
This indicator plots a line representing the real body of each candle. The value will oscillate between positive and negative values.

Real Body = Difference between Open and Close.

Indicator: **Real Body

```
Value1 = Close – Open;

Plot1 (Value1);
Plot2 (0);
```



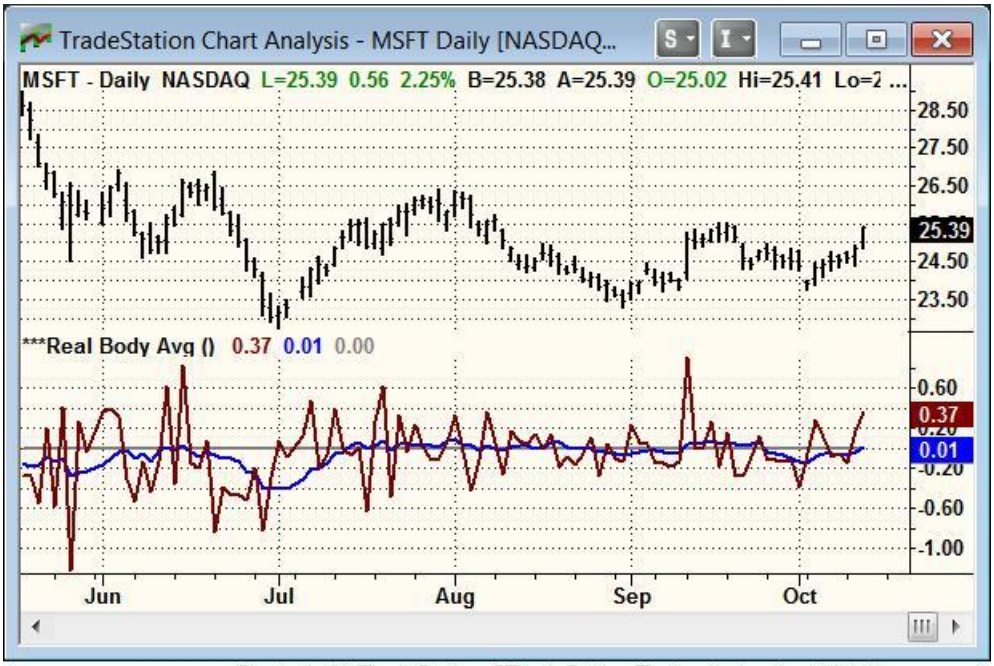
Exercise 3
Using EasyLanguage Functions

Modify the Real Body indicator to plot a line representing the average of real body over a user-specified number of bars.

Indicator: **Real Body Avg

```
Value1 = Close – Open;
Value2 = Average (Close – Open, 10);

Plot1 (Value1);
Plot2 (Value2);
Plot3 (0);
```



Exercise 4
Creating Alerts

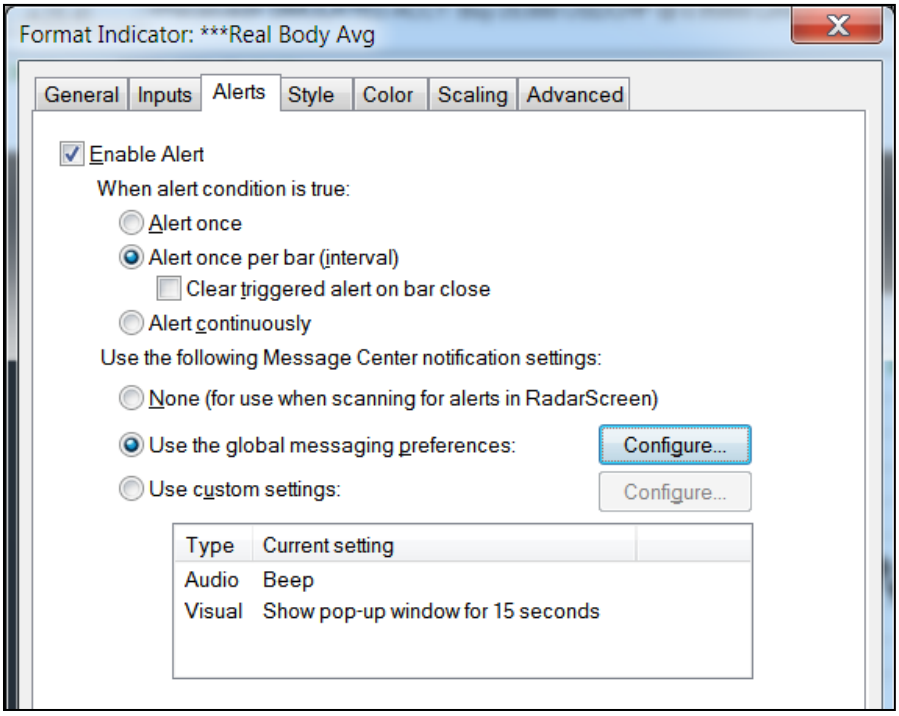
Modify the Average Real Body indicator to generate an alert every time the average crosses the zero line.

Indicator: **Real Body Avg

```
Value1 = Close – Open;
Value2 = Average (Close – Open, 10);

Plot1 (Value1);
Plot2 (Value2);
Plot3 (0);

If Value2 crosses over 0 then
      Alert;
If Value2 crosses under 0 then
      Alert;
```



Exercise 5
Creating a ShowMe

This ShowMe will display a dot on the bar that meets specific criteria. In this case, it will identify the bar where the Average Real Body oscillator crosses from positive to negative and vice versa.

ShowMe: **Real Body Cross

```
Value1 = Average (Close - Open, 10);

If Value1 crosses under 0 then
      Plot1 (Low);

If Value1 crosses over 0 then
      Plot2 (High);
```

Exercise 6
Creating a Strategy

This strategy will generate a long entry when the Real Body oscillator crosses over the zero line. It will generate a short entry when the Real Body oscillator crosses under the zero line.

This strategy is always in the market. Long entries will exit short positions, and short entries will exit long positions.

Strategy: **Real Body Cross

```
Value1 = Average (Close – Open, 10);

If Value1 crosses over 0 then
      Buy next bar at market;

If Value1 crosses under 0 then
      Sell Short next bar at market;
```

Exercise 7
Adding Plots to Indicators

You may create and plot other lines to already existing analysis techniques. This is done by adding plot statements to the EasyLanguage document.

Indicator: RSI

```
Inputs: Price( Close ), Length( 14 ), OverSold( 30 ),
OverBought( 70 ), OverSColor( Cyan ), OverBColor( Red ) ;

Variables: MyRSI( 0 ) ;

MyRSI = RSI ( Price, Length ) ;

Plot1( MyRSI, "RSI" ) ;
Plot2( OverBought, "OverBot" ) ;
Plot3( OverSold, "OverSld" ) ;
Plot4( Average (MyRSI, 30) );
```

RSI with RSI Average

Exercise 8
Using RadarScreen

Insert custom analysis techniques into a RadarScreen window and monitor hundreds of symbols simultaneously for real-time alerts.

Indicator: **Real Body Avg

TradeStation RadarScreen - Page 1

	Symbol	Inter...	Last	Net C...	Net %...	***Real Body Avg PLOT2
1	Nasdaq 100 Index (101)					
2	AAPL	Daily	300.10	1.56	0.52%	-0.04
3	ADBE	Daily	27.60	-0.06	-0.22%	0.20
4	ADP	Daily	42.47	0.47	1.12%	-0.11
5	ADSK	Daily	33.47	0.79	2.41%	0.14
6	ALTR	Daily	29.67	-0.42	-1.41%	-0.05
7	AMAT	Daily	11.96	0.00	0.02%	0.01
8	AMGN	Daily	55.50	-0.44	-0.78%	0.05
9	AMZN	Daily	155.24	-1.24	-0.79%	-0.56
10	APOL	Daily	44.37	-5.61	-11.22%	-0.19
11	ATVI	Daily	11.30	0.05	0.46%	-0.01
12	BBBY	Daily	43.50	0.25	0.58%	-0.14
13	BIDU	Daily	99.95	0.33	0.33%	-1.13
14	BIIB	Daily	57.20	0.27	0.48%	0.15
15	BMC	Daily	43.68	1.09	2.56%	-0.03
16	BRCM	Daily	37.36	0.63	1.71%	0.11
17	CA	Daily	21.92	0.18	0.85%	-0.05
18	CELG	Daily	58.24	0.36	0.62%	-0.06
19	CEPH	Daily	63.59	0.91	1.46%	-0.07
20	CERN	Daily	86.66	1.13	1.32%	0.10
21	CHKP	Daily	39.75	0.54	1.37%	0.22
22	CHRW	Daily	71.51	0.88	1.25%	0.05
23	CMCSA	Daily	18.15	0.13	0.72%	-0.03
24	COST	Daily	63.37	0.03	0.05%	0.17
25	CSCO	Daily	23.17	0.55	2.43%	0.03

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