

Variables and Commands

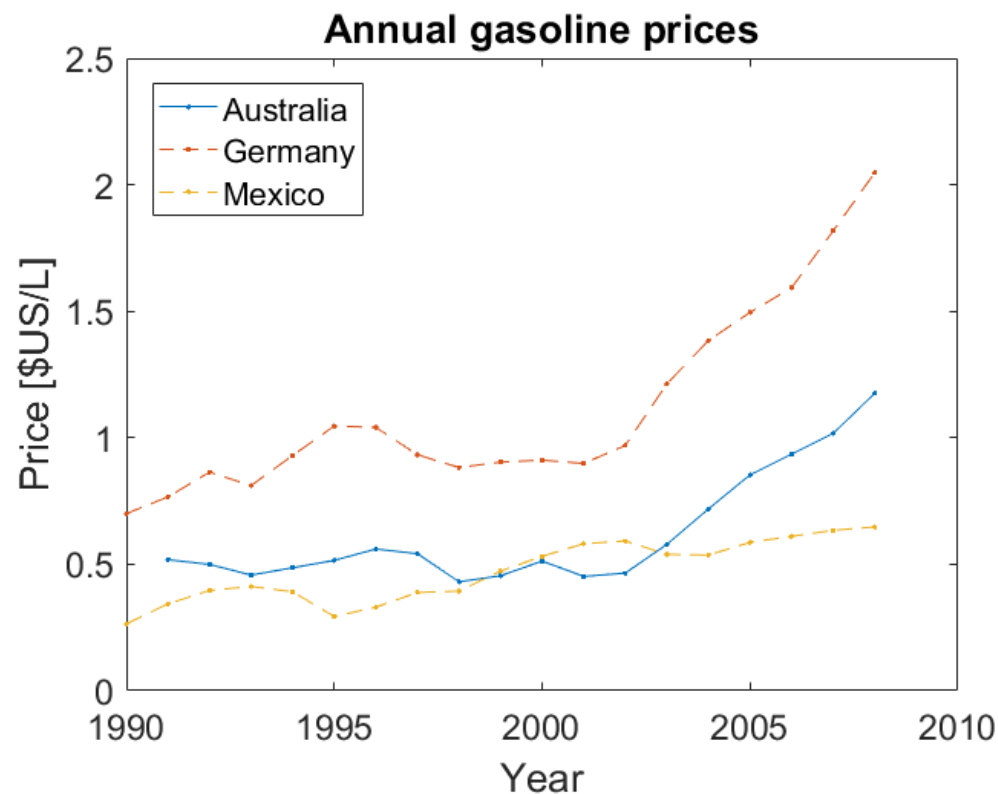
MATLAB® Fundamentals for Aerospace Applications



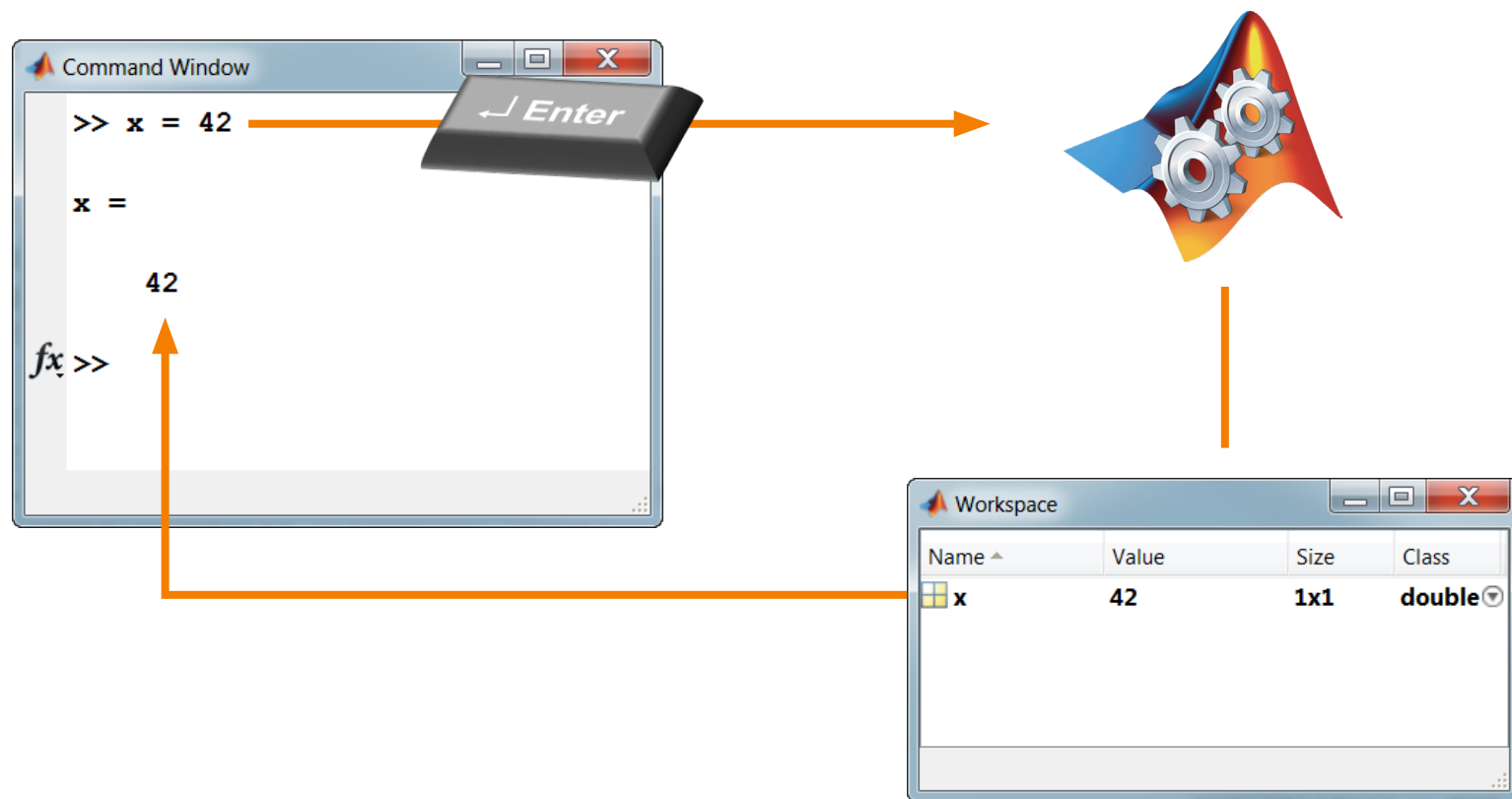
Outline

- Entering commands
- Creating numeric variables
- Creating character variables
- Making and annotating plots
- Getting help
- Creating and running scripts
- Formatting live scripts

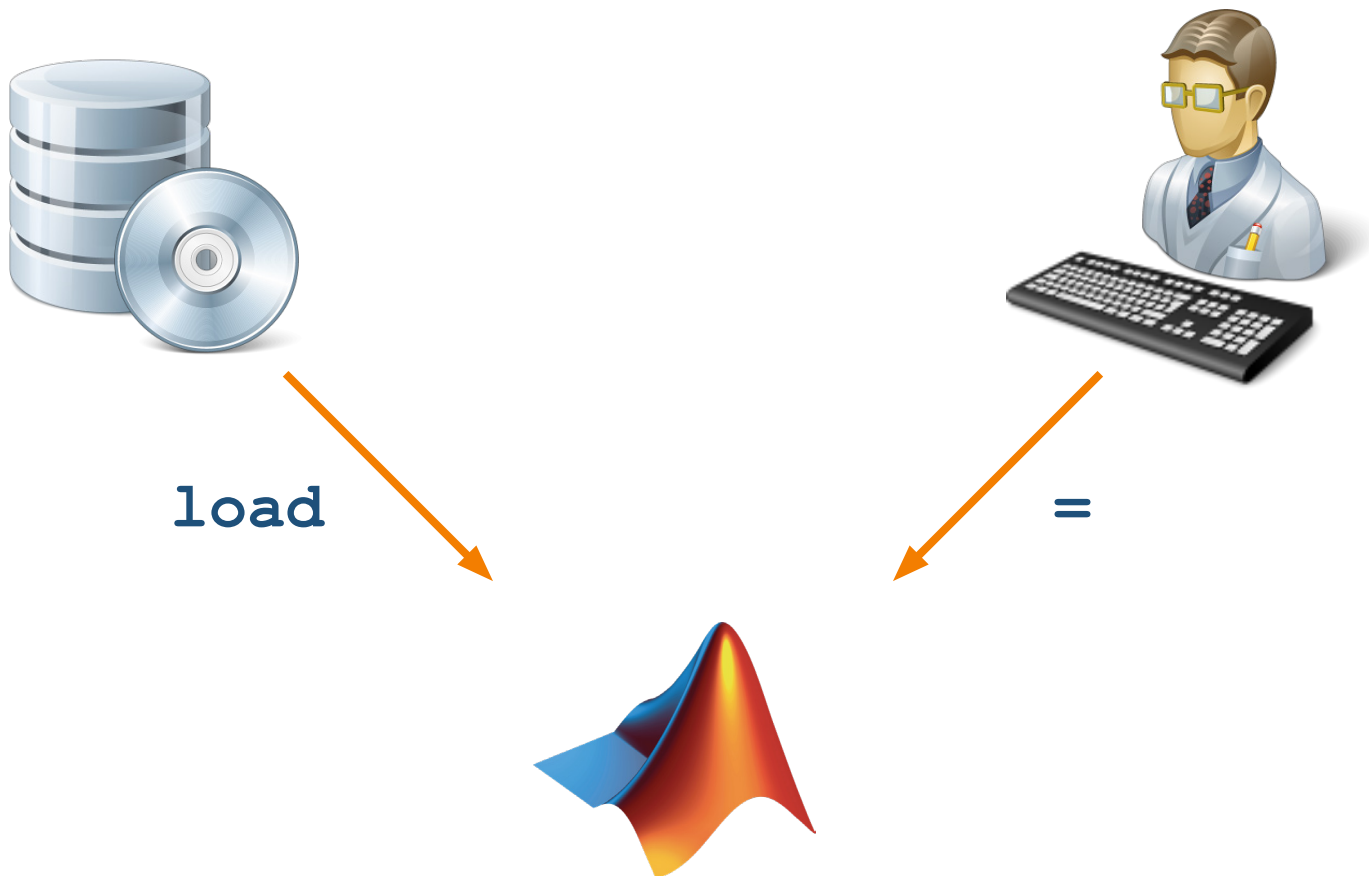
Course Example: Comparing Prices Visually



Entering Commands



Getting Data into MATLAB®



Assigning Values to Variables

$$x = 6 * 7$$


Assignment



1) Evaluate right side

42

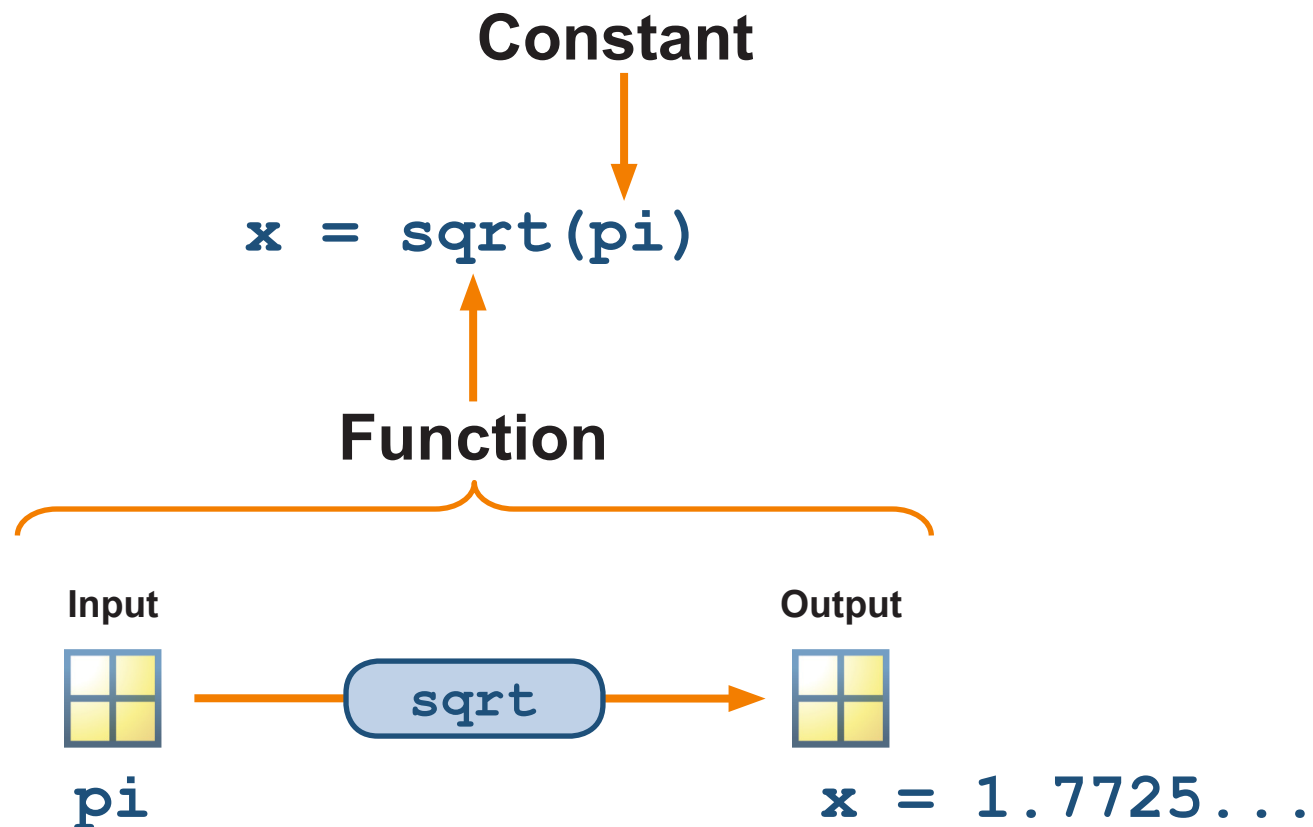
**2) Assign to variable
on left side**



1-by-1



Using Built-In Functions and Constants

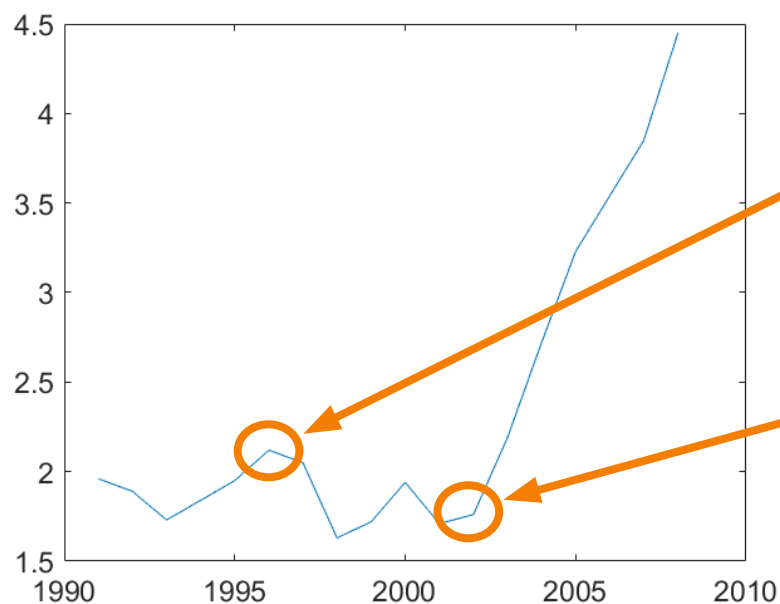


Plotting

```
plot(Year, Australia)
```



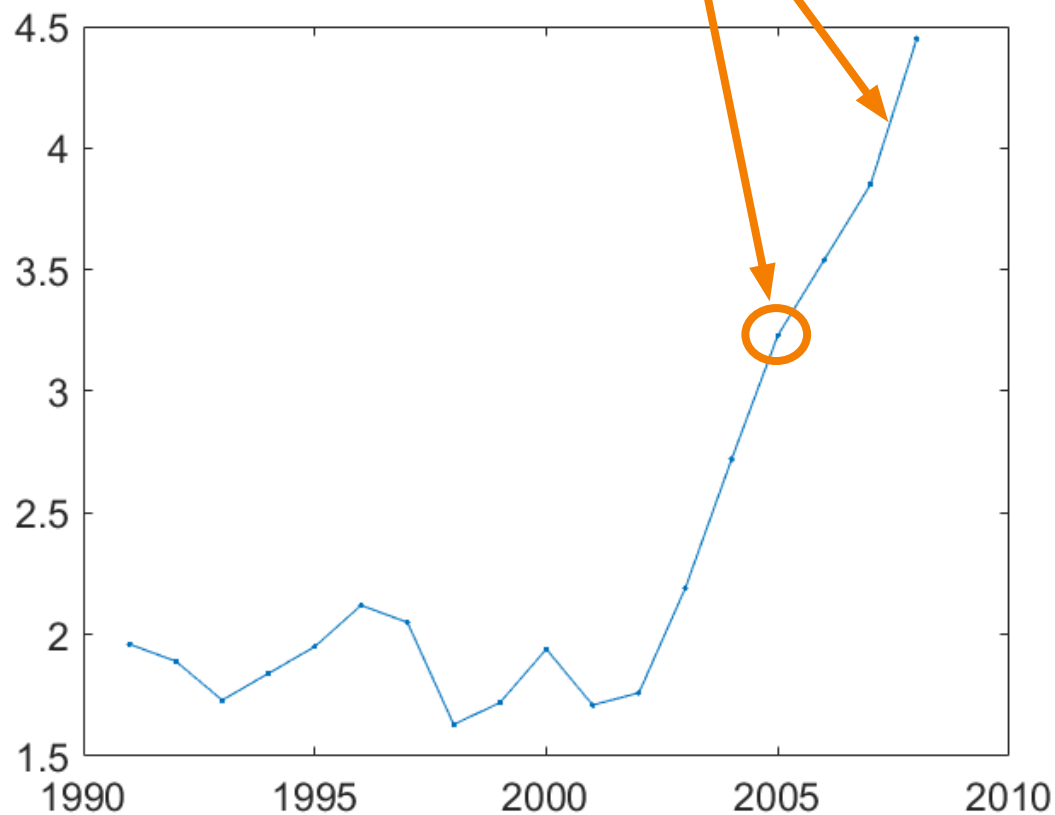
plot



1990	NaN
1991	1.9600
1992	1.8900
1993	1.7300
1994	1.8400
1995	1.9500
1996	2.1200
1997	2.0500
1998	1.6300
1999	1.7200
2000	1.9400
2001	1.7100
2002	1.7600
2003	2.1900
2004	2.7200
2005	3.2300
2006	3.5400
2007	3.8500
2008	4.4500

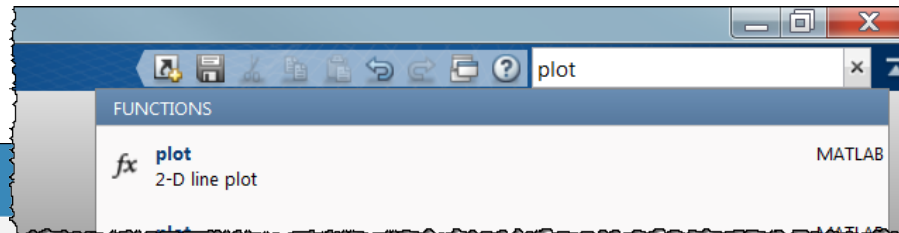
Plot Options

```
plot(Year,Australia, ' .- ')
```

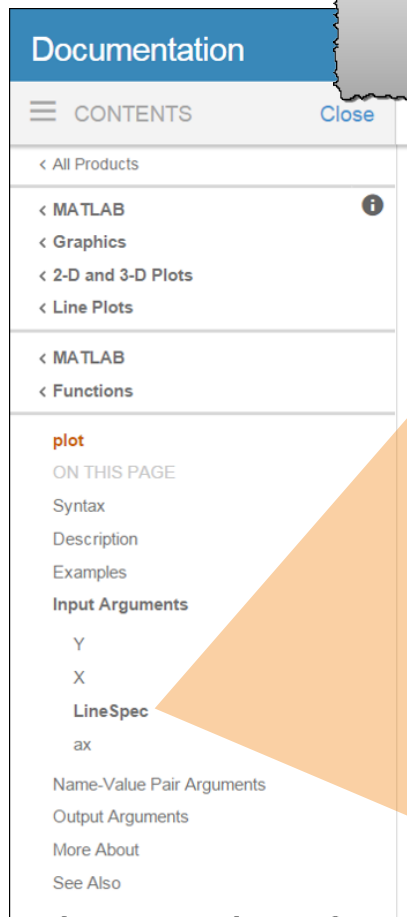


Obtaining Help

search



browse



LineSpec — Line style, marker symbol, and color

string

Line style, marker symbol, and color, specified as a string. The elements of the string can appear in any order, and you can omit one or more options from the string specifier. If you omit the line style and specify the marker character, then the plot shows only the marker and no line.

If Y is a matrix and you specify a color with LineSpec, then all the lines use the specified color. If you specify a marker type or line style and do not specify a color, then the lines cycle through the color order.

Example: ' - -or ' is a red dashed line with circle markers

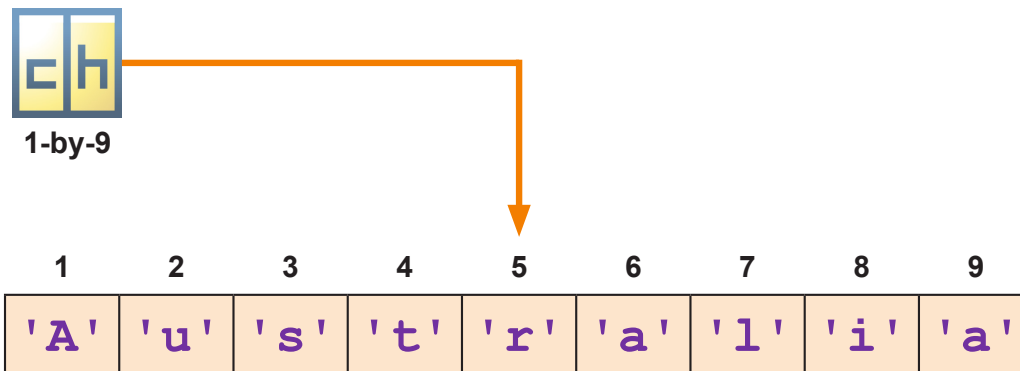
Specifier	Line Style
-	Solid line (default)
--	Dashed line
:	Dotted line
-.	Dash-dot line

Specifier	Marker
o	Circle
+	Plus sign
*	Asterisk
.	Point
x	Cross

Creating Characters and Text

`y = x` → variable called **x**
`y = 'x'` → character "x"

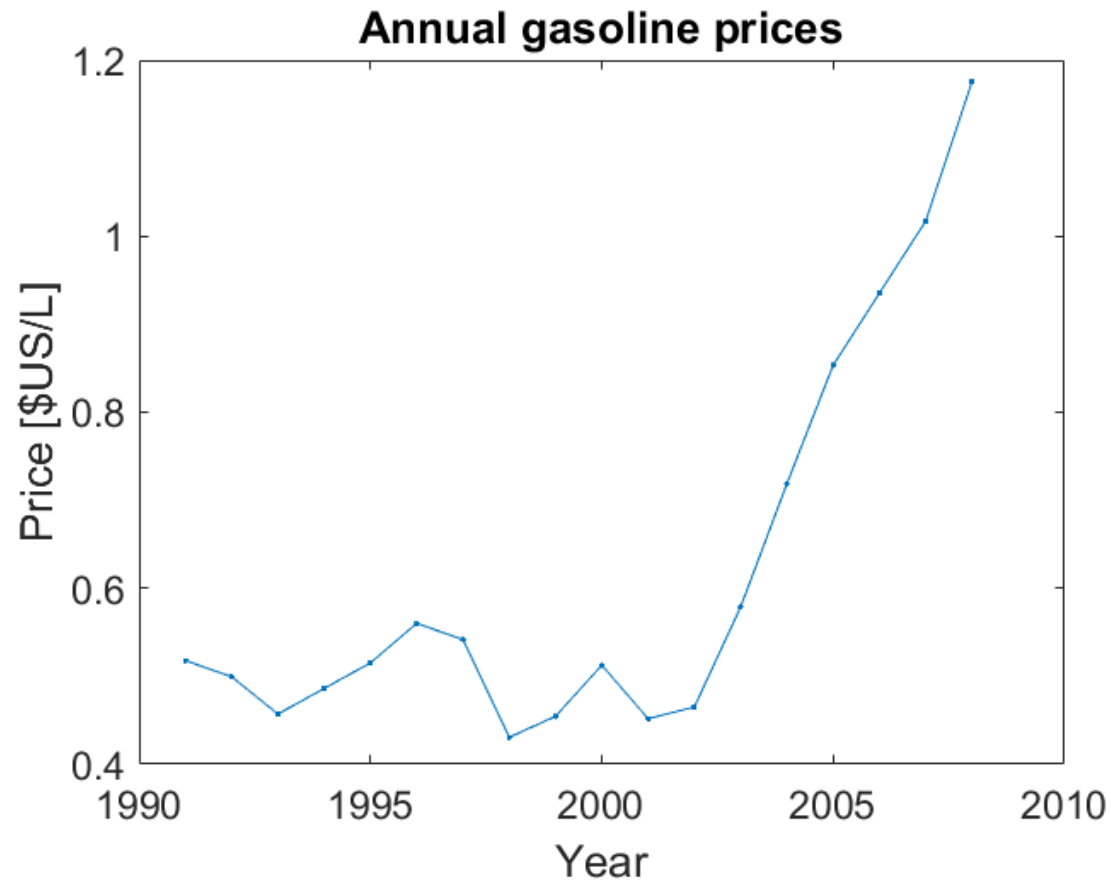
`country = 'Australia'`



Annotating Plots

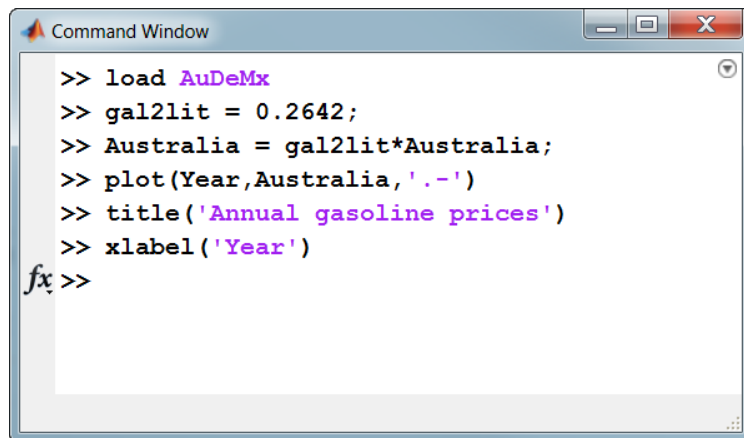
`title('ch')`

`ylabel('ch')`

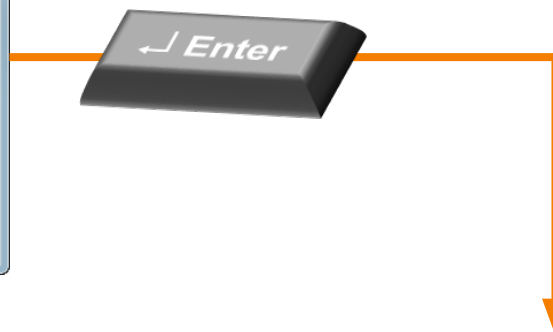


`xlabel('ch')`

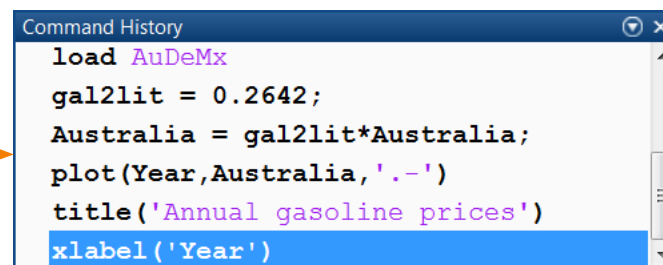
The Command History



A screenshot of the MATLAB Command Window. It contains the following commands: `>> load AuDeMx`, `>> gal2lit = 0.2642;`, `>> Australia = gal2lit*Australia;`, `>> plot(Year,Australia,'.-')`, `>> title('Annual gasoline prices')`, and `>> xlabel('Year')`. The prompt `fx>>` is visible at the bottom left.

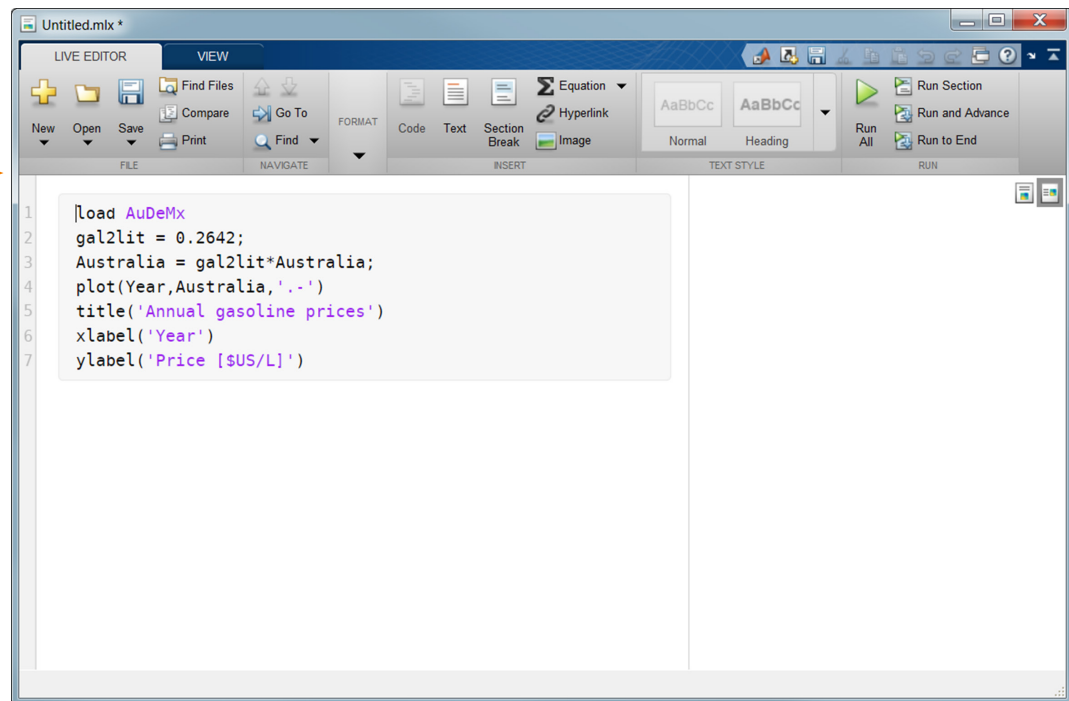
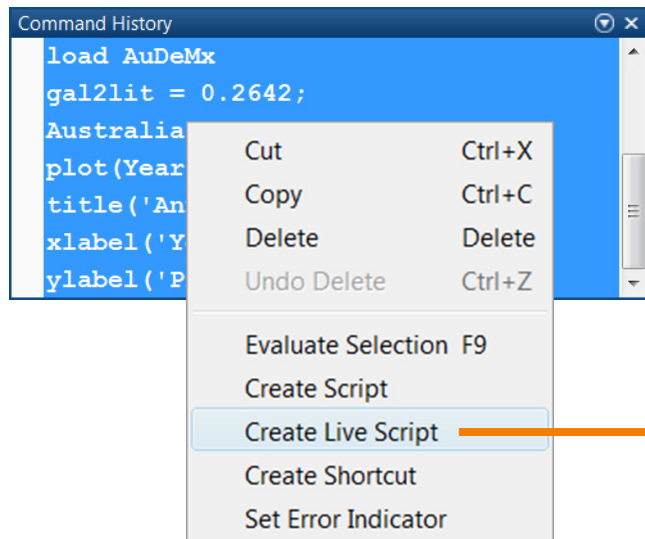


**Retrieve
Reuse**



A screenshot of the MATLAB Command History window. It displays the same sequence of commands as the Command Window: `load AuDeMx`, `gal2lit = 0.2642;`, `Australia = gal2lit*Australia;`, `plot(Year,Australia,'.-')`, `title('Annual gasoline prices')`, and `xlabel('Year')`. The last command, `xlabel('Year')`, is highlighted with a blue background.

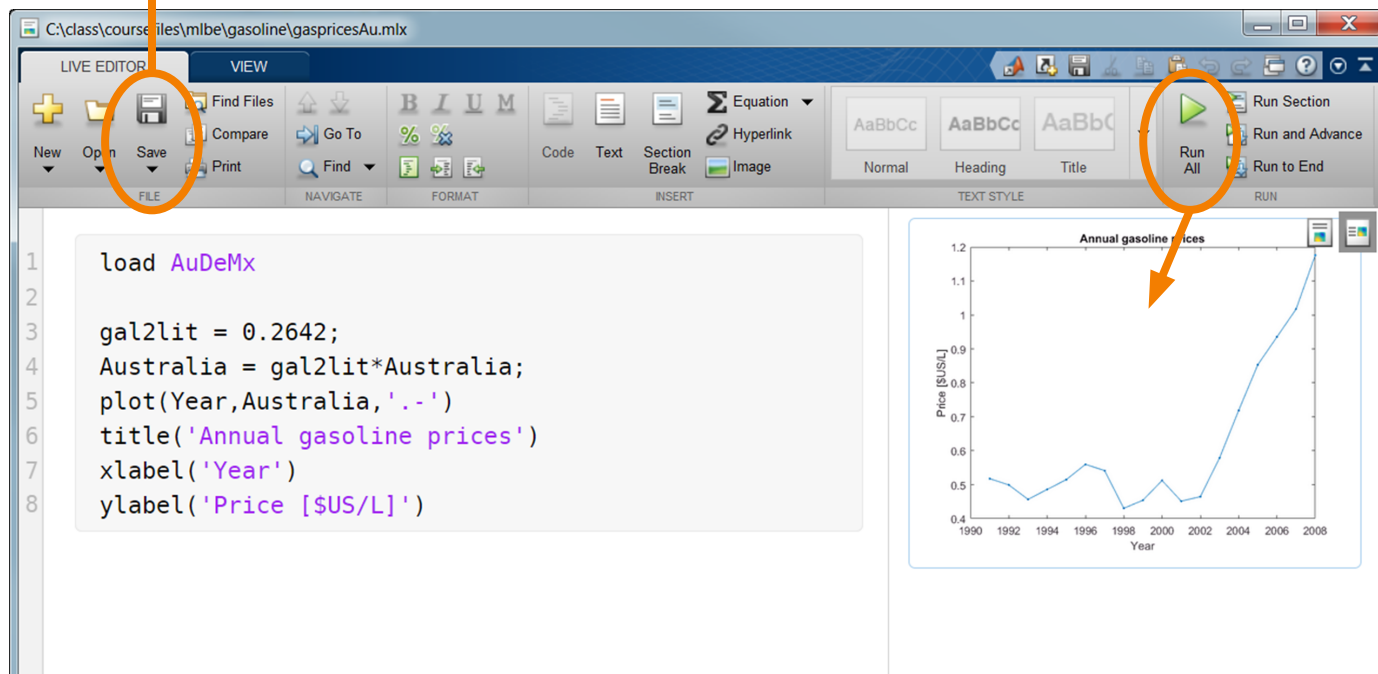
The MATLAB® Live Editor



Live Scripts



gaspricesAu.mlx



Adding Plots

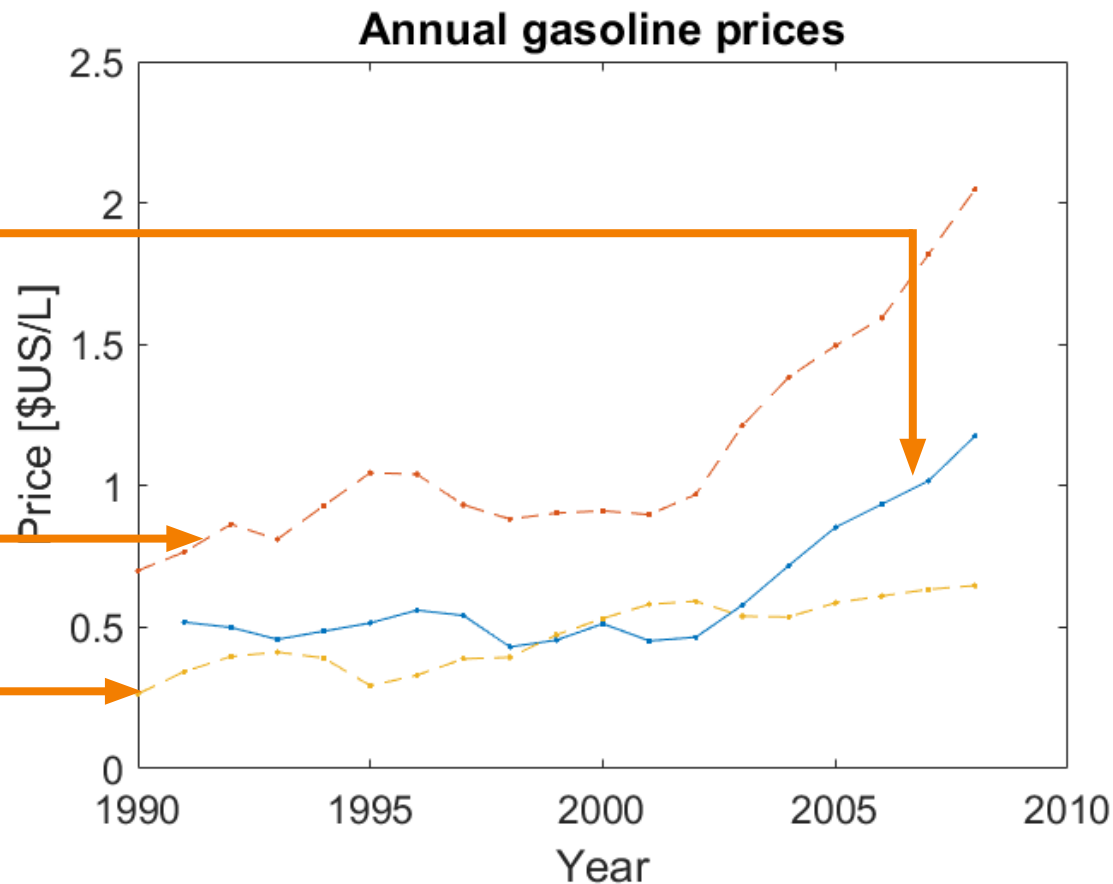
```
plot(...)
```

```
hold on
```

```
plot(...)
```

```
plot(...)
```

```
hold off
```



Code Sections

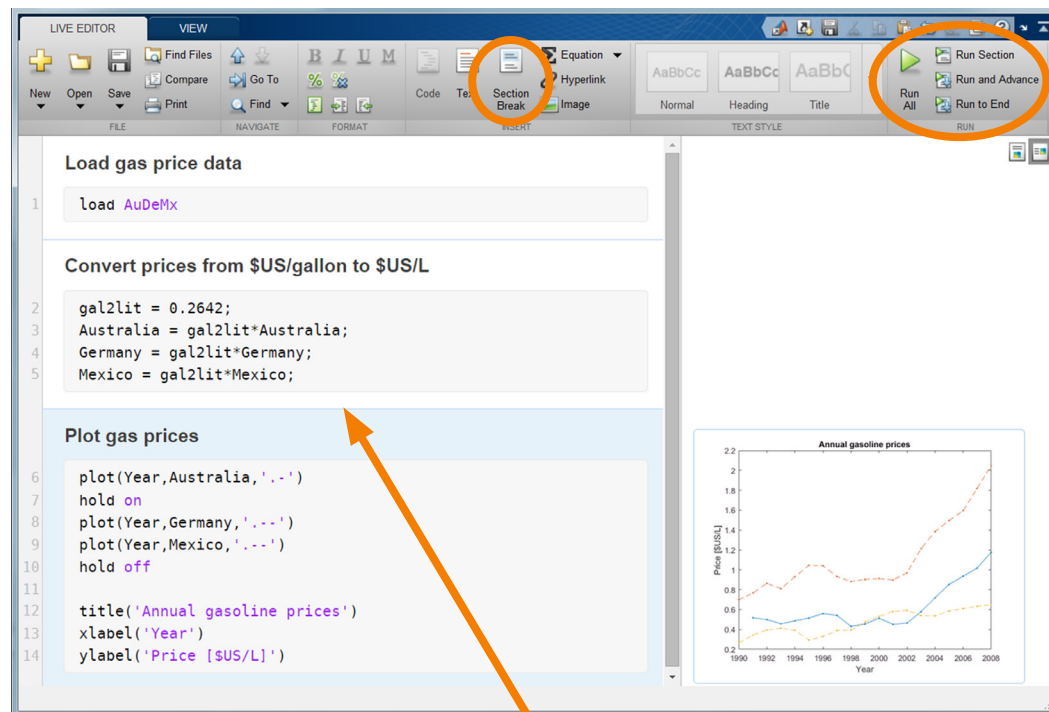
Load price data



Convert prices from
gallons to liters



Plot results



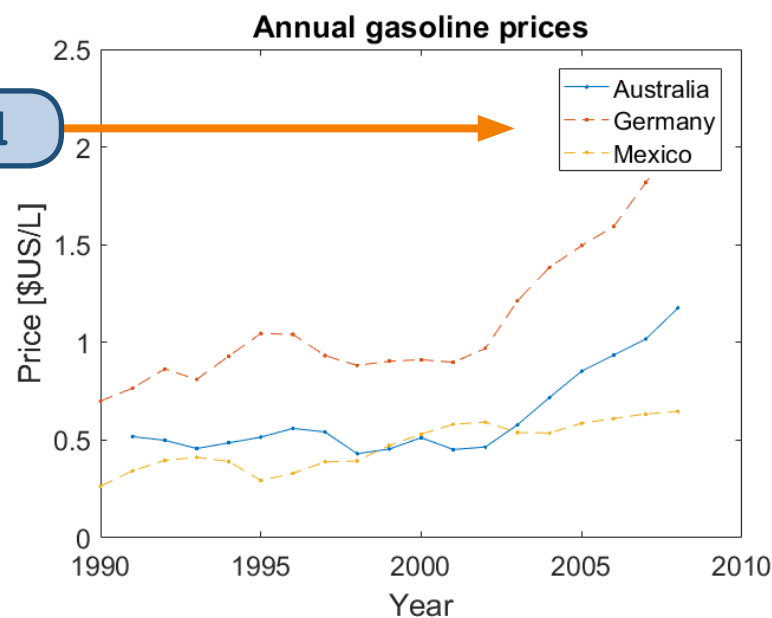
Section break

Adding A Plot Legend

```
legend('Australia', 'Germany', 'Mexico')
```

'Australia'
'Germany'
'Mexico'

legend



Providing Documentation

Title → **Gas Prices**

Heading → **Load gas price data.**

Text → File contains annual gas prices in Australia, Germany, and Mexico in \$US/gal for the years 1990 to 2008.

Code → `load AuDeMx`

Equation →
$$\frac{USD}{L} = \frac{gal}{L} \times \frac{USD}{gal}$$

Code → `gal2lit = 0.2642; % conversion factor`

Code → `Australia = gal2lit*Australia;`

Code → `Germany = gal2lit*Germany;`

Code → `Mexico = gal2lit*Mexico;`

Comment → `% conversion factor`

Summary

- Entering commands
- Creating numeric variables
- Creating character variables
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Test Your Knowledge

1. (Select all that apply) Which of the following will create a scatter plot of **frogs** on the horizontal axis and **GDP** on the vertical axis, with red markers at the data points?
 - A. `plot(GDP,frogs,'ro')`
 - B. `plot(GDP,frogs,'o','r')`
 - C. `plot(frogs,GDP,'ro')`
 - D. `plot(frogs,GDP,'red')`

2. **T/F:** Script files can access and modify any variables already in the base MATLAB workspace.