

**MATLAB®**

Desktop Tools and Development Environment



**MATLAB®**

R2020b



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# Startup and Shutdown

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## Start MATLAB on Windows Platforms

Choose one of these ways to start MATLAB.

- “Select MATLAB Icon” on page 1-2
- “Call matlab from Windows System Command Line” on page 1-2
- “Call matlab from MATLAB Command Prompt” on page 1-3
- “Open File Associated with MATLAB” on page 1-3
- “Select MATLAB Executable from Windows Explorer Tool” on page 1-3

When you start MATLAB, it automatically adds the `userpath` folder to the search path. MATLAB also reopens any desktop components that were open when you last shut down.


To customize startup, see “Specify Startup Options” on page 1-17.

The MATLAB startup folder is the folder you are in when you get the MATLAB prompt. To change the default startup folder, see “MATLAB Startup Folder” on page 1-14.

If you have trouble starting MATLAB, then see MATLAB Installation, Activation & Startup Help.


### Select MATLAB Icon

On Microsoft Windows platforms, double-click the MATLAB icon. The term *Release* refers to your MATLAB release number; for example, R2017a.

- Installer shortcut on your Windows desktop — Double-click the MATLAB icon .
- Windows 10 systems — **Start > All apps > MATLAB Release**
- Windows 8 systems — On the Start screen or the desktop, click **MATLAB Release**.
- Windows 7 systems — If you chose to have the installer put a shortcut to the MATLAB program on the Windows Start menu, then select **Start > MATLAB Release**

With this option, the startup folder is the last working folder from the previous MATLAB session or the custom path specified in the **Initial working folder** preference described in “General Preferences” on page 2-38.

You also can specify a custom startup folder in the MATLAB shortcut icon using the **Start in** field. However, this technique is the same as setting a custom path in the **Initial working folder** preference. If you enter an invalid path in the **Start in** field, then the startup folder is unpredictable. To set a custom path in the **Start in** field:

- 1 Right-click the shortcut icon for MATLAB  and select **Properties** from the context menu. The Properties dialog box for MATLAB opens to the **Shortcut** pane.
- 2 In the **Start in** field, type the full path to a folder on your system, and then click **OK**.

### Call matlab from Windows System Command Line

From the Windows system prompt, type `matlab`.

The startup folder is the folder in which you run the `matlab` command. To use the folder specified by the **Initial working folder** preference, type:



```
matlab -useStartupFolderPref
```

## Call matlab from MATLAB Command Prompt

If you start another MATLAB session from within MATLAB, then the startup folder is folder where you call the command:

```
!matlab
```

To display the startup folder, type `pwd` before calling `matlab`.

## Open File Associated with MATLAB

The MATLAB installer sets up associations between certain file types and MathWorks® products. MATLAB starts when you open one of those files. The startup folder is the folder containing the file.

For example, using the Windows Explorer tool, double-click a file with a `.m` extension. MATLAB starts and opens the file in the MATLAB Editor.

## Select MATLAB Executable from Windows Explorer Tool

When you double-click the `matlab.exe` file from the Windows Explorer, the startup folder is one of the following:

- The last working folder from the previous MATLAB session.
- The custom path specified in the **Initial working folder** preference.

## See Also

`matlab` (Windows) | `userpath`

## More About

- “Specify Startup Options” on page 1-17
- “MATLAB Startup Folder” on page 1-14
- “General Preferences” on page 2-38
- MATLAB Installation, Activation & Startup Help

## Associate .mat Files with MATLAB

To associate a .mat extension type with MATLAB R2010b or later, use the Microsoft Windows **Default Programs** control panel.

- 1 Open the Windows **Control Panel**. The **Control Panel** is typically available from the Windows Start menu, or refer to your Windows documentation.
- 2 From **View by: Category**, select **Programs**.
- 3 Select **Default Programs**.
- 4 Select **Set your default programs**. The **Programs** pane shows installed versions of MATLAB, R2010b and later.
- 5 Select a MATLAB release, then **Choose defaults for this program**.
- 6 Check the box next to the .mat entry.
- 7 Select **Save**.
- 8 Close all dialog boxes and menus, and exit the **Control Panel**.

If you want to use MATLAB R2010a or earlier, then choose the **Associate a file type or protocol with a program** options from the **Default Programs** menu instead. Scroll down the list of file types to the .mat entry. Select **Change Program...** and choose a version of MATLAB from the **Recommended Programs** list. Do not use the **Browse** button.

For information about using these options, see your Windows documentation.

---

**Note** By default, MATLAB associates the latest installed version to MATLAB file types. However, once you use the Windows Control Panel or the file manager to associate a MATLAB version to a file type, you must manually reassociate the type with each new installation of MATLAB. If you want to return to the default behavior, then uninstall every MATLAB that is manually associated to any MATLAB file type. Then reinstall the latest MATLAB release.

---

### See Also

## Start MATLAB on Linux Platforms

To start MATLAB on Linux platforms, type `matlab` at the operating system prompt. If you did not set up symbolic links in the installation procedure, then type `matlabroot/bin/matlab`. *matlabroot* is the name of the folder in which you installed MATLAB. To see the folder, type `matlabroot`.

After starting MATLAB, the desktop opens. Desktop components that were open when you last shut down MATLAB reopen. If the `DISPLAY` environment variable is not set or is invalid, then the desktop does not display.

MATLAB automatically adds the `userpath` folder to the search path.

To customize startup, see “Specify Startup Options” on page 1-17.

The MATLAB startup folder is the folder you are in when you get the MATLAB prompt. To change the default startup folder, see “MATLAB Startup Folder” on page 1-14.

If you have trouble starting MATLAB, then see MATLAB Installation, Activation & Startup Help.

### Startup Folder

On Linux platforms, the default startup folder is the folder from which you started MATLAB.

To specify the `userpath` as the startup folder, set the value of the environment variable `MATLAB_USE_USERWORK` to 1 before startup. By default, `userpath` is `userhome/Documents/MATLAB`. To specify a different folder for `userpath`, and for other options, call the MATLAB `userpath` function.

### Execute MATLAB Script from Remote ssh Login

To execute a MATLAB script `hello.m` via a remote ssh login, in a terminal window type:

```
ssh local.foo.com matlab -nodisplay -nojvm < hello.m
```

The ssh command pipes `hello.m` to MATLAB running on the remote host `local.foo.com`. The `-nodisplay` option starts MATLAB without the desktop.

### See Also

`matlab` (Linux) | `matlabroot` | `userpath`

### More About

- “Specify Startup Options” on page 1-17
- “MATLAB Startup Folder” on page 1-14
- “General Preferences” on page 2-38
- MATLAB Installation, Activation & Startup Help

# Start MATLAB on macOS Platforms

Choose one of these ways to start MATLAB.

- “Start from Applications Folder” on page 1-6
- “Start from Terminal Window” on page 1-6

When you start MATLAB, it automatically adds the `userpath` folder to the search path. MATLAB also reopens any desktop components that were open when you last shut down.

To customize startup, see “Specify Startup Options” on page 1-17.

The MATLAB startup folder is the folder you are in when you get the MATLAB prompt. To change the default startup folder, see “MATLAB Startup Folder” on page 1-14.

If MATLAB fails to start due to a problem with required system components such as Java® software, then diagnostics run automatically. The software advises you of the problem and offers suggestions to correct it. For information about other startup problems, see MATLAB Installation, Activation & Startup Help.

## Start from Applications Folder

- Double-click the MATLAB icon in the `matlabroot` folder. Replace `matlabroot` with the name of the folder in which you installed MATLAB.

The startup folder is the last working folder from the previous MATLAB session or the custom path specified in the **Initial working folder** preference described in “General Preferences” on page 2-38.

## Start from Terminal Window

- To start from the Terminal window, you need to know the value of `matlabroot`, the full path to the folder where MATLAB is installed. If you do not know the path, then open MATLAB from the Applications folder, type `matlabroot`, and note the value. Exit MATLAB.
- Open a Terminal window.
- Navigate to the following location from your terminal window:

```
matlabroot/bin
```

- Start MATLAB.

```
./matlab
```

The startup folder is the MATLAB installation folder.

## See Also

`matlab` (macOS) | `matlabroot` | `userpath`

## More About

- “Specify Startup Options” on page 1-17

- “MATLAB Startup Folder” on page 1-14
- “General Preferences” on page 2-38
- MATLAB Installation, Activation & Startup Help



## Exit MATLAB

### In this section...

“Ways to Quit or Exit” on page 1-8  
“Confirm Exiting” on page 1-8  
“Run Script When Exiting” on page 1-9

### Ways to Quit or Exit

At any time, do one of the following:


- Click the close button  on the MATLAB desktop.
- Click  on the left side of the desktop title bar and select **Close**.
- Type `quit` or `exit` at the command prompt.

MATLAB closes after:

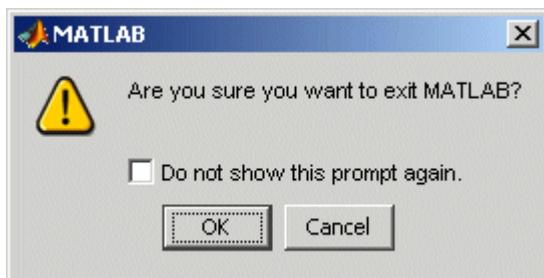
- Prompting you to confirm exiting on page 1-8, if that preference is specified.
- Prompting you to save any unsaved files
- Running a script when exiting on page 1-9, if the `finish.m` script exists in the current folder or on the search path.

### Confirm Exiting

To set a preference that displays a confirmation dialog box when you exit:

- 1 On the **Home** tab, in the **Environment** section, click  **Preferences**.
- 2 Select **MATLAB > General > Confirmation Dialogs**.
- 3 Select the **Confirm before exiting MATLAB** check box and click **OK**.

MATLAB then displays the following dialog box when you exit.



You can also display your own exit confirmation dialog box using a `finish.m` script, as described in the following section.

## Run Script When Exiting

When MATLAB exits, it runs the script `finish.m`, if the file exists in the current folder or anywhere on the search path. You create the script containing statements such as saving the workspace or displaying a confirmation dialog box. For more information, see `finish`.

There are two sample files in `matlabroot/toolbox/local` that you can use as the basis for your own `finish.m` file:

- `finishesav.m` — Includes a `save` function so the workspace is saved to a MAT-file.
- `finishdlg.m` — Displays a confirmation dialog box that allows you to cancel quitting.

## See Also

`exit` | `finish` | `quit`

## More About

- “Confirmation Dialog Boxes Preferences” on page 2-39
- “Recovering Data After Abnormal Termination” on page 1-10
- “Crash Reporting” on page 1-11
- MATLAB Installation, Activation & Startup Help

## Recovering Data After Abnormal Termination

If MATLAB terminates unexpectedly, then you might lose information. After you start MATLAB again, you can try the following suggestions to recover some of the information. Some of these suggestions refer to actions you need to take during the session before MATLAB terminates. If you did not take those actions, then consider regularly performing them to help you recover from any future abnormal terminations you might experience.

- Use the Command History or the file on which it is based, `history.m`, to run statements from the previous session. You might be able to recreate data as it was before the termination.
- If you used the `diary` function or `-logfile` startup option for the session in which MATLAB terminated unexpectedly, then you might be able to recover output.
- If you saved the workspace to a MAT-file during the session, then you can recover it by loading the MAT-file.
- If you were editing a file in the Editor when MATLAB terminated unexpectedly, and you had the backup feature enabled, then you should be able to recover changes you made to files you had not saved. To recover, open the backup version *filename.asv* in the Editor. Then save it as *filename.m* to use the last good version of *filename*.
- If you were in a Simulink® session when a segmentation violation occurred, and you have the Simulink **Autosave Options** preference selected, then the last autosave file for the model reflects the state of the autosave data before the segmentation violation. Because Simulink models might be corrupted by a segmentation violation, a model is not autosaved after a segmentation violation occurs. To recover the file, open the model.

### See Also

`diary` | `load` | `save`

### Related Examples

- “Save and Load Workspace Variables” on page 5-13
- “Save Files”

### More About

- “Commonly Used Startup Options” on page 1-16



## Crash Reporting

If MATLAB crashes, then the MathWorks Crash Reporter dialog box prompts you to send the crash report to MathWorks. Doing so helps us improve our products. The crash report contains one or more crash logs containing information on the stack trace and the MATLAB configuration. You can see the entire contents of the crash report by clicking the **Show Report** button in the dialog box. This data, along with information that you provide as reproduction steps, is the only information sent to MathWorks.

Reproduction steps are most helpful if you know what appears to cause the crash, but any information on what you were doing at the time helps our developers better understand the cause.

- If you do know the cause of the crash, then look for information about it in the MathWorks Bug Reports database.
- If the problem is reproducible, then submit a Service Request at [https://www.mathworks.com/support/contact\\_us.html](https://www.mathworks.com/support/contact_us.html).

## Locating Crash Logs

In some situations, The Crash Reporter does not open. For example, the Crash Reporter is unavailable when you start MATLAB with the `-batch` option or run it in deployed mode. If you experience abnormal termination, but do not see the Crash Reporter, then you can email the crash logs to MathWorks instead at [https://www.mathworks.com/support/contact\\_us.html](https://www.mathworks.com/support/contact_us.html). The crash logs are files with the prefix `matlab_crash_dump`, `java.log`, or `hs_err`. To locate the logs, type one of these commands in the MATLAB Command Window, replacing *prefix* with `matlab_crash_dump`, `java.log`, and `hs_err`.

- On Windows platforms

```
dir(fullfile(tempdir,'prefix.*.*'))
```

Alternatively, open Windows Explorer and navigate to the `%USERPROFILE%\AppData\Local\` folder.

- On Linux and macOS platforms

```
dir(fullfile('~','prefix.*'))
```

Alternatively on macOS, open a Finder window. Press **Command+Shift+G** to open the Go To Folder dialog box and enter `~`.

## See Also

`tempdir`

## More About

- “When MATLAB Terminates Unexpectedly” on page 1-12

# When MATLAB Terminates Unexpectedly

If MATLAB detects an internal error, then MATLAB displays one of two dialog boxes: the “MathWorks Crash Reporter” on page 1-12 or the “MathWorks Crash Analyzer” on page 1-12. In both cases, the internal state of MATLAB is unreliable and not suitable for further use.

## MathWorks Crash Reporter

The MathWorks Crash Reporter provides an easy mechanism to send any relevant crash logs to MathWorks Technical Support. If you click **Send Report** and provide a valid email address, then you should receive an automated message within 5 minutes. If you want help, reply to the automated message and a technical support agent will contact you.

If you do not receive an email, then you can directly contact Technical Support at [https://www.mathworks.com/support/contact\\_us.html](https://www.mathworks.com/support/contact_us.html).

## MathWorks Crash Analyzer

When MATLAB terminates unexpectedly, MATLAB locally analyzes the crash report on your machine to determine a potential cause. If there is a potential solution, MATLAB displays the **MathWorks Crash Analyzer** dialog box. Click **View Solution** to open a web page in your browser that points to the relevant MATLAB Answers™ page or MathWorks Bug Reports database. Follow the steps in the solution. To apply a fix, you must restart MATLAB.

After viewing the solution, if you feel that it is not relevant, then click **Send Report** and enter reproduction steps in the window.

If you apply the fix and still experience a crash, then click **Send Report** or create a Service Request directly at [https://www.mathworks.com/support/contact\\_us.html](https://www.mathworks.com/support/contact_us.html).

## See Also

### More About

- “Crash Reporting” on page 1-11

## Specifying Java Startup Options

You can specify custom Java startup options by creating a `java.opts` file, a text file containing one option per line. For example, use the `-Dproperty=value` command to assign a *value* to a system *property*.

Put the `java.opts` file in one of the following folders:

- MATLAB startup folder, if starting MATLAB from an operating system prompt. For more information, see “MATLAB Startup Folder” on page 1-14.
- If there is no `java.opts` file in the startup folder, then MATLAB checks the `matlabroot/bin/arch` folder. `matlabroot` is the output of the `matlabroot` function. `arch` is the output of the `MATLAB computer('arch')` function, for example `glnxa64`.

A `java.opts` file in this location applies to all users, but individual users might not have permissions to modify files there.

Do not use a `java.opts` file in the following situations:

- To enable the use of the Java debugger, use the `matlab -jdb` command. For information, see `matlab` (Linux) or `matlab` (macOS).
- To adjust the Java heap size on desktop versions of MATLAB, use “Java Heap Memory Preferences”.
- To modify the static Java class path, create a `javaclasspath.txt` file. For information, see “Static Path”.

To modify the library path, create a `javalibrarypath.txt` file. For information, see “Locate Native Method Libraries”.

- To override built-in options that MATLAB specifies to Java at startup. Options in `java.opts` are appended to the end of the built-in list. Whether these additional options override built-in options is JVM-dependent and can change between Java versions. To see what options MATLAB provides to Java, run this command:

```
java.lang.management.ManagementFactory.getRuntimeMXBean.getInputArguments
```

### See Also

`matlab` (Linux) | `matlab` (macOS)

### Related Examples

- “Java Heap Memory Preferences”
- “Static Path”
- “Locate Native Method Libraries”

### More About

- “MATLAB Startup Folder” on page 1-14

## MATLAB Startup Folder

### Default Startup Folder

By default, MATLAB sets the startup folder based on the way you start MATLAB. To identify the startup folder, type `pwd` at the command line immediately after starting MATLAB and before typing any other commands. You can change the startup folder using the General Preferences panel. For convenience, make this folder a folder that you frequently use.

---

**Note** If a `startup.m` file changes the current folder, then this value overrides the initial working folder value. Do not add `cd` statements to `startup.m`. For more information about user-defined options, see `startup`.

---

### Default Folder on Windows Platforms

How You Start MATLAB	Startup Folder
Double-click the MATLAB icon on your Windows desktop or in the Start menu	Last working folder from the previous MATLAB session or the custom path specified in the <b>Initial working folder</b> preference, described in “General Preferences” on page 2-38
From a Windows system prompt	Folder in which you run the <code>matlab</code> command (To use the folder specified by the <b>Initial working folder</b> preference, use the <code>-useStartupFolderPref</code> startup option.)
From the MATLAB command prompt	Folder in which you run the <code>!matlab</code> command
Double-click a file type associated with MATLAB	Folder containing the file
Double-click the <code>matlab.exe</code> executable file from Windows Explorer Tool	Last working folder from the previous MATLAB session or the custom path specified in the <b>Initial working folder</b> preference

For more information, see “Start MATLAB on Windows Platforms” on page 1-2.

### Default Folder on macOS Platforms

How You Start MATLAB	Startup Folder
Double-click the MATLAB application	Last working folder from the previous MATLAB session or the custom path specified in the <b>Initial working folder</b> preference described in “General Preferences” on page 2-38
Start MATLAB from a Terminal window	Folder in which you run the <code>matlab</code> command

For more information, see “Start MATLAB on macOS Platforms” on page 1-6.

### Default Folder on Linux Platforms

On Linux platforms, the default startup folder is the folder from which you started MATLAB.

For more information, see “Start MATLAB on Linux Platforms” on page 1-5.

## Change Startup Folder

Starting in R2014b, you can change the startup folder using the General Preferences panel. On the **Home** tab, in the **Environment** section, click **Preferences**. Select **MATLAB > General**. Choose an option for the **Initial working folder** preference.

Alternatively on Windows platforms, specify the initial working folder in the MATLAB shortcut icon. For more information, see “Select MATLAB Icon” on page 1-2.

## userpath as Initial Working Folder

Using userpath as the **Initial working folder** value offers these benefits.

- You can store the MATLAB files you work with in one folder, such as Documents/MATLAB.
- You can always run your files because MATLAB automatically adds the userpath folder to the top of the search path.
- The first time you run a new version of MATLAB, the software automatically creates the userpath folder if it does not exist.
- When you upgrade to a newer version of MATLAB, the software automatically continues to use the same startup folder and your existing files.
- The default userpath uses the benefits provided by the standard location in the Windows and macOS environments for storing personal files. Files in the Documents/MATLAB folder are available to you when you use other machines. Each user has an individual Documents/MATLAB folder. Other users, even those using your machine, cannot access files in your Documents/MATLAB folder.

## See Also

startup

## Related Examples

- “Start MATLAB on Windows Platforms” on page 1-2
- “Start MATLAB on macOS Platforms” on page 1-6
- “Start MATLAB on Linux Platforms” on page 1-5

## More About

- “General Preferences” on page 2-38

## Commonly Used Startup Options

This table lists commonly used startup options for the `matlab` command. For a complete list of options, refer to the input arguments for `matlab` (Windows), `matlab` (macOS), or `matlab` (Linux).

Platform	Option	Description
All	<code>-c licensefile</code>	Set <code>LM_LICENSE_FILE</code> to <code>licensefile</code> . It can have the form <code>port@host</code> .
All	<code>-h</code> or <code>-help</code>	Display startup options (without starting MATLAB).
All	<code>-logfile</code> <code>"logfilename"</code>	Automatically write output from MATLAB to the specified log file.
Windows platforms	<code>-minimize</code>	Start MATLAB with the desktop minimized. Any desktop tools or documents that were undocked when MATLAB was last closed are not minimized at startup.
macOS and Linux platforms	<code>-nojvm</code>	Start MATLAB without loading the JVM™ software. This minimizes memory usage and improves initial startup speed, but restricts functionality. With <code>nojvm</code> , you cannot use the desktop, figures, or any tools that require Java software.  For example, you cannot set preferences if you start MATLAB with the <code>-nojvm</code> option. However, you can start MATLAB once <i>without</i> the <code>-nojvm</code> option, set the preference, and quit MATLAB. MATLAB remembers that preference when you start it again, even if you use the <code>-nojvm</code> option.
All	<code>-nosplash</code>	Start MATLAB without displaying its splash screen.
All	<code>-batch "statement"</code>	Run the specified statement non-interactively.
All	<code>-r "statement"</code>	Run the specified statement interactively.
All	<code>-singleCompThread</code>	Limit MATLAB to a single computational thread. By default, Windows uses the multithreading capabilities of the computer on which it is running.

For a complete list of options, refer to the input arguments for `matlab` (Windows), `matlab` (macOS), or `matlab` (Linux).

### See Also

`matlab` (Linux) | `matlab` (Windows) | `matlab` (macOS)

## Specify Startup Options

### In this section...

"Startup Options from Operating System Prompt" on page 1-17  
 "Startup Options in Shortcut on Windows Systems" on page 1-17  
 "Startup Options in MATLAB Startup File" on page 1-18  
 "Passing Perl Variables on Startup" on page 1-18  
 "Startup and Calling Java Software from MATLAB" on page 1-18

### Startup Options from Operating System Prompt

Startup options instruct MATLAB to perform certain operations when you start the program. Startup options also are called command flags or command-line switches. When you start at the operating system prompt, specify the options as arguments to the `matlab` command. For example, the following starts MATLAB and suppresses the display of the splash screen.


```
matlab -nosplash
```

On Windows platforms, you can precede a startup option with either a hyphen (-) or a slash (/). For example, `-nosplash` and `/nosplash` are equivalent.

### Startup Options in Shortcut on Windows Systems

You can add selected startup options to the target path for your shortcut on the Windows platform for MATLAB.

To use startup options for the MATLAB shortcut icon, follow these steps:

- 1 Right-click the shortcut icon for MATLAB  and select **Properties** from the context menu. The Properties dialog box for MATLAB opens to the **Shortcut** pane.
- 2 In the **Target** field, after the target path for "`matlab.exe`", add the startup option, and click **OK**.

This example runs the MATLAB `results` script or function after startup, where `results.m` is in the startup folder or on the MATLAB search path. The text in the **Target** field is similar to the following:

```
"C:\Program Files\MATLAB\R2016b\bin\matlab.exe" -r "results"
```

Include the statement, but not the option (-r) in double quotation marks.

Use semicolons or commas to separate multiple statements. This example changes the format to `short`, and then runs the MATLAB code file `results`:

```
"... matlab.exe" -r "format('short');results"
```

Separate multiple options with spaces. This example starts MATLAB without displaying the splash screen, and then runs the MATLAB code file `results`:

```
"... matlab.exe" -nosplash -r "results"
```

## Startup Options in MATLAB Startup File

The `startup.m` file is a file you create to specify startup options. Create the `startup.m` file in a folder on the MATLAB search path. Use `startup.m` to modify the default search path, predefine variables in your workspace, or define defaults for graphics objects. For example, the following statement adds the user-defined folder `/home/myname/mytools` to the search path.

```
addpath /home/myname/mytools
```

To change the current folder on startup to `mytools`, set the **Initial working folder** value, described in “General Preferences” on page 2-38, to:

```
/home/myname/mytools
```

At startup, MATLAB automatically executes the `matlabrc.m` file and `startup.m`, if it exists on the MATLAB search path. The file `matlabrc.m`, which is in the `matlabroot/toolbox/local` folder, is reserved for use by MathWorks and by system administrators on multiuser systems. To locate the `startup.m` file, type:

```
which startup
```

If MATLAB finds a `startup.m` file, then it displays the path to the file.

## Passing Perl Variables on Startup

You can pass Perl variables to MATLAB on startup by using the `-r` option of the `matlab` function. For example, assume a MATLAB function `test` that takes one input variable:

```
function test(x)
```

To pass a Perl variable instead of a constant as the input parameter, follow these steps. This command starts MATLAB and runs `test` with the input argument `10`.

- 1 Create a Perl script such as

```
#!/usr/local/bin/perl
$val = 10;
system('matlab -r "test(' . ${val} . ')"');
```

- 2 Invoke the Perl script at the prompt using a Perl interpreter.

For more information, see the `-r` option in `matlab` (Windows), `matlab` (macOS), or `matlab` (Linux).

## Startup and Calling Java Software from MATLAB

When MATLAB starts, it constructs the class path for Java software using `javaclasspath.txt` and `javalibrarypath.txt` files. For more information, see “Java Class Path” and “Locate Native Method Libraries”.

For information about memory allocation for Java objects, see “Java Heap Memory Preferences”.

## See Also

`matlab` (Linux) | `matlab` (Windows) | `matlab` (macOS)



## **More About**

- “Commonly Used Startup Options” on page 1-16
- “What Is the MATLAB Search Path?” on page 6-44

## Toolbox Path Caching in MATLAB

<b>In this section...</b>
“About Toolbox Path Caching in MATLAB” on page 1-20
“Using the Cache File Upon Startup” on page 1-20
“Updating the Cache and Cache File” on page 1-20

### About Toolbox Path Caching in MATLAB

For performance reasons, MATLAB disables folder change detection for the *matlabroot* folder and caches the folder information across sessions. The disabled folder change detection and caching features are mostly transparent to you. However, if MATLAB does not see the latest versions of your MATLAB code files or if you receive warnings about the path cache, then you might need to update the cache.

### Using the Cache File Upon Startup

Upon startup, MATLAB gets information from a cache file to build the *matlabroot* folder cache. Because of the cache file, startup is faster, especially if you run MATLAB from a network server or if you have many folders within the *matlabroot* folder. When you end a session, MATLAB updates the cache file.

MATLAB does not use the cache file at startup if you clear the **Enable toolbox path cache** check box in **General Preferences**. Instead, it creates the cache by reading from the operating system folders, which is slower than using the cache file.

### Updating the Cache and Cache File

#### How the Toolbox Path Cache Works

MATLAB caches (essentially, stores in a known files list) the names and locations of files in the *matlabroot* folder. This folder is for files provided with MathWorks products that should not change except for product installations and updates. Caching those folders provides better performance during a session because MATLAB does not actively monitor those folders.

We strongly recommend that you save any MATLAB code files you create and any files provided by MathWorks that you edit in a folder that is *not* in the *matlabroot* folder tree. If you keep your files in the *matlabroot* folder, then they might be overwritten when you install a new version of MATLAB.

#### When to Update the Cache

When you add files to the *matlabroot* folder, the cache and the cache file need to be updated. MATLAB updates the cache and cache file automatically when you install toolboxes or toolbox updates using the installer for MATLAB. MATLAB also updates the cache and cache file automatically when you use MATLAB tools, such as when you save files from the MATLAB Editor to the *matlabroot* folder.

When you add or remove files in the *matlabroot* folder by some other means, MATLAB might not recognize those changes. For example, when you:

- Save new files in the *matlabroot* folder using an external editor
- Use operating system features and commands to add or remove files in the *matlabroot* folder


and then attempt to use one of the new files, MATLAB displays this message:

Undefined function or variable

Update the cache so MATLAB recognizes the changes you made in the *matlabroot* folder.

### Steps to Update the Cache

To update the cache and the cache file,

- 1 On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > General**.

The **General Preferences** pane is displayed.

- 2 Click **Update Toolbox Path Cache** and click **OK**.

### Function Alternative

To update the cache, use `rehash toolbox`. To update both the cache and the cache file, use `rehash toolboxcache`. For more information, see `rehash`.

# Startup with Java Access Bridge Software

On Windows platforms, MATLAB might crash during startup with screen readers using the Java Access Bridge software. Choose one of these workarounds:

- Disable Java Access Bridge before starting MATLAB, then reenable it after startup. The command to disable Java Access Bridge is:

```
jabswitch /disable
```

- Remove the following file from the MATLAB installation directory. MATLAB displays error messages at startup, but no crash dialog. MATLAB continues to run normally.

```
sys\java\jre\win64\jre\bin\WindowsAccessBridge-64.dll
```

## See Also

# Desktop

---



- “Change Fonts” on page 2-2
- “Fonts Custom Preferences” on page 2-5
- “Change Color Settings” on page 2-6
- “Access Frequently Used Features” on page 2-9
- “Optimize Desktop Layout” on page 2-10
- “Use a Screen Reader in MATLAB Online” on page 2-13
- “Use Keyboard Shortcuts to Navigate MATLAB” on page 2-18
- “Customize Keyboard Shortcuts” on page 2-21
- “Set Print Options” on page 2-26
- “Web Browsers and MATLAB” on page 2-28
- “Manage Your Licenses” on page 2-32
- “Update an Existing Installation” on page 2-33
- “macOS Platform Conventions” on page 2-34
- “Preferences” on page 2-36
- “Web Preferences” on page 2-44

## Change Fonts

### Change Font Size

Changing the font size in MATLAB depends on the tool. This table describes how to change the font size for each tool in MATLAB.


To change the font size for charts, see “Add Title and Axis Labels to Chart”.


Tool	Procedure
Live Editor	Use the <b>Ctrl + Plus (+)</b> and <b>Ctrl + Minus (-)</b> keyboard shortcuts.
Code tools <ul style="list-style-type: none"> <li>• Editor</li> <li>• Command Window</li> <li>• Command History</li> </ul>	On the <b>Home</b> tab, in the <b>Environment</b> section, click  <b>Preferences</b> . Select <b>MATLAB &gt; Fonts</b> and in the <b>Desktop code font</b> section, select a font size.
Text-based tools <ul style="list-style-type: none"> <li>• Current Folder browser</li> <li>• Workspace browser</li> <li>• Variables editor</li> </ul>	On the <b>Home</b> tab, in the <b>Environment</b> section, click  <b>Preferences</b> . Select <b>MATLAB &gt; Fonts</b> and in the <b>Desktop text font</b> section, clear the <b>Use system font</b> option. Then, select a font size.
Help Browser MATLAB web browser	Use the <b>Ctrl + Plus (+)</b> and <b>Ctrl + Minus (-)</b> keyboard shortcuts.

In MATLAB Online™, you only can change the font size for the Editor.

### Change Font Name and Style

Changing the font name and style in MATLAB depends on the tool. This table describes how to change the font name and style for each tool in MATLAB.


Tool	Procedure
Live Editor	Changing the font name and style is not supported.
Code tools <ul style="list-style-type: none"> <li>• Editor</li> <li>• Command Window</li> <li>• Command History</li> </ul>	On the <b>Home</b> tab, in the <b>Environment</b> section, click  <b>Preferences</b> . Select <b>MATLAB &gt; Fonts</b> and in the <b>Desktop code font</b> section, select a font name and style. By default, the code font is set monospaced to preserve vertical alignment.

Tool	Procedure
Text-based tools <ul style="list-style-type: none"> <li>• Current Folder browser</li> <li>• Workspace browser</li> <li>• Variables editor</li> </ul>	On the <b>Home</b> tab, in the <b>Environment</b> section, click  <b>Preferences</b> . Select <b>MATLAB &gt; Fonts</b> and in the <b>Desktop text font</b> section, clear the <b>Use system font</b> option. Then select a font name and style. By default, the text font is set to your system font.
Help Browser	Changing the font name and style is not supported.
MATLAB web browser	

In MATLAB Online, you only can change the font name and style for the Editor.

To apply antialiasing and create a smoother desktop appearance on UNIX® systems, select **Use antialiasing to smooth desktop fonts**. You must restart MATLAB for the preference to take effect. On Microsoft Windows and Macintosh platforms, MATLAB uses system setting for antialiasing.

## Advanced Customization

You can further customize fonts in MATLAB by changing the font preferences for an individual tool. On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Fonts > Custom**. Then, select a tool from the list of **Desktop tools** and specify the **Font to use**:

- **Desktop code** — Specify this option to use the desktop code font for this tool.
- **Desktop text** — Specify this option to use the desktop text font for this tool.
- **Custom** — Specify this option to specify a custom font for this tool. Then, specify a font name, style, and size.

For example, to change the Editor font to a custom font, in the list of **Desktop tools**, select **Editor**. Then, in the **Font to use** section, select **Custom** and specify the desired font name, style, and size.

Some tools, such as the Profiler, use a custom font by default.

---

**Note** For the Profiler, you can change the font type and size, but not the style (for example, bold or italic).

---

This table shows the default font preferences for tools in MATLAB. Use this table to restore fonts to their original state.

Tool	Font to Use	Default Font
Command History	<b>Desktop code</b>	Monospaced, Plain, 10 point
Command Window		
Editor (and Shortcuts Editor)		
Current Folder browser (and Path browser)	<b>Desktop text</b>	Your system's current font
Workspace browser		

Tool	Font to Use	Default Font
Variables editor		
Function Browser		
Profiler	Custom	SansSerif, Plain, 10 point

## Adding Fonts

MATLAB determines the set the fonts used in font preferences from the fonts installed on your system. MATLAB looks for fonts in these locations:

- The operating system's standard location (see your system administrator for details)
- The `/jre/lib/fonts` folder where Java software is installed on your system

MATLAB only includes compatible fonts in the font preferences.

- For desktop components (such as the Command Window), figure windows, and uicontrols, fonts must be compatible with TrueType and Microsoft OpenType® fonts
- For graphics objects, such as `xlabel`, `ylabel`, `title`, and `text`, fonts must be TrueType and Microsoft OpenType fonts

If you install a font with MATLAB running, restart MATLAB to include the font in the font preferences. A common reason to install additional fonts is to read files created in different languages. For details on adding fonts to your system, refer to the documentation for your system.

## See Also


### Related Examples

- “Set Print Options” on page 2-26
- “Add Title and Axis Labels to Chart”



## Fonts Custom Preferences

You can override font settings for individual desktop tools, as described in the table that follows. Desktop tools otherwise use the settings that the “Advanced Customization” on page 2-3 specify.

On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Fonts > Custom**, and then set options as described in this table:

Preference	Usage
<b>Desktop tools</b>	Select the desktop tool for which you want to view or customize fonts, such as the Command Window or Editor.
<b>Font to use</b>	<p>Indicates the font currently being used in the selected desktop tool. Use one of these fonts to change it.</p> <ul style="list-style-type: none"> <li> <b>Desktop code</b> <p>Uses the characteristics of the desktop code font, as described in “Advanced Customization” on page 2-3.</p> </li> <li> <b>Desktop text</b> <p>Uses the characteristics of the desktop text font, as described in “Advanced Customization” on page 2-3.</p> </li> <li> <b>Custom</b> <p>Uses the type, style, and size you specify in the fields.</p> <div data-bbox="618 1102 937 1176"> <div>SansSerif</div> <div>Plain10</div> </div> <p>For the Profiler, you can change the font type and size, but changes to the font style (for example, bold or italic) have no effect.</p> </li> </ul>

## Change Color Settings

### In this section...

“Change Text and Background Colors in Desktop Tools” on page 2-6

“Change Syntax Highlighting Colors” on page 2-6


“Change Command Window Colors” on page 2-7

“Change Code Analyzer Colors” on page 2-7

### Change Text and Background Colors in Desktop Tools

To change the colors that MATLAB uses for text and background in desktop tools, follow these steps:

**Note** The colors that you specify also apply to the Import Wizard, but do not apply to the Live Editor, the Help display pane or the web browser. In addition, changing the text and background colors in desktop tools is not supported in MATLAB Online.

- 1 On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Colors**.

- 2 Clear **Use system colors**.

System colors are the text and background colors that your platform (for example, Microsoft Windows) uses for other applications.

- 3 Select the colors that you want to use from the **Text** and **Background** color palettes.

When you choose a color, the **Syntax Highlighting sample** and **Command Window sample** areas in the dialog box update to show you how it looks.

**Tip** If you use a gray background color, a selection in an inactive window is not visible.


- 4 Click **OK**.

### Change Syntax Highlighting Colors

In the Command Window, Command History, Editor, Live Editor, and Shortcuts callback area, MATLAB conveys syntax information using different colors. This feature, known as syntax highlighting, helps you to identify syntax elements, such as `if/else` statements at a glance. The Editor also provides syntax highlights colors for other languages.

In the Command Window, only the MATLAB input you type is highlighted. The output from running MATLAB functions is not highlighted.

To change syntax highlighting colors, follow these steps:

- 1 On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Editor/Debugger > Language**.


- 2 From the **Language** drop-down menu, select the language for which you want to change syntax highlighting colors.

- 3 In the **Syntax highlighting** section, select **Enable syntax highlighting**.
- 4 Change the colors.
  - If you set the **Language** to MATLAB, click the **Set syntax colors** link, and then change the colors under **MATLAB syntax highlighting colors**.
  - If you did not set the **Language** to MATLAB, change the colors under **Syntax highlighting**.
- 5 Click **OK**.

In MATLAB Online, syntax highlighting colors preferences are located under **MATLAB > Editor/Debugger > MATLAB Language** and **MATLAB > Editor/Debugger > Other Languages**.

## Change Command Window Colors

To change the colors that MATLAB uses for errors, warnings and hyperlinks in the Command Window, follow these steps:

- 1 On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Colors**.
- 2 Select the colors that you want to use from the **Error text** and **Warning text**, and **Hyperlinks** color palettes.

When you choose a color, the **Command Window sample** area in the dialog box updates to show you how it looks.


- 3 Click **OK**.

## Change Code Analyzer Colors

Code Analyzer helps you to identify potential problems and refine your MATLAB code. By default, the Editor indicates:

- Code for which there are warnings, by underlining that code with an orange wavy line and placing an orange line in the message bar.
- Code for which there are errors, by underlining that code with a red wavy line and placing a red line in the message bar.
- Code that MATLAB can fix automatically (autofix), by highlighting that code in tan.

To change Code Analyzer colors:

- 1 On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Colors > Programming Tools**.
- 2 Under **Code analyzer colors**, select the colors that you want for warnings, autofix highlighting, or both.
- 3 Decide if you want autofix highlights to appear in the Editor.
 

Clear **Autofix highlight** if you do not want autofix highlights to appear in the Editor; select **Autofix highlight** if you do.
- 4 Click **Apply**.
- 5 Decide if you want to change the color that the Code Analyzer uses for errors.

- If you do not, go to step 6.
- If you do, then:
  - a** In the left navigation pane, click **Colors**.
  - b** Under **MATLAB syntax highlighting colors**, change the color for **Errors**.

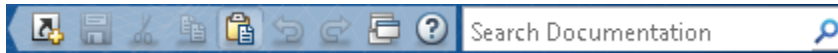
In addition to changing the color of Code Analyzer indicators for errors, this action also changes the color for errors in the Command Window, Command History window, Editor, and Shortcuts callback area.

**6** Click **OK**.


For more information, see “Automatically Check Code in the Editor and Live Editor — Code Analyzer”.

## Access Frequently Used Features


The quick access toolbar provides access to frequently used operations. This toolbar is always visible, even when you navigate between different MATLAB toolstrip tabs.



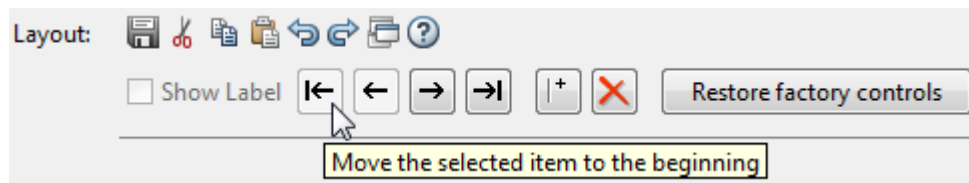
You can change the location of the quick access toolbar. On the **Home** tab, in the **Environment** section, click **Layout**, and then select an option for the **Quick Access Toolbar**. Moving the quick access toolbar is not supported in MATLAB Online.

To add a toolstrip item to the quick access toolbar, right-click the button, and then select **Add to Quick Access Toolbar**. You also can select from a list of common items by going to the quick access toolbar and clicking the  button. To remove an item from the quick access toolbar, right-click the item icon and select **Remove from Quick Access Toolbar**. To arrange buttons in the quick access toolbar, drag the button icon to the desired location.

To further configure the quick access toolbar, follow these steps:

- 1 On the quick access toolbar, click the  button and select **Customize Toolbar**. The MATLAB Toolbars Preference panel open.
- 2 In the **Controls** list, select or clear the check box for controls that you want to display or remove from the toolbar, respectively.
- 3 Under **Layout**, rearrange the controls and separator bars on the selected toolbar, by doing either of the following:
  - Drag the icon for a control or separator bar to another position.
  - Select a **Layout** icon, and then click one of the **Layout** buttons below the layout icons.

For instance, to move the MATLAB desktop **Cut** icon to the beginning of the toolbar, select the **Cut** icon , and then click .



- 4 Click **Apply** or **OK**.

## See Also

### More About

- “Rerun Favorite Commands” on page 3-13
- “Use Keyboard Shortcuts to Navigate MATLAB” on page 2-18
- “Customize Keyboard Shortcuts” on page 2-21

## Optimize Desktop Layout

### In this section...






“Desktop Layout” on page 2-10






“Document Layout” on page 2-12

### Desktop Layout

You can close, minimize, and undock desktop tools to optimize the desktop layout. Once you design a layout you like, you can save it for reuse.

This table shows how you can optimize the MATLAB desktop layout on your screen. To optimize the MATLAB Online desktop, see “Desktop Layout in MATLAB Online” on page 2-11.


Action	Procedure
Minimize or restore the MATLAB toolstrip	<p>To minimize, at the lower right corner of the toolstrip, click .</p> <p>To restore, select one of the tab labels and in the lower right corner of the toolstrip, click .</p>
Open or hide a tool	<p>On the <b>Home</b> tab, in the <b>Environment</b> section, click <b>Layout</b>. Then, under <b>Show</b>, select, or clear desktop tools you want to show or hide.</p> <p>You also can use a function to open desktop tools. For example, to open the Editor, use <code>edit</code>. To open the Profiler, use <code>profile</code> with the <code>viewer</code> option.</p>
Maximize a tool	<p>Do one of the following:</p> <ul style="list-style-type: none"> <li>Double-click the title bar in that tool.</li> <li>On the title bar of a docked tool, click , and then select <b>Maximize</b>.</li> </ul>
Minimize a tool	<p>On the title bar of a docked tool, click , and then select <b>Minimize</b> .</p> <p>The button for the tool appears along the edge of the MATLAB desktop indicated by the arrow in the <b>Minimize</b> icon. Move the button to a different edge of the desktop by dragging it.</p> <p>To use a minimized tool, click the button for the tool to open the tool temporarily on the desktop. When you finish using the tool, click another tool.</p>


Action	Procedure
Restore a tool as it appeared before maximizing or minimizing	Do one of the following: <ul style="list-style-type: none"> <li>• Double-click the title bar of the maximized tool, or the button of the minimized tool.</li> <li>• On the title bar of the tool, click , and then select <b>Restore</b>.</li> <li>• Click the Restore button  on the title bar in that tool.</li> </ul>
Move a tool	Drag a tool by its title bar to a new location. The status bar indicates where the tool moves if you release the mouse.
Close a tool	On the title bar of a docked tool, click  , and then select <b>Close</b> .
Show or hide title bars	On the <b>Home</b> tab, in the <b>Environment</b> section, click <b>Layout</b> . Then, under <b>Show</b> , select, or clear <b>Panel Titles</b> .
Show or hide a toolbar in a figure window	From the <b>View</b> menu, select the toolbar of interest.
Undock tools to move them outside the desktop	Do one of the following: <ul style="list-style-type: none"> <li>• Drag a tool by its title bar to a new location outside of the MATLAB desktop.</li> <li>• On the title bar of the tool, click , and then select <b>Undock</b>.</li> </ul>
Move undocked tools back to the desktop	At the upper right of the tool panel, click  , and then select <b>Dock</b> .
Manage a desktop arrangement <ul style="list-style-type: none"> <li>• Save an arrangement</li> <li>• Use an arrangement</li> <li>• Rename or delete a saved arrangement</li> </ul>	On the <b>Home</b> tab, in the <b>Environment</b> section, click <b>Layout</b> , and then select an option.  MATLAB stores the arrangements you save as XML files in the preferences folder on page 2-37 for MATLAB. The layout last used in a session is <code>MATLABDesktop.xml</code> . The <code>MATLABDesktop.xml</code> file loads when you start MATLAB and is overwritten when you close MATLAB.


When you end a session, MATLAB saves the current desktop arrangement. The next time you start MATLAB, the desktop appears as you left it. However, tools such as the Help browser, web browser, and Variables editor do not reopen automatically, even if they were open when you ended the last session. You can use startup options to specify tools that you want to open on startup. For more information, see “Specify Startup Options” on page 1-17. Startup options are not available MATLAB Online.

### Desktop Layout in MATLAB Online

MATLAB Online on page 10-2 provides access to MATLAB from a standard web browser. To change the desktop layout in MATLAB Online go to the **Home** tab, click **Layout**, and then select an option. To move an individual tool, drag the tool by its title bar to a new location. You cannot undock a tool in MATLAB Online.

To minimize a tool, collapse the panel in which the tool resides. For example, if the MATLAB Online desktop is in the default layout with the Current Folder browser in the left side panel, click the .








button at the bottom left corner of the panel to collapse the panel. To restore the panel, click the  button.

If the left or right side panel contains multiple tools, you can minimize an individual tool by clicking the  button to the left of the tool's title bar. Multiple tools in the bottom panel display as tabs and cannot be minimized.

## Document Layout

When you open MATLAB documents, they open in the associated tool, such as the Editor or Variables editor. The Editor and Variables editor appear in the position they occupied when last used. Entries for undocked documents appear on the Windows task bar, or the equivalent for your platform. Click the task bar entry for a document to make that document active.

This table shows how to optimize the layout of documents within a tool.

Action	Procedure
Change the tabs position	On the <b>View</b> tab, in the <b>Document Tabs</b> section, click <b>Tabs Position</b>  , and then select an option.  In MATLAB Online, on the title bar of the tool, click  , select <b>Tab Position</b> , and then select an option.
Reorder documents	Drag a document tab to a different position.  To alphabetize names of documents, in the <b>Document Tabs</b> section of the <b>View</b> tab, select <b>Alphabetize</b> .
Arrange or tile documents	In the Editor and Variables editor, select the <b>View</b> tab. In the <b>Tiles</b> section, click a tile option.  In a Figure panel, Help browser, or web browser, select a tile option,  ,  ,  , or  , on the right side of the toolbar.  In MATLAB Online, on the title bar of the tool, click  , select <b>Tile All</b> , and then select a tile option.
Move a tiled document	Drag the document tab to another tile. If you drag it to a tile that already contains a document, the document you are dragging covers up the other document.
Undock a document	Right-click the document tab and then select <b>Undock</b> .
Close and save the document currently displaying	Click <b>×</b> .
Close a document in the Editor without saving	Click <b>Ctrl +×</b> .



## Use a Screen Reader in MATLAB Online

In MATLAB Online on page 10-2, you can use a screen reader and a keyboard to interact with the Command Window, create and edit scripts and functions in the Editor, and navigate through the MATLAB desktop tools.

MATLAB Online works with a variety of screen readers. On Windows systems, the recommended setup is a Google Chrome™ browser with the NVDA screen reader. For more information about NVDA, see Get Help on the NV Access website.

### Navigate MATLAB Using a Screen Reader

When you first start MATLAB Online, the cursor is in the Command Window. To move forward through the different areas of the MATLAB Online desktop, press **Ctrl+F6** (or **Command+F6** on macOS systems). To move backward, press **Ctrl+Shift+F6** (or **Command+Shift+F6** on macOS systems).

By default MATLAB Online has five areas that you can navigate to:

- **Toolstrip** – The toolstrip is at the top of the MATLAB Online desktop. By default, the toolstrip includes three tabs, **Home**, **Plots**, and **Apps**. Use the arrow keys to navigate between the toolstrip tabs and the **Tab** key to enter and navigate within the toolstrip tabs.
- **Current Folder Toolbar** – The Current Folder toolbar is under the toolstrip. You can use the toolbar to view and change the current folder.
- **Current Folder Browser** – The Current Folder browser is on the left underneath the Current Folder toolbar. Use the Current Folder browser to manage files and folders in MATLAB Online. Actions include viewing, creating, opening, moving, and renaming files and folders in the current folder.
- **Workspace Browser** – The Workspace Browser is on the left underneath the Current Folder browser. Use the Workspace Browser to view and manage the contents of the workspace in MATLAB Online.
- **Command Window** – The Command Window is to the right of the Current Folder browser and Workspace browser, in the middle of the MATLAB Online desktop. Use the Command Window to enter individual statements at the command line and view the resulting output.

---

**Note** The locations of the tools described above are default locations. For more information about changing the location of these tools, see “Optimize Desktop Layout” on page 2-10.

---

For example, you can use the toolstrip to send feedback about the current release:

- 1 On a Windows system with the NVDA screen reader running, open a Google Chrome browser and start MATLAB Online.
- 2 With the cursor in the Command Window, press **Ctrl+F6** to navigate to the toolstrip. You hear:  

```

Toolstrip region
Toolstrip tab control
Home tab selected one of three

```
- 3 Press the **Tab** key to enter the **Home** tab and then continue pressing the **Tab** key until you reach the **Feedback** button. You hear:

Feedback button  
Send us feedback or report a bug

- 4 Press **Enter**. The Send Feedback dialog opens.

For more information about the MATLAB desktop, see “Desktop Basics”.

## Enter Statements in the Command Window Using a Screen Reader

As you work in MATLAB, you can enter individual statements in the Command Window using a screen reader and a keyboard.

For example:

- 1 On a Windows system with the NVDA screen reader running, open a Google Chrome browser and start MATLAB Online.
- 2 With the cursor in the Command Window, create a variable named `x` by typing this statement in the Command Window.

```
x = 1
```

MATLAB adds `x` to the workspace and displays the results in the Command Window. You hear:

```
Greater greater  
X equals one
```

When you hear `Greater greater`, the Command Window is ready for the next statement at the command-line prompt (`>>`).

- 3 Create another variable `y` by entering the following statement in the Command Window.

```
y = cos(x)
```

You hear:

```
Y equals zero point five four zero three
```

- 4 Set the value of `x` to the value of `y` by entering the following statement in the Command Window.

```
x = y
```

You hear:

```
X equals zero point five four zero three
```

- 5 Press the **Up Arrow** to display the Command History. You hear:

```
X equals Y
```

- 6 Press the **Up Arrow** two more times to select the `x = 1` statement. You hear:

```
X equals one
```

- 7 Press **Enter** to run the command. MATLAB sets the value of `x` back to 1. You hear:

```
X equals one
```

- 8 Clear all text from the Command Window by entering the following statement in the Command Window.

```
clc
```

You hear:

```
Greater greater
```

The Command Window is ready for the next statement.

For more information about entering statements in the Command Window, see “Enter Statements in Command Window” on page 3-2.

## Create Scripts Using a Screen Reader

Scripts are the simplest kind of program file because they have no input or output arguments. They are useful for automating series of MATLAB commands, such as computations that you have to perform repeatedly from the command line or series of commands you have to reference.

You can create and edit scripts using a screen reader and a keyboard. For example:

- 1 On a Windows system with the NVDA screen reader running, open a Google Chrome browser and start MATLAB Online.
- 2 Navigate to the toolbar by typing **Ctrl+F6** until you hear:

```
Toolbar region
Toolbar tab control
Home tab selected one of three
```

- 3 Press the **Tab** key to enter the **Home** tab. The **New Script** button is selected. You hear:

```
Home property page
File grouping
New script button
Create a new script in the current folder
```

- 4 Press **Enter** to create a new script. MATLAB creates the script and opens it in the Editor. You hear:

```
Untitled property page
Edit multiline, line one
```

- 5 Add this code that generates an array of random numbers and then calculates the size and mean of the array.

```
n = 50;
r = rand(n,1);
```

```
sz = size(r)
m = mean(r)
```

- 6 To save the file, navigate to the toolbar by typing **Ctrl+F6** until you hear:

```
Toolbar region
Toolbar tab control
Editor tab selected four of seven
```

If the **Home** tab is selected instead, you hear:

```
Home tab selected one of seven
```

To select the **Editor** tab, press the **Right Arrow** key until you hear:

```
Editor tab selected four of seven
```

- 7 Press the **Tab** key to enter the **Editor** tab and then continue pressing the **Tab** key until you reach the **Save** button. You hear:

```
Clickable save button
Save all modified files
Ctrl plus S
```

- 8 Press **Enter** to save the script. You also can save the script using the keyboard shortcut **Ctrl+S**. MATLAB opens the Save As dialog. You hear:

```
Save as dialog  
Edit untitled.m
```

- 9 Type **Ctrl+A** to select the default file name and then enter a name for the script. For example, enter the name `myrandom.m`. Press **Enter** to save the file.
- 10 To run the file, navigate to the toolstrip by typing **Ctrl+F6** until you hear:

```
Toolstrip region  
Toolstrip tab control  
Editor tab selected four of seven
```

- 11 Press the **Tab** key to enter the **Editor** tab and then continue pressing the **Tab** key until you reach the **Run** button. You hear:

```
Run grouping  
Clickable run button  
Save and execute the active program file  
F5
```

- 12 Press **Enter** to run the script. You also can run the script using the keyboard shortcut **F5**. MATLAB runs the script and displays the output in the Command Window. You hear:

```
myrandom.m property page  
Edit multiline, line 5  
m equals mean r  
sz equals 50 1  
m equals zero point five one seven two
```

For more information about creating scripts, see “Create Scripts”.

## Screen Reader Tips and Limitations

### Modifying Graphics Objects

When working with graphics objects, avoid using the property inspector to view and modify properties. Instead, view and modify graphics object properties programmatically. For example, the `plot` function returns a chart line object. You can use dot notation to view and set properties.

```
p = plot(1:10,1:10);  
p.LineWidth = 3;
```

Alternatively, you can set properties using name-value pair arguments when creating the object, such as `plot(1:10,1:10,'LineWidth',3)`.

For more information about viewing and modifying graphics object properties, see “Modify Graphics Objects”.

### Accessing MathWorks Documentation

To ensure the best experience when viewing and searching the documentation using a screen reader, open it in a separate browser tab or window at <https://www.mathworks.com/help>.

### Live Editor

Using a screen reader is not supported in the Live Editor. To create scripts and functions, use the Editor instead.

## **See Also**

## **More About**

- “Use Keyboard Shortcuts to Navigate MATLAB” on page 2-18
- “Desktop Basics”

## Use Keyboard Shortcuts to Navigate MATLAB

Using keyboard shortcuts to navigate MATLAB can increase productivity and is useful in situations where using a mouse is not an option.

This table describes the actions and related keyboard shortcuts useful for navigating MATLAB without a mouse.

Action	Keyboard Shortcut
Move to the next visible panel.	<b>Ctrl+Tab</b>
Move to the previous visible panel.	<b>Ctrl+Shift+Tab</b>
Move to the next tab in a panel.	<b>Ctrl+Page Down</b>
Move to the previous tab in a panel.	<b>Ctrl+Page Up</b>
Make an open tool the active tool.	<ul style="list-style-type: none"> <li>• Command Window: <b>Ctrl+0</b></li> <li>• Command History: <b>Ctrl+1</b></li> <li>• Current Folder: <b>Ctrl+2</b></li> <li>• Workspace: <b>Ctrl+3</b></li> <li>• Profiler: <b>Ctrl+4</b></li> <li>• Figure Palette: <b>Ctrl+6</b></li> <li>• Plot Browser: <b>Ctrl+7</b></li> <li>• Property Editor: <b>Ctrl+8</b></li> <li>• Editor: <b>Ctrl+Shift+0</b></li> <li>• Figures: <b>Ctrl+Shift+1</b></li> <li>• Web browser: <b>Ctrl+Shift+2</b></li> <li>• Variables Editor: <b>Ctrl+Shift+3</b></li> <li>• Comparison Tool: <b>Ctrl+Shift+4</b></li> <li>• Help browser: <b>Ctrl+Shift+5</b></li> </ul> <p>On macOS systems, use the <b>Command</b> key instead of the <b>Ctrl</b> key.</p>
Show access keys for the toolbar.	<b>Alt</b>  Not supported on macOS systems.
Open a toolbar tab and show access keys for the toolbar.	<b>Alt+&lt;character&gt;</b>  For example, pressing <b>Alt</b> followed by <b>H</b> accesses the <b>Home</b> tab and displays access keys for the features available on that tab.  Not supported on macOS systems.

You cannot customize most of these shortcuts. For information about customizable keyboard shortcuts and how to view and modify them, see “Customize Keyboard Shortcuts” on page 2-21.

## MATLAB Online

MATLAB Online provides access to MATLAB from a standard web browser. Because MATLAB Online runs in a browser, navigation using the keyboard is slightly different.

This table describes the actions and related keyboard shortcuts useful for navigating MATLAB Online without a mouse.

Action	Keyboard Shortcut
Move forward through the toolbar and other tools.	<b>Ctrl+F6</b> On macOS systems, use <b>Command+F6</b> instead.
Move backward through the toolbar and other tools.	<b>Ctrl+Shift+F6</b> On macOS systems, use <b>Command+Shift+F6</b> instead.
Move into a tool.	<b>Tab</b>
Move between controls within a tool.	<b>Up/Down Arrow, Left/Right Arrow</b>
Close controls within a tool, for example, documents in the Editor and Live Editor.	<b>Delete</b>
Open context menu.	<b>Shift+F10</b> Not supported on macOS systems.
Show access keys for the toolbar.	<b>Alt</b> Not supported on macOS systems.
Open a toolbar tab and show access keys for the toolbar.	<b>Alt+&lt;character&gt;</b> For example, pressing <b>Alt</b> followed by <b>H</b> accesses the <b>Home</b> tab and displays access keys for the features available on that tab. Not supported on macOS systems.
Display a compact list of keyboard shortcuts.	<b>Ctrl+/</b>

Customizing shortcuts is not supported in MATLAB Online.

## Additional Keyboard Shortcuts

In addition to navigation, keyboard shortcuts are useful for accessing other frequently used actions in MATLAB.

This table describes several of these actions and their related keyboard shortcuts. For additional keyboard shortcuts, see the documentation for a specific tool or feature.

Action	Keyboard Shortcut
Cancel the current action.	<b>Esc</b> (escape)  For example, if you click the name of the <b>Edit</b> menu, the whole menu appears. Pressing <b>Esc</b> hides the menu again.  In the Function Browser, pressing <b>Esc</b> up to three times has the following effects:  <b>1</b> Dismiss the search history. <b>2</b> Clear the search field. <b>3</b> Close the Function Browser.
Interrupt MATLAB execution.	<b>Ctrl+C</b>  On Windows and Linux systems, you also can use <b>Ctrl+Break</b> . On macOS systems, you also can use <b>Command+.</b> (period).

You cannot customize these shortcuts. For information about customizable keyboard shortcuts and how to view and modify them, see “Customize Keyboard Shortcuts” on page 2-21.

## See Also

### More About

- “Customize Keyboard Shortcuts” on page 2-21
- “Rerun Favorite Commands” on page 3-13
- “Access Frequently Used Features” on page 2-9




## Customize Keyboard Shortcuts

Keyboard shortcuts are useful for accessing desktop features quickly. To optimize your experience, you can customize the current set of keyboard shortcuts in MATLAB.

There are several ways you can modify the current set of keyboard shortcuts. You can:

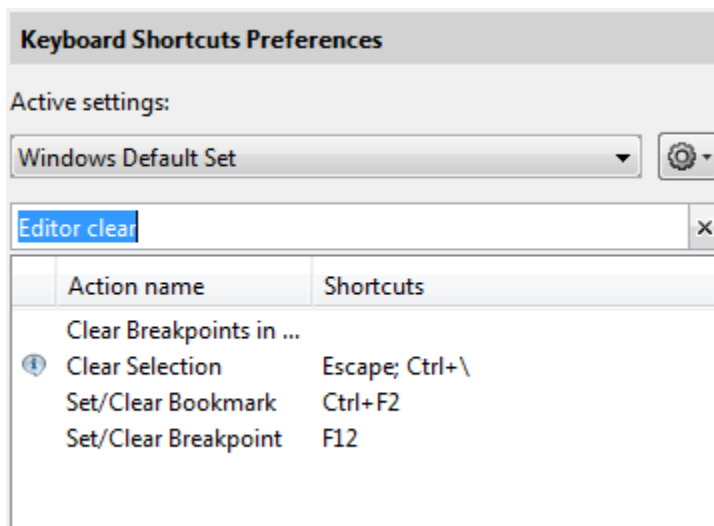
- Create new keyboard shortcuts or modify existing ones.
- Choose among available sets of keyboard shortcuts.
- Create customized sets of keyboard shortcuts or use existing customized sets.

To view or modify the current set of keyboard shortcuts, use the Keyboard Shortcuts Preferences panel. To open the Keyboard Shortcuts Preferences panel, go to the **Home** tab, and in the **Environment** section, click  **Preferences**. Then, select **MATLAB > Keyboard > Shortcuts**.

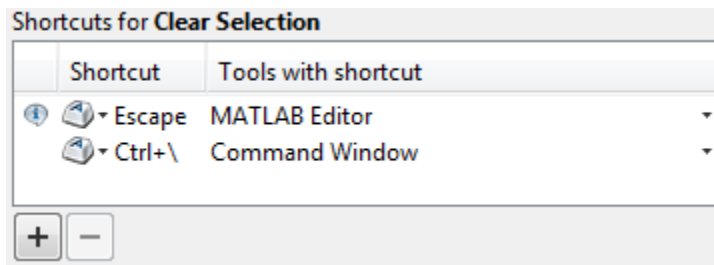
### View Keyboard Shortcuts

For actions performed with a menu item, keyboard shortcuts appear in the menu itself. (This is true whether the menu item is in the toolbar or in a context menu.) If a menu item does not display a keyboard shortcut, then a keyboard shortcut for the action does not exist.

For actions that are not performed with a menu item, to find keyboard shortcuts, open the Keyboard Shortcuts Preferences panel. Then, in the search box, enter the name of the tool or action for which you want to see the keyboard shortcuts. For example, type `Editor clear` to find the keyboard shortcut for clearing selected text in the Editor.



To view the shortcuts for an action, select the action name. For example, select **Clear Selection**. MATLAB displays the keyboard shortcuts for the selected action. For example, the keyboard shortcut for the **Clear Selection** action in the Editor is the **Escape** key.



### Create a List of All Keyboard Shortcuts in a Set

You can create a list of all the keyboard shortcuts in the current set by copying them to the clipboard and pasting them in a text file or spreadsheet application, such as Microsoft Excel®. For the best formatting, use a spreadsheet application. To copy all the keyboard shortcuts, open the Keyboard Shortcuts Preferences panel. Click the Actions button and from the drop-down menu, choose Copy to Clipboard. Paste the data into the desired application.

### Customize Keyboard Shortcuts for Individual Actions

Customizing a keyboard shortcut is useful if you frequently perform an action and the action does not have a keyboard shortcut defined, or if the defined keyboard shortcut is hard to use or conflicts with a different shortcut. For an overview on customizing keyboard shortcuts, watch the Customizable Keyboard Shortcuts video. You must have an internet connection to watch the video.

To customize a keyboard shortcut:

- 1 Open the Keyboard Shortcuts Preferences panel and, in the search box, type an existing keyboard shortcut or the name of an action, tool, or menu.

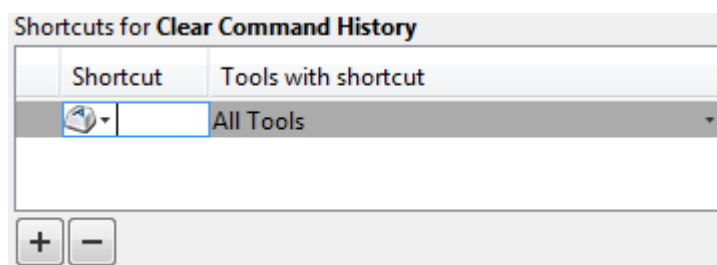
For example, you can type Ctrl+R (shortcut), Delete (action), Command Window (tool), or File (menu).

You can enter most keyboard shortcuts by either pressing keystrokes or typing the key names. If using keystrokes for a keyboard shortcut does not work, try typing the key names instead. For example, if pressing the **Ctrl** key and then **R** does not work, try typing the text Ctrl+R.

MATLAB displays the list of matching actions for which you can customize or define a keyboard shortcut. If you specify the name of a tool, MATLAB displays actions associated with the tool or menu, as well as any action names that contain the specified text.

- 2 Select the name of the action for which you want to define or modify a keyboard shortcut.
- 3 Click the Add button .


An editable text box opens in the **Shortcut** column.



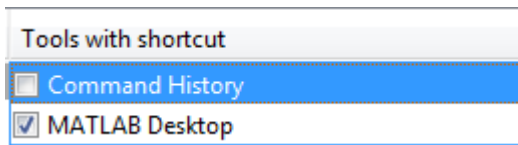
- 4 Specify the keystrokes you want to use for the keyboard shortcut.





A *keystroke* can be a single key or the combination of a modifier (**Alt**, **Shift**, or **Ctrl**) and another key. Specify a keystroke by performing it, not by typing the names of the keys character by character. For example, press the **Ctrl** key and the **Y** key. Do not type **C-t-r-l-Y**.



Alternatively, you can choose a shortcut from the drop-down menu.

To specify multiple keystrokes for one action, or to limit the number of keystrokes for an action, click the down arrow next to the key icon  in the **Shortcuts** box. Then, select either **Limit to 1 keystroke**, **Limit to 2 keystrokes**, or **Limit to 3 keystrokes**. For example, to specify **Ctrl+Y**, **Shift+Z**, **F9** as the three keystrokes for an action, select **Limit to 3 keystrokes** and then type the keystrokes.

- 5 In the **Tools with shortcut** column, click the down arrow and select which tools you want to assign the keyboard shortcut to.




- 6 Evaluate and resolve any conflicts, indicated by the  and  icons. The  icon indicates that two different actions within the same tool have the same shortcut. The  icon indicates that two different actions in two different tools have the same shortcut.

There is no requirement to resolve keyboard shortcut conflicts. However, if the same shortcut specifies two different actions, the shortcuts can be confusing to use. Resolving all conflicts indicated by the error icon  is recommended, although in some situations, resolving a conflict might be unnecessary. For example, resolving the conflict might be unnecessary if the conflict is temporary or the two actions are associated with different modes of the same tool. Resolving conflicts indicated by the informational icon  is recommended if you use both tools frequently and you perform both actions frequently.


To resolve a conflict, change or delete shortcuts such that there is a one-to-one correspondence between shortcuts and frequently used actions.

- 7 Click **OK** or **Apply**.

New or modified keyboard shortcuts become available immediately. Changed shortcuts that correspond to menu items immediately appear in the menu.

To delete a keyboard shortcut for a selected action, select the keyboard shortcut that you want to delete and click the Delete button .

### Restore Default Keyboard Shortcut Sets

If you modify keyboard shortcuts, and then decide you do not want to keep the changes, you can restore the default shortcuts. To restore the default state of a keyboard shortcut, click the Actions button  and select **Undo Modifications to <Set Name> Default Set (modified)**, where **<Set Name>** is the name of the modified default set.

---

**Note** Undoing modifications reverts all keyboard shortcuts changes that you made to the set. You cannot undo modifications on a shortcut-by-shortcut basis.

---

### Restrictions When Customizing Keyboard Shortcuts

There are some actions and tools for which you cannot change the keyboard shortcuts. Actions for which the keyboard shortcut cannot be customized do not appear when you search for them in the MATLAB Keyboard Shortcuts Preferences panel. Examples of these actions include canceling the current action (**Esc**), interrupting MATLAB execution (**Ctrl+C**), and some of the navigational actions described in “Use Keyboard Shortcuts to Navigate MATLAB” on page 2-18.

In addition, you cannot change the keyboard shortcuts associated with these tools or portions of tools:

- Figure windows — For example, you cannot modify the keyboard shortcut, **Ctrl+S**, for saving a MATLAB .fig file.
- Toolboxes — For example, you cannot modify keyboard shortcuts in the SimBiology® desktop.
- Incremental search — You can modify the keyboard shortcuts for initiating a forward or backward incremental search. However, you cannot change the keyboard shortcuts that you use within incremental search mode, such as **Ctrl+Shift+S** to search forward.
- Dialog boxes — For example, you cannot create a keyboard shortcut for the **OK** button.


## Manage Sets of Keyboard Shortcuts

### Select Set of Keyboard Shortcuts

By default, MATLAB uses the keyboard shortcut settings for your current platform. To select a different set of keyboard shortcuts, open the Keyboard Shortcuts Preferences panel and, in **Active settings**, select from the available options. To use a keyboard shortcut settings file that is on your system but not in the **Active settings** list, select **Browse . . .** to find and select the desired file.


This table lists the keyboard shortcut settings files installed with MATLAB.

Operating System	Keyboard Shortcut Settings Files Installed with MATLAB
Windows	<ul style="list-style-type: none"> <li>• Windows Default Set (Default)</li> <li>• Emacs Default Set</li> </ul>
UNIX	<ul style="list-style-type: none"> <li>• Emacs Default Set (Default)</li> <li>• Windows Default Set</li> </ul>
Macintosh	<ul style="list-style-type: none"> <li>• Macintosh Default Set (Default)</li> </ul>

You also can download keyboard shortcut settings files from File Exchange. For example, to restore the MATLAB default keyboard shortcuts that were in place for MATLAB Version 7.9 (R2009a) and earlier releases, go to File Exchange and search for **MATLAB Desktop R2009a Default Keyboard Shortcut sets**. Download and extract the set and then select it as the active settings file. A valid keyboard shortcut settings file appears with a keyboard key icon .

### Compare Sets of Keyboard Shortcuts


To compare the current set of keyboard shortcuts to another set:

- 1 Open the Keyboard Shortcuts Preferences panel and click the Actions button .
- 2 From the drop-down menu, choose the set of keyboard shortcuts to which you want to compare the current set.
- 3 The Comparison Tool opens and displays the two keyboard shortcut sets side-by-side. For more information about how to read the results, see “Compare Text Files” on page 6-8.

### Save Set of Keyboard Shortcuts to File


Saving a set of keyboard shortcuts to a settings file is useful if you want to:

- Save the changes you make to a default keyboard shortcut set to a new set.
- Use a set of customized keyboard shortcuts on another system running MATLAB.
- Overwrite a previously saved set of keyboard shortcuts.
- Share a set of keyboard shortcuts with others, for example, on File Exchange.

To save a keyboard shortcut settings file, open the Keyboard Shortcuts Preferences panel. Then, click the Actions button  and select **Save As**. MATLAB saves the file as an `.xml` file in the folder that you specify.

You cannot overwrite the default settings files that install with MATLAB. MATLAB saves modifications that you make to a default set using the name of the default set appended with the text `(modified)`, for instance, `Windows default (modified)`.

### Delete Set of Keyboard Shortcuts

To delete a previously saved set of keyboard shortcuts, open the Keyboard Shortcuts Preferences panel and in **Active settings**, select the set of keyboard shortcuts that you want to delete. Click the Actions button  and select **Delete *filename***, where *filename* is the name of a keyboard shortcut set you want to delete. You cannot delete default keyboard shortcut sets, such as `Windows Default Set`.

## See Also

### More About

- “Use Keyboard Shortcuts to Navigate MATLAB” on page 2-18
- “Rerun Favorite Commands” on page 3-13
- “Access Frequently Used Features” on page 2-9

## Set Print Options

In this section...
"Page Setup Options" on page 2-26
"Layout Options for Page Setup" on page 2-26
"Header Options for Page Setup" on page 2-27
"Fonts Options for Page Setup" on page 2-27

### Page Setup Options

MATLAB provides special page setup options for printing from the Command Window and Editor. Page setup is not supported in the Live Editor.

To specify page setup options for printing from the Command Window, right-click in the Command Window, and then select **Page Setup**.

To specify page setup options for printing from the Editor, first select the **Editor** tab. Then, in the **File** section, click **Print** ▼ and select **Page Setup**.

The Page Setup dialog box opens for that tool.

Then, perform these steps:

- 1 Click the **Layout**, **Header**, or **Fonts** tab in the dialog box and set those options for that tool, as detailed in subsequent sections. On Mac platforms, you must first select **MATLAB** in the **Settings** menu in order to see these tabs.
- 2 Click **OK**.
- 3 After specifying the options, select **Print** in the tool you want to print from, for example, the Command Window.

The contents from the tool print, using the options you specified in Page Setup.

### Layout Options for Page Setup

You can specify the following layout options. A preview area shows you the effects of your selections.

- **Print header** — Print the header specified in the **Header** pane.
- **Print line numbers** — Print line numbers.
- **Wrap lines** — Wrap any lines that are longer than the printed page width.
- **Syntax highlighting** — For keywords and comments that are highlighted in the Command Window, specify how they are to appear in print. Options are black and white text (that is, no highlighting), colored text (for use with a color printer), or styled text. For styled text, keywords appear in bold, comments appear in italics, and all other text appears in the normal style. Only keywords and comments you input in the Command Window are highlighted; output is not highlighted.

## Header Options for Page Setup

If you want to print a header, select the **Layout** tab and then select **Print header**. Next, select the **Header** tab and specify how the elements of the header are to appear. A preview area shows you the effects of your selections:

- **Page number** — Format for the page number, for example # of n
- **Border** — Border style for the header, for example, Shaded box
- **Layout** — Layout style for the header. For example, Standard one line includes the date, time, and page number all on one line

## Fonts Options for Page Setup

Specify the font to use for the printed contents:

- 1 From **Choose font**, select the element, either Body or Header, where Body text is everything except the Header.
- 2 Select the font to use for the element.

For example, if you access this dialog box while using the Command Window, you can select **Use Command Window font** for Body text. The printed text matches the Command Window font.

- 3 Repeat for the other element.

If you did not select **Print header** on the **Layout** pane, you do not need to specify the Header font.

As an example, for Header text, select **Use custom font** and then specify the font characteristics — type, style, and size. After you specify a custom font, the **Sample** area shows how the font will look.

---

**Tip** You can change the font that a desktop tool uses. On the **Home** tab, in the **Environment** section, click **Preferences > Fonts > Custom**.

---

## Web Browsers and MATLAB

In this section...
“About Web Browsers and MATLAB” on page 2-28
“Display Pages in Web Browsers” on page 2-30
“Specify Proxy Server Settings for Connecting to the Internet” on page 2-30
“Specify the System Browser for Linux Platforms” on page 2-30

### About Web Browsers and MATLAB

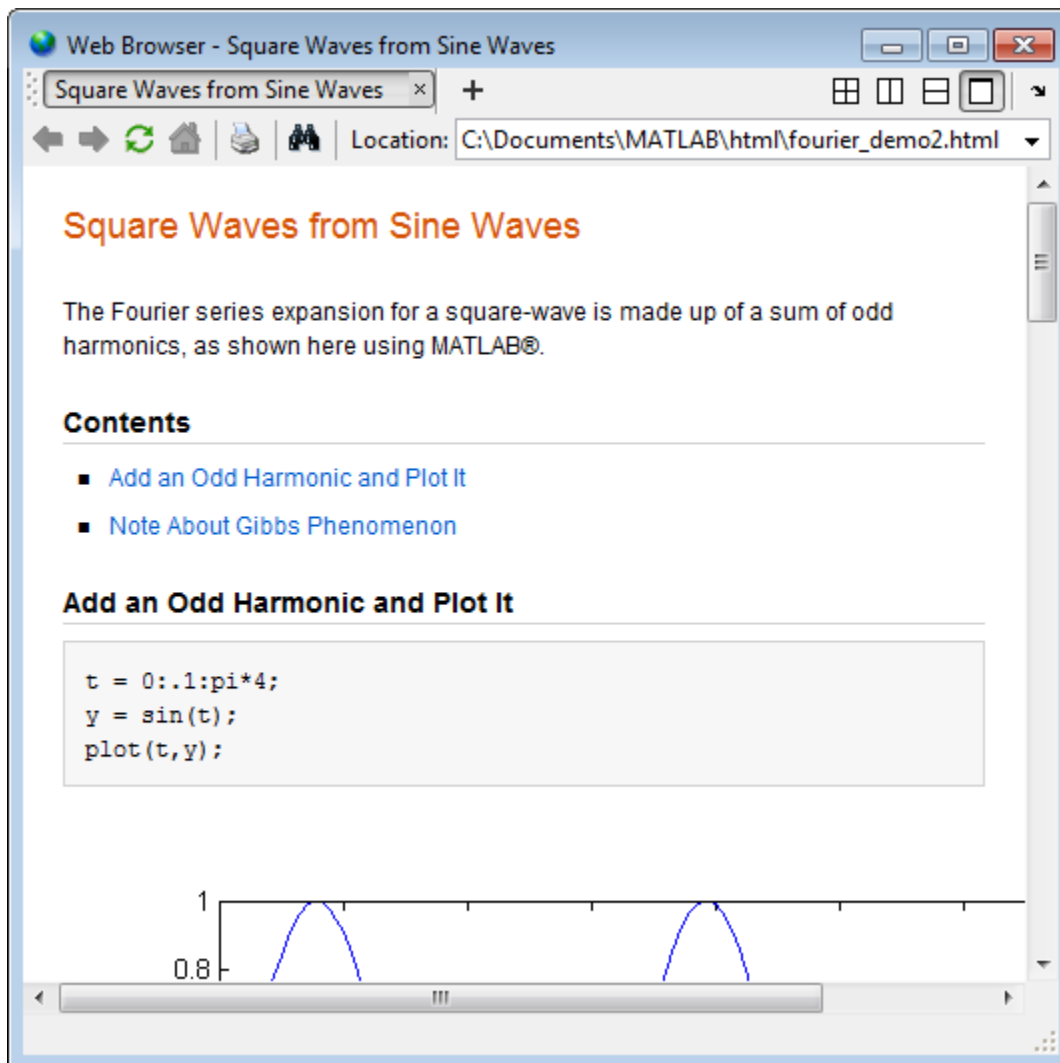
From MATLAB, Web sites and documents can display in any of the following browsers:

- MATLAB Web browser
- Help browser
- Your system Web browser, such as Mozilla® Firefox®

MATLAB uses the different browsers to display different types of information:

- Web sites display in your system browser.
- Documentation displays in the Help browser.
- Other HTML files display in the MATLAB Web browser. For example, after publishing a MATLAB program file to HTML, the HTML file displays in the MATLAB Web browser:





## MATLAB Web and Help Browsers

The MATLAB Web and Help browsers may not support all the features that a particular Web site or HTML page uses. For example, the MATLAB Web browser does not display .bmp (bitmap) image files. Instead use .gif or .jpeg formats for image files in HTML pages.

## System Browser

The system browser that MATLAB uses depends on your platform:

- On Microsoft Windows and Apple Macintosh platforms, MATLAB uses the default browser for your operating system.
- On UNIX platforms, MATLAB uses the Mozilla Firefox browser. You can specify a different system browser for MATLAB using Web preferences on page 2-30.

## Display Pages in Web Browsers

To display an HTML document in the MATLAB Web browser, double-click the document name in the Current Folder browser.

To display a Web page or any file type in the MATLAB Web browser:


- 1 Open the browser using the `web` command.
- 2 Type a URL or full path to a filename in the **Location** field.

## Specify Proxy Server Settings for Connecting to the Internet

If your network uses a firewall or another method of protection that restricts Internet access, provide information about your proxy server to MATLAB. Be aware that:

- MATLAB supports non-authenticated, basic, digest, and NTLM proxy authentication types.
- If a proxy with basic authentication is specified, MATLAB only supports HTTP connections. HTTPS connections are not supported.
- You cannot specify the proxy server settings using a script.
- There is no automated way to provide the proxy server settings your system browser uses to MATLAB.

To specify the proxy server settings:

- 1 On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Web**.
- 2 Select the **Use a proxy server to connect to the Internet** check box.
- 3 Specify values for **Proxy host** and **Proxy port**.

Examples of acceptable formats for the host are: `172.16.10.8` and `ourproxy`. For the port, enter an integer only, such as `22`. If you do not know the values for your proxy server, ask your system or network administrator for the information.

If your proxy server requires a user name and password, select the **Use a proxy with authentication** check box. Then enter your proxy user name and password.

- 4 Ensure that your settings work by clicking the **Test connection** button.


MATLAB attempts to connect to `https://www.mathworks.com`:

- If MATLAB can access the Internet, **Success!** appears next to the button.
  - If MATLAB cannot access the Internet, **Failed!** appears next to the button. Correct the values you entered and try again. If you still cannot connect, try using the values you used when you authenticated your MATLAB license.
- 5 Click **OK** to accept the changes.
  - 6 Restart MATLAB to enable the changes.

## Specify the System Browser for Linux Platforms

On Linux platforms, you can specify the system browser to use. Specifying the system browser is not supported on Windows and Mac platforms.

To specify the system browser:

- 1** On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Web**.
- 2** Under **System Web browser**, in the **Command** field, specify the system command to open the browser, for example, `opera`, which opens the Opera Web browser.
- 3** Add options for opening your system browser in the **Options** field. For example, `geometry 1064x860` specifies the size of the window for Opera.
- 4** Click **OK**.

---

**Note** If you specify Firefox as the system browser using the system command `firefox`, specify a display option to ensure that the browser opens correctly.

---

## See Also

web

## More About

- “Web Preferences” on page 2-44

## Manage Your Licenses

You can use the MATLAB licensing features to perform license management activities, such as activating licenses, deactivating licenses, or updating licenses. You also can visit the License Center at the MathWorks website to perform other license-related activities.

To access the licensing feature:

- 1 On the **Home** tab, in the **Resources** section, click **Help > Licensing**.
- 2 Select a Licensing option. The following table describes the Licensing options. Depending on your license type, your system might not include all these options.

---

**Note** Some options require an internet connection. If your internet connection requires a proxy server, use MATLAB web preferences to specify the server host and port. See “Specify Proxy Server Settings for Connecting to the Internet” on page 2-30 for more information.

---

Option	Description
<b>Update Current Licenses</b>	Displays a list of all your MathWorks licenses on this computer, with their status. When you select a license and click <b>Update Selected License</b> , MATLAB contacts MathWorks to retrieve the most current version of the License File for the license. The update process overwrites the current License File on your system. You need to restart MATLAB.
<b>Activate Software</b>	Starts the activation application, which walks you through the activation process. Answer the questions on each dialog box, select the license you want to activate, and click <b>Activate</b> .
<b>Deactivate Software</b>	Displays a list of all your MathWorks licenses on this computer, with their status. When you select a license and click <b>Deactivate</b> , MATLAB deactivates all releases on this computer associated with the license, and updates the licensing information at the MathWorks website. You will not be able to use MathWorks software with that license on this computer.  If you are not connected to the Internet, MATLAB deactivates the licenses on your computer but cannot update the corresponding license information stored at the MathWorks website. In this scenario, MATLAB returns a deactivation string. To complete deactivation, save a copy of this string, go to a computer with an internet connection, and visit the License Center at the MathWorks website. There you can sign in to your MathWorks Account and enter the deactivation string.
<b>Manage Licenses</b>	Starts a web browser, opening the My Licenses page associated with your MathWorks Account. You can use this page, called the License Center, to perform many licensing activities.

### See Also

### More About

- “Install Products”

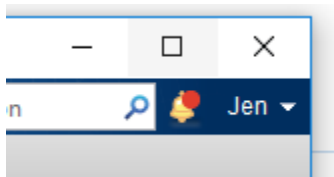
## Update an Existing Installation

You can download and install a more recent version of the release of MATLAB that you currently have installed. For example, if you have R2020a installed, you might be able to download a more recent version of R2020a. This version is called a MATLAB update. When you install a MATLAB update, you get not only the most recent update for your version but also all previous updates for your version as well.

### Update from Notifications

*Since R2019a*

If a more recent version is available, a notification displays in MATLAB when you start the program.



To install the MATLAB update, click the notification icon and then select **Install Update**. If you click the notification but decide not to install the update, the notification is cleared; however, you can still install the update at a later time.

### Check for Updates

*Since R2016b*

You also can check for updates manually. You must have an active internet connection to check for and update your installation.

On the **Home** tab, click **Help > Check for Updates**. The Add-On Manager opens with the **Updates** tab selected. If there is an update available for your version of MATLAB, click the **Update** button to the right of the update name to install it. If there is no update available for your version or if you have already installed the latest update, MATLAB displays that information.

*In R2019a:* On the **Home** tab, click **Help > Check for Updates > Products**. If there is an update available, click **Install Update**.

*Before R2019a:* On the **Home** tab, click **Add-Ons > Check for Updates > Products**.

### See Also

#### More About

- “Upgrade MATLAB Release”

## macOS Platform Conventions

### In this section...

“Mouse Instructions and macOS Platforms” on page 2-34

“Navigating Within the MATLAB Root Folder on macOS Platforms” on page 2-34

“MATLAB Dock Menu” on page 2-34

### Mouse Instructions and macOS Platforms

The documentation typically presents conventions for Microsoft Windows platforms. Therefore, some conventions and operations differ on the macOS platform from those that appear in the rest of the documentation. The intended action for the macOS platform is typically obvious. Mouse operations follow macOS conventions.

Make the following replacements to adjust documented mouse instructions for Macintosh platforms if you are using a one-button mouse:


- Replace right-click with **Ctrl**+click
- Replace middle-click with **Command**+click

### Navigating Within the MATLAB Root Folder on macOS Platforms

On macOS platforms, MATLAB is installed as an application bundle. The root folder, the string returned by the `matlabroot` command, has a `.app` extension.

To view the contents of the MATLAB root folder in the Mac Finder, right-click the MATLAB application bundle, and then select **Show Package Contents** from the context menu.

To view the content of the MATLAB root folder from within MATLAB:

- 1 On the **Home** tab, in the **File** section, click 
- 2 In the File Browser dialog box, press **Command+Shift+G** to open the Go To Folder dialog box.
- 3 Enter the full path to a folder within the MATLAB application package, for example, `/Applications/MATLAB_R2019a.app/bin`.
- 4 Press **Go**.

To open a file with a MATLAB command, such as `edit`, specify the full path of the MATLAB root folder. For example:

```
edit(fullfile(matlabroot, '/toolbox/matlab/demos/lotka.m'))
```

### MATLAB Dock Menu


Starting in MATLAB R2012a, the MATLAB Dock menu lists open windows and documents associated with the running MATLAB. Choosing an open document from the Dock menu brings the selected document's window to the foreground. In addition, the MATLAB Dock menu includes the item **Open Additional Instance of MATLAB**. This option starts another instance of MATLAB. You can select **Options > Keep in Dock**, but only for the first MATLAB instance. Use **Open Additional Instance**

**of MATLAB** to start additional instances rather than trying to keep multiple MATLAB icons in the Dock.

## Preferences

### Set Preferences for MATLAB

MATLAB provides various options called *preferences* for customizing MATLAB. To access and set preferences:

- 1 On the **Home** tab, in the **Environment** section, click  **Preferences**.
- 2 From the left pane of the Preferences dialog box, select a tool, product, or an entry revealed when you click an arrow preceding a tool or product name.
- 3 Change settings in the right pane of the Preferences dialog box.
- 4 Click **Apply** or **OK**.

Preferences take effect immediately. They remain persistent across sessions of MATLAB.

Most preferences are not available in MATLAB Online on page 10-2.

#### Function Alternative

You can open the Preferences dialog box using the `preferences` function.

You also can access and set some MATLAB options programmatically using settings. For more information, see “Access and Modify Settings”.

### Where MATLAB Stores Preferences

MATLAB and other MathWorks products store their preferences in the preferences folder. To see the full path for the preferences folder type `prefdir` in the MATLAB Command Window. The name of the preferences folder matches the name of the release. For instance, for MATLAB R2016b, the name of the preferences folder is R2016b.

On macOS and iOS, the folder might be in a hidden folder. If so, to access the hidden folder:

- 1 In the Apple macOS Finder tool, select **Go > Go to Folder**.
- 2 In the resulting dialog box, type the path returned by `prefdir`, and then press **Enter**.

You must have write access to the preferences folder. Otherwise, MATLAB generates an error in the Command Window when you try to change preferences. MATLAB also can generate an error if the preferences folder is hidden.

#### Temporary Preferences Folder

In some situations, if MATLAB is unable to create or use the preferences folder when starting up, it creates a temporary preferences folder. If a preferences folder exists for a previous release, MATLAB copies the preference files from that release to the temporary preferences folder. Otherwise, MATLAB creates the default preference files for the current release. MATLAB continues to use the temporary preferences folder until the issue is resolved.

If you make changes to preferences while MATLAB is using the temporary preferences folder, the preferences persist across sessions. Once the issue preventing MATLAB to access the preferences folder is resolved though, MATLAB copies the preference files from the previous release or creates



the default preference files for the current release. Any changes made to the preferences while using the temporary preference folder are lost.

Each version of MATLAB can have a temporary preferences folder. MATLAB does not migrate preferences from the temporary preferences folder across releases.

### **Effects of Installation and Deinstallation on the Preferences Folder**

Installing MATLAB has no effect on the preferences folder. That is, MATLAB creates, checks, copies, and writes to the preferences folder when you start up MATLAB, not when you install it. When you uninstall MATLAB, there is an option in the uninstaller to remove the preferences folder. However, this option is not selected by default.

## **Preferences MATLAB Uses When Multiple Releases Are Installed**

The files in the preferences folder that MATLAB uses depends on the version of MATLAB you are starting up. How and if MATLAB migrates (reuses) preferences files from one version of MATLAB to the next also depends on the version.

### **Process for Creating and Migrating Preferences Folder and Files**

When you start up, MATLAB looks for a preferences folder name that matches the release starting up, and then it does one of the following:

- If MATLAB finds a preferences folder name matching the release starting up, then it uses that folder and the files within it. This is usually the case after the first time you start MATLAB for a given release.

If a preference folder exists but is empty, then MATLAB recreates the default preference files for the release starting up.

- If MATLAB does not find a preferences folder name matching the release starting up, then it creates one. Next, MATLAB checks to see if a preference folder exists for any of the three releases of MATLAB that immediately precede the one you are starting.
  - If none of the preference folders from the previous three releases exist, then MATLAB creates the default preference files for the release starting up.

For example, if you start up R2016a and neither R2015b, R2015a, or R2014b are installed, then MATLAB creates the default files for the R2016a release. This is true even if a preference folder exists for the R2014a release or earlier.

- If one or more of the preference folders for the previous three releases exist, then MATLAB migrates the files from the preferences folder corresponding to the latest previous release to the preferences folder for the release starting up.

For example, if you start up R2016a and a preference folder exists for both the R2015b and R2014b releases, then MATLAB migrates the files from the R2015b preferences folder to the R2016a preferences folder.


### **Control Preferences Files MATLAB Uses**

This table describes how to control which versions of preferences files MATLAB uses.

To Use:	Do This:
Default preference files for a given release of MATLAB	<ul style="list-style-type: none"> <li>• If a preference folder for the given release exists, make sure that the folder is empty before starting up.</li> <li>• If a preference folder for the given release does not exist and one or more of the preference folders for the previous three releases do exist, create an empty preferences folder for the given release.</li> </ul>
All the preference files from a release of MATLAB up to three releases preceding the release you plan to start up or sign into.	Ensure that the preferences folder exists for that previous release. Delete the entire preferences folder for each release after the release you want to migrate from, including the folder for the release of MATLAB you plan to start up or sign into.
The release-specific default for just a particular file in the preferences folder	<p>Delete just that file from the preferences folder for the release of MATLAB you plan to start up or sign into.</p> <p>One file to consider keeping is <code>history.m</code>. For more information, see “Set Command History Preferences” on page 3-24.</p>

## General Preferences

You can set preferences for the initial working folder, deleting files, and toolbox path caching.


On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > General**. Then, adjust preference options as described in this table.

Preference	Usage
<b>Initial working folder</b>	<p>Select the last working folder from your previous MATLAB session, or specify the full path to a folder on your system. For more information, see “MATLAB Startup Folder” on page 1-14.</p> <p>If you create a <code>startup.m</code> file, <code>cd</code> commands in that file override the preference option.</p>
<b>Deleting files</b>	<p>Select an option to specify what MATLAB does with files you delete using the <code>delete</code> function.</p> <p>Selecting <b>Delete permanently</b> makes the <code>delete</code> function run faster.</p> <p>On Linux systems, if you select <b>Move to a temporary folder</b>, MATLAB moves files to a subfolder with the prefix <code>MATLAB_Files_</code> in the system temporary folder, as returned by the <code>tempdir</code> function.</p>

Preference	Usage
<b>Toolbox path caching</b>	<p>Select <b>Enable toolbox path caching</b> to have MATLAB cache <i>matlabroot</i> folder information across sessions for quicker startup performance.</p> <p>Click <b>Update Toolbox Path Cache</b> to add files to the <i>matlabroot</i> folder. (Use after you use tools not provided with MATLAB to create MATLAB files.)</p> <p>For details, see “Toolbox Path Caching in MATLAB” on page 1-20.</p>
<b>Desktop language</b> (selected non-English systems only)	<p>Select the language in which the MATLAB desktop appears. Supported languages include Japanese, Korean, and Chinese. This option affects the text in dialog boxes, button names, menu items, and error and warning messages. For more information, see “MATLAB Desktop Language Preference” on page 9-15.</p> <p>This option is only available for selected non-English systems.</p>

## Confirmation Dialog Boxes Preferences

You can specify whether MATLAB displays specific confirmation dialog boxes.

On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > General > Confirmation Dialogs**. Then, adjust preference options as described in the table below.


This table summarizes the core MATLAB confirmation dialog boxes. There might be additional confirmation dialog boxes for other products you install, and some options are not available in MATLAB Online.

Option	Confirmation Dialog Box Appears
<b>Warn before deleting Command History items</b>	<p>When you delete entries from the Command History window.</p> <p>For details, see <b>Command History Window</b>.</p>
<b>Warn before clearing the Command Window</b>	<p>When, on the <b>Home</b> tab, in the <b>Code</b> section, you click <b>Clear Commands</b>. Does not appear when you use the <code>clc</code> function.</p>
<b>Confirm when overwriting variables in MAT-files</b>	<p>When you save variables by dragging them from the Workspace browser onto a MAT-file in the Current Folder browser.</p>
<b>Confirm when overwriting workspace variables via drag-and-drop</b>	<p>When you load variables by dragging them from the Details Panel of the Current Folder browser to the Workspace browser or Command Window.</p>
<b>Prompt when editing files that do not exist</b>	<p>When you type <code>edit filename</code> and filename does not exist in the current folder or on the search path.</p>
<b>Prompt to exit debug mode when saving file</b>	<p>When you try to save a modified file while in debug mode.</p> <p>For details, see “End Debugging Session”.</p>

Option	Confirmation Dialog Box Appears
<b>Prompt to save on activate</b>	When you have unsaved changes to a figure and program file and you activate the UI by clicking the <b>Run</b> button, for example.  For details, see “GUIDE Preferences”.
<b>Prompt to save on export</b>	When you have unsaved changes to a figure and program file and you select <b>File &gt; Export</b> .  For details, see “GUIDE Preferences”.
<b>Confirm changing default callback implementation</b>	When you have modified a callback signature in GUIDE.  For details, see “GUIDE Preferences”.
<b>Confirm before exiting MATLAB</b>	When you quit MATLAB.
<b>Confirm when deleting variables</b>	When you delete variables from the workspace using menu items. Does not appear with the <code>clear</code> function.  For details, see “Save and Load Workspace Variables” on page 5-13.

## Source Control Preferences


You can select which previously installed and configured source control system to use with MATLAB.

On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > General > Source Control**. Then, select an option from the list.

For more information, see “Select or Disable Source Control System”.

## Keyboard Shortcuts Preferences



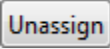
You can set keyboard shortcuts for actions you perform using MathWorks software. You can specify or import sets of predefined keyboard shortcuts, set individual shortcuts on an action-by-action basis, or use a combination of both approaches.

On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Keyboard > Shortcuts**. Then, adjust preference options as described in this table.

For more information on customizing keyboard shortcuts, see “Customize Keyboard Shortcuts for Individual Actions” on page 2-22.


If you use source control integration through the MATLAB Current Folder Browser, MATLAB might crash when you view or commit changes.

Preference	Usage
<b>Active settings</b>	Select or import a set of predefined keyboard shortcuts.

Preference	Usage
	<p>Select any one of these options:</p> <ul style="list-style-type: none"> <li>• <b>Save As</b> — Save current set of keyboard shortcuts to a file.</li> <li>• <b>Copy to clipboard</b> — Copy current set of keyboard shortcuts to clipboard, so you can import into Microsoft Excel, for example.</li> <li>• <b>Compare</b> — Compare the current set of keyboard shortcuts to another set.</li> <li>• <b>Undo Modifications</b> — Undo changes to a default keyboard shortcut set.</li> <li>• <b>Delete</b> — Delete a set of keyboard shortcuts you previously saved or added.</li> </ul>
<b>Search by action name or shortcut</b>	Search the list of displayed actions.
<b>Shortcuts for &lt;action-name&gt;</b>	View the keyboard shortcut assigned to a selected action.
	Add or delete a keyboard shortcut to a selected action.
<b>All possible conflicts</b>	Display conflicts when two or more different actions have the same shortcut.
	Remove the keyboard shortcut from the selection in the <b>All possible conflicts</b> list.

## Colors Preferences

You can specify the text and background color for desktop tools, as well as colors for highlighting syntax elements of MATLAB code.


On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Colors**. Then, set options as described in the table below.

Preference	Usage
<b>Desktop tool colors</b>	<p>Specify that desktop tools use the same text and background colors that your platform uses for other applications by selecting <b>Use system colors</b>.</p> <p>Customize colors by clearing <b>Use system colors</b>, and then choose <b>Text</b> and <b>Background</b> colors from the drop-down menus.</p> <p>The colors that you specify also apply to the Import Wizard, but do not apply to the Live Editor, the Help display pane or the web browser.</p> <p>For details, see “Change Text and Background Colors in Desktop Tools” on page 2-6.</p>

Preference	Usage
<b>MATLAB syntax highlighting colors</b>	Set colors to help you quickly identify elements of MATLAB syntax in the Editor, Live Editor, Command Window, Command History window, and the MATLAB shortcuts callback area.  For details, see “Change Syntax Highlighting Colors” on page 2-6.
<b>MATLAB Command Window colors</b>	Set colors to help you quickly identify errors, warnings, and hyperlinks in the Command Window.

## Colors Programming Tools Preferences

You can specify options used for editing and debugging code, including code analysis colors, variable and function colors, and cell display options.


On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Colors > Programming Tools**. Then, set options as described in the table below.

Preference	Usage
<b>Code analyzer colors</b>	<ul style="list-style-type: none"> <li>• <b>Warnings</b>—Specifies the color Code Analyzer uses to identify code in the Editor and Live Editor for which there are warning messages.</li> <li>• <b>Autofix highlight</b>— Specifies the color Code Analyzer uses to identify code in the Editor and Live Editor for which there is an automatic fix.</li> </ul> <p>For details, see “Automatically Check Code in the Editor and Live Editor — Code Analyzer”.</p>
<b>Variable and function colors</b>	<ul style="list-style-type: none"> <li>• <b>Automatically highlight</b>— Specifies the color the Editor and Live Editor use to highlight all occurrences of a specific variable or function. For details, see “Find and Replace Functions or Variables in the Current File”.</li> <li>• <b>Variables with shared scope</b>— Specifies the color of variables with shared scope. The text is colored, not shaded. For details, see “Check Variable Scope in Editor”</li> </ul>
<b>Section display options</b>	<p><b>Highlight sections</b>— Specifies the color the Editor uses to shade code sections.</p> <p><b>Show lines between sections</b>— Specifies that code section divisions appear with a gray line between each section in the Editor. These lines do not appear in the published or printed file.</p> <p>See also “Code Sections”.</p>

## Comparison Preferences

### Colors

You can change and save your diff color preferences for the Comparison Tool. You can apply your color preferences to all comparison types.

On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Comparison**. Then, set options as described in the table below.


Preference	Usage
<b>Colors</b>	Set colors to help you quickly identify differences, modifications, and merges in comparison reports. Choose colors from the drop-down menus. View the colors in the <b>Sample</b> pane. To use your modified settings in comparisons, click <b>Apply</b> . Refresh any open comparison reports to use the new colors.
<b>Active Settings</b>	<p>To save your modified color preferences for use in future MATLAB sessions, click <b>Save As</b>. Enter a name for your color settings profile and click <b>OK</b>.</p> <p>After saving settings, you can select them in the <b>Active Settings</b> list.</p> <p>For details, see “Comparison Report Tools and Options” on page 6-11.</p>

### External Source Control Integration

Use the check box to control external source control interactions: **Allow external source control tools to use open MATLAB sessions for diffs and merges**. After you configure your source control tool to use MATLAB Comparison Tool, the Comparison Tool prompts you to set this preference. For details, see “Customize External Source Control to Use MATLAB for Diff and Merge” (Simulink).

## Toolbars Preferences

You can customize some toolbars in the MATLAB application.

On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Toolbars**. Then, set options as described in the table below.

For step-by-step instructions on setting these preferences, see “Access Frequently Used Features” on page 2-9.

Preference	Usage
<b>Toolbar</b>	Select the toolbar you want to customize.
<b>Layout</b>	Rearrange controls in the toolbar by dragging and dropping them to a new location in the <b>Layout</b> .
<b>Controls</b>	Select which buttons appear on the selected toolbar.

## See Also

prefdir

## More About


- “Access and Modify Settings”

## Web Preferences

Web preferences enable you to specify internet connection information to MATLAB.

### Limitations

- MATLAB supports nonauthenticated, basic, digest, and NTLM proxy authentication types.
- You cannot specify proxy server settings using a script.
- There is no automated way to provide MATLAB with the proxy server settings that your system browser uses.

You can set Web preferences on the **Home** tab, in the **Environment** section. Click  **Preferences**. Select **MATLAB > Web**, and then adjust preference options as described in this table.

Preference	Usage
<b>Use a proxy server to connect to the Internet</b>	Provide information that MATLAB needs to access the Internet when your network uses a firewall or another method of protection that restricts internet access.
<b>Proxy host</b>	Specify a value for the <b>Proxy host</b> . For example, 172.16.10.8 or ourproxy. If you do not know the values for your proxy server, ask your system or network administrator for the information.
<b>Proxy port</b>	Specify an integer value for the <b>Proxy port</b> . For example, 22. If you do not know the values for your proxy server, ask your system or network administrator for the information.
<b>Use a proxy with authentication</b>	Specifies that your proxy server requires a user name and password.
<b>Proxy username</b>	Specify the proxy server user name.
<b>Proxy password</b>	Specify the proxy server password.
<b>Test connection</b>	Ensure that your settings work.  If MATLAB cannot access the Internet, <b>Failed!</b> appears next to the button. Correct the values you entered and try again. If you still cannot connect, try using the values you used when you authenticated your MATLAB license.
<b>System Web browser</b>	Select <b>Use system web browser when opening links to external sites (recommended)</b> to open external sites in your system browser. Clear the option to use the MATLAB browser instead. Using the system browser is recommended when opening external sites.



Preference	Usage
	<p>UNIX platforms only, excluding Macintosh:</p> <p>Specify the system <b>Command</b> to use to open the system browser. For example, <code>opera</code>, opens the Opera Web browser.</p> <p>Specify the <b>Options</b> to use for the system browser. For example, <code>geometry 1064x860</code> specifies the size of the window for Opera.</p> <p>If you specify Firefox as the system browser using the system command <code>firefox</code>, specify a display option to ensure that the browser opens correctly.</p>



# Entering Commands

---

- “Enter Statements in Command Window” on page 3-2
- “Find Functions to Use” on page 3-4
- “Format Output” on page 3-7
- “Stop Execution” on page 3-10
- “Find Text in Command Window or History” on page 3-11
- “Rerun Favorite Commands” on page 3-13
- “Set Command Window Preferences” on page 3-15
- “Set Keyboard Preferences” on page 3-17
- “Check Syntax as You Type” on page 3-19
- “Set Command History Preferences” on page 3-24

## Enter Statements in Command Window

As you work in MATLAB, you can enter individual statements in the Command Window. For example, create a variable named `a` by typing this statement at the command line:

```
a = 1
```

MATLAB immediately adds variable `a` to the workspace and displays the result in the Command Window.

```
a =  
  
1
```

When you do not specify an output variable, MATLAB uses the variable `ans`, short for *answer*, to store the results of your calculation.

```
sin(a)  
  
ans =  
  
0.8415
```

The value of `ans` changes with every command that returns an output value that is not assigned to a variable.

If you end a statement with a semicolon, MATLAB performs the computation, but suppresses the display of output in the Command Window.

```
b = 2;
```

To enter multiple statements on multiple lines before running any of the statements, use **Shift+Enter** between statements. This action is unnecessary when you enter a paired keyword statement on multiple lines, such as `for` and `end`.

You also can enter more than one statement on the same line by separating statements. To distinguish between commands, end each one with a comma or semicolon. Commands that end with a comma display their results, while commands that end with a semicolon do not. For example, enter the following three statements at the command line:

```
A = magic(5), B = ones(5) * 4.7; C = A./B  
  
A =  
17    24     1     8    15  
23     5     7    14    16  
 4     6    13    20    22  
10    12    19    21     3  
11    18    25     2     9  
  
C =  
3.6170    5.1064    0.2128    1.7021    3.1915  
4.8936    1.0638    1.4894    2.9787    3.4043  
0.8511    1.2766    2.7660    4.2553    4.6809  
2.1277    2.5532    4.0426    4.4681    0.6383  
2.3404    3.8298    5.3191    0.4255    1.9149
```

MATLAB displays only the values of `A` and `C` in the Command Window.


To recall previous lines in the Command Window, press the up- and down-arrow keys, ↑ and ↓. Press the arrow keys either at an empty command line or after you type the first few characters of a command. For example, to recall the command `b = 2`, type `b`, and then press the up-arrow key.

To clear a command from the Command Window without executing it, press the Escape (**Esc**) key.

You can evaluate any statement already in the Command Window. Select the statement, right-click, and then select **Evaluate Selection**.

In the Command Window, you also can execute only a portion of the code currently at the command prompt. To evaluate a portion of the entered code, select the code, and then press **Enter**.


For example, select a portion of the following code:

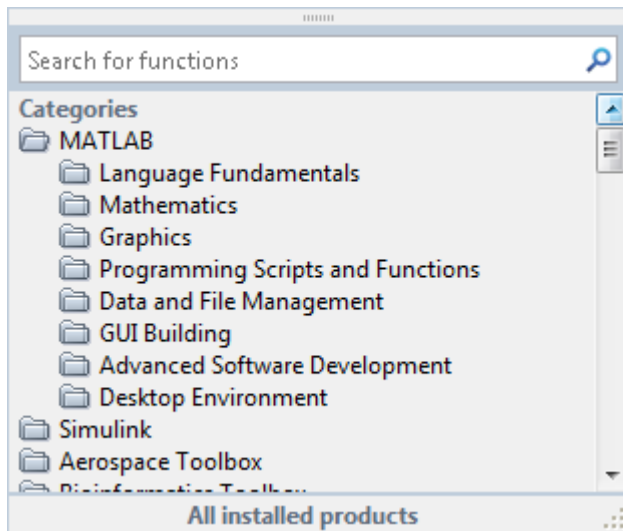
```
 >> disp('hello'), disp('world')
```

```
hello
```

## Find Functions to Use

This example shows how to find the name and description of a MathWorks function from the Command Window or Editor using the Function browser. The Function browser is not supported in the Live Editor.

- 1 Click the Browse for functions button, . In the Command Window, this button is to the left of the prompt. In the Editor, the button is on the **Editor** tab, in the **Edit** section. The Function browser opens.

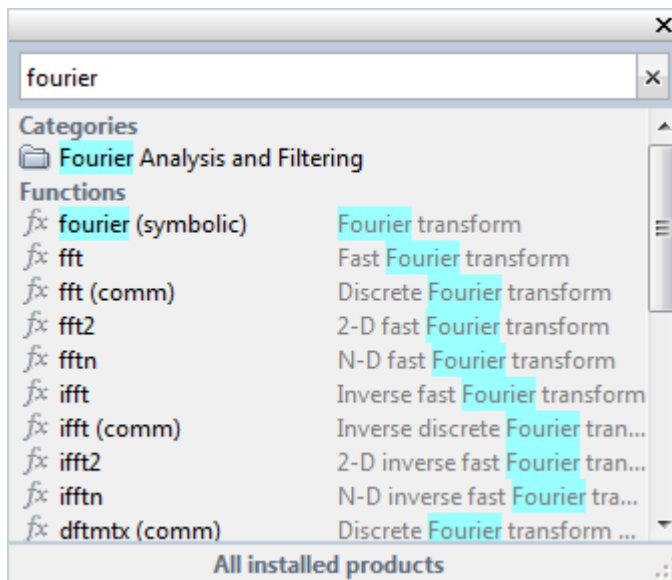


---

**Tip** The Function browser closes when you move the pointer outside of it. To keep the browser open, drag it by the top edge to a different location.

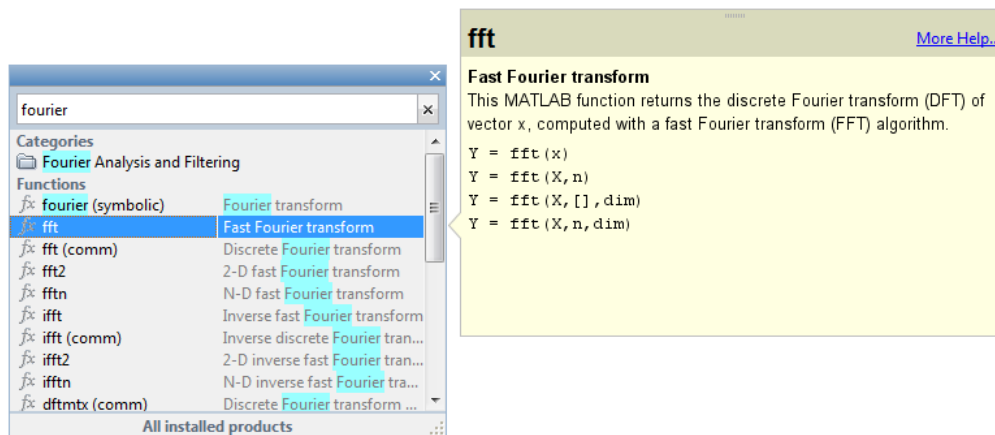
---

- 2 Optionally, select a subset of products to display in the list. Click the product area at the bottom of the browser (where the text **All installed products** appears by default), and then set the **Selected Products** preference and click **OK**. This preference also applies to the Help browser.
- 3 Find functions by browsing the list or by typing a search term. For example, search for the term *fourier*.



In the search results, a parenthetical term after a function name indicates either that the function is in a product folder other than MATLAB, or that there are multiple functions with the same name. For example, `fft (comm)` corresponds to the `fft` function in the Communications Toolbox™ folder.

- 4 Select a function that you would like to use or learn more about, as follows.
  - Insert the function name into the current window by double-clicking the name. Alternatively, drag and drop the function name into any tool or application.
  - View syntax information for the function by single-clicking its name. A brief description for each of the syntax options displays in a yellow pop-up window.



**Tip** The pop-up window automatically closes when you move your pointer to a new item in the results list. To keep the pop-up window open, drag it by the top edge to a different location.

You can change the font that the Function browser uses by setting preferences. On the **Home** tab, in the **Environment** section, select **Preferences > Fonts**. By default, the Function browser uses the desktop text font and the pop-up window uses the Profiler font.



# Format Output

MATLAB displays output in both the Command Window and the Live Editor. You can format the output display using several provided options.

## Format Line Spacing in Output

By default, MATLAB displays blank lines in Command Window output.

You can select one of two line spacing options in MATLAB.

- `loose` — Keeps the display of blank lines (default).

```
>> x = [4/3 1.2345e-6]


x =

    1.3333    0.0000
```

- `compact` — Suppresses the display of blank lines.

```
>> x = [4/3 1.2345e-6]
x =
    1.3333    0.0000
```

To change the line spacing option, do one of the following:

- On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Command Window**, and then choose a **Line spacing** option.
- Use the `format` function at the command line, for example:

```
format loose
format compact
```

**Note** Line spacing options do not apply in the Live Editor.

## Format Floating-Point Numbers

You can change the way numbers display in both the Command Window and the Live Editor. By default, MATLAB uses the short format (5-digit scaled, fixed-point values).

For example, suppose that you enter `x = [4/3 1.2345e-6]` in the Command Window. The MATLAB output display depends on the format you selected. This table shows some of the available numeric display formats, and their corresponding output.


Numeric Display Format	Example Output
short (default)	x = 1.3333 0.0000
short e	x = 1.3333e+00 1.2345e-06
long	x = 1.3333333333333333 0.000001234500000
+	x = ++

---

**Note** The text display format affects only how numbers are shown, not how MATLAB computes, or saves them.

---

To format the way numbers display, do one of the following:


- On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Command Window**, and then choose a **Numeric format** option.
- Use the `format` function, for example:

```
format short
format short e
format long
```

See the [format reference page](#) for a list and description of all supported numeric formats.

## Wrap Lines of Code to Fit Window Width

A line of code or its output can exceed the width of the Command Window, requiring you to use the horizontal scroll bar to view the entire line. To break a single line of input or output into multiple lines to fit within the current width of the Command Window:

- 1 On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Command Window**.
- 2 Select **Wrap Lines**.
- 3 Click **OK**.

---

**Note** Line wrapping options do not apply in the Live Editor.

---

## Suppress Output

To suppress code output, add a semicolon (;) to the end of a command. This is useful when code generates large matrices.

Running the following code creates **A**, but does not show the resulting matrix in the Command Window or the Live Editor:

```
A = magic(100);
```

## View Output by Page

Output in the Command Window might exceed the visible portion of the window. You can view the output, one screen at a time:

- 1 In the Command Window, type `more on` to enable paged output.
- 2 Type the command that generates large output.
- 3 View the output:
  - Advance to the next line by pressing **Enter**.

- Advance to the next page by pressing **Space Bar**.
- Stop displaying the output by pressing **q**.

To disable paged output, type `more off`.

---

**Note** Paged output options do not apply in the Live Editor.

---

## Clear the Command Window

If the Command Window seems cluttered, you can clear all the text (without clearing the workspace) by doing one of the following:

- On the **Home** tab, in the **Code** section, select **Clear Commands > Command Window** to clear the Command Window scroll buffer.
- Use the `clc` function to clear the Command Window scroll buffer.
- Use the `home` function to clear your current view of the Command Window, without clearing the scroll buffer.

## See Also

`clc` | `format` | `home` | `more`

## Stop Execution

To stop execution of a MATLAB command, press **Ctrl+C** or **Ctrl+Break**.

On Apple Macintosh platforms, you also can use **Command+.** (the Command key and the period key).

**Ctrl+C** does not always stop execution for files that run a long time, or that call built-ins or MEX-files that run a long time. If you experience this problem, include a `drawnow`, `pause`, or `getframe` function in your file, for example, within a large loop. Also, **Ctrl+C** might be less responsive if you start MATLAB with the `-nodesktop` option.

---

**Note** For certain operations, stopping the program might generate errors in the Command Window.

---

To programmatically stop execution of a function or script before reaching the end, use the `return` function. MATLAB returns control to the Command Window or the invoking function.

### See Also

`drawnow` | `getframe` | `pause` | `return`

## Find Text in Command Window or History

### In this section...


- “Find Text in the Command Window” on page 3-11
- “Find Text in the Command History Window” on page 3-12

### Find Text in the Command Window

You can search text currently in the Command Window. This includes text that is visible on the screen, and text that is in the scroll buffer.


- “Search Using Find Dialog Box” on page 3-11
- “Search Using Keyboard Shortcuts” on page 3-11

#### Search Using Find Dialog Box

To search for specified text in the Command Window, on the Command Window title bar, click , and then select **Find**. The Find dialog box opens. The search begins at the current cursor position. MATLAB finds the text you specified and highlights it.

MATLAB beeps when a search for **Find Next** reaches the end of the Command Window, or when a search for **Find Previous** reaches the top of the Command Window. If you have **Wrap around** selected, MATLAB continues searching after beeping.

To search for the specified text in other MATLAB desktop tools, change the selection in the **Look in** field.

You can increase the amount of information available in the Command Window so that more text is available for searching. Doing so requires more memory. On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Command Window**, and then increase the setting for **Number of lines in the command window scroll buffer**.

Clearing the command window (for example, with the `clc` function), empties the scroll buffer. The cleared text is no longer available for searching. To clear your display in the Command Window without clearing the buffer, use the `home` function.

#### Search Using Keyboard Shortcuts

You can also perform an incremental search in the Command Window using keyboard shortcuts.

- 1 Begin an incremental search by using one of the defined keyboard shortcuts.

Action	Windows Default Shortcut	Macintosh or Emacs Default Shortcut
Initiate a forward incremental search.	<b>Ctrl+Shift+S</b>	<b>Ctrl+S</b>
Initiate a backward incremental search.	<b>Ctrl+Shift+R</b>	<b>Ctrl+R</b>

An incremental search field appears in the bottom right corner of the MATLAB Desktop window. For a forward search, the text **F Inc Search** appears. The F indicates a forward search.

- 2 Begin typing your search term.

When you enter lowercase letters in the incremental search field, MATLAB looks for both lowercase and uppercase instances of the letters. For example, if you enter **b**, MATLAB looks for **b** and **B**. However, if you enter uppercase letters, MATLAB only looks for instances that match the case you entered.

- 3 Perform incremental search actions using these keyboard shortcuts:

Action	Keyboard Shortcut
Complete a partially highlighted set of characters.	<b>Ctrl+W</b>
Find the next occurrence of a set of characters.	<b>Ctrl+S</b>
Remove characters from the incremental search field, back to the last successful search	<b>Ctrl+G</b>

If you search for a set of characters that does not appear in the Command Window text, **Failing** appears in the incremental search field.

- 4 End incremental searching by pressing **Esc** (escape), **Enter**, or any other key that is not a character or number.

The incremental search field disappears. The cursor remains at the position where the text was last found, with the search text highlighted.

## Find Text in the Command History Window




You can search for text in the Command History Window. You can search for text either at the beginning of a command, or anywhere within a command.

- 1 In the Command History window, type in the Search field. To display the Search field if it is not visible, click , and then select **Find**.



- 2 Begin typing your search term.

The Command History window searches backward and selects the previous entry that contains the sequence of letters you typed.

- 3 Select from the different search options using the buttons to the right of the search field. Options include  (match case),  (match anywhere within command), and  (match at beginning of command).
- 4 Find the previous or next occurrence of the entry with the up and down arrow keys, respectively.
- 5 Press **Esc** to clear the search.

# Rerun Favorite Commands

## Create and Run Favorite Commands

MATLAB favorite commands (previously called command shortcuts) are an easy way to run a group of MATLAB language statements that you use regularly. For example, you can use a favorite command to set up your environment when you start working, or to set the same properties for figures you create.

To create a favorite command:



- 1 On the **Home** tab, in the **Code** section, click **Favorites** and then click **New Favorite**. The Favorite Command Editor dialog box opens.
- 2 In the **Label** field, enter a name for the favorite command. For this example, enter **Setup Workspace**.
- 3 In the **Code** field, type the statements you want the favorite command to run. You also can drag and drop statements from the Command Window, the Command History Window, or a file. MATLAB automatically removes any command prompts (`>>`) from the **Code** field when you save the favorite command.

For example, enter these statements:

```
format compact
clear
workspace
filebrowser
clc
```

- 4 In the **Category** field, type the name of a new category or select an existing category from the drop-down list. If you leave this field blank, the favorite command appears in the default **Favorite Commands** category.
- 5 In the **Icon** field, select an icon.
- 6 To add the favorite command to the quick access toolbar, select both the **Add to quick access toolbar** and **Show label on quick access toolbar** options.
- 7 To run the statements in the **Code** section and ensure that they perform the desired actions, click **Test**.
- 8 When you are done configuring the favorite command, click **Save**.

To run a favorite command, on the **Home** tab, click **Favorites** and then click the icon for the desired favorite command. All the statements in the **Code** field of the Favorite Command Editor execute as if you ran those statements from the Command Window, although they do not appear in the Command History window.



To edit a favorite command, click the  icon to the right of the favorite command. To delete a favorite command, click the  icon to the right of the favorite command. You also can right-click the favorite command and select **Edit Favorite** or **Delete Favorite**.



## Organize Favorite Commands


You can organize your favorite commands by storing them in different categories.

To create a new category:

- 1 On the **Home** tab, in the **Code** section, click **Favorites** and then click **New Category**. The Favorite Category Editor dialog box opens.
- 2 In the **Label** field, enter a name for the category. For this example, enter **My Favorite Favorites**.
- 3 In the **Icon** field, select an icon.
- 4 To add the category to the quick access toolbar, select both the **Add to quick access toolbar** and **Show label on quick access toolbar** options.
- 5 Click **Save**.

To move a category up or down in the list of categories, or to move a favorite command within a category, drag the category or favorite command to the desired location. You also can use the  and  buttons to the right of the category.

To change whether a single category or favorite command appears in the quick access bar, click the  and  icons to the right of the category or favorite command. In MATLAB Online, right-click the category or command and select **Add to quick access toolbar**. To add all favorite commands to the quick access bar, on the **Home** tab, right-click **Favorites** and select **Add to quick access toolbar**.

To further configure which favorite commands and categories appear in the quick access bar, on the **Home** tab, in the **Code** section, click **Favorites** and then click  **Quick Access**. Configuring the quick access bar is not supported in MATLAB Online.

## See Also


### More About

- “Customize Keyboard Shortcuts” on page 2-21
- “Set Command History Preferences” on page 3-24





## Set Command Window Preferences

You can customize the visual display of the Command Window and command output within it.

On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Command Window**, and then adjust preference options as described in the following table.

Some Command Window preferences are not available in MATLAB Online on page 10-2.

Preference	Usage
<b>Text display</b>	Select a <b>Numeric format</b> option to specify the output format of numeric values in the Command Window.  For details, see “Format Floating-Point Numbers” on page 3-7.
	Select a <b>Line spacing</b> option to specify whether blank lines appear in Command Window output. To suppress blank lines, select <b>compact</b> . To display blank lines, select <b>loose</b> .
<b>Datetime format</b>	Select a <b>Locale</b> option to specify the default input locale of the <b>Datetime</b> object. You also can enter a custom locale. For more information, including a list of common values, see <b>datetime</b> .
	Select a <b>Default date and time format</b> option to specify the default format of the <b>Datetime</b> object. You also can enter a custom format. For more information, see the <b>Format</b> property for datetime arrays.
	Select a <b>Default date-only format</b> option to specify the default date format of the <b>Datetime</b> object. You also can enter a custom format. For more information, see the <b>Format</b> property for datetime arrays.
<b>Display</b>	Select <b>Wrap lines</b> to make each line of input or output in the Command Window break into multiple lines to fit within the current width of the Command Window.  For details, see “Wrap Lines of Code to Fit Window Width” on page 3-8.
	Select <b>Set matrix display width to eighty columns</b> to limit the width of matrix output.
	<b>Note</b> If you also select <b>Wrap lines</b> , and the width of the Command Window is fewer than 80 characters, each row of 80 characters of matrix output wraps to fit within the width of the Command Window.
	Select <b>Show getting started message bar</b> to display the Command Window message bar that provides links to introductory information.  
	Select <b>Show function browser button</b> to display the Function Browser button  to the left of the prompt in the Command Window. You can use the Function Browser to search for MATLAB functions.

Preference	Usage
	<p>Select <b>Suggest corrections for mistyped functions and variables</b> to display suggestions in the Command Window. If you enter an undefined function, variable name, or MATLAB operator, MATLAB displays:</p> <p>Did you mean:</p> <p>followed by a suggested command at the command line. You can press <b>Enter</b> to execute that command, or <b>Esc</b> to delete the suggestion.</p> <p><b>Number of lines in command window scroll buffer</b> specifies the maximum number of lines displayed in the Command Window. A larger scroll buffer provides a larger base for search features, but requires more memory. By default, the scroll buffer is set to 5,000 lines.</p> <p>The scroll buffer size does not impact the number of lines you can recall. By default, you can use the up arrow key ↑ to recall all lines shown in the Command History window, regardless of how many lines you can see in the Command Window.</p>
<b>Tab key</b>	<p><b>Tab size</b> specifies the number of spaces assigned to the tab key.</p> <hr/> <p><b>Note</b> This setting does not apply if you have enabled tab completion for the Command Window or Editor. To enable or disabled tab completion, on the <b>Home</b> tab, select <b>Preferences &gt; Keyboard</b>.</p>

In MATLAB Online, to have MATLAB suggest and complete names automatically when you type the first few characters of the name in the Command Window, in the **Suggestions and completions** section, select **Show Automatically**. To have MATLAB suggest and complete names only after you press the **Tab** key, select **Show on tab**.


## See Also

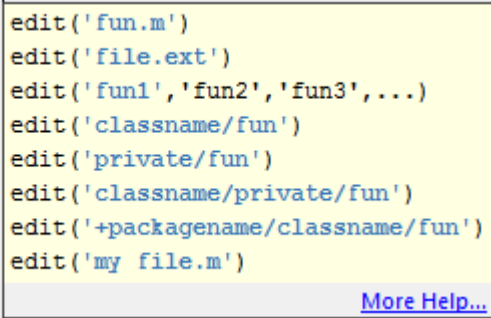
## More About

- “Change Fonts” on page 2-2

## Set Keyboard Preferences

Keyboard preferences enable you to set suggestion and completion options and delimiter matching options in the Command Window, Editor, and Live Editor.

To set Keyboard Preferences, on the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Keyboard**, and then adjust preference options as described in this table.

Preference	Usage
Suggestions and completions	Select <b>Tab key narrows completions</b> to have MATLAB continue to reduce the list of possible names for completions as you type each additional character and press the <b>Tab</b> key. This option is not supported in the Live Editor.
	For details, see “Code Suggestions and Completions” on page 3-20.
	In the <b>Command Window</b> or <b>Editor</b> sections, select <b>Enable tab completion</b> to have MATLAB suggest and complete names when you type the first few characters of the name and press the <b>Tab</b> key in the Command Window and/or Editor.
	In the <b>Command Window</b> or <b>Editor</b> sections, select <b>Enable function hints</b> to have MATLAB display function hints in the Command Window and/or Editor.
	When enabled, if you type a function name with an opening parenthesis, and then pause, a tooltip opens showing the basic syntax for the function. For example:  <pre>x = edit(</pre> 
	For details, see “Function Syntax Hints” on page 3-22.
	In the <b>Live Editor and App Designer</b> section, select <b>Show automatically</b> to have MATLAB suggest and complete names automatically when you type the first few characters of the name.
	Select <b>Show on tab</b> to have MATLAB suggest and complete names only after you press the <b>Tab</b> key.

Preference	Usage
<b>Delimiter Matching</b>	Specify when and if MATLAB alerts you to matched and mismatched delimiters. Delimiters include parentheses, brackets, braces, and, in the Editor only, paired keywords.
	Select <b>Match while typing</b> (or <b>Show matches and mismatches when typing</b> in MATLAB Online) to have MATLAB alert you to matched and mismatched delimiters as you type.
	Select <b>Match on arrow key</b> (or <b>Show matches and mismatches when using arrow keys</b> in MATLAB Online) to have MATLAB alert you to matched and mismatched delimiters when you move the cursor over a delimiter using an arrow key.
	For details, see “Delimiter Matching” on page 3-19.
	Select one of these <b>Show match with</b> options to specify how MATLAB indicates matching delimiters:
	<ul style="list-style-type: none"> <li>• <b>Balance</b> — The corresponding delimiter highlights briefly.</li> <li>• <b>Underline</b> — Both delimiters in the pair display underlines briefly.</li> <li>• <b>Highlight</b> — Both delimiters in the pair highlight briefly.</li> </ul>
	In the Live Editor and in MATLAB Online, changing the delimiter matching indicator is not supported. When delimiter matching is enabled, MATLAB indicates matching delimiters using the <b>Underline</b> option.
	Select one of these <b>Show mismatch with</b> options to specify how MATLAB indicates mismatched delimiters:
	<ul style="list-style-type: none"> <li>• <b>Beep</b> — MATLAB beeps.</li> <li>• <b>Strikethrough</b> — The delimiter you type appears crossed out briefly.</li> <li>• <b>None</b> — There is no alert.</li> </ul>
	In the Live Editor and in MATLAB Online, changing the delimiter matching indicator is not supported. When delimiter matching is enabled, the MATLAB indicates mismatching delimiters using the <b>Strikethrough</b> option.

In MATLAB Online to change how MATLAB suggests and completes names in the Editor, Live Editor, and App Designer, go to the **MATLAB > Editor/Debugger** preferences and select from the available options. To change how MATLAB suggests and completes names in the Command Window, go to the **MATLAB > Command Window** preferences.

## Check Syntax as You Type

### In this section...

“Syntax Highlighting” on page 3-19  
 “Delimiter Matching” on page 3-19  
 “Code Suggestions and Completions” on page 3-20  
 “Function Syntax Hints” on page 3-22

## Syntax Highlighting


To help you identify MATLAB elements, some entries appear in different colors in the Command Window, the Editor, and the Live Editor. This is known as *syntax highlighting*. By default:

- Keywords are blue.
- Character vectors are purple.
- Unterminated character vectors are maroon.
- Comments are green.

```
% check to see if A is greater than B
if A > B
    'greater'
elseif A < B
    'less'
end
```

Except for errors, output in the Command Window does *not* appear with syntax highlighting.

MATLAB software copies the selection to the Clipboard in RTF format, which many Microsoft Windows and Macintosh applications support. When you paste or drag a selection from the Editor and Live Editor to another application, such as Microsoft Word, the pasted text maintains the syntax highlighting colors and font characteristics from the Editor and Live Editor.

You can change syntax highlighting preferences. On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Editor/Debugger > Language**. In MATLAB Online, select **Editor/Debugger > MATLAB Language** or **Editor/Debugger > Other Languages**.

## Delimiter Matching

MATLAB indicates matched and mismatched delimiters, such as parentheses, brackets, and braces, to help you avoid syntax errors. MATLAB also indicates paired language keywords, such as **for**, **if**, **while**, **else**, and **end** statements.


By default, MATLAB indicates matched and mismatched delimiters and paired language keywords as follows:

- Type a closing or opening delimiter — MATLAB briefly highlights the corresponding opening or closing delimiter.
- Type more closing delimiters than opening delimiters (or more opening delimiters than closing delimiters) — MATLAB puts a strikethrough on the unmatched delimiter.

- Use the arrow keys to move the cursor over one delimiter — MATLAB briefly highlights both delimiters in a pair. If no corresponding delimiter exists, MATLAB puts a strikethrough on the unmatched delimiter.

If a matching delimiter exists, but it is not visible on the screen, a pop-up window appears and shows the line containing the matching delimiter. Click in the pop-up window to go to that line.

```
>> a = ['first',...  
        'third',...  
        'fourth',...  
        'fifth',...  
        'sixth']
```

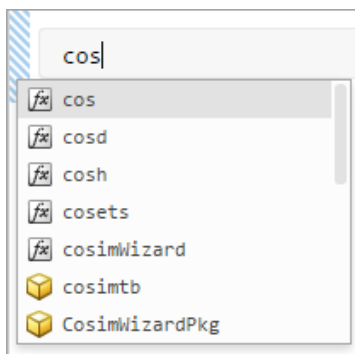
You can change what the delimiter matching indicators are, and when or if they appear. On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Keyboard**.

In the Live Editor and MATLAB Online, changing the delimiter matching indicator is not supported. When delimiter matching is enabled, MATLAB indicates matching delimiters by underlining both delimiters in the pair briefly. Mismatching delimiters are indicated by crossing out the mismatched delimiter briefly.

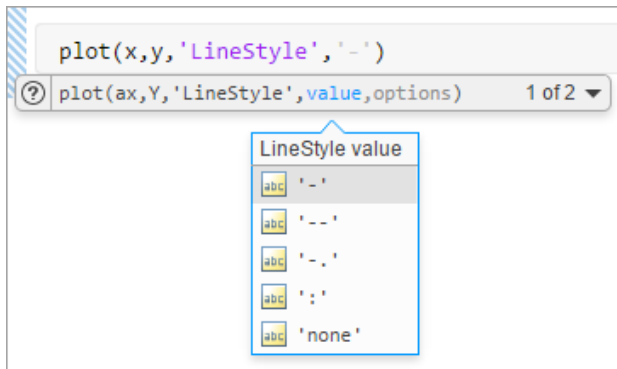
## Code Suggestions and Completions

When you write code, MATLAB automatically suggests and completes the names of functions, models, MATLAB objects, files, folders, variables, structures, graphics properties, parameters, and options. You can use automatic suggestions and completions to write commands faster and avoid typographical errors.

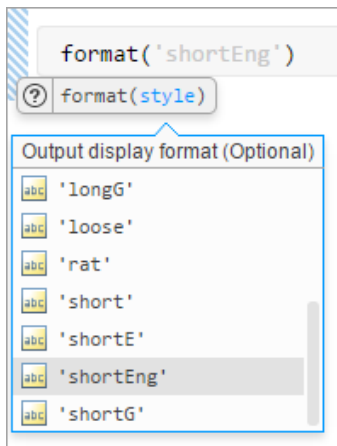
The Live Editor automatically displays possible matches as you type. To insert a match in your script, use the arrow keys to select the name you want, and then press the **Tab** key. Press the **Esc** key to clear the list of possible completions without selecting anything. To complete names in the Command Window or Editor, type the first few characters of the name you want to complete, and then press the **Tab** key. Use the arrow keys to select the name you want, and then press the **Tab** key again.



Automatic suggestions and completions are especially useful when completing the names and values of graphics properties. For example, `plot(x,y,'LineStyle','-')`.



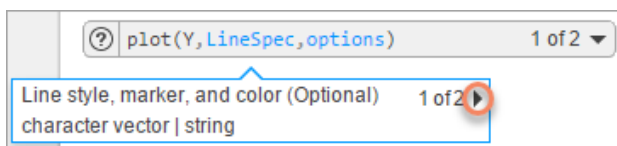
You can also use the suggestions to complete parameter names and options for certain functions. For example, `format('shortEng')`.



When entering a statement that includes a function, MATLAB might suggest multiple syntaxes for the function. To view the additional syntaxes, click the arrow to the right of the syntax. You also can use the **Ctrl + Down Arrow** keyboard shortcut to show and hide the additional syntaxes. On macOS systems, use the **Command** key instead of **Ctrl**.



Similarly, if MATLAB suggests multiple arguments, click the arrow to the right of the argument description to view the additional arguments. You also can use the **Ctrl + Alt + Right Arrow** and **Ctrl + Alt + Left Arrow** keyboard shortcuts.



MATLAB displays suggestions based on its current state. This includes:

- Variables that are defined in the current workspace
- Files and folders that are on the search path or in the current folder
- Variables, functions, class properties, and class methods that are defined in the active document and available at the current location of the cursor

MATLAB does not complete field names of structure arrays defined only within the active file.

---

**Tip** To insert a tab within a statement when suggestions and completions are enabled, first, add a space. Then, press the **Tab** key. Otherwise, MATLAB attempts to complete a name. In the Live Editor, if suggestions and completions are enabled but there are no available completions, MATLAB inserts a tab.

---

To have MATLAB suggest and complete names only after you press the **Tab** key in the Live Editor, on the **Home** tab, in the **Environment** section, click  **Preferences**. Then, select **MATLAB > Keyboard** and in the **Suggestions and completions > Live Editor** section, select **Show on tab**.

To disable suggestions and completions in the Command Window and Editor, in the **Suggestions and completions** section, clear **Enable tab completion** for the desired tool.

### **MATLAB Online**

In MATLAB Online, the Editor and Command Window automatically display possible matches as you type. This behavior matches the Live Editor behavior.

To change how MATLAB suggests and completes names in MATLAB Online for the Editor, Live Editor, and App Designer, go to the **MATLAB > Editor/Debugger** preferences and select from the available options. To change how MATLAB suggests and completes names in the Command Window, go to the **MATLAB > Command Window** preferences.

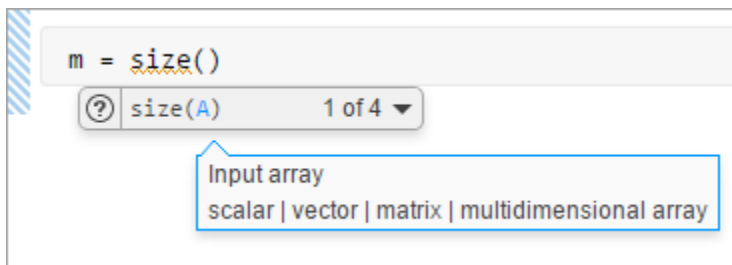
## **Function Syntax Hints**

As you enter a function in the Command Window, Live Editor, or Editor, syntax hints open in a pop-up window to display allowable input arguments for the function.

Function syntax hints appear for both MATLAB installed functions and functions you create. The syntax hints for MATLAB functions come from the documentation. The syntax hints for functions you create come from the function definition statement (first executable line) in the MATLAB program file. That file must be on the search path or in the current folder. For more information about adding help to the functions you create, see “Add Help for Your Program”.

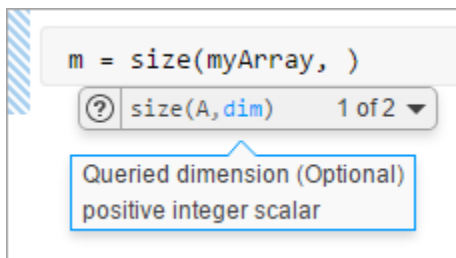
To use function syntax hints, type a function name with an opening parenthesis. A pop-up window opens showing the basic syntax for the function. In the Live Editor (and Editor and Command Window in MATLAB Online), you can use the drop-down arrow ▼ to the right of the syntax to display all available syntaxes.



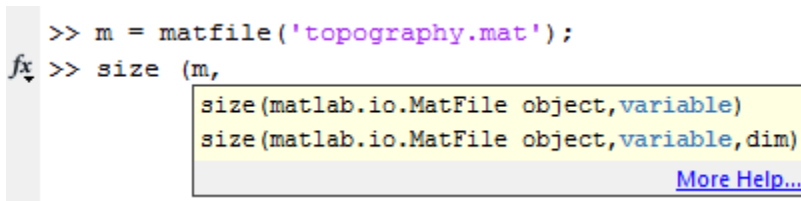



You can type an input for any argument that appears in blue. Enter your own input names, and not the argument names shown in the window. The displayed syntax options change based on the argument you just entered.


In the Live Editor (and Editor and Command Window in MATLAB Online), MATLAB displays descriptions for each argument. Optional arguments are indicated by the **(optional)** keyword next to the argument description.



Some function names are overloaded. That is, there are different functions with the same name that support different types of input. Overloaded functions require that you pass an object as the first input. When you specify the object name, the syntax hints update to reflect the correct version of the function, as shown. The Live Editor might not display all overloads.



Function syntax hints are suggestions only. For detailed information about a function, see the function reference page in the documentation. To open the documentation for the function, click the  button to the left of the function syntax hint.

To disable function syntax hints in the Command Window and Editor, on the **Home** tab, in the **Environment** section, click  **Preferences**. Then, select **MATLAB > Keyboard** and in the **Suggestions and completions** section, clear **Enable function hints** for the desired tool. Disabling function syntax hints is not supported in the Live Editor or in MATLAB Online.

## Set Command History Preferences

You can exclude statements from the command history and specify how many commands to save to the command history file, `History.xml`. MATLAB uses the command history file for both the Command History window and statement recall in the Command Window.

---

**Note** When you exclude statements from the command history file, you cannot recall them in the Command Window, nor can you view them in the Command History window.

---

You can also change the way you search for previously executed statements in the command history. Select from different search text matching options and change the way results are displayed in the Command History window.

To set Command History preferences, on the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Command History**, and then adjust the preference options as described in the following table.

Some Command History preferences are not available in MATLAB Online on page 10-2.

Option	Usage
Save	Select <b>Save exit/quit commands</b> to save <code>exit</code> and <code>quit</code> commands in the command history.
	Select <b>Save consecutive duplicate commands</b> to save consecutive executions of the same statement in the command history.
	<ul style="list-style-type: none"> <li>With this option selected, if you run <code>magic(5)</code> two times in a row, the entries for <code>magic(5)</code> appear on separate lines in the command history.</li> <li>With this option cleared, the command history retains only one entry for <code>magic(5)</code> and displays a tally of consecutive executions to the left.</li> </ul>
	Select <b>Don't save history file</b> to prevent saving the command history across sessions. This option is useful when multiple users share the same machine. For example, the option prevents each user from viewing statements others have run.
	Any entries predating the current session remain unless you first delete entries from the Command History window.
Match	<b>Save last <math>n</math> commands</b> specifies the number of commands to save.
	Select <b>Match anywhere</b> to retrieve statements that contain the search text in any location.
	Select <b>Match beginning</b> to retrieve statements that begin with the search text. This option is selected by default.
	Select <b>Match case</b> to retrieve statements that match the case of the search text.

Option	Usage
	Select <b>Filter matches</b> to display only statements that match the search text. Clear <b>Filter matches</b> to display all previously executed statements and highlight the statements that match the search text.
<b>Show</b>	Select <b>Show match toolbar</b> to display a search toolbar at the top of the Command History window. Search for previously executed statements using the search field and change <b>Match</b> preferences using the provided buttons.
	Select <b>Show match locations</b> to display yellow markers to the right of the scroll bar in the Command History window that indicate the location of matches throughout the command history.
	Select <b>Show execution time</b> to display an approximate execution time to the right of each statement. Times display for any statements that take longer than 0.1 seconds to execute.
<b>Favorite Commands</b>	Select <b>Don't show</b> to disable showing favorite commands in the Command History window.
	Select <b>Show default category</b> to only show the default <b>Favorite Commands</b> category in the Command History window.
	Select <b>Show all categories</b> to show all the favorite commands categories in the Command History window.

## Change the Command History Date Format

MATLAB uses the short date format of your operating system to display dates in the Command History window. To change the date format, for instance from MM/DD/YYYY to DD/MM/YYYY:

- 1 Change the short date format for your operating system as described in its documentation.
- 2 Restart MATLAB.

---

**Note** Clearing the command history deletes all entries from the Command History window. You can no longer recall those entries in the Command Window.

---

## See Also

### Command History Window





# Help and Product Information

---

- “Ways to Get Function Help” on page 4-2
- “MATLAB Code Examples” on page 4-3
- “Search Syntax and Tips” on page 4-6
- “Bookmark and Share Page Locations” on page 4-8
- “Contact Technical Support” on page 4-10
- “Help Preferences” on page 4-12
- “Translated Documentation” on page 4-14
- “Information About Your Installation” on page 4-16

## Ways to Get Function Help

Each MATLAB function has supporting documentation that includes examples and describes the function inputs, outputs, and calling syntax. This table describes ways to access that documentation.

Type of Help	How to Access	Example or Icon
Reference page in Help browser	Use the <code>doc</code> command. — <i>or</i> — Select a function name in the Editor, Command Window, or Help browser; right-click; and then select <b>Help on Selection</b> .	<code>doc mean</code>
Function syntax hints in Command Window	After you type an open parenthesis for function inputs, pause or press <b>Ctrl + F1</b> .	<code>mean(</code>
Abbreviated help text in Command Window	Use the <code>help</code> command.	<code>help mean</code>
Function browser in Command Window	Click the function icon to the left of the command prompt.	
Complete documentation in Help browser	Click the Help button on the quick access toolbar or on the <b>Home</b> tab. — <i>or</i> — Enter search terms in the <b>Search Documentation</b> box.	

### See Also

`doc`

### More About

- “MATLAB Code Examples” on page 4-3

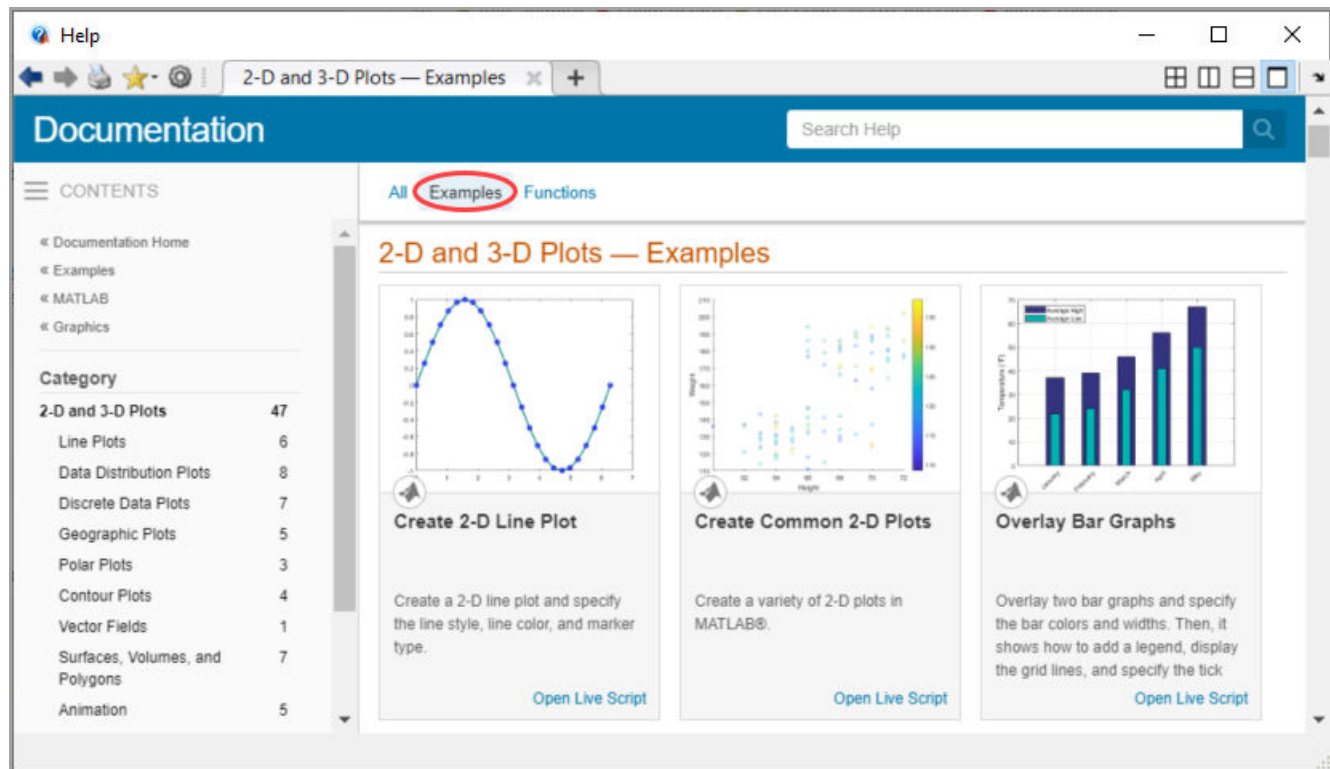
# MATLAB Code Examples

## Standalone Examples

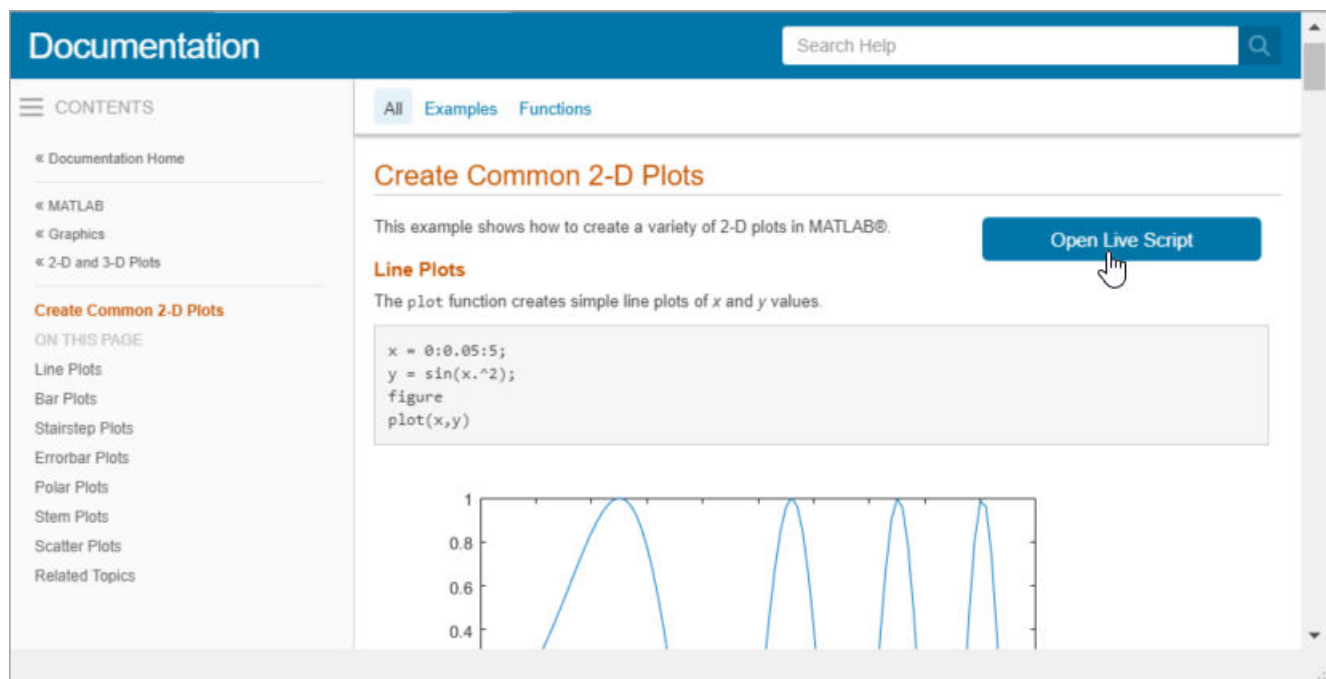
A standalone example is a readable version of a MATLAB script or live script that shows how to accomplish a particular task. MATLAB and all MATLAB toolboxes include examples as part of the installed documentation. (Before release R2012b, these examples were called demos.)

To access examples, click **Examples** at the top of a documentation page. The Help browser displays the examples for the current product category.



MATLAB includes examples that demonstrate various functionalities. For instance, to view examples demonstrating plotting in MATLAB, navigate to the **MATLAB > Graphics > 2-D and 3-D Plots** category and click **Examples** at the top of the page.



Each example combines comments, code, and output in a formatted document. If you are viewing the documentation in MATLAB, you can open the corresponding script or live script by clicking **Open Script** or **Open Live Script**.



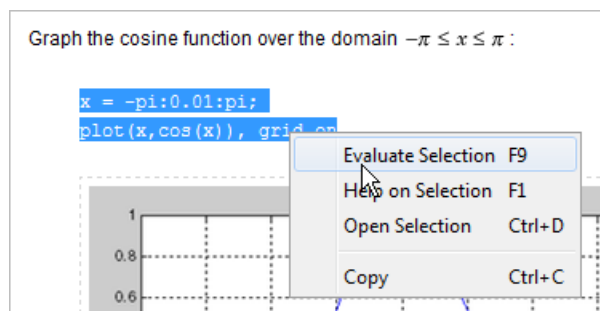
If you are viewing the documentation on the web, you can open live script examples using the Live Editor in a web browser. To open the example, click the **Try this Example** button to the right of the example.

Once it is open, run the example by clicking **Run** . To run the example one section at a time and view the incremental results, select the first section and then step through the script by clicking **Run and Advance** .

Additional examples, created by members of the MATLAB community, are available at the File Exchange.

## Inline Examples

The product documentation also includes inline code excerpts, such as examples on function pages like `cos` or `plot`. You can run inline code from the Help browser by selecting the code, right-clicking, and then selecting **Evaluate Selection**, as shown. Evaluating a selection from the Help browser is not available in MATLAB Online.





**See Also**

demo | echodemo

**Related Examples**

- “Code Sections”

**External Websites**

- File Exchange

## Search Syntax and Tips

Find keywords in the documentation by entering text in the Search box on the desktop or in the Help browser.



When you view pages linked from the search results, search terms appear with highlights. To clear the highlights, press the **Esc** key.

The search engine ignores common, insignificant words such as *a*, *an*, *the*, and *of*, unless they are part of an exact phrase in quotation marks. It also ignores capitalization, punctuation, and special characters such as *+*. To find a symbol or special character:

- Search for the word instead of the symbol or character, such as *plus* instead of *+*.
- View the documentation on “MATLAB Operators and Special Characters”.
- Search the PDF documentation, available from the documentation home page.

Searches can include the following operators:

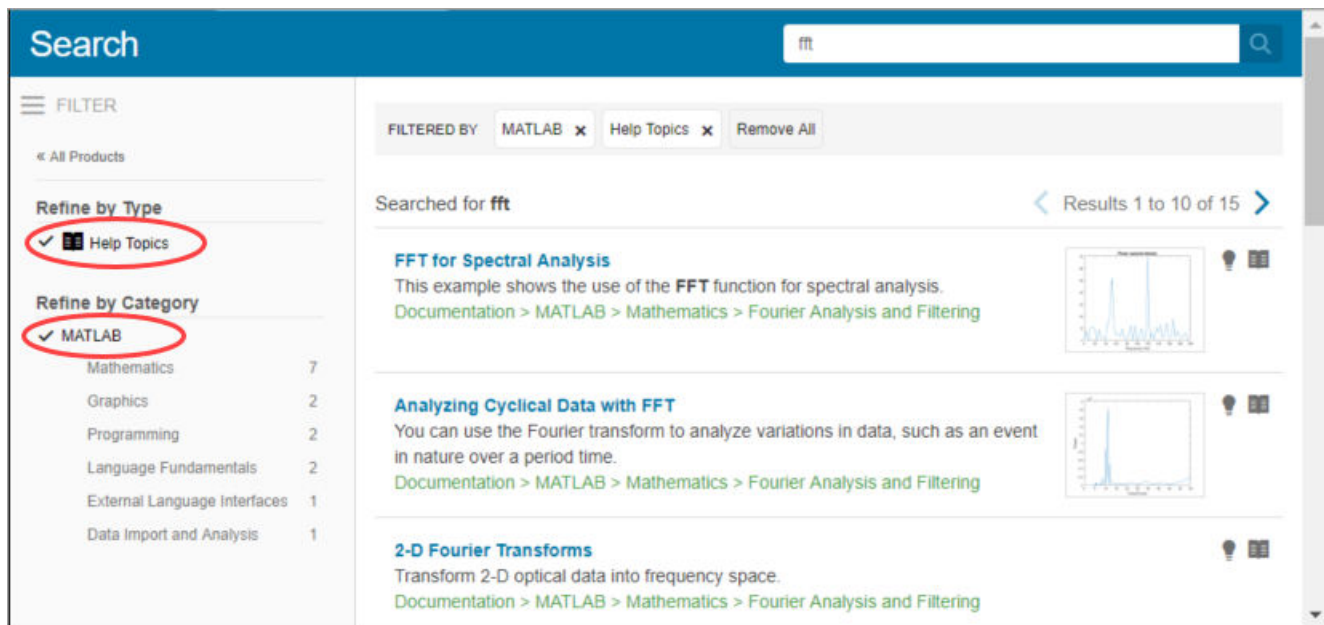
" "	Exact phrase
	Example: "plot tools" finds pages that contain <i>plot tools</i> , in that sequence, with no words between them.
*	Wildcard
	Requires at least two nonwildcard characters, and cannot appear at the start of a keyword or in an exact phrase.
	Example: plot* finds <i>plot</i> , <i>plot3</i> , and <i>plotting</i> .
OR	Boolean OR
	Example: plot OR graph finds pages with either <i>plot</i> or <i>graph</i> .
NOT	Boolean NOT
	Example: "plot tools" NOT "time series" finds pages with <i>plot tools</i> but excludes pages with <i>time series</i> .
AND	Boolean AND
	Implied when no operator is present between keywords.
	Example: plot AND tools is equivalent to "plot" "tools".

The Help browser search evaluates NOT operators first, OR operators second, and AND operators last. For example,

"plotting tool" OR "plot tools" NOT "time series" AND workspace

finds pages that contain either *plotting tool* or *plot tools* and contain *workspace*, but do not contain *time series*.

You can filter search results using facets that appear on the left side of the page. For example, view MATLAB topics by selecting **MATLAB** and **Help Topics**.



The search engine searches the following text in the documentation:

- Documentation — Text and code shown in the Help browser
- User interface examples — Help comments in the program file
- Videos — Title


## Bookmark and Share Page Locations

### In this section...

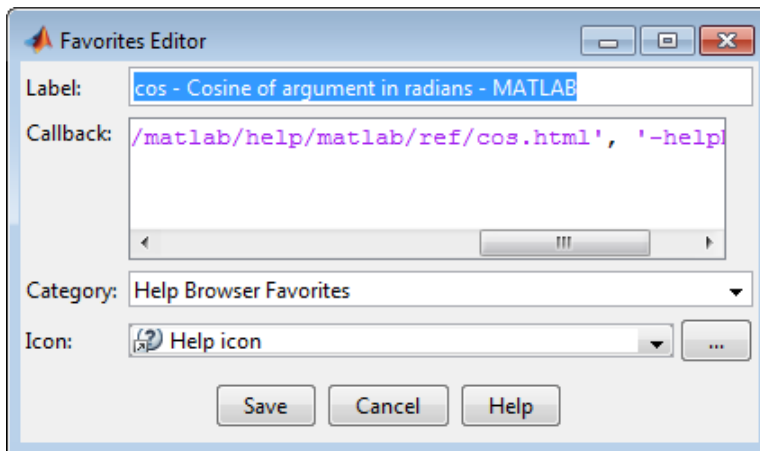
“Bookmark Favorite Pages” on page 4-8

“View Page Locations” on page 4-8

### Bookmark Favorite Pages

In MATLAB, bookmarks are called favorites. Add, find, and organize favorites by clicking the Favorites button in the Help browser, .

When you add a favorite, do *not* change the **Callback**. MATLAB requires special values to create a shortcut that opens the page in the Help browser. In addition, if you want the bookmark to appear in your list of favorites, keep the **Category** set to **Help Browser Favorites**, as shown.



---

**Note** You cannot migrate favorites that you save in one MATLAB release to a new release.

---

### View Page Locations

To identify the location of a page in the Help browser to share with someone else, right-click within the page, and then select **Get Page Address**.

The Help Page Location dialog box provides two ways to access the page:

- A web command to run from the command line that opens the page from the installed documentation. This command is subject to change between releases, so it is not always accurate for someone running a different version of MATLAB.
- A URL for the page corresponding to your product version at the MathWorks website. This documentation is available to anyone, even if they do not have MathWorks products. However, to access archived documentation from previous releases, as well as translated documentation, you must sign in with a MathWorks Account.


---

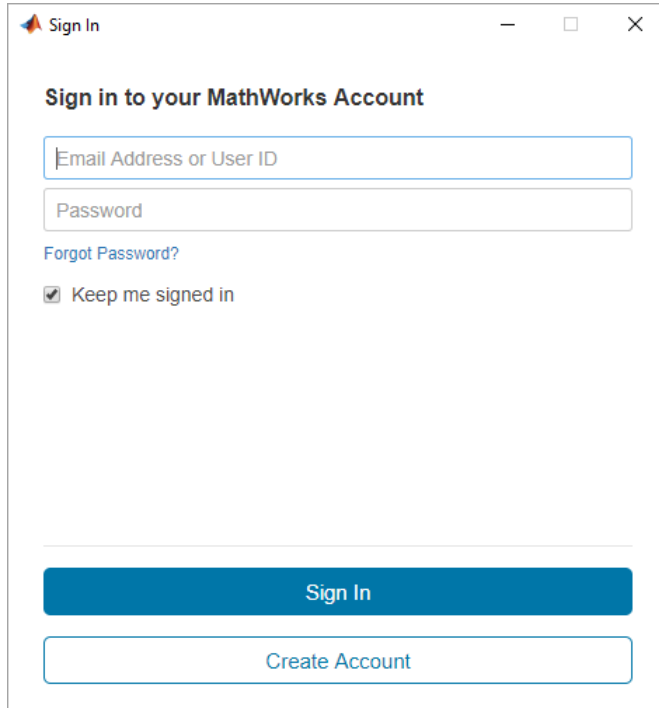
**Note** If you are running a prerelease version, the URL is invalid because the documentation does not yet exist on the website.

---

## Contact Technical Support

This example shows how to contact MathWorks Technical Support to report a bug or request help. This procedure requires internet access.

- 1 On the **Home** tab, in the **Resources** section, click  **Request Support**.
- 2 When requested, sign in using your MathWorks Account email address and password. If you do not have a MathWorks Account, create one.



The image shows a 'Sign In' dialog box with the title 'Sign in to your MathWorks Account'. It contains two input fields: 'Email Address or User ID' and 'Password'. Below the password field is a link for 'Forgot Password?'. There is a checkbox labeled 'Keep me signed in' which is checked. At the bottom, there are two buttons: a blue 'Sign In' button and a white 'Create Account' button with a blue border.

- 3 Provide information to help technical support reproduce your issue, such as a description of the steps you followed or a code excerpt. Optionally, you can attach up to five files to your request, where each file is no larger than 5 MB.

**Submit a MathWorks Support Request**

**Summary:**  
Function foo produces unexpected results

**Description:** ⓘ  
When I call function foo as follows:  
  
% code start  
myinput1 = 1;  
myinput2 = 2;  
myoutput = foo(myinput1, myinput2)  
% code end  
  
I get an error message: Undefined function or variable 'foo'.

**Product:** MATLAB ▼

**Please attach your related files:** Attach

MathWorks is a worldwide organization. Your submission will be accessed by staff who will assist with your support request. If you plan to attach any files that contain export controlled information, call [MathWorks Technical Support](#) for your country before you submit your request.

Submit Cancel

- 4 Specify the product that is related to the issue.
- 5 Submit the request.


## See Also

## External Websites

- [MathWorks Support Page](#)

## Help Preferences

To set Help preferences:

- 1 On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Help**.
- 2 Adjust the preference options as described in the table.

Preference	Usage
<b>Documentation Location</b>	<p>Specify whether to view the documentation provided with your installed products or the documentation on the web at <a href="https://www.mathworks.com/help">https://www.mathworks.com/help</a>. Viewing the web documentation requires an internet connection.</p> <p>If your preference is set to view web documentation, but your internet connection becomes unavailable, MATLAB changes the preference to view the installed documentation. You can reset the preference after your connection is restored.</p> <p>Changes to this preference apply only to new Help browser tabs.</p>
<b>Selected Products</b>	<p>Select the products to include for viewing and searching documentation in the Help browser or Function browser.</p> <p>If your <b>Documentation Location</b> is set to view documentation on the web, then you can select <b>Show products that are not installed</b> to select and access documentation for all MathWorks products.</p> <p>When the Help browser is already open, changes to this preference apply only to new Help browser tabs.</p>
<b>Quick Help Display</b>	<p>Specify whether help links display content in the Help browser or in a small window. This preference applies to reference pages or program help that you access using:</p> <ul style="list-style-type: none"> <li>• <b>Help on Selection</b> in context menus or <b>F1</b></li> <li>• Function hints or the Function Browser</li> <li>• Links in error messages</li> </ul> <p>Links to reference pages from the Current Folder browser always open in the Help browser.</p>
<b>Language</b> (selected non-English systems only)	<p>Specify whether you want documentation in the Help browser and context-sensitive help to appear in English. Installed non-English documentation is not always current.</p> <p>This option is only available if your <b>Documentation Location</b> is set to view documentation on the web, and for selected non-English systems only.</p>

To adjust the font size in the Help browser or MATLAB web browser, use the **Ctrl + Plus** and **Ctrl + Minus** keyboard shortcuts.



## **See Also**

## **More About**

- “Translated Documentation” on page 4-14

## Translated Documentation


Many MathWorks products have translated documentation in Japanese. In addition, some features of MATLAB have translated documentation in Korean, simplified Chinese, and Spanish. Usually, if a product provides translated documentation, the new version of the product installs the translated documentation from the *previous* version and the English documentation for the *current* version.

For information about documentation in other languages, contact your MathWorks sales and service office.

### Set Documentation Language

By default, if your system language is set to Japanese, Korean, Chinese, or Spanish, MATLAB opens the web documentation in that language.

If the documentation does not display in the language you want, check the preference settings using these steps:


- 1 Go to the **Home** tab and, in the **Environment** section, click  **Preferences** .
- 2 Select **MATLAB > Help**.
- 3 Make sure the **Language** is set to **Japanese**, **Korean**, **Chinese**, or **Spanish**.

The **Language** preference is only available when your system language is set to Japanese, Korean, Chinese, or Spanish. The preference changes the language only in the Help browser and context-sensitive help. If the documentation for a product is not translated, the Help browser displays the English documentation.

To view the English documentation, set the **Language** preference to English.

### View Installed Documentation


To view the installed version of the documentation, follow these steps:

- 1 Go to the **Home** tab and in the **Environment** section, click  **Preferences** .
- 2 Select **MATLAB > Help**.
- 3 Set the **Documentation Location** to **Installed locally**.
- 4 Select the desired **Language**.

Spanish documentation is only available on the web, and is not installed with MATLAB.

### View Documentation on the Web

To view the documentation directly on the web in a different language:

- 1 Open the MathWorks help website, <https://www.mathworks.com/help>.
- 2 Click the button with the globe icon  at the bottom-left corner of the web page, and select a country based on the language in which you want to view the documentation.

## See Also

### Related Examples

- “Set Locale on Microsoft Windows Platforms” on page 9-5
- “Set Locale on Linux Platforms” on page 9-8
- “Set Locale on macOS Platforms” on page 9-7

## Information About Your Installation

MATLAB software can tell you what products are installed, their versions, and other information about your license and platform. This information is important to have in the event you contact technical support on page 4-10.

Type of Information You Want	To Get the Information
Version and license for Installed product	From the product, select <b>Help &gt; About <i>Product Name</i></b> .  Or use functions: <ul style="list-style-type: none"><li>• <code>license</code> — for the license number</li><li>• <code>ver</code> — for version numbers for MATLAB and libraries</li><li>• <code>version</code> — for version numbers for MathWorks products</li></ul>
MATLAB platform	In MATLAB, select <b>Help &gt; About MATLAB</b> . The About MATLAB dialog box shows 32-bit or 64-bit.
arch value used to locate library files for the mex function and standalone applications	In MATLAB, select <b>Help &gt; About MATLAB</b> . The About MATLAB dialog box shows the arch value, for example win64.  Or use the <code>computer</code> function.
Passcodes and licenses	From any desktop tool, select <b>Help &gt; Licensing &gt; Manage Licenses</b> .

# Workspace Browser and Variable Editor

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- “Create and Edit Variables” on page 5-2
- “Display Statistics in the Workspace Browser” on page 5-11
- “Save and Load Workspace Variables” on page 5-13
- “Workspace and Variable Preferences” on page 5-15

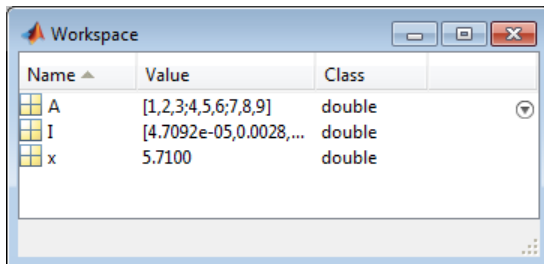
## Create and Edit Variables

### Create Variables

The MATLAB workspace consists of the variables you create and store in memory during a MATLAB session. You can create new variables in the workspace by running MATLAB code or using existing variables.

To create a new variable, enter the variable name in the Command Window, followed by an equal sign (=) and the value you want to assign to the variable. For example, if you run these statements, MATLAB adds the three variables `x`, `A`, and `I` to the workspace:

```
x = 5.71;
A = [1 2 3; 4 5 6; 7 8 9];
I = besseli(x,A);
```



You do not have to declare variables before assigning values to them.

If you do not end the assignment statement with a semicolon (;), MATLAB displays the result in the Command Window. For example,

```
x = 5.71
x =
    5.7100
```

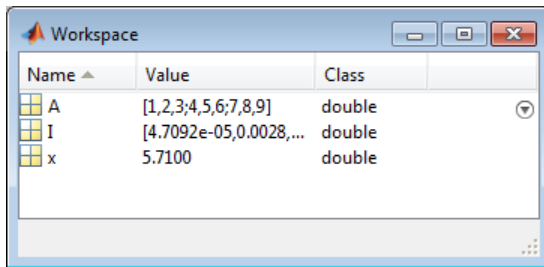
If you do not explicitly assign the output of a statement to a variable, MATLAB generally assigns the result to the reserved word `ans`. The value of `ans` changes with every statement that returns an output value that is not assigned to a variable. For example,

```
sin(1)
ans =
    0.8415
```

To view and edit variables, use the Workspace browser and Variables Editor. (Some editing options are not available in MATLAB Online on page 10-2.)

### View Workspace Contents


To view a list of variables in your workspace, use the Workspace browser.



To open the Workspace browser if it is not currently visible, do either of the following:

- On the **Home** tab, in the **Environment** section, click **Layout**. Then, under **Show**, select **Workspace**.
- Type `workspace` in the Command Window.

By default, the Workspace browser displays the base workspace. You also can view function workspaces if MATLAB is in debug mode. For more information, see “Base and Function Workspaces”.

To display additional columns such as size and range, on the Workspace browser title bar, click , and then click **Choose Columns**. In MATLAB Online, to select which columns to display, right-click a column name in the Workspace browser and select or clear the desired column names.

You also can use the `who` command in the Command Window to view a list of variables. To list information about size and class, use the `whos` command. For example, if you have the variables `x`, `A`, and `I` in your workspace, you can run the `who` and `whos` commands to view your workspace contents:

```
who
```

```
Your variables are:
```

```
A  I  x
```

```
whos
```

Name	Size	Bytes	Class	Attributes
A	3x3	72	double	
I	3x3	72	double	
x	1x1	8	double	

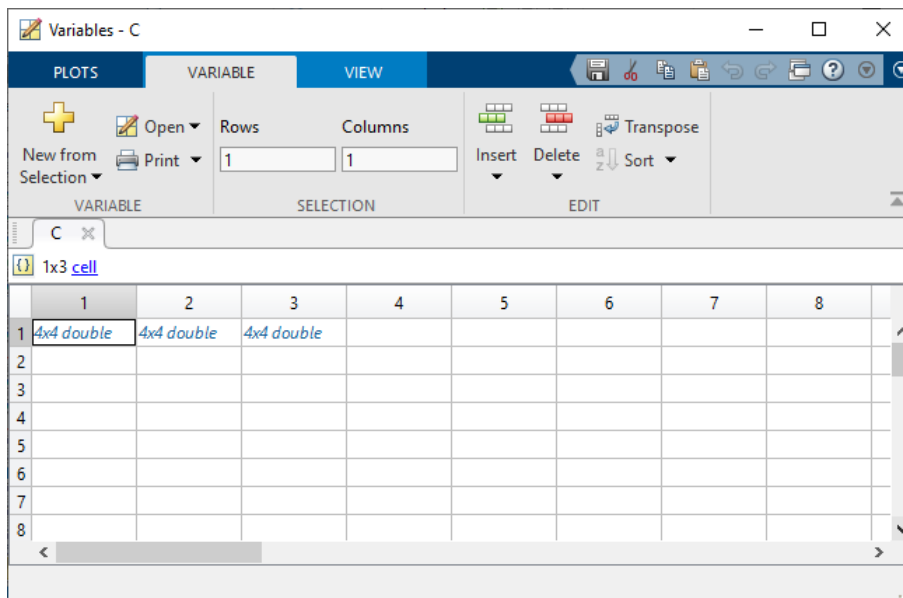
## View Variable Contents

You can view the contents of a variable in several ways:



- Command Window — Type the variable name at the command prompt. For example:

```
x
x =
    5.7100
```

- Variables editor — In the Workspace browser, double-click a variable name. The Variables editor opens for that variable.



Some variables open a viewer or other tool appropriate for the type of value they have, such as **timeseries**. For details, see the documentation for that data or object type.

A  or  icon next to a variable property in the Variables editor indicates that the property is protected or private.

To change how the Variables editor displays variables, go to the **View** tab, and in the **Format** section, select a number display format. The display format does not affect how values are displayed in the Command Window or Workspace browser, or how the variables are saved.

---

**Note** The maximum number of elements in a variable that you can open in the Variables editor depends on your operating system and the amount of physical memory installed on your system.

---

## Edit Variable Contents

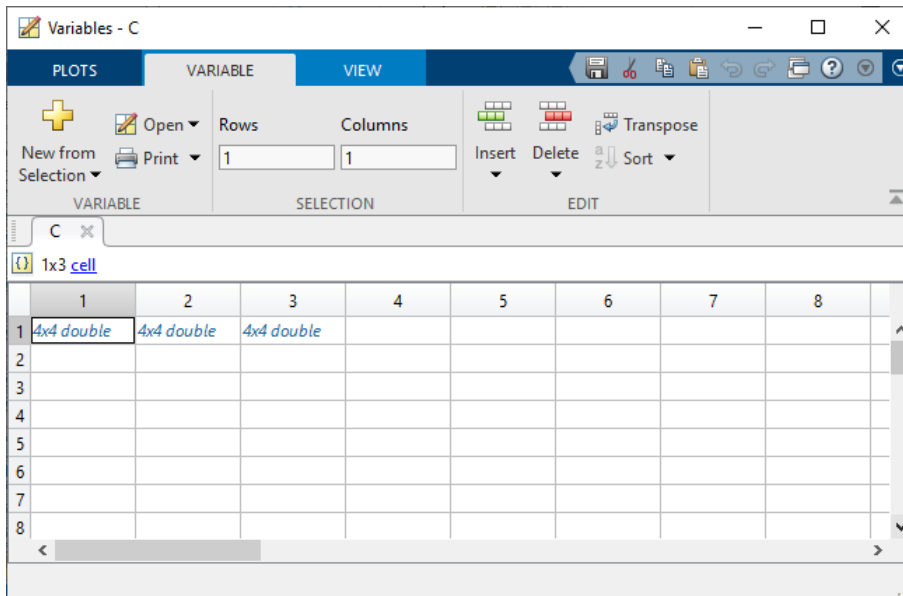
You can edit the contents of scalar (1-by-1) variables in the Workspace browser. To edit the contents, click the variable value to select it and then enter a new value.

To edit other variables, open them in the Variables editor. For example, suppose that you create a cell array, **C**, by running these commands in the Command Window:

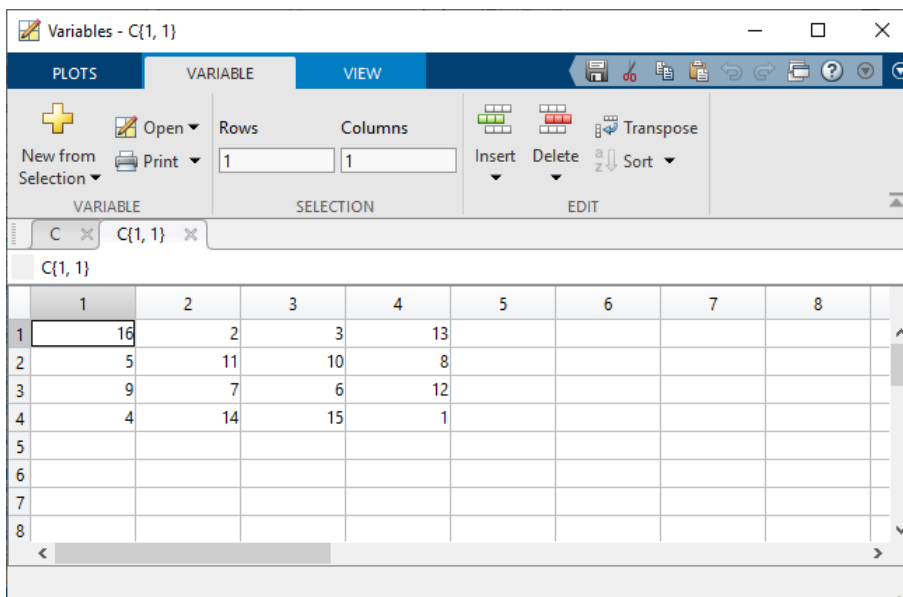
```
A = magic(4);
C = {A A A};
```

In the Workspace browser, double-click the variable name **C** to open it in the Variables editor.





To edit an element of a variable, double-click the element. The element opens in a new document within the Variables editor. For example, if you double-click element `C{1,1}` in the Variables editor, the contents of that cell open in a new tab. You can edit the value of a variable element by clicking the element and typing a new value. Press **Enter** or click another element to save the change.



To return to the parent cell array or structure of an element, go to the **View** tab and click the **Go Up** button.

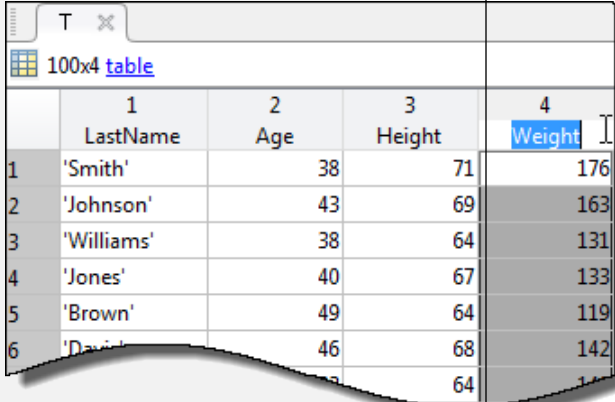
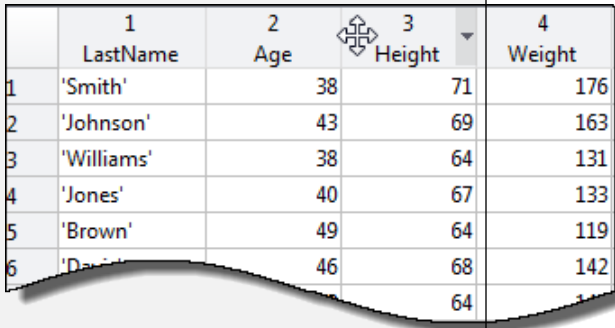
Changes you make in the Variables editor are automatically saved in the workspace. Changes you make to variables via the Command Window or other operations automatically update the information for those variables in the Workspace browser and Variables editor.

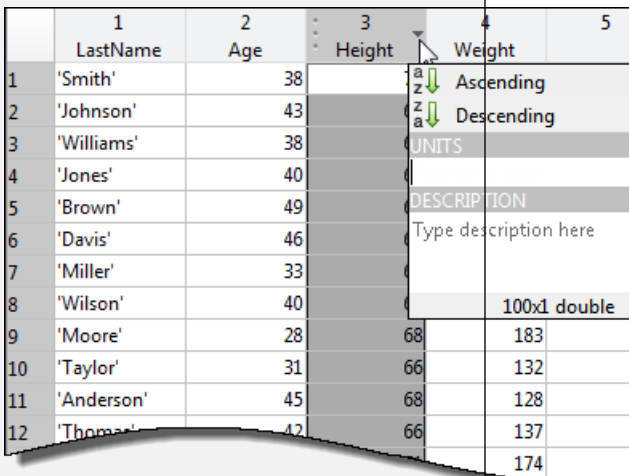
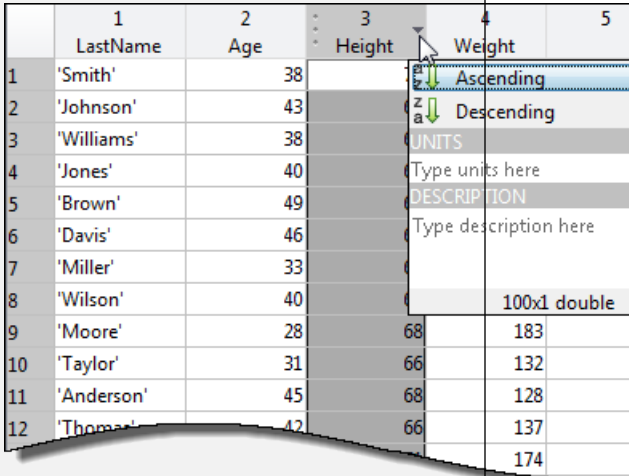
## Note

- You cannot edit elements or subsets of multidimensional arrays in the Variables editor.
- You cannot edit tall arrays in the Variables editor.
- When editing strings in the Workspace browser or as part of a structure in the Variables editor, you must use double quotes to surround the string value.

**Edit Table and Structure Array Variables**

Tables (including timetables) and structure arrays support additional editing actions.

Action	Procedure	Example
Modify column or row name	Double-click the name and enter the new text.	
Reorder variables	Hover over the left side of a variable until a four-headed arrow appears. Then, click and drag the column to a new location.	

Action	Procedure	Example
Modify units and description of variables	Click the arrow that appears to the right of a variable name. Then, enter new text in the <b>Units</b> and <b>Description</b> fields.	
Sort variable data	Click the arrow that appears to the right of a variable name and select <b>Ascending</b> or <b>Descending</b> .	

**Note** The contents of a table are only visible and modifiable when the number of variables is fewer than 5000. When the number of variables equals or exceeds 5000, you can only view the table properties.

Changes made to certain variable types in the Variables editor also appear in the Command Window. For example, suppose you have a table `T` that contains three columns, `A`, `B`, and `C`. If you delete column `A` in the Variables editor, the line `T(:, 'A') = [];` displays in the Command Window. To suppress code display in the Command Window, on the **View** tab, clear the **Show MATLAB Code** check box.

## Resize or Reshape Variables

To modify the size, shape, and order of variable elements in the Variable editor, use one of these procedures.

Action	Procedure
Delete row, column, or variable elements	Right-click the desired row header, column header, or selected elements and select <b>Delete Row</b> or <b>Delete Column</b> .
Insert new row or column	Right-click the desired row header, column header, or element and select <b>Insert Row Above</b> , <b>Insert Row Below</b> , <b>Insert Column to the Left</b> , or <b>Insert Column to the Right</b> . You can also add rows or columns simply by entering a value in an empty row or column. For example, to add a row and column to the array in <code>C{1,1}</code> , enter a value in element (5,5).
Cut variable elements	Right-click the desired row header, column header, or selected elements and select <b>Cut</b> . The cut values move to the clipboard and are replaced by the default value for empty elements. For more information, see “Empty Elements” on page 5-8.
Copy variable elements	Right-click the desired row header, column header, or selected elements and select <b>Copy</b> .
Paste variable elements	Right-click the row header, column header, or element where you want the insertion to begin and select <b>Paste</b> .
Paste cells from Microsoft Excel spreadsheet	Right-click the element where you want the insertion to begin, and then select <b>Paste Excel Data</b> .

### Empty Elements

Empty elements in variables are assigned default values. Default assignments are:

- 0 for numeric arrays
- [] for cell arrays and structure arrays
- <undefined> for categorical variables

### Copy, Rename, and Delete Variables

You can copy and paste, duplicate, rename, and delete variables within the Workspace browser.

Action	Procedure
Copy variable to and from clipboard	Select the variables, right-click, and then select <b>Copy</b> . Then, you can paste the names, for example, into the Command Window or an external application. Multiple variables are comma-separated.
Duplicate variable	Select the variables, right-click, and then select <b>Duplicate</b> . MATLAB creates a copy of the selected variables.
Rename a workspace variable	Right-click the variable name, and then select <b>Rename</b> . Type the new variable name and press <b>Enter</b> .

Action	Procedure
Delete all variables in workspace	On the <b>Home</b> tab, in the <b>Variable</b> section, click <b>Clear Workspace</b> .  You also can use the <code>clear</code> function in the Command Window.
Delete selected variables from workspace	Select the variables in the Workspace browser, right-click, and then select <b>Delete</b> .  You can also use the <code>clear</code> function in the Command Window. For example, to clear variables A and B, use the command <code>clear A B</code> .  To preserve specified variables, but delete others, use the <code>clearvars</code> function with the <code>-except</code> option. For example, to clear all variables except variable A, use the command <code>clearvars -except A</code> .

To create a new workspace variable from an existing variable, in the Variables editor, select an element, data range, row, or column in an array, and then in the **Variable** tab, select **New from Selection**.

You can change the character that delimits decimals in the data when you cut and paste values from the Variables editor into text files or other applications. You might do this, for instance, if you provide data to a locale that uses a character other than the period (.). To change the delimiter character, specify a **Decimal separator for exporting numeric data via system clipboard** in the “Variables Preferences” on page 5-16.

## Navigate Variable Contents

When editing variables in the Variables editor, some variables can contain large amounts of data, making it difficult to navigate between elements. Use these keyboard shortcuts to move easily between variable elements in the Variables editor. You cannot modify these keyboard shortcuts.

Action	Keyboard Shortcut
Commit changes to element and move to next element.  “Variables Preferences” on page 5-16 enable you to specify what the next element is. The default is to move down.	<b>Enter</b>
Move right.  Within a selection, <b>Tab</b> also moves from the last column in one row to the first column in the next row.	<b>Tab</b>
Move in opposite direction of <b>Enter</b> or <b>Tab</b> .	<b>Shift+Enter</b> or <b>Shift+Tab</b>
Move up <i>m</i> rows, where <i>m</i> is the number of visible rows.	<b>Page Up</b>
Move down <i>m</i> rows, where <i>m</i> is the number of visible rows.	<b>Page Down</b>
Move to column 1.	<b>Home</b>
Move to row 1, column 1.	<b>Ctrl+Home</b>

Action	Keyboard Shortcut
Edit current element, positioning cursor at the end of the element.	<b>F2 (Ctrl+U</b> on Apple Macintosh platforms)

## See Also


**Workspace Browser** | `openvar`

## More About

- “Variable Names”
- “Display Statistics in the Workspace Browser” on page 5-11
- “Workspace and Variable Preferences” on page 5-15
- “Save and Load Workspace Variables” on page 5-13

## Display Statistics in the Workspace Browser


For each variable or object, the Workspace browser can display statistics such as the **Min**, **Max**, and **Mean**, when relevant. MATLAB performs these calculations using the `min`, `max`, and `mean` functions, and updates the results automatically.

To display statistics, on the Workspace browser title bar, click , and then select **Choose Columns**. Select the statistics you want MATLAB to calculate. In MATLAB Online, to select which columns to display, right-click a column name in the Workspace browser and select or clear the desired column names.


## Improve Workspace Browser Performance During Statistical Calculations

If you show statistical columns in the Workspace browser, and you work with very large arrays, you might experience performance issues when the data changes as MATLAB updates the statistical results. To improve performance, consider one or both of the following:

- Show only the statistics of interest to you.


On the Workspace browser title bar, click , and then select **Choose Columns**. Clear the statistics that you do not want MATLAB to calculate. In MATLAB Online, to change which statistics display, right-click a column name in the Workspace browser and clear the statistics that you do not want MATLAB to calculate.

- Exclude large arrays from statistical calculations.

On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Workspace**, and then use the arrow buttons under **Statistical calculations** to change the maximum array size for which the Workspace browser performs statistical calculations. Any variable exceeding the maximum array size reports `<Too many elements>` in Workspace browser statistics columns instead of statistical results.

Changing Workspace preferences is not supported in MATLAB Online.

## Include or Exclude NaN Values in Statistical Calculations

If your data includes NaNs (Not-a-Number values), you can specify that the Workspace browser statistical calculations consider or ignore the NaNs. On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Workspace**, and then select one of the following:

- **Use NaNs when calculating statistics**

If a variable includes a NaN, and you select this option, the values for **Min**, **Max**, **Var**, and several other statistics appear as NaN. However, **Mode** and several other statistics show a numeric result.

- **Ignore NaNs whenever possible**

If a variable includes a NaN, and you select this option, numeric results appear for most statistics including **Min**, **Max**, and **Mode**. However, **Var** still appears as NaN.

Changing Workspace preferences is not supported in MATLAB Online.

### See Also

### More About

- “Infinity and NaN”
- “Workspace and Variable Preferences” on page 5-15



## Save and Load Workspace Variables

The workspace is not maintained across sessions of MATLAB. When you quit MATLAB, the workspace clears. However, you can save any or all the variables in the current workspace to a MAT-file (.mat). You can then reuse the workspace variables later during the current MATLAB session or during another session by loading the saved MAT-file.

### Save Workspace Variables

There are several ways to save workspace variables interactively:

- To save all workspace variables to a MAT-file, on the **Home** tab, in the **Variable** section, click **Save Workspace**.
- To save a subset of your workspace variables to a MAT-file, select the variables in the Workspace browser, right-click, and then select **Save As**. You also can drag the selected variables from the Workspace browser to the Current Folder browser.
- To save variables to a MATLAB script, click the **Save Workspace** button or select the **Save As** option, and in the **Save As** window, set the **Save as type** option to **MATLAB Script**. Variables that cannot be saved to a script are saved to a MAT-file with the same name as that of the script.

You also can save workspace variables programmatically using the `save` function. For example, to save all current workspace variables to the file `june10.mat`, use the command

```
save('june10')
```

To save only variables `A` and `B` to the file `june10.mat`, use the command

```
save('june10', 'A', 'B')
```

To store fields of a scalar structure as individual variables, use the `save` function with the `-struct` option. This can be useful if you previously loaded variables from a MAT-File into a structure using the syntax `S = load(filename)` and want to keep the original variable structure when saving to a new MAT-File.

To save part of a variable, use the `matfile` function. This can be useful if you are working with very large data sets that are otherwise too large to fit in memory. For more information, see “Save and Load Parts of Variables in MAT-Files”.

In MATLAB Online on page 10-2, variables persist between sessions. Saving allows you to clear the workspace and load variables at a later time. To save variables, use the `save` or `matfile` functions.

### Load Workspace Variables

To load saved variables from a MAT-file into your workspace, double-click the MAT-file in the Current Folder browser.

To load a subset of variables from a MAT-file on the **Home** tab, in the **Variable** section, click **Import Data**. Select the MAT-file you want to load and click **Open**. You also can drag the desired variables from the Current Folder browser Details panel of the selected MAT-file to the Workspace browser. The Details panel is not available in MATLAB Online.

To load variables saved to a MATLAB script into the workspace, simply run the script.

You also can load saved variables programmatically, use the `load` function. For example, load all variables from the file `durer.mat`

```
load('durer')
```

To load variables `X` and `map` from the file `durer.mat`

```
load('durer','X','map')
```

To load part of a variable, use the `matfile` function. This is useful if you are working with very large data sets that are otherwise too large to fit in memory. For more information, see “Save and Load Parts of Variables in MAT-Files”.

---

**Caution** When you load data into the MATLAB workspace, the new variables you create overwrite any existing variables in the workspace that have the same name. To avoid overwriting existing variables, use the `load` function to load the variables into a structure. For example, `S = load('durer')` loads all the variables from the file `durer.mat` into the structure `S`.

---

## View Contents of MAT-File

To see the variables in a MAT-file before loading the file into your workspace, click the file name in the Current Folder browser. Information about the variables appears in the **Details** pane.

Alternatively, use the command `whos -file filename`. This function returns the name, dimensions, size, and class of all variables in the specified MAT-file. For example, you can view the contents of the example file `durer.mat`.

```
whos -file durer.mat
```

Name	Size	Bytes	Class	Attributes
X	648x509	2638656	double	
caption	2x28	112	char	
map	128x3	3072	double	

The byte counts represent the number of bytes that the data occupies in memory when loaded into the MATLAB workspace. Because of compression, data encoding, and metadata, the space occupied in the file by a variable may be different from the in-memory size. MATLAB compresses data in Version 7 or higher MAT-files. For more information, see “MAT-File Versions”.

## See Also

`load` | `save`

## More About

- “MAT-File Versions”
- “Save and Load Parts of Variables in MAT-Files”

## Workspace and Variable Preferences


### In this section...

“Workspace Preferences” on page 5-15

“Variables Preferences” on page 5-16

## Workspace Preferences

Workspace preferences enable you to configure options for saving workspace variables to MATLAB scripts. They also enable you to restrict the size of arrays on which MATLAB performs calculations, and to specify if you want those calculations to include or ignore NaNs.


To open Workspace preferences, on the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Workspace**. Workspace preferences are not available in MATLAB Online.

Preference	Usage
<b>Threshold for saving variables to MATLAB script</b>	Specify <b>Maximum array size</b> to limit the number of elements of arrays saved to a MATLAB script.  Specify <b>Maximum struct/object nesting levels</b> to limit the nesting level of structures, arrays, or objects saved to a MATLAB script.
<b>Multidimensional array formatting</b>	Specify how multidimensional arrays are formatted when saved to a MATLAB script.  To create a compact script, select <b>Row vector with reshape (compactness and efficiency)</b> .  To retain array representation, select <b>As 2-D pages (readability)</b> . Specify the dimensions of a 2-D slice as positive integers less than or equal to the dimensions of the n-D array. The second integer must be greater than the first.
<b>File formatting</b>	Set the character width at which text in the MATLAB script is wrapped by specifying <b>Maximum characters per line</b> .
<b>n element and smaller arrays show statistics</b>	Limit the size of arrays for which the Workspace browser displays statistics to improve performance when MATLAB updates the statistical results in the Workspace browser.  For more information, see “Improve Workspace Browser Performance During Statistical Calculations” on page 5-11.

Preference	Usage
<b>Handling NaN values in calculations</b>	Specify whether NaN values are included or excluded from calculations for the statistics displayed in the Workspace browser. You can select to either <b>Use NaNs when calculating statistics</b> or <b>Ignore NaNs when calculating statistics</b> .
<b>MATLAB array size limit</b>	<p>By default, MATLAB can use up to 100% of the size of RAM (not including virtual memory) of your computer to allocate memory for each MATLAB array. To change this limit to a smaller percentage, select the <b>Limit the maximum array size to a percentage of RAM</b> check box. Then move the slider to adjust the percentage of RAM.</p> <p>To allow MATLAB to use both RAM and virtual memory when creating an array, clear the <b>Limit the maximum array size to a percentage of RAM</b> check box. If MATLAB attempts to allocate memory that exceeds the resources available on the computer, your system might become nonresponsive.</p> <p>This limit applies to the size of each array, not the total size of all MATLAB arrays.</p>

## Variables Preferences

When working in the Variables editor, Variables preferences enable you to specify array formatting, cursor movement, and the decimal separator for exporting data using the system clipboard.

To open Variables preferences, on the **Home** tab, in the **Environment** section, click  **Preferences**. Select **MATLAB > Variables**.

Preference	Usage
<b>Format</b>	Select an option from the <b>Default array format</b> to specify the default array output format of numeric values displayed in the Variables editor. This format preference affects only how numbers display, not how MATLAB computes or saves them. For information on formatting options, see the reference page for the <code>format</code> function.

Preference	Usage
<b>Editing</b>	<p>Specify where the cursor moves to after you type an element and press <b>Enter</b>.</p> <p>To keep the cursor in the element where you typed, clear the <b>Move selection after Enter</b> check box.</p> <p>To move the cursor to another element, select the <b>Move selection after Enter</b> check box. In the <b>Direction</b> field, specify how you want the cursor to move.</p>
<b>International number handling</b>	<p>In the <b>Decimal separator for exporting numeric data via system clipboard</b> field, specify the decimal separator for numbers you cut or copy from the Variables editor and then paste into text files or other applications.</p> <p>This preference has no effect on numeric data copied from and pasted into MATLAB. Within MATLAB, decimal separators are always periods.</p>

Most Variables preferences are not available in MATLAB Online. To show generated code in the Command Window when performing operations in the MATLAB Online Variables Editor, select **Show MATLAB code for operations**.

## See Also

## More About

- “Create and Edit Variables” on page 5-2



# Managing Files in MATLAB

---

- “Find Files and Folders” on page 6-2
- “Compare Files and Folders and Merge Files” on page 6-5
- “Compare and Merge Live Scripts and Functions” on page 6-13
- “Compare and Merge Apps” on page 6-17
- “Compare and Merge MAT-Files” on page 6-21
- “Compare XML Files” on page 6-25
- “Manage Files and Folders” on page 6-30
- “Share Folders in MATLAB” on page 6-33
- “Files and Folders that MATLAB Accesses” on page 6-35
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- “Specify File Names” on page 6-39
- “Create and Extract from Zip Archives” on page 6-42
- “What Is the MATLAB Search Path?” on page 6-44
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- “Add Folders to the MATLAB Search Path at Startup” on page 6-51
- “Assign userpath as Startup Folder (Macintosh or UNIX)” on page 6-53
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## Find Files and Folders

<b>In this section...</b>
“Simple Search for File and Folder Names” on page 6-2
“Advanced Search for Files” on page 6-2

### Simple Search for File and Folder Names


If you know the name of the file you want to find, begin typing the first characters of the name in the Current Folder browser. As you type, the Current Folder browser searches downward from the top of the window, looking through all expanded folders. To open the Current Folder browser if it is not open, on the **Home** tab, in the **Environment** section, click **Layout**. Then, under **Show**, select **Current Folder**.

Alternatively, to search for a series of characters anywhere in the name of a file:

- 1 Click the search button  in the current folder toolbar. The address bar becomes a search field.
- 2 Type a portion of a file name. The asterisk character (\*) is a wildcard. For example, to show only file names that begin with `coll` and have a `.m` extension, type `coll*.m`.
- 3 Press **Enter**.

MATLAB displays all files within the current folder (including its subfolders) that match that file name. If you typed the full path to a folder, that folder becomes the current folder.


To clear the results and show all items in the current folder, press the **Esc** key.

In MATLAB Online, to search for files in the current folder, go to the **Home** tab and click the  **Go to File** button.

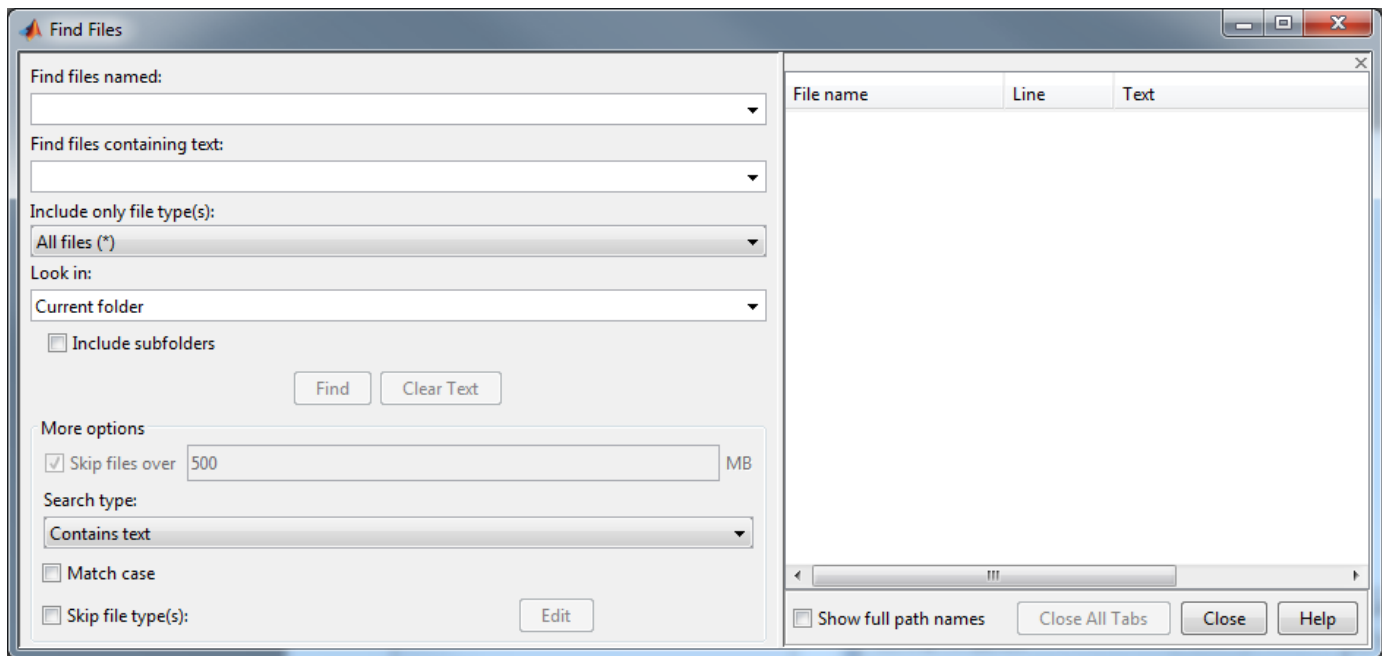
### Advanced Search for Files

To conduct an advanced search for files, you can use the Find Files tool. Use the Find Files tool to:

- Search for specific text in file names and within files
- Include or exclude specified file types from your search
- Search in specified folders
- Exclude large files from your search

To open the Find Files tool, on the **Home** tab, in the **File** section, click  **Find Files**. Enter your search criteria in the dialog box that opens.





Use the **Look in** menu to specify the folders you want to search. Select **Entire MATLAB Path** to search all folders on the MATLAB search path. Alternatively, you can browse for a folder by selecting **Browse...** or you can enter the full path for one or more folders. Separate each path with a semicolon (;).

Click **Find** to begin the search. Search results appear in the right pane of the dialog box, with a summary at the bottom. For text searches, results include the line number and line of code. To see file locations, select **Show full path names**.

Open one or more files by right-clicking the files and selecting one of the **Open** options.

### Include or Exclude File Types

You can search for files with only a specified extension, by selecting an option in the **Include only file type(s)** menu. For example, select **\*.m**, **\*.mlx** to limit the search to MATLAB program files.

To exclude some file types from the search:

- 1 In the **Include only file type(s)** menu, select **All files (\*)**.
- 2 Under **More options**, select the **Skip file type(s)** box and click **Edit**. The Edit Skipped File Extensions dialog box opens.
- 3 Select the **State** check box for the file types to exclude from your search.
- 4 Click **OK** to accept your changes.

You can remove any file extension from the list by selecting the extension to highlight it. Then, click **Remove**.

### Search Within File

Under **More options**, you can choose to search file contents for a partial word. From the **Search type** menu, select **Contains text**. To find an exact full-word match, select **Matches whole word**.

Searching within large files can be time consuming. To speed up your search, specify a file size in the **Skip files over** field. The Find Files tool ignores files larger than the size you specify.

### Troubleshooting

If the Find Files tool does not find the file you want, try the following:

- When searching for file names, use the asterisk character (\*) as a wildcard character to expand your search. For example, to show file names that begin with `coll` and have a `.m` extension, type `coll*.m`.
- Select the **Include Subfolders** check box if the file might be in a subfolder.
- If you select the **Skip file type(s)** check box, ensure that you do not exclude relevant file types from your search. Click **Edit** and review the Edit Skipped File Extensions dialog box. Ensure that relevant file types do not have the **State** check box selected.

### See Also

`dir` | `exist` | `what` | `which`

### More About

- “Find Functions to Use” on page 3-4
- “What Is the MATLAB Search Path?” on page 6-44

## Compare Files and Folders and Merge Files

You can use the Comparison Tool to display the differences between selected pairs of files or folders. For some file types, you also can merge changes from one file to the other.



### Comparison Process


The comparison process involves three steps:


- 1 Select the files or folders to compare.
- 2 Choose a comparison type.
- 3 Explore the comparison report.

### Select the Files or Folders to Compare

You can select files and folders to compare using any of these methods:

- MATLAB desktop — Go to the **Home** tab, and in the **File** section, click **Compare**. Click the  button to select items to compare, or drag and drop files from your file browser into the **First file or folder** or **Second file or folder** fields.
- Current Folder browser — Select a file or folder, right-click, and select **Compare Against**. Click the  button to select a second item to compare, or drag and drop a file from your file browser into the **Second file or folder** field. To select two files or subfolders to compare, **Ctrl-click** the file names. Then right-click and select **Compare Selected Files/Folders**.
- Editor or Live Editor — Go to the **Editor** or **Live Editor** tab, and in the **File** section, click **Compare**. The Comparison Tool includes the currently open file in the **First file or folder** field.

Click the  button to select a second item to compare, or drag and drop a file from your file browser into the **Second file or folder** field.

To compare a file with the autosave version or the saved version on disk, go to the **Editor** tab and click **Compare**  and select **Compare with Version on Disk** or **Save and Compare with Autosave**. If your file is modified, the Editor saves the file before comparing. The **Compare with Version on Disk** and **Save and Compare with Autosave** options are only available if the option for automatically saving changes to a file is disabled. To disable the option, go to the **Home** tab, and in the **Environment** section, click **Preferences**. Then, select **Editor/Debugger** and clear **Save changes upon clicking away from a file**. This option is not available in the Live Editor.

- Command Window — Use the `visdiff` function. For example, to compare the two files `lengthofline.m` and `lengthofline2.m` using the `visdiff` function and the default text comparison, type `visdiff('lengthofline.m', 'lengthofline2.m')`. MATLAB opens the Comparison Tool and displays the resulting comparison report.

---

**Tip** When selecting folders to compare, select **Include subfolders** to include subfolder content in the comparison.

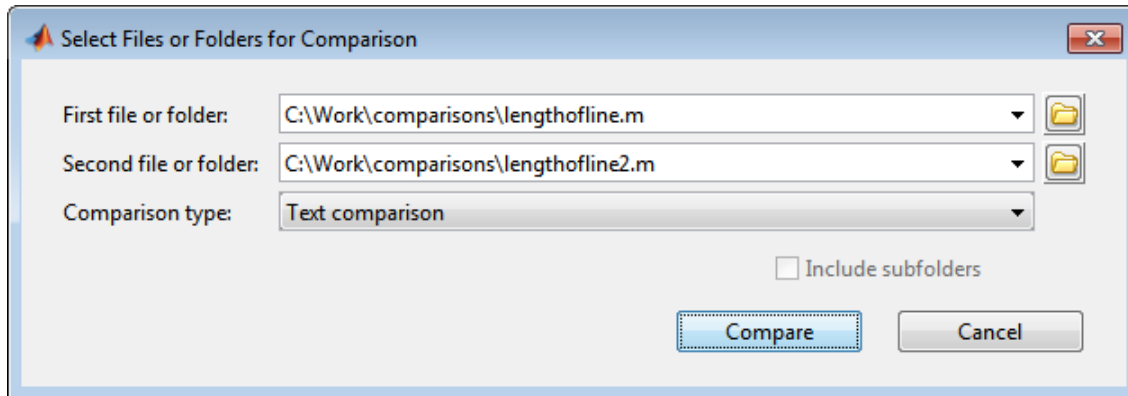
---

### Choose a Comparison Type

The Comparison Tool compares selected items using the default comparison type defined for the selected items. For some item types, you can select a different comparison type from the default. For

example, you can choose from a text, binary, file list, or XML comparison. To change the comparison type, select the files or folders to compare. Then, select from the available **Comparison type** options. The Comparison Tool displays only the valid options for the selected item types.

You cannot change the comparison type for an existing comparison report. To change the comparison type, start a new comparison.



If you specify two files or folders to compare using either the Current Folder browser or the `visdiff` function, then the Comparison Tool automatically performs the default comparison type. For example, from the Current Folder browser, if you select two XML files to compare, the tool uses the default text comparison. To change the comparison type to a hierarchical comparison instead, create a new comparison using the Comparison Tool.

### Explore the Comparison Report

After selecting the comparison type, click the **Compare** button. The comparison report opens. You can explore the comparison report in different ways depending on the items being compared. For more information, see the details described for each comparison type below.

## Compare Folders and Zip Files

You can compare any combination of folders and ZIP files using the Comparison Tool. For example, you can compare the contents of a folder to the contents of a ZIP file. The Comparison Tool performs a file list comparison of the selected items.

Create a folder comparison report to:

- Identify common files.
- Determine whether files or folders with identical names have identical content. If such files or folders exist, you can open a detailed comparison report for the items directly from the report.

When you perform a file list comparison, a new window opens and displays the contents of the specified lists side by side. For example, suppose that you have two folders, `curvefittings` and `curvefittings2`, with several differences. When you compare the two folders, the Comparison Tool displays the resulting report.

Comparison - curvefitting vs. curvefitting2

COMPARISON VIEW

New Refresh Swap Sides Save As Print Find

COMPARISON NAVIGATE

curvefitting vs. curvefitting2

### Comparing folder curvefitting vs. folder curvefitting2

<b>Left file list</b>	Contents of folder C:\Work\comparisons\curvefitting
<b>Right file list</b>	Contents of folder C:\Work\comparisons\curvefitting2

Click on a column header to sort the table

		In left list (folder curvefitting)		In right list (folder curvefitting2)		Difference Summary
Type	File Name	Size (bytes)	Last Modified Date	Size (bytes)	Last Modified Date	
folder	cftoolgui/	-	2017-12-15 14:02:26	-	2017-12-15 14:02:29	contents changed ( <a href="#">compare</a> )
MATLAB Code File	csapidem.m ( <a href="#">open</a> )	(not in this list)		15038	2009-01-08 12:56:28	added
folder	curvefit/	-	2017-12-15 14:02:28	-	2017-12-15 14:02:30	contents changed ( <a href="#">compare</a> )
folder	demosearch/	-	2017-12-15 14:02:28	-	2017-12-15 14:02:31	identical
folder	html/	-	-	(not in this list)		removed
Text Document	kdm.txt ( <a href="#">open</a> )	(not in this list)		1367	2008-10-03 10:13:38	added
Editor Autosave	lengthofline.asv ( <a href="#">open</a> )	(not in this list)		2403	2009-11-16 14:24:46	added
MATLAB Code File	lengthofline.m ( <a href="#">open: left   right</a> )	2405	2009-11-12 15:56:52	2408	2009-11-16 14:25:14	contents changed ( <a href="#">compare</a> )
Chrome HTML Document	manifest_report.html ( <a href="#">open</a> )	2410	2008-11-27 13:24:50	(not in this list)		removed
XML Document	report.xml ( <a href="#">open</a> )	(not in this list)		4868	2008-09-11 16:53:32	added
folder	sftoolgui/	(not in this list)		-	-	added
MAT-file	splinetool.mat ( <a href="#">open</a> )	1720	2001-08-20 17:14:12	(not in this list)		removed

Insertion Deletion Modification

The Comparison Tool highlights files and subfolders that do not match using the colors listed in this table.

Highlight Color	Description
Purple	The contents of the files or folders differ. Click the <b>compare</b> link to investigate.
Blue	The file or folder only exists in the right list.
Yellow	The file or folder only exists in the left list.
None	The files or folders are identical.

You further can explore the results using several methods:

- To sort the results by name, type, size, or last modified timestamp, click the corresponding column header. For example, click the **Type** column header to sort by folder and file type.
- To open a detailed comparison report for items with differing content, click the **compare** link next to the item.
- To open a file in the Editor, click the **open** link next to a file name. If the file is present in both folders, you can click links to open the **left** or **right** version of the file.
- If subfolders are very large and contain many files, analysis continues in the background. The tool displays the number of items still to be compared at the top of the report. You can click **Skip Current** to skip the current item or **Cancel All** to stop further analysis.



- To save time when reviewing differences, especially when comparing many subfolders, you can filter the report. To apply a filter, on the **View** tab, select **Filter** > "**filterName**".

To create a new filter, on the **View** tab, select **Filter** > **Add/Remove Filter**. You can specify filters to ignore certain files and folders, such as backup files or files created by a revision control system. For example, to ignore all files and folders in a folder named CVS, type CVS/. To ignore all files in a folder named CVS, but not ignore subfolders, type CVS/\*.

To edit existing filters, double click the filter.

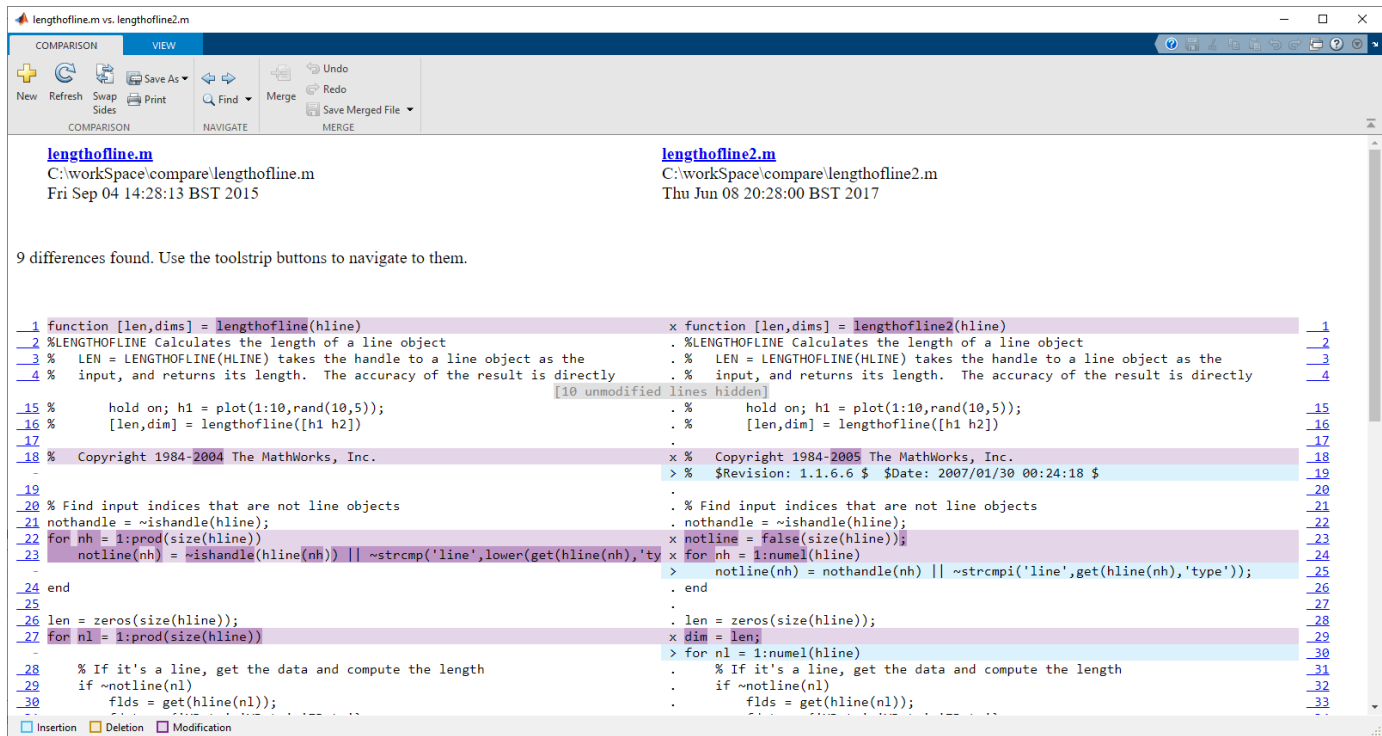
For information about how to further configure the comparison report, see “Comparison Report Tools and Options” on page 6-11.

## Compare Text Files

You can compare and merge lines in two text files using the Comparison Tool. When you perform a text comparison, a new window opens and displays the two files side by side. Symbols in between the two files indicate how you can adjust the files to make them match. For example, run this code to view a text comparison of the example files `lengthofline.m` and `lengthofline2.m`.

```
file1 = fullfile(matlabroot,'help','techdoc','matlab_env',...  
'examples','lengthofline.m')  
file2 = fullfile(matlabroot,'help',...  
'techdoc','matlab_env','examples','lengthofline2.m')  
visdiff(file1,file2)
```

The Comparison Tool displays the resulting report.



The Comparison Tool displays the total number of differences at the top of the comparison report and highlights the lines that have changed with the colors listed in this table.

Highlight Color	Description
Purple	The line contains differences. The Comparison Tool displays an <b>x</b> in the column between the two files.
Dark Purple	The highlighted characters are different.
Blue	Line exists only in right file. The Comparison Tool displays a <b>&gt;</b> in the column between the two files.
Yellow	Line exists only in left file. The Comparison Tool displays a <b>&lt;</b> in the column between the two files.




The Comparison Tool attempts to match lines and detects text that is added, deleted, or changed. For example, in the text comparison of `lengthofline.m` and `lengthofline2.m`, the tool determines that `lengthofline2.m` has a line of code that does not exist in `lengthofline.m` and highlights it (line 23) in blue. Also, the tool takes the additional line into account and determines that the line containing the end statement in each file matches, even though the end statement does not occur on the same line number in both files.


You further can explore and configure the results using several methods:

- View a summary of differences — To view a summary of differences between two text files, including the number of matching lines and the number of unmatched lines in each file, scroll to the bottom of the comparison report.

- Ignore whitespace differences — To help distinguish between functional changes and changes to indentation, you can hide whitespace differences. To hide differences that only involve white-space characters, go to the **View** tab, click the **Filter** button, and select **Ignore White Space**.
- Show differences only — To specify whether to show only differences or the entire files, go to the **View** tab, click the **Filter** button, and select or clear **Show Differences Only**. Showing differences only is especially useful in large text comparison reports. When you are showing differences only and some lines are hidden, the report displays a message indicating the number of lines hidden. For example, if 10 lines are hidden, the report displays `10 unmodified lines hidden`.
- Change the display width — To increase or decrease the line lengths of the text files in the comparison display, go to the **View** tab, and in the **Display** section, change the **Column Width**. Resize the window if necessary.
- Save HTML Report — To save a copy of the comparison report as an HTML file, go to the **Comparison** tab, and in the **Comparison** section, click **Save As > HTML**.

For information about how to further configure the comparison report, see “Comparison Report Tools and Options” on page 6-11.

To step through the results one difference at a time, use the  and  buttons. Once the last difference has been reached, clicking the  button loops back to the first difference in the files.

Similarly, if the first difference is selected and the  button is clicked, the Comparison Tool loops to the last difference in the files.



If the files you are comparing are extremely long, the Comparison Tool can run out of memory while attempting to perform the file comparison. If it does, it displays this message:


Maximum file length exceeded.  
Defaulting to line-by-line comparison.

When this occurs, the Comparison Tool switches to a line-by-line comparison. In a line-by-line comparison of the files `lengthofline.m` and `lengthofline2.m` for example, the tool highlights the lines containing the `end` statement because in performing this operation, it finds that the last line in one file does not match the last line in the other file.

By default, XML files are compared using a text comparison. To compare XML files with a hierarchical comparison instead, see “Compare XML Files” on page 6-25.

## Merge Text Files

When comparing text files, you can merge changes from one file to the other. Merging changes can be useful when resolving conflicts between different versions of files. When merging changes, you only can merge from left to right. If you want to merge into the left file, click the  **Swap Sides** button before you start merging. Clicking the  **Swap Sides** button reverts any merges already made and creates a new comparison report for the original files.

To merge a change from the left file to the right file, select the difference in the report and on the **Comparison** tab, click the  **Merge** button. The Comparison Tool highlights merged lines in gray and displays a green merge arrow.



```
1 function [len,dims] = lengthofline(hline) . function [len,dims] = lengthofline(hline) 1 ↗
```

The merged file name at the top of the report indicates that the file contains unsaved changes (*filename.m\**).

To revert the last merge operation, on the **Comparison** tab, click **Undo**. Click **Redo** to reapply a merge. To revert all merges and start again, click **Refresh**.

To save your changes, click **Save Merged File**. To save to a different name, select **Save Merged File > Save Merged File As**.

To view the files in the Editor, click a line number link in the report. Before making any changes in the Editor, save your merge changes from the comparison report. Otherwise, the comparison report can become incorrect. The report does not update to reflect the changes you make in the Editor.

## Compare Binary Files

You can compare two binary files, such as DLL files or MEX files, using the Comparison Tool. You also can perform a binary comparison on any two selected files, instead of the default comparison.

To compare any two files using a binary comparison, in the **Comparison type** menu, select **Binary comparison**. When you perform a binary comparison, a new window opens and indicates whether the two files are identical or different. If the files are different, click the **Show Details** link to view the binary files and the byte offset of the first difference.



## Compare Additional File Types


You can use the Comparison Tool to compare additional file types:

- **Live Code** — Compare and merge the code and text in two live code files. For more information, see “Compare and Merge Live Scripts and Functions” on page 6-13.
- **Apps** — Compare and merge the code in two apps. For more information, see “Compare and Merge Apps” on page 6-17.
- **MAT-Files** — Compare and merge variables in two MAT-files. For more information, see “Compare and Merge MAT-Files” on page 6-21.
- **XML Files** — Compare two XML files using a text comparison or a hierarchical XML comparison. For more information, see “Compare XML Files” on page 6-25.
- **Simulink Models** — If you have Simulink, you can compare and merge Simulink models. For information, see “Model Comparison” (Simulink).

## Comparison Report Tools and Options

You can further explore and configure a comparison report using the available tools and options.

-  **Swap Sides** button — Switch the left side file or folder with the right side file or folder.
-  **Refresh** button — Update the results in the Comparison Tool after making changes to and saving the files in the Editor.

-  **Find** button — Find a phrase in the current display. For more information, see “Find Text in Command Window or History” on page 3-11.

To change and save the color preferences for the Comparison Tool, go to the MATLAB **Home** tab, click **Preferences**, and select **MATLAB > Comparison**. Select the desired colors for differences, modified lines, modified contents, and merged lines. Color preferences apply to all comparison types.

To save the modified color preferences for use in future MATLAB sessions, click **Save As**. Enter a name for your color settings profile and click **OK**. After saving a color settings profile, you can select the profile in the **Active Settings** list. To restore the default settings, click **Reset** and then click **Apply**. Refresh the comparison report.

## Source Control

You can use the MATLAB Comparison Tool to compare and merge files and folders in external source control tools. For more information, see “Customize External Source Control to Use MATLAB for Diff and Merge”.

## Troubleshooting

If you encounter errors like `java.lang.OutOfMemoryError: Java heap space` or `java.lang.OutOfMemoryError: GC Overhead limit exceeded` when comparing large files, then edit your MATLAB preferences to increase the heap size.

- 1 On the **Home** tab, in the **Environment** section, click **Preferences**.
- 2 Select **MATLAB > General > Java Heap Memory**.
- 3 Move the slider to increase the heap size, and then click **OK**.
- 4 Restart MATLAB.

## See Also

`visdiff`

## Related Examples



- “Customize External Source Control to Use MATLAB for Diff and Merge”

## Compare and Merge Live Scripts and Functions

You can compare two live code files and merge changes between one file and another using the Comparison Tool. The Comparison Tool highlights differences in code, text, and text formatting.

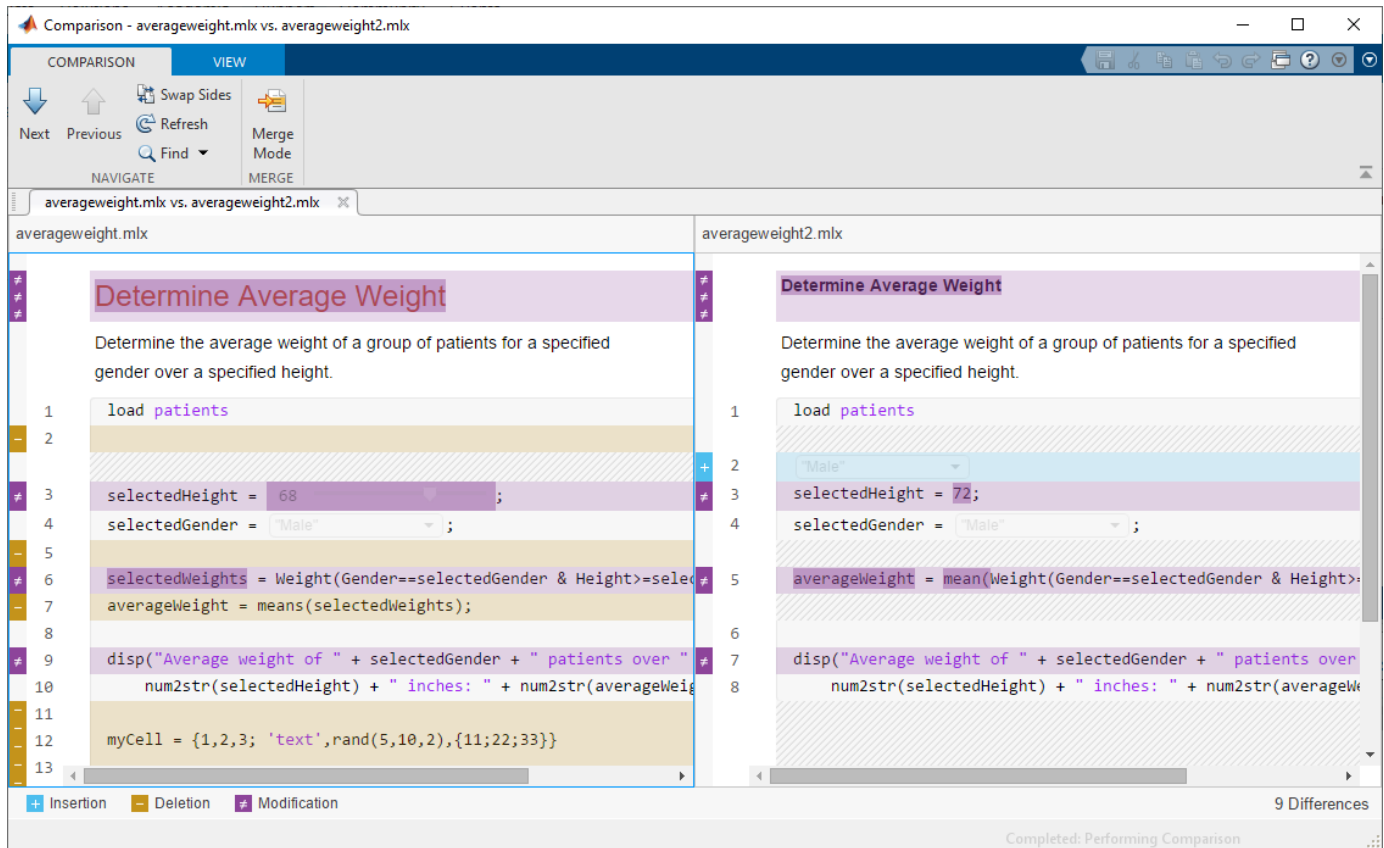
### Select Files to Compare

There are multiple ways to select two files and start the Comparison Tool:

- Live Editor — Go to the **Live Editor** tab and, in the **File** section, click **Compare**. The Comparison Tool includes the currently open file in the **First file or folder** field. Click the  button to select a second item to compare, or drag and drop a file from your file browser into the **Second file or folder** field.
- Current Folder browser — Select a file, right-click, and select **Compare Against**. Click the  button to select a second item to compare, or drag and drop a file from your file browser into the **Second file or folder** field. To select two files or subfolders to compare, **Ctrl-click** the file names. Then right-click and select **Compare Selected Files/Folders**.
- Command Window — Use the `visdiff` function. For example, to compare the two files `averageweight.mlx` and `averageweight2.mlx` using the `visdiff` function and the default text comparison, type `visdiff('averageweight.mlx','averageweight2.mlx')`. MATLAB opens the Comparison Tool and displays the resulting comparison report.

### Explore Differences

When you perform a live code comparison, a new window opens and displays the two files side by side. For example, suppose that you have two files, `averageweight.mlx` and `averageweight2.mlx`, with several differences. When you compare the two files, the Comparison Tool displays the resulting report.





When comparing live code files, the Comparison Tool highlights differences in code, text, and text formatting. The Comparison Tool ignores output, even if the file contains saved output. If the tool detects a difference within an equation, image, or control, the entire item is highlighted. The Comparison Tool displays the total number of differences in the bottom-right corner of the comparison report, and highlights the lines that do not match using the colors listed in this table.

Highlight Color	Description
Purple	The line contains differences.
Dark Purple	The highlighted characters are different.
Blue	The line exists only in right file. This can happen when the line is inserted in the right file, or when it is deleted from the left file. The corresponding line in the left file is highlighted using a gray striped pattern.
Yellow	The line exists only in left file. This can happen when the line is inserted in the left file, or when it is deleted from the right file. The corresponding line in the right file is highlighted using a gray striped pattern.



The Comparison Tool attempts to match lines and detects code and text that is added, deleted, or changed. For example, in the live code comparison of `averageweight.mlx` and `averageweight2.mlx`, the tool determines that `averageweight.mlx` has two lines of code that do




not exist in `averageweight2.mlx` and highlights them (line 5 and line 7) in yellow. Also, the tool takes the additional lines into account and determines that the line containing the `disp` statement in each file matches, even though the `disp` statement does not occur on the same line number.

To step through the results one difference at a time, use the  **Next** and  **Previous** buttons.

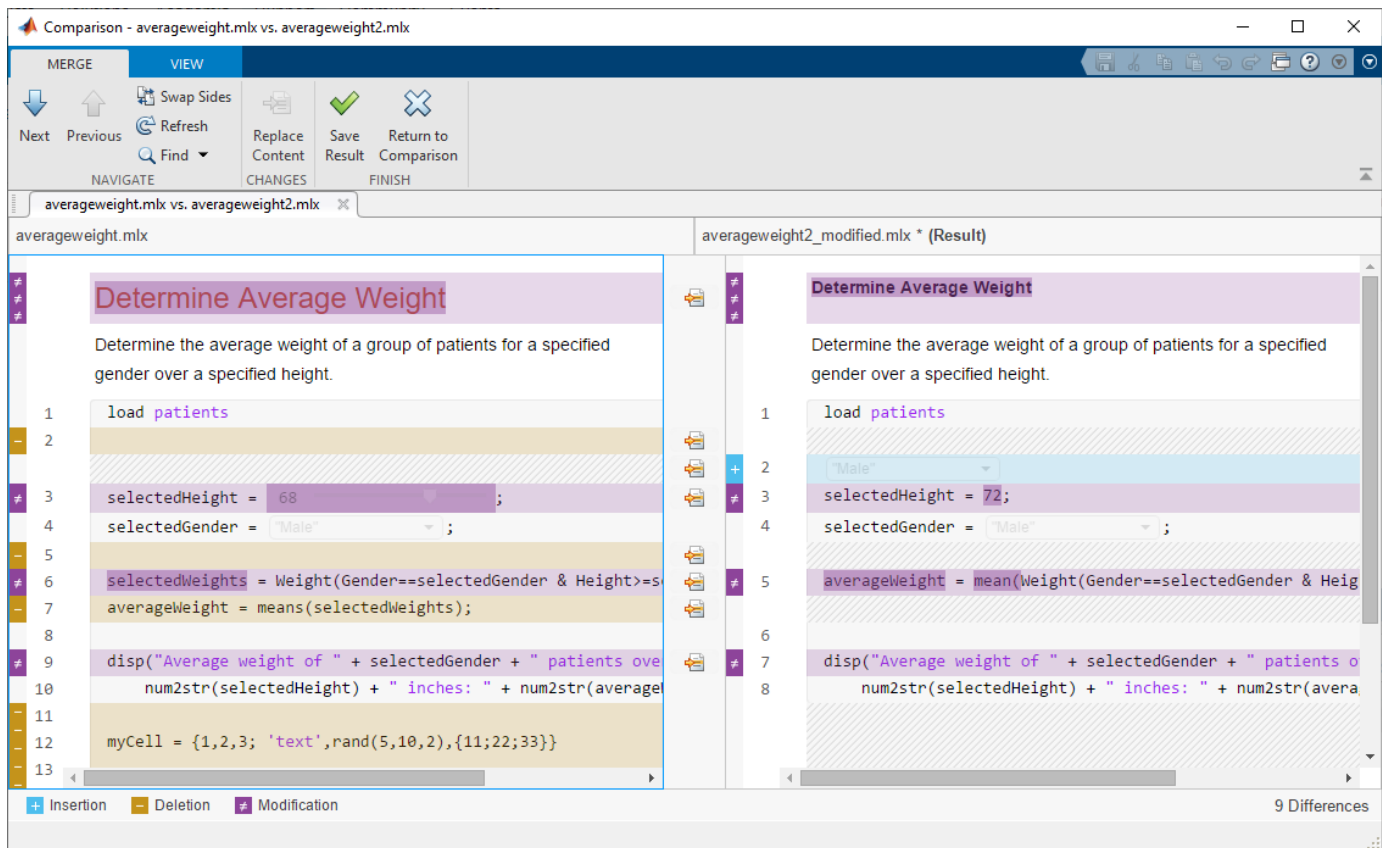
For information about how to configure the comparison report, see “Compare Files and Folders and Merge Files” on page 6-5.




## Merge Changes



When comparing live code files, you can merge changes from one file to the other. Merging changes can be useful when resolving conflicts between different versions of files. You only can merge from left to right. If you want to merge into the left file, click the  **Swap Sides** button before you start merging. Clicking the  **Swap Sides** button reverts any merges already made and creates a new comparison report for the original files.

To begin merging, on the **Comparison** tab, click the  **Merge Mode** button. Then, to replace content from the right pane with content from the left pane, click the  button located next to the line you want to merge. You also can select a difference and, in the **Merge** tab, click the  **Replace Content** button.

The right pane contains the merged result. An asterisk next to the merged file name in the right pane (*filename\_modified.mlx\**) indicates that the file contains unsaved changes.



To undo a replacement, click the  button between the modified lines or on the **Comparison** tab. To revert all merges and start again, click the  **Refresh** button. You also can click the  **Refresh** button to update the comparison report after making changes to and saving the files in the Live Editor. Refreshing discards all unsaved merged changes.

To save your changes and return to the comparison report, click the  **Save Result** button. To return to the comparison report without saving changes, click the  **Return to Comparison** button.

## See Also

visdiff

## More About



- “Compare Files and Folders and Merge Files” on page 6-5
- “Customize External Source Control to Use MATLAB for Diff and Merge”

## Compare and Merge Apps

You can compare two apps and merge changes between one file and another using the Comparison Tool. The Comparison Tool highlights differences in the code of two apps.

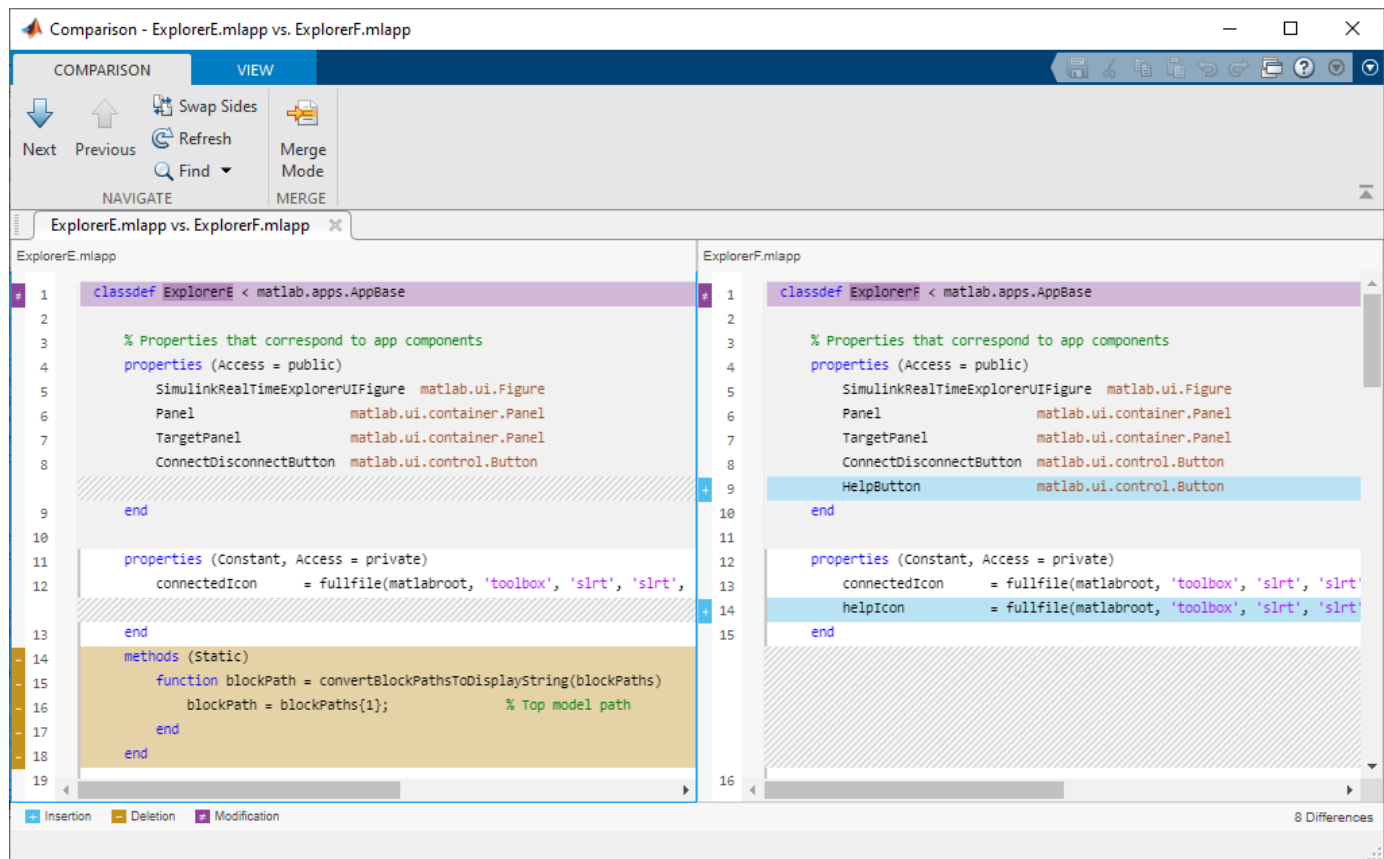
### Select Files to Compare

There are multiple ways to select two files and start the Comparison Tool:

- App Designer — Go to the **Designer** or **Editor** tab and, in the **File** section, click **Compare**. The Comparison Tool includes the currently open file in the **First file or folder** field. Click the  button to select a second item to compare, or drag and drop a file from your file browser into the **Second file or folder** field.
- Current Folder browser — Select a file, right-click, and select **Compare Against**. Click the  button to select a second item to compare, or drag and drop a file from your file browser into the **Second file or folder** field. To select two files or subfolders to compare, **Ctrl**-click the file names. Then right-click and select **Compare Selected Files/Folders**.
- Command Window — Use the `visdiff` function. For example, to compare the two files `ExplorerE.mlapp` and `ExplorerF.mlapp` using the `visdiff` function and the default text comparison, type `visdiff('ExplorerE.mlapp','ExplorerF.mlapp')`. MATLAB opens the Comparison Tool and displays the resulting comparison report.



### Explore Differences

When you perform an app comparison, a new window opens and displays the two files side by side. For example, suppose that you have two files `ExplorerE.mlapp` and `ExplorerF.mlapp` with several differences. When you compare the two files, the Comparison Tool displays the resulting report.



When comparing apps, the Comparison Tool attempts to match lines and detects code that is added, deleted, or changed. The Comparison Tool displays the total number of differences in the bottom-right corner of the comparison report and highlights the lines that do not match using the colors listed in this table.

Highlight Color	Description
Purple	The line contains differences.
Dark Purple	The highlighted characters are different.
Blue	The line exists only in right file. This can happen when the line is inserted in the right file, or when it is deleted from the left file. The corresponding line in the left file is highlighted using a gray striped pattern.
Yellow	The line exists only in left file. This can happen when the line is inserted in the left file, or when it is deleted from the right file. The corresponding line in the right file is highlighted using a gray striped pattern.




To step through the results one difference at a time, use the  **Next** and  **Previous** buttons.

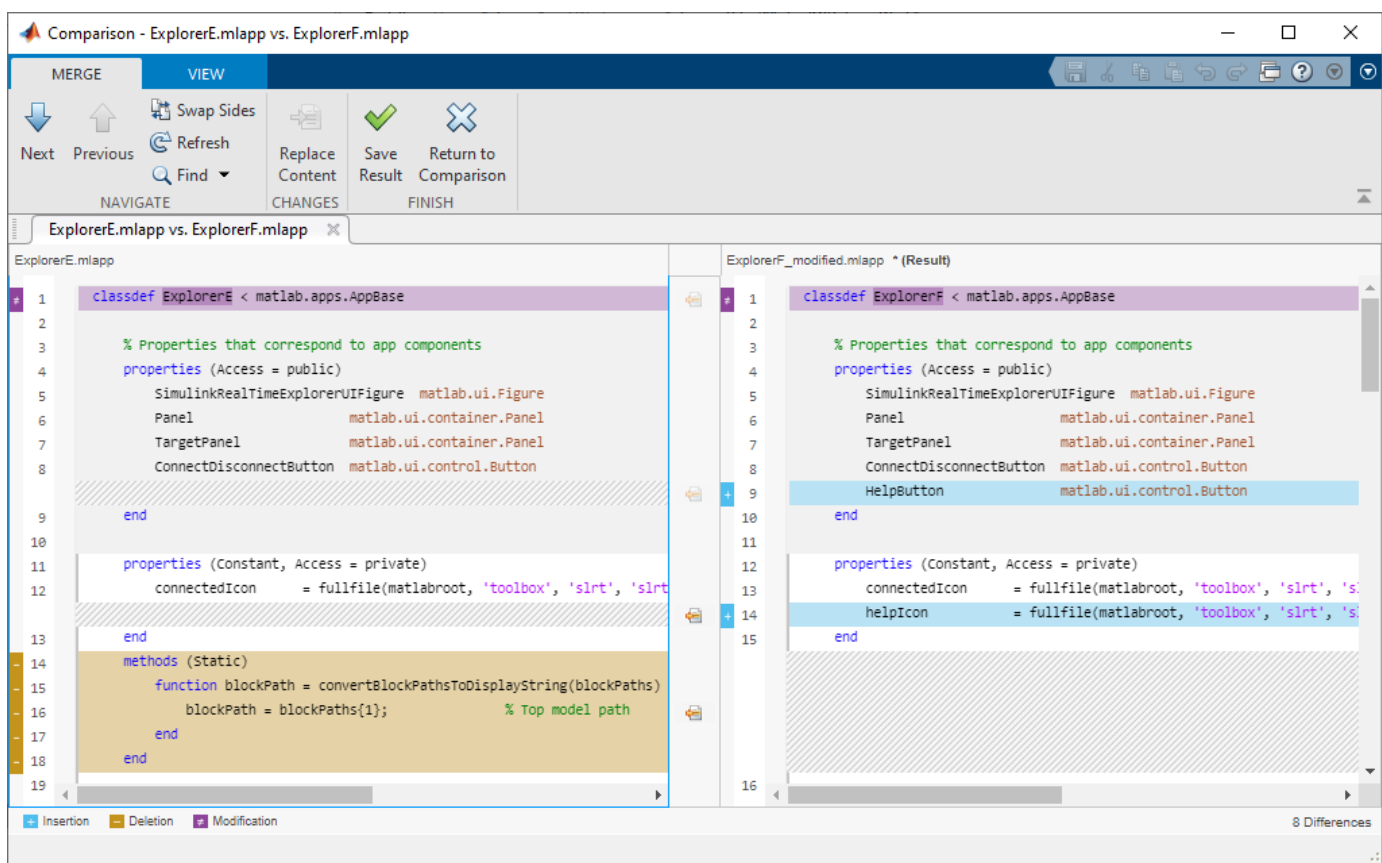


For information about how to configure the comparison report, see “Compare Files and Folders and Merge Files” on page 6-5.




## Merge Changes



When comparing apps, you can merge changes from one app to the other. Merging changes can be useful when resolving conflicts between different versions of an app.

To begin merging, on the **Comparison** tab, click the  **Merge Mode** button. Then, to replace content from the right pane with content from the left pane, click the  button located next to the line you want to merge. You also can select a difference and, in the **Merge** tab, click the  **Replace Content** button.



The right pane contains the merged result. An asterisk next to the merged file name in the right pane (*ExplorerF\_modified.mlapp\**) indicates that the file contains unsaved changes.



To undo a replacement, click the  button between the modified lines or on the **Comparison** tab. To revert all merges and start again, click the  **Refresh** button. You also can click the  **Refresh** button to update the comparison report after making changes to and saving the files in the Live Editor. Refreshing discards all merged changes.


To save your changes and return to the comparison report, click the  **Save Result** button. To return to the comparison report without saving changes, click the  **Return to Comparison** button.

### Tips for Successful Merging

You can merge changes only in editable code. Sections of code with a white background are editable. Examples of editable sections include the body of functions that you define (such as callbacks and helper functions) and the definitions of custom properties. Sections with a gray background contain non-editable generated code and therefore cannot be merged. If a change spans both an editable and non-editable section, you cannot merge it.

You can merge changes only from left to right. This makes the locations of the files in the Comparison Tool important.

If neither app contains changes in the generated code, place the file containing the changes that you want to merge in the left pane. You only can merge from left to right. To swap a file from the left pane to the right pane, click the  **Swap Sides** button before you start merging. Clicking the  **Swap Sides** button reverts any merges already made and creates a new comparison report for the original files.

If one of the apps contains changes in the generated code, place the file containing the generated code that you want in the merged result in the right pane of the Comparison Tool. To swap a file from the left pane to the right pane, click the  **Swap Sides** button before you start merging.

If both apps contain changes in the generated code, the files cannot be merged in the Comparison Tool. To merge the files, use App Designer to interactively apply the desired changes to the app

### See Also

`visdiff`

### More About

- “Compare Files and Folders and Merge Files” on page 6-5
- “Customize External Source Control to Use MATLAB for Diff and Merge”



## Compare and Merge MAT-Files

You can use the Comparison Tool to compare two MAT-files. Compare two MAT-files to:

- Determine which variables are common to both files and which appear in only one file.
- Identify differences between individual variables. For example, you can determine which fields of a structure are different or which elements of an array differ.

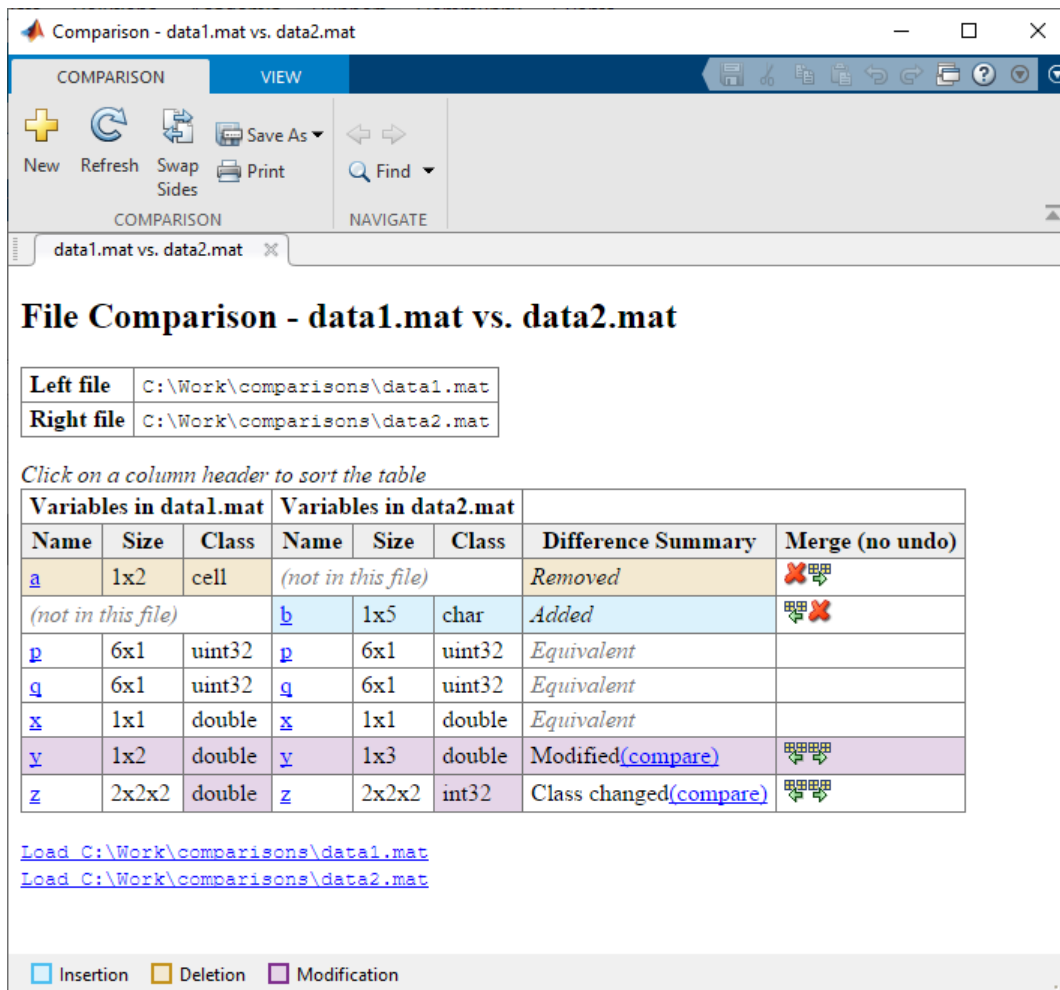
### Select Files to Compare

There are multiple ways to select two files and start the Comparison Tool:

- MATLAB desktop — Go to the **Home** tab and, in the **File** section, click **Compare**. Click the  button to select items to compare, or drag and drop files from your file browser into the **First file or folder** or **Second file or folder** fields.
- Current Folder browser — Select a file, right-click, and select **Compare Against**. Click the  button to select a second item to compare, or drag and drop a file from your file browser into the **Second file or folder** field. To select two files or subfolders to compare, **Ctrl**-click the file names. Then right-click and select **Compare Selected Files/Folders**.
- Command Window — Use the `visdiff` function. For example, to compare the two files `data1.mat` and `data2.mat` using the `visdiff` function, type `visdiff('data1.mat','data2.mat')`. MATLAB opens the Comparison Tool and displays the resulting comparison report.

### Explore Differences

When you perform a MAT-file comparison, a new window opens and displays the two files side by side. For example, suppose that you have two MAT-files, `data1.mat` and `data2.mat`. When you compare the two files, the Comparison Tool displays the resulting report.



**File Comparison - data1.mat vs. data2.mat**

<b>Left file</b>	C:\Work\comparisons\data1.mat
<b>Right file</b>	C:\Work\comparisons\data2.mat

Click on a column header to sort the table

Variables in data1.mat			Variables in data2.mat			Difference Summary	Merge (no undo)
Name	Size	Class	Name	Size	Class		
<b>a</b>	1x2	cell	(not in this file)			Removed	
(not in this file)			<b>b</b>	1x5	char	Added	
<b>p</b>	6x1	uint32	<b>p</b>	6x1	uint32	Equivalent	
<b>q</b>	6x1	uint32	<b>q</b>	6x1	uint32	Equivalent	
<b>x</b>	1x1	double	<b>x</b>	1x1	double	Equivalent	
<b>y</b>	1x2	double	<b>y</b>	1x3	double	Modified( <a href="#">compare</a> )	
<b>z</b>	2x2x2	double	<b>z</b>	2x2x2	int32	Class changed( <a href="#">compare</a> )	

[Load C:\Work\comparisons\data1.mat](#)  
[Load C:\Work\comparisons\data2.mat](#)

Insertion Deletion Modification

The Comparison Tool highlights changes in variables. If the variables in both files are equivalent but the files are not identical, the Comparison Tool displays a message. Possible causes of the differences between the files include file formats, file timestamps, the order in which the variables are stored, or variables that contain ignored differences. The Comparison Tool uses these colors to highlight differences.

Highlighting	Description
Purple	Values of the variable differ between the two files. Click the <b>compare</b> link to investigate.
Blue	The variable only exists in the right file.
Yellow	The variable only exists in the left file.
None	The variables in both files are equivalent. The tool ignores differences in NaN patterns, field ordering in structs, and the difference between negative zero or positive zero.
Purple (only in Class columns)	The variable data class changed. Click the <b>compare</b> link to investigate.

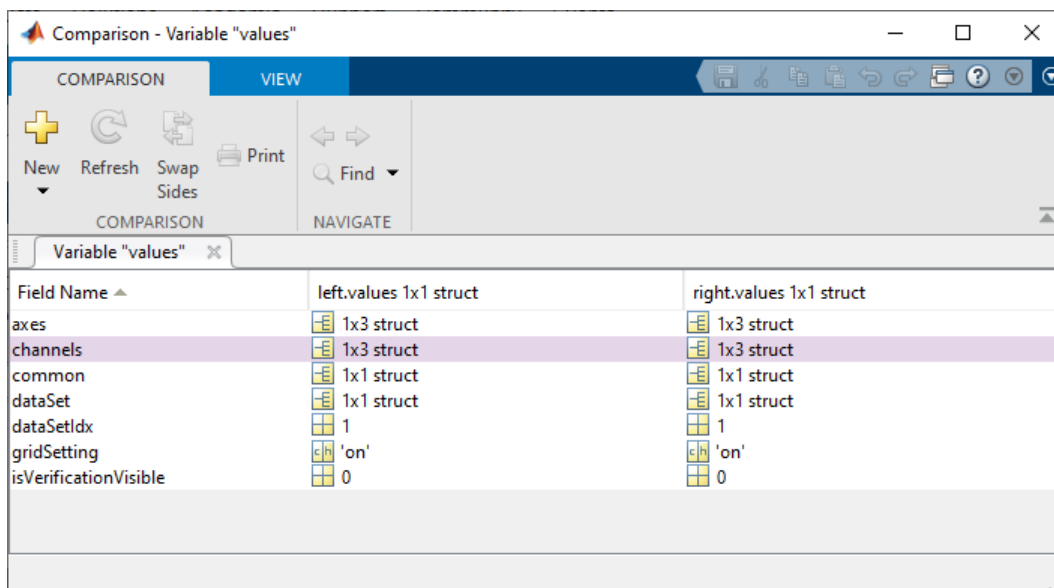
You can further explore the results in the report using several methods:

- Sort results — To sort the results by name, size, class, or difference summary, click the corresponding column header. For example, click the **Class** column header to sort by class type.
- Load variable — To load the contents of a variable into the Variable Editor, click the name of that variable.
- Load MAT-file — To load one of the MAT-files into the workspace, click the corresponding **Load** link at the bottom of the report.
- Save HTML report — To save a copy of the report as an HTML file, go to the **Comparison** tab and click **Save As > HTML**.

For information about how to further configure the comparison report, see “Compare Files and Folders and Merge Files” on page 6-5.


## Compare Variables

To investigate differences between instances of a variable in both files, click the **compare** link in the **Difference Summary** column of the comparison report table. The Comparison Tool displays a report for the specified variable. To further investigate differences in individual array elements or fields of a structure, double-click a highlighted row.



## Merge Changes

When comparing MAT-files, you can merge changes from one file to the other. There are no undo capabilities when merging MAT-files, so merge with caution.

To copy modified variables from one file to the other, on the **Comparison** tab, in the **Merge** section, click the  merge button.

## See Also

visdiff

### More About

- “Compare Files and Folders and Merge Files” on page 6-5
- “Customize External Source Control to Use MATLAB for Diff and Merge”

## Compare XML Files

### In this section...

“Choose XML Files to Compare” on page 6-25  
 “Change Comparison Type” on page 6-26  
 “Navigate the XML Comparison Report” on page 6-26  
 “Save Comparison Log Files in a Zip File” on page 6-27  
 “Export Results to the Workspace” on page 6-28

You can use the Comparison Tool to compare a pair of XML text files. The tool processes the results into a report that you can use to explore the file differences. You can compare XML files with a text comparison or a hierarchical XML comparison.

You can access the XML Comparison Tool from the Current Folder browser, the Comparison Tool, or programmatically using the `visdiff` function.

The XML comparison compares the files using the “Chawathe” algorithm, as described in this paper: *Change Detection in Hierarchically Structured Information*, Sudarshan Chawathe, Anand Rajaraman, and Jennifer Widom; SIGMOD Conference, Montreal, Canada, June 1996, pp. 493-504.

This conference paper is based on work published in 1995: see <http://dbpubs.stanford.edu:8090/pub/1995-45>.

XML comparison reports display in the Comparison Tool. For more information about the Comparison Tool, see “Compare Files and Folders and Merge Files” on page 6-5.

The XML comparison report shows a hierarchical view of the portions of the two XML files that differ. The report does not show sections of the files that are identical.

If the files are identical, you see a message reporting there are no differences.

---

**Note** It might not be possible for the analysis to detect matches between previously corresponding sections of files that have diverged too much.

---

Change detection in the Chawathe analysis is based on a scoring algorithm. Items match if their Chawathe score is above a threshold. The implementation of Chawathe's algorithm uses a comparison pattern that defines the thresholds.

## Choose XML Files to Compare

### From the Current Folder Browser

To compare two files from the Current Folder browser:

- For two files in the same folder, select the files, right-click and select **Compare Selected Files/Folders**.
- To compare files in different folders:
  - 1 Select a file, right-click, and select **Compare Against**

- 2 Select the second file to compare in the Select Files or Folders for Comparison dialog box.
- 3 Select the **Comparison type** XML text comparison.
- 4 Click **Compare**.

The XML Comparison Tool performs a Chawathe analysis on the files and displays a report in the Comparison Tool. The file you right-click to open the XML Comparison Tool displays on the right side of the report.

For more information about comparisons of other file types with the Comparison Tool, such as text, MAT, or binary, see “Compare Files and Folders and Merge Files” on page 6-5.

### Compare from the Comparison Tool

To compare files using the Comparison Tool, from the MATLAB toolstrip, in the **File** section, select the **Compare** button. In the dialog box, select files to compare.

If the files you select to compare are XML files and you select an XML text comparison, the XML Comparison Tool performs a Chawathe analysis of the XML files, and generates a report.

### Compare from the Command Line

To compare XML files from the command line, enter

```
visdiff(filename1, filename2, 'xml')
```

where `filename1` and `filename2` are XML files.

## Change Comparison Type

If you specify two XML files to compare using either the Current Folder Browser or the `visdiff` function, then the Comparison Tool performs the default comparison type for the selected files. You can compare XML files with a text comparison or a hierarchical XML comparison.

To change comparison type, either create a new comparison from the Comparison Tool, or use the **Compare Against** option from the Current Folder browser. You can change comparison type in the Select Files or Folders for Comparison dialog box. Select XML text comparison before clicking **Compare**.

## Navigate the XML Comparison Report

The XML comparison report shows changes only. The report is a hierarchical view of the differences between two XML text files, and is not a hierarchical view of the original XML data.

To *step through differences*, use the **Comparison** tab on the toolstrip. To move to the next or previous group of differences, on the **Comparison** tab, in the **Navigate** section, click the arrow buttons to go to the previous or next difference.

You can also click to select items in the hierarchical trees.

- Selected items appear highlighted in a box.
- If the selected item is part of a matched pair, it is highlighted in a box in both left and right trees.

Report item highlighting indicates the nature of each difference as follows:



Type of report item	Highlighting	Notes
Modified	Purple	Modified items are matched pairs that differ between the two files. When you select a modified item it is highlighted in a box in both trees. Changed parameters for the selected pair are displayed underneath.
Inserted	Blue	When you select an unmatched item it is highlighted in a box in one tree only.
Deleted	Yellow	
Container	None	Rows with no highlighting indicate a container item that contains other modified or unmatched items.

Use the **Comparison** tab for the following functions:

- **Refresh** — Run Chawathe analysis again to refresh the comparison report.
- **Swap Sides** — Swap sides and rerun comparison. Runs the Chawathe analysis again.
- **Save As > HTML** — Opens the Save dialog box, where you can choose to save a printable version of the XML comparison report. The report is a noninteractive HTML document of the differences detected by the Chawathe algorithm for printing or archiving a record of the comparison.
- **Save As > Workspace Variable** — Export XML comparison results to workspace.
- In the **Navigate** section, click the arrow buttons (or press Up or Down keys) to go to the previous difference or go to the next difference.
- **Compare Selected Parameter** — Open a new report for the currently selected pair of parameters. Use this when the report cannot display all the details in the Parameters pane, e.g., long character vectors or a script.

Use the **View** tab controls on the toolbar for the following functions:

- **Expand All** — Expands every item in the tree.

---

**Tip** Right-click to expand or collapse the hierarchy within the selected tree node.

---

- **Collapse All** — Collapses all items in the tree to the most compact view possible.

---

**Note** It may not be possible for the analysis to detect matches between previously corresponding sections of files that have diverged too much.

---

## Save Comparison Log Files in a Zip File

Temporary XML comparison files accumulate in `tempdir/MatlabComparisons/XMLComparisons/TempDirs/`. These temporary files are deleted when you close the related comparison report.

You can zip the temporary files (such as log files) created during XML comparisons, for sharing or archiving. While the comparison report is open, enter:

```
xmlcomp.zipTempFiles('c:\work\myexportfolder')
```

The destination folder must exist. The output reports the zip file name:

Created the zipfile "c:\work\myexportfolder\20080915T065514w.zip"

To view the log file for the last comparison in the MATLAB Editor, enter:

```
xmlcomp.showLogFile
```

## Export Results to the Workspace

To export the XML comparison results to the MATLAB base workspace,

- 1 On the **Comparison** tab, in the **Comparison** section, select **Save As > Workspace variable**.

The Input Variable Name dialog box appears.

- 2 Specify a name for the export object in the dialog box and click **OK**. This action exports the results of the XML comparison to an `xmlcomp.Edits` object in the workspace.

The `xmlcomp.Edits` object contains information about the XML comparison including file names, filters applied, and hierarchical nodes that differ between the two XML files.

To create an `xmlcomp.Edits` object at the command line without opening the Comparison Tool, enter:

```
Edits = xmlcomp.compare(a.xml,b.xml)
```

Property of <code>xmlcomp.Edits</code>	Description
Filters	Array of filter structure arrays. Each structure has two fields, Name and Value.
LeftFileName	File name of left file exported to XML.
LeftRoot	<code>xmlcomp.Node</code> object that references the root of the left tree.
RightFileName	File name of right file exported to XML.
RightRoot	<code>xmlcomp.Node</code> object that references the root of the right tree.
TimeSaved	Time when results exported to the workspace.
Version	MathWorks release-specific version number of <code>xmlcomp.Edits</code> object.

Property of <code>xmlcomp.Node</code>	Description
Children	Array of <code>xmlcomp.Node</code> references to child nodes, if any.
Edited	Boolean — If <code>Edited = true</code> then the node is either inserted or part of a modified matched pair.
Name	Name of node.
Parameters	Array of parameter structure arrays. Each structure has two fields, Name and Value.
Parent	<code>xmlcomp.Node</code> reference to parent node, if any.

Property of <code>xmlcomp.Node</code>	Description
Partner	If matched, Partner is an <code>xmlcomp.Node</code> reference to the matched partner node in the other tree. Otherwise empty [ ].


## See Also


## Related Examples

- “Compare Files and Folders and Merge Files” on page 6-5

## Manage Files and Folders

This table shows how to create, open, move, and rename files and folders on local and network drives. If you have MATLAB Drive Connector installed on your system, you also can access files and folders in MATLAB Drive from MATLAB.

Action	Tools Workflow	Function Alternative
Create a new folder	<p>In the Current Folder browser, right-click in white space, and then select <b>New &gt; Folder</b>.</p> <p>MATLAB creates and selects a folder named <b>New Folder</b> in the current folder.</p>	<p>Use the <code>mkdir</code> function. For example, create a subfolder named <code>newdir</code> in a parent folder named <code>parentFolder</code>:</p> <pre>mkdir('parentFolder','newdir');</pre>
Move a file or folder	<p>In the Current Folder browser, click and drag the item.</p> <p>You cannot move a folder while it is on the search path.</p>	<p>Use the <code>movefile</code> function. For example, move the file named <code>myfile.m</code> in the current folder to the folder, <code>d:/work</code>:</p> <pre>movefile('myfile.m','d:/work');</pre>
Rename a file or folder	<p>In the Current Folder browser, right-click the item and select <b>Rename</b>.</p> <p>File names must start with a letter, and can contain letters, digits, or underscores.</p>	<p>Use the <code>movefile</code> function. For example, in the current folder, rename <code>myfile.m</code> to <code>oldfile.m</code>:</p> <pre>movefile('myfile.m','oldfile.m');</pre>
Open a file in MATLAB	<p>On the <b>Home</b> tab, in the <b>File</b> section, click <b>Open</b> , and then select a file to open.</p> <p>You also can double-click the file in the Current Folder browser.</p> <p>To open a file in the Editor as a text file, even if the file type is associated with another application or tool right-click the file in the Current Folder browser and select <b>Open as Text</b>.</p>	<p>Use the <code>open</code> function. The file opens in MATLAB or in an external application, depending on the file extension.</p>
Open a file in another program	<p>In the Current Folder browser, right-click the file and select <b>Open Outside MATLAB</b>. The file opens in the application or tool that the operating system associates with the file type.</p>	
Preview file contents without opening the file	<p>In the Current Folder browser, right-click the file and select <b>Show Details</b>. The Details Panel expands.</p> <p>Not supported for live scripts and functions.</p>	none

Action	Tools Workflow	Function Alternative
Delete a file or folder	<p>In the Current Folder browser, select the file or folder and press <b>Delete</b>.</p> <p>By default, MATLAB deletes or recycles files and folders according to your operating system preferences. To permanently remove the selection when the system preference is set to recycle, press <b>Shift+Delete</b>.</p> <p>On Linux systems, you can request that MATLAB move deleted files to a temporary folder by setting the <b>Deleting files</b> preference. Access this preference on the <b>Home</b> tab, in the <b>Environment</b> section, by clicking  <b>Preferences</b>. Select <b>MATLAB &gt; General</b>.</p>	<p>To delete a file, use the <b>delete</b> function. For example, delete a file named <code>myfile.m</code> in the current folder:</p> <pre>delete('myfile.m');</pre> <p>By default, files are permanently removed. To move deleted files to a temporary folder instead, use the <b>recycle</b> function or set the <b>Deleting files</b> preference.</p> <p>To delete a folder, use the <b>rmdir</b> function.</p> <p><b>Note</b> You cannot recover folders deleted using <b>rmdir</b>.</p>
View MATLAB Drive recent activity	In the Current Folder browser, right-click any MATLAB Drive file or folder and select <b>MATLAB Drive &gt; View Recent Activity...</b>	none
Open MATLAB Drive online	In the Current Folder browser, right-click any MATLAB Drive file or folder and select <b>MATLAB Drive &gt; Go to MATLAB Drive Online...</b>	none

To open the Current Folder browser if it is not visible, go to the **Home** tab, and in the **Environment** section, click **Layout**. Then, under **Show**, select **Current Folder**. Double-clicking a subfolder displays its contents, and makes that folder the current folder.

To add a quick access button to the toolbar, right-click the toolbar and select **Customize....** MATLAB opens the MATLAB Toolbar Preferences panel. In the **Controls** section, select from the available options and click **OK**. For example, if you have MATLAB Drive Connector installed, you can add a MATLAB Drive quick access button. To do so, in the MATLAB Toolbar Preferences panel, select the **Go to MATLAB Drive** option and click **OK**. MATLAB adds the button to the toolbar.



## Manage Files and Folders in MATLAB Online

MATLAB Online on page 10-2 provides access to MATLAB from a standard web browser. In MATLAB Online, you only have access to the files and folders in your MATLAB Drive, and some file actions are not available.

A special purpose folder named **Published** stores the paths to your published program files and results. This folder is publicly available to others on the web.

To transfer a file from MATLAB Online to the local system, select the file and on the **Home** tab, select **Download**.

### See Also

`delete` | `edit` | `mkdir` | `movefile` | `open` | `recycle` | `rmdir`

### More About

- “Share Folders in MATLAB” on page 6-33
- “Save and Load Workspace Variables” on page 5-13
- “Configure the Run Button for Functions”
- “Errors When Updating Folders on Search Path” on page 6-56

## Share Folders in MATLAB

Starting in R2019b, if you want other people to be able to view or edit your files, you can share the folder in MATLAB and control the file permissions. You can share a folder by inviting individual members to have access to the folder or by sharing a link to the folder.

To share a folder from MATLAB, MATLAB Drive Connector must be running and the folder you choose to share must be in your MATLAB Drive. If you are working in MATLAB Online on page 10-2, you do not need MATLAB Drive Connector to share folders since sharing is always enabled.

For more information about sharing with MATLAB Drive, including limitations, see the MATLAB Drive documentation.

### Share a Folder

To share a folder by invitation, in the Current Folder browser, right-click the folder and select **Share > Manage Members**. You can select to share with view-only or can-edit permission for each person individually. To enter several addresses at one time, use a semi-colon or comma separator. You can only do this if they all have the same access level.

People you invite to a shared folder in this way will receive an email invitation. They must accept the invitation to have access to the shared folder. When inviting individual participants, you can make changes to each member's access at any time after the initial invite.

To share a folder with a view-only link, in the Current Folder browser, right-click the folder and select **Share > Manage Link**. Click **Copy Link** to copy the link to the clipboard.

In MATLAB Online, to share a folder that you have not shared before by invitation, right-click the folder and select **Share > Invite Members**. To share a folder by link, right-click the folder and select **Share > Create Link**.

### Remove Access to Shared Folder

You can rescind invitations to a shared folder when you no longer want the content to be shared. To rescind an invitation, right-click the shared folder and select **Share > Manage Members**. Click the **X** next to each member name to delete shared access. Changing the access of invited members does not change access for people who joined using a shared link.

To remove access to a shared folder from a view-only link, right-click the folder and select **Share > Manage Link**. Then, Click **Delete Link**.

People who joined using the link will no longer have access to the shared folder, and anyone who then clicks the link gets an error. Deleting the link does not cause any change in access by members who received personal invitations.

### Access Folders Shared with You

When you are personally invited to a shared folder, you will receive an email invitation. After you accept the invitation, you can view the shared folder in the Current Folder browser.

When you are provided with a link to a shared folder, click the link and an invitation shows up in MATLAB Drive online. When you accept the invitation, the shared folder appears in the Current Folder browser.

### **See Also**

### **More About**

- “Manage Files and Folders” on page 6-30
- “Restore Files in MATLAB Online” on page 10-4



## Files and Folders that MATLAB Accesses

### In this section...

“Where Does MATLAB Look for Files?” on page 6-35

“Files and Folders You Should Add to the Search Path” on page 6-35

“When Multiple Files Have the Same Name” on page 6-35

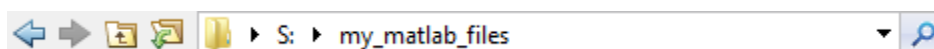
“Locations of MathWorks Products” on page 6-36

### Where Does MATLAB Look for Files?

When you do not specify a path to a file, MATLAB looks for the file in the current folder or on the search path. Functions in the current folder take precedence over functions with the same file name that reside anywhere on the search path. To identify the current folder, type `pwd` in the Command Window.

To make files accessible to MATLAB, do one of the following:

- Change the current folder to the folder that contains the files. Use the `cd` function or browse to a different folder in the current folder toolbar:



- Add the folder that contains the files to the search path. Changes you make to the search path apply to the current MATLAB session. To reuse the modified search path in future MATLAB sessions, save your changes.
- Store individual files in the *userpath* MATLAB folder, which is on the search path. To determine the location of this folder, run the `userpath` function.

### Files and Folders You Should Add to the Search Path

The MATLAB search path should include:

- Folders containing files that you run.
- Folders containing files that are *called by* files you run.
- Subfolders containing files that you run. Making a folder accessible does not make its subfolders accessible.

For files in @ (class) and + (package) folders, make the parent folder accessible. For details, see “Folders Containing Class Definitions”.

If files call other files that are in multiple folders, determine the location of all the called files by creating a Dependency Report. See “Dependencies Within a Folder”

### When Multiple Files Have the Same Name

Name conflicts arise when MATLAB has access to multiple files with the same name, and when a file has the same name as a variable in the base workspace or a built-in function for a MathWorks product.

When there are name conflicts, MATLAB follows these precedence rules:

- “Function Precedence Order”
- “Class Precedence and MATLAB Path”

The file that MATLAB does *not* use is called a shadowed file. In some cases, MATLAB warns you that a shadowed file exists.

## Locations of MathWorks Products

Files and folders for products provided by MathWorks are in *matlabroot/toolbox*. The files and folders under *matlabroot* are important to your installation. In particular:

- Do *not* store your personal files and folders in *matlabroot/toolbox*.
- Do *not* change files, folders, and subfolders in *matlabroot/toolbox*. The exception is the `pathdef.m` file, which you can update and save in its default location, *matlabroot/toolbox/local*.

To see a list of all toolbox folder names supplied with MathWorks products, run:

```
dir(fullfile(matlabroot,'toolbox'))
```

## See Also


`cd` | `pwd` | `userpath`

## More About

- “What Is the MATLAB Search Path?” on page 6-44
- “MATLAB Startup Folder” on page 1-14
- “Toolbox Path Caching in MATLAB” on page 1-20

## Current Folder Browser Preferences

You can specify the number of files that display in the Current Folder browser, and customize their appearance.

On the **Home** tab, in the **Environment** section, click  **Preferences**. Then, select **MATLAB > Current Folder**.

Some Current Folder Browser preferences are not available in MATLAB Online on page 10-2.

Preference	Usage
<b>History</b>	Specify the number of recently used folders maintained in the Current Folder toolbar drop-down list.
<b>Refresh</b>	<p>Specify how frequently the Current Folder browser updates to reflect changes to files made from programs and tools other than MATLAB.</p> <p>When you access files on a network, frequent refreshing of the Current Folder browser can slow performance in MATLAB. If this seems to be a problem, try increasing the value for <b>Number of seconds between auto-refresh</b>. Alternatively, clear the <b>Auto-refresh view from file system</b> selection to disable automatic refresh.</p> <p>To manually refresh the view at any time, right-click in the Current Folder browser and select <b>Refresh</b>.</p>
<b>Path indication</b>	<p>Control the appearance of folders and files that are inaccessible to MATLAB, and whether to display tooltips describing their status. MATLAB cannot access files if they are not on the search path or, in some cases, if they are in a private folder.</p> <p>Select the <b>Indicate inaccessible files</b> check box to dim the display of files and folders inaccessible to MATLAB. Move the <b>Text and icon transparency</b> slider to adjust the level of dimming.</p> <p>Select the <b>Show tooltip explaining why files are inaccessible</b> check box to display a tooltip that provides information on why a dimmed file is inaccessible, when you hover over it.</p> <p>If you do not select the <b>Indicate inaccessible files</b> check box, then the Current Folder browser displays all files and folders as undimmed and provides no tooltips.</p>
<b>Toolbar</b>	Access the toolbar preferences to adjust the toolbar layout and controls for Desktop tools, including the Current Folder browser.
<b>Initial working folder</b>	Access the General preferences to specify the current folder in MATLAB when it starts.

Preference	Usage
<b>Hidden Files</b>	<p>Specify whether the Current Folder browser displays files and folders that the operating system hides from system file browsers and file-listing commands.</p> <p>This preference does not apply to Microsoft Windows platforms. On Windows platforms, the Current Folder browser follows the Windows preference for showing hidden files. To set or change the Windows preference, access the Folder Options, and then select an option for viewing <b>Hidden files and folders</b>.</p>

To change how dates display in the Current Folder browser, change the short date format for your operating system. Then, refresh the date display: Right-click in the Current Folder browser and select **Refresh**. MATLAB uses your operating system's short date format to display dates in both the Current Folder browser and the Command History.

## Specify File Names

### In this section...

“Construct Valid Path and File Names” on page 6-39

“Case Sensitivity of File Names” on page 6-41

## Construct Valid Path and File Names

### Specify Path Names

A path name specifies file locations, for example, `C:\work\my_data` (on Microsoft Windows platforms) or `/usr/work/my_data` (on Linux or Mac platforms). If you do not specify a path name when accessing a file, MATLAB first searches in the current folder. To indicate a file in a particular location, specify a path name.

Path name specifications differ, depending on the platform on which you are running MATLAB. Use the `fullfile` function to construct path names in statements that work on any platform. This function is particularly useful when you provide code to someone using it on a platform other than your own.

`fullfile` inserts platform-specific file separators where necessary. The file separator character is the symbol that distinguishes one folder level from another in a path name. A forward slash (/) is a valid separator on any platform. A backward slash (\) is valid only on Microsoft Windows platforms. In the full path to a folder, the final slash is optional. Type `filesep` in the Command Window to determine the correct file separator character to use on your platform.

To identify the platform on which MATLAB is currently running, use the `ismac`, `ispc`, and `isunix` functions.

### Characters Within File and Folder Names

File names must start with a letter, and can contain letters, digits, or underscores.

Avoid using accent characters such as umlauts or circumflexes in path names. MATLAB might not recognize the path. In addition, attempts to save a file to such a path might result in unpredictable behavior.

If a path or file name contains spaces, enclose the input in single quotes. For example:

```
load 'filename with space.mat'
```

or

```
load('filename with space.mat')
```

### Absolute and Relative Path Names

MATLAB always accepts absolute path names (also called full path names), such as `I:/Documents/My_Files` or `/users/myuserid/Homework/myfile.m`. An absolute path name can start with any of the following:

- UNC path '\\ '.

- Drive letter, on Microsoft Windows platforms, such as `C:\`.
- `'/'` character on Linux platforms.

Some MATLAB functions also support relative path names. Unless otherwise noted, the path name is relative to the current folder. For example:

- `myfile.m` refers to the `myfile.m` file in the current folder.
- `myfolder` refers to the `myfolder` folder in the current folder.
- `../myfolder/myfile.m` refers to the `myfile.m` file in the `myfolder` folder, where `myfolder` is at same level as the current folder. Each repetition of `../` at the beginning of the path moves up an additional folder level.

---

**Tip** If multiple documents are open and docked in the Editor, you can copy the absolute path of any of these documents to the clipboard. This practice is useful if you need to specify the absolute path in another MATLAB tool or an external application. Right-click the document tab, and then select **Copy Full Path to Clipboard**.

---

### Partial Path Names in MATLAB

A partial path name is the last portion of a full path name for a location on the MATLAB search path. Some functions accept partial path names.

Examples of partial path names are: `matfun/trace`, `private/cancel`, and `demos/clown.mat`.

Use a partial path name to:

- Specify a location independent of where MATLAB is installed.
- Locate a function in a specific toolbox when multiple toolboxes contain functions with that name. For example, to open the file for the `set` function in the Database Toolbox™ product, type:  
`open database/set`
- Locate method files. For example, to check if a `plot` method exists for the time series object, type:  
`exist timeseries/plot`

Specifying the at sign character (`@`) in method folder names is optional.

- Locate private and method files, which sometimes are hidden.

Be sure to specify enough of the path name to make the partial path name unique.

### Maximum Length of Path Names in MATLAB

The maximum length allowed for a path name depends on your platform.

For example, on Microsoft Windows platforms:

- The maximum length is known as `MAX_PATH`.
- You cannot use an absolute path name that exceeds 260 characters.
- For a relative path name, you might need to use fewer than 260 characters. When the Windows operating system processes a relative path name, it can produce a longer absolute path name, possibly exceeding the maximum length.

If you get unexpected results when working with long path names, use absolute instead of relative path names. Alternatively, use shorter names for folders and files.

## Case Sensitivity of File Names

In general, it is best to specify path and case precisely when specifying a file name.

### Case Sensitivity When Calling Functions

You call function files by specifying the file name without the file extension. MATLAB returns an error if it cannot find a case-sensitive match on the search path. By default, MATLAB suggests a function with the correct case.

When multiple files have the same name, MATLAB follows precedence rules to determine which to call. For more information, see “Function Precedence Order”.

### Case Sensitivity When Loading and Saving Files

**Linux platforms** — File names are case sensitive.

- When loading or reading from a file, specify the file name using the correct case.
- When saving or writing to a file, MATLAB saves the file in the case you specify. Two files with the same name, but different cases can exist in the same folder.

**Windows platforms** — File names are case insensitive. The Windows operating system considers two files with the same name to be the same file, regardless of case. Therefore, you cannot have two file names that differ only by case in the same folder.

- When loading or reading from a file, MATLAB accesses the file with the specified name that is higher on the search path, regardless of case. For example, if you attempt to load MYFILE and myfile.mat is higher on the search path than MYFILE.MAT, then MATLAB loads myfile.mat without warning that there is a case mismatch.
- When saving or writing to a file, if you specify a file name that already exists in the folder, MATLAB accesses the existing file without warning. For example, if you save data to a file named myfile using the save function, and MYFILE.mat already exists in the folder, the data replaces the contents of MYFILE.mat. However, the file name remains MYFILE.mat.

## See Also

filesep | fullfile | ismac | ispc | isunix | which

## More About

- “What Is the MATLAB Search Path?” on page 6-44

## Create and Extract from Zip Archives

### In this section...

“Create a Zip Archive” on page 6-42  
 “Add Files to a Zip Archive” on page 6-42  
 “Extract Files from a Zip Archive” on page 6-43  
 “Compare Zip Archive to Unzipped Files” on page 6-43

### Create a Zip Archive

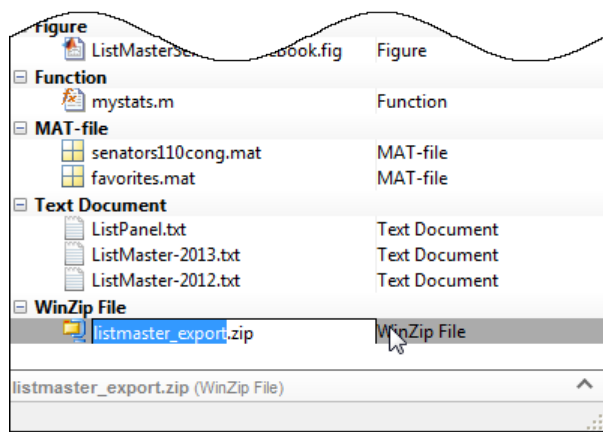
Create archives using zip files to back up files, conserve file storage space, or to share collections of files with others. You can either create an empty archive, or select files and folders to create an initial archive. In either case, you can add more files later.

Create zip archives interactively using the Current Folder browser:

- To create an empty zip file, right-click white space, and then select **New > Zip File**.
- To create a populated zip file from selected files and folders, select the folders and files you want to archive, right-click, and then select **Create Zip File**.

MATLAB creates an archive with a default name of `Untitled $n$ .zip`, where  $n$  is an integer.

Type over the default file name to specify a descriptive name, for example `listmaster_export.zip`, as shown here.



You also can create zip archives programmatically using the `zip` function. For example, to zip all files with a `.m` and `.mat` extension in the current folder to a zip file archive named `backup.zip`, call:

```
zip('backup',{'*.m','*.mat'});
```

### Add Files to a Zip Archive

To add files and folders to a zip file archive in the Current Folder browser, do one of the following:

- Select, and then drag the file that you want to add onto the archive.



- Copy the file that you want to add to the archive. Then, select the archive to which you want to add the file and paste the file into the archive.

## Extract Files from a Zip Archive

To extract a single file from within a zip file archive in the Current Folder browser:

- 1 Expand the zip file archive to view the archive contents, by clicking the associated + (expand) button. By default, files within a zip file archive appear dimmed to indicate that they are not on the MATLAB path.
- 2 Drag the file into a folder in the Current Folder browser.

MATLAB extracts the file and saves it to the folder where you dragged or pasted it.

To extract all the contents of a zip file, double-click the zip file in the Current Folder browser. MATLAB creates a folder with the same name as the zip file, and extracts the entire contents of the zip file into this folder.

To extract the contents of a zip file programmatically, use the `unzip` function. `unzip` also allows you to specify a target folder. For example, to unzip the file, `examples.zip`, to a folder named `myfolder`, call:

```
unzip('examples.zip','myfolder')
```

---

**Note** Archives created outside of MATLAB can be encrypted or password-protected. You cannot add files to, or extract files from, protected archives from within MATLAB.

---

## Compare Zip Archive to Unzipped Files

To determine differences between archived and unarchived files, use the Comparison Tool from within the Current Folder browser as you would for any other files and folders.

- Right-click a zip archive, and then from the context menu select **Compare Against** and specify the folder to which you want to compare the contents of the zip archive.
- Expand a zip archive, right-click a file within it, and then from the context menu select **Compare Against**. Specify the file to which you want to compare the archived file.

## See Also

`unzip` | `zip`

## More About

- “Compare Files and Folders and Merge Files” on page 6-5

## What Is the MATLAB Search Path?

The MATLAB search path is a subset of all the folders in the file system. MATLAB uses the search path to locate files used with MathWorks products efficiently.

The order of folders on the search path is important. When files with the same name appear in multiple folders on the search path, MATLAB uses the one found in the folder nearest to the top of the search path.

By default, the search path includes

- The MATLAB *userpath* folder, which is added to the search path at startup, and is the default location for storing user files
- The folders defined as part of the MATLABPATH environment variable
- The folders provided with MATLAB and other MathWorks products, which are under *matlabroot/toolbox*, where *matlabroot* is the folder displayed when you run `matlabroot` in the Command Window

Class, package, private, and resources folders are special folders that cannot be specified explicitly as part of the search path. A special folder is added to the search path implicitly when its parent folder is specified as part of the path. To access the files and folders within a special folder, you must add its parent folder to the path.

You can explicitly add folders to the search path for the files you run. For more information about adding files to the search path, see “Change Folders on the Search Path” on page 6-48.

In MATLAB Online on page 10-2, all folders are automatically on the path.

### userpath Folder on the Search Path

The *userpath* folder is first on the search path. By default, MATLAB adds the *userpath* folder to the search path at startup. This folder is a convenient place for storing files that you use with MATLAB.

The default *userpath* folder is platform-specific.

- Windows platforms — %USERPROFILE%/Documents/MATLAB.
- Mac platforms — \$home/Documents/MATLAB.
- Linux platforms — \$home/Documents/MATLAB if \$home/Documents exists.
- MATLAB Online — /users/*youruserid*.

Alternatively, to determine or change the current *userpath* folder, call `userpath`.

By default, the *userpath* folder is also the startup folder when you start MATLAB by double-clicking either the MATLAB shortcut on Windows systems or the MATLAB application on Mac systems.

### MATLABPATH Environment Variable

The MATLABPATH environment variable can contain a list of additional folders to be added to the MATLAB search path at startup. These folders are placed after the *userpath* folder, but ahead of the folders supplied by MathWorks. By default, the MATLABPATH environment variable is not set. For

more information on how to set the MATLABPATH environment variable, see “Set the MATLABPATH Environment Variable” on page 6-51.


## Determine If Files and Folders Are on the Search Path

There are several ways to determine if files and folders are on the search path. You can either check whether an individual file or folder is on the search path, or you can view the entire search path.

### Check Whether File or Folder on Search Path

To determine whether a file is on the search path, run `which filename`. If the file is on the search path, MATLAB returns the full path to the file.

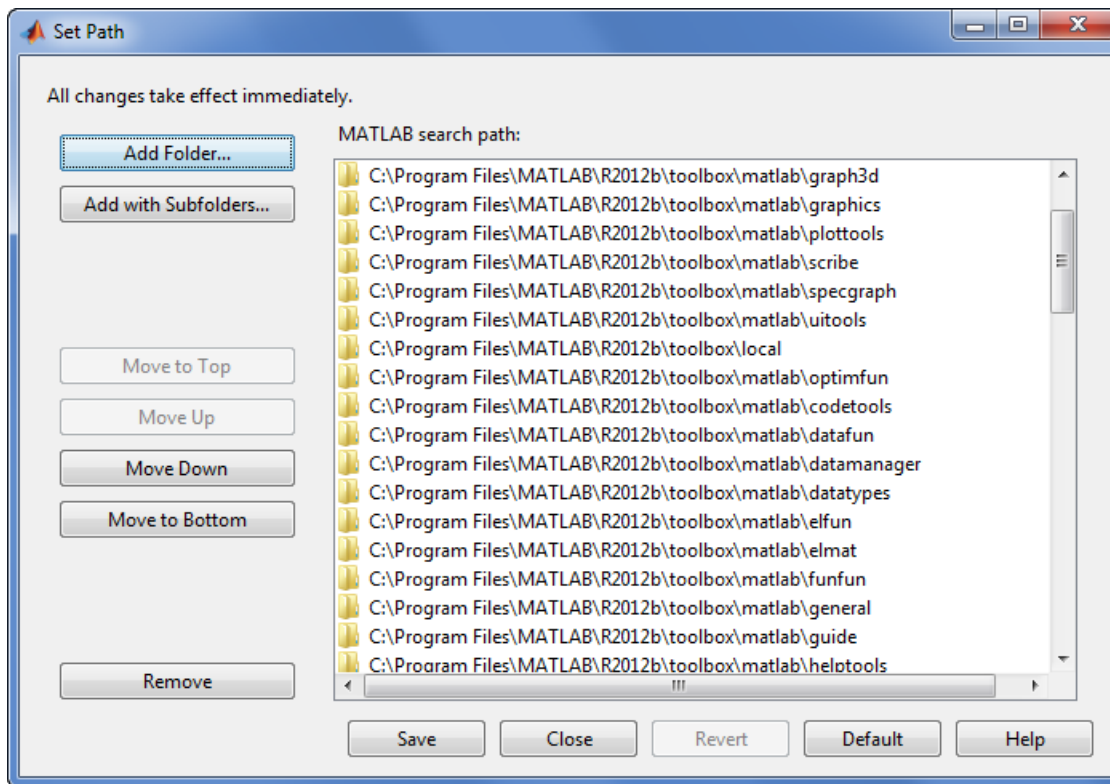
To determine whether a file or folder is on the search path, use the Current Folder browser. Files and folders not on the path are dimmed. To ensure that the Current Folder browser is set to indicate whether a file or folder is on the search path, right-click any file or folder, and select the **Indicate Files Not on Path** option.

Hover the pointer over any dimmed file or folder in the Current Folder browser to find out why it is dimmed. A tooltip opens with an explanation. Frequently, the tooltip indicates that the file or folder is not on the MATLAB path. If a tooltip does not appear, it may be disabled. To enable it, go the **Home** tab and in the **Environment** section, click  **Preferences**. Then, select **MATLAB > Current Folder**. Select **Show tooltip explaining why files are inaccessible** to display the tooltip.

### View Entire Search Path

Run the `path` command to view all the folders on the MATLAB search path.

Alternatively, use the Set Path dialog box to view the entire MATLAB search path. On the **Home** tab, in the **Environment** section, click **Set Path**. The Set Path dialog box opens, listing all folders on the search path. For more information on using the Set Path dialog box, see “Change Folders on the Search Path” on page 6-48.



## The Search Path Is Not the System Path

The search path is *not* the same as the system path. Furthermore, there is no explicit relationship between the MATLAB search path and the system path. However, both paths help in locating files, as follows:

- MATLAB uses the search path to locate MATLAB files efficiently.
- The operating system uses a system path to locate operating system files efficiently.

## How MATLAB Stores the Search Path

MATLAB saves search path information in the `pathdef.m` file. This file contains a series of full path names, one for each folder on the search path.

By default, `pathdef.m` is in `matlabroot/toolbox/local`.

When you change the search path, MATLAB uses it in the current session, but does not update `pathdef.m`. To use the modified search path in the current and future sessions, save the changes using `savepath` or the **Save** button in the Set Path dialog box. This updates `pathdef.m`.

In MATLAB Online, all changes to the search path are automatically saved.

## See Also

`userpath`

## **More About**

- “Add Folders to the MATLAB Search Path at Startup” on page 6-51
- “Change Folders on the Search Path” on page 6-48

## Change Folders on the Search Path

### In this section...

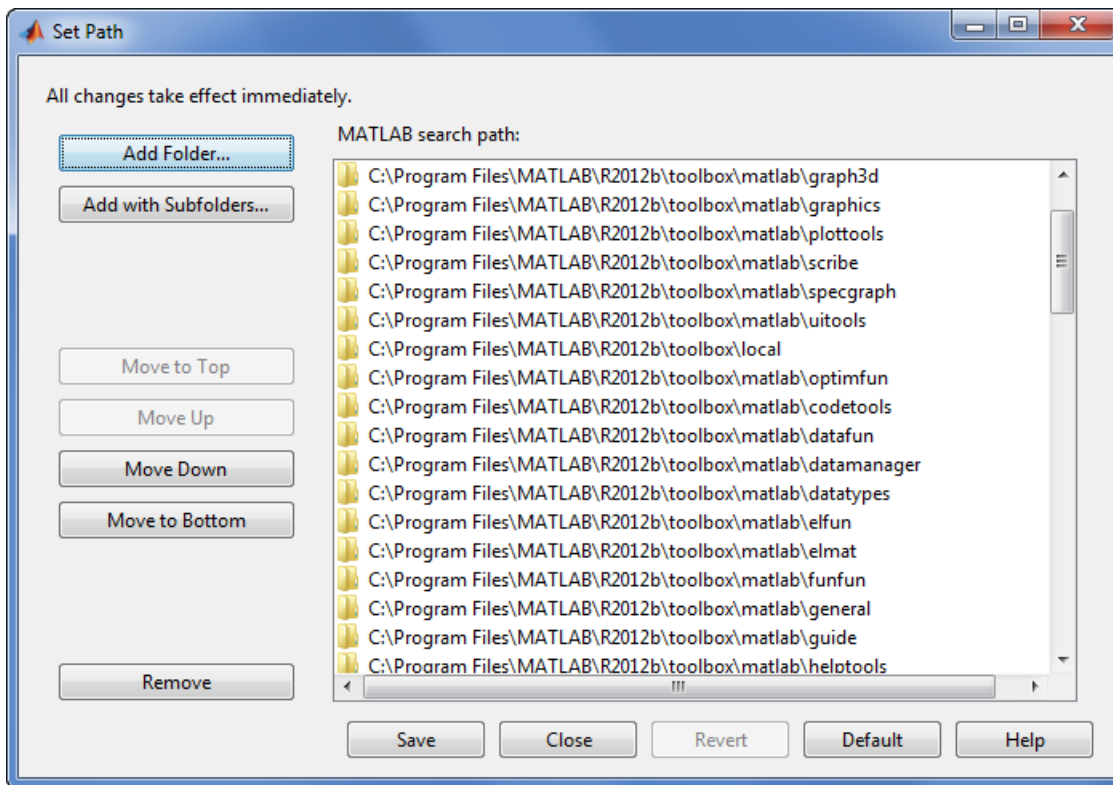
“For Current and Future Sessions” on page 6-48

“For the Current Session Only” on page 6-49

### For Current and Future Sessions

You can interactively add and remove folders, and change the order of folders on the search path, for the current MATLAB session and for future MATLAB sessions. When files with the same name appear in multiple folders on the search path, MATLAB uses the one found in the folder nearest to the top of the search path.

- 1 On the **Home** tab, in the **Environment** section, click **Set Path**. The Set Path dialog box appears.



- 2 Use the Set Path dialog box to modify the search path.
- 3 Apply or cancel the search path changes:
  - To use the newly modified search path only in the current session, click **Close**.
  - To reuse the newly modified search path in the current session and future sessions, click **Save**, and then **Close**.
  - To undo your changes, click **Revert**, and then **Close**.
  - To restore the default search path, click **Default**, and then **Close**. The default search path contains only folders provided by MathWorks.

**Note** The MATLAB (*userpath*) folder automatically moves to the top of the search path the next time you start MATLAB. For more information about the *userpath* folder, see “*userpath* Folder on the Search Path” on page 6-44

---

## For the Current Session Only

There are three ways to change the folders on the search path for the current MATLAB session only:

- Use the Set Path dialog box to make changes to the search path, and do not save the changes.
  - 1** On the **Home** tab, in the **Environment** section, click **Set Path**.
  - 2** After making the changes, click **Close**.
- Use the Current Folder browser to add or remove folders from the search path.
  - 1** From the Current Folder browser, select, and then right-click the folder or folders to add or remove.
  - 2** From the context menu, select **Add to Path** or **Remove from Path**, and then select an option:
    - **Selected Folders**
    - **Selected Folders and Subfolders**
- In the Editor, you also can add or remove the folder that contains an Editor document from the search path. Right-click the document tab, and then select an option to Add or Remove the folder from the Search Path.

## See Also

addpath | rmpath | savepath

## Use Search Path with Different MATLAB Installations

The default search path changes for each MATLAB version because the default folders that come with the products change. Different MATLAB versions cannot use the same `pathdef.m` file.

To use your files with a new MATLAB version or with multiple versions, do one of the following:

- For each version, add the folders containing your files to the search path. Save the search path (that is, save the `pathdef.m` file) where that version of MATLAB can access it.
- Include `addpath` statements in the `startup.m` file. Use the same `startup.m` file with the multiple versions of MATLAB.

Including `addpath` statements in the `startup.m` file also allows you to use your files with MATLAB on different platforms.

### See Also

`addpath`

### More About

- “Startup Options in MATLAB Startup File” on page 1-18



## Add Folders to the MATLAB Search Path at Startup

There are two ways to add folders to the MATLAB search path at startup. You can either use a `startup.m` file or you can set the `MATLABPATH` environment variable.

### Use a `startup.m` File

The `startup.m` file is for specifying startup options. You can add folders to the search path by including `addpath` statements in a `startup.m` file. For example, to add the specified folder, `/home/username/mytools` to the search path at startup, include this statement in a `startup.m` file:

```
addpath /home/username/mytools
```

For more information on creating a `startup.m` file with `addpath` statements, see “Startup Options in MATLAB Startup File” on page 1-18.

### Set the `MATLABPATH` Environment Variable

You can also add folders to the search path at startup by setting the `MATLABPATH` environment variable. :

#### Windows

To set the `MATLABPATH` environment variable in Windows, from the Windows **Control Panel**, go to **System** and select **Advanced system settings**. Click the **Environment Variables...** button. Click **New...** or **Edit...** to create or edit the `MATLABPATH` environment variable. In the dialog box that appears, set the variable name to `MATLABPATH` and the variable value to a semicolon-separated list of folders you want to add to the search path. For example, to add two folders, `c:\matlab_files\myfolder1` and `c:\matlab_files\myfolder2`, to the `MATLABPATH` environment variable, enter `c:\matlab_files\myfolder1;c:\matlab_files\myfolder2` as the variable value. Click **OK** to set the variable and exit the dialog box. Restart MATLAB for the new settings to take effect.

To set the environment variable from a command window, run the command `set MATLABPATH=folders`, where `folders` is a semicolon-separated list of folders. For example, suppose that you want to add two folders, `c:\matlab_files\myfolder1` and `c:\matlab_files\myfolder2`, to the `MATLABPATH` environment variable. Run the command

```
set MATLABPATH=c:\matlab_files\myfolder1;c:\matlab_files\myfolder2
```

Once the environment variable is set, you must start MATLAB from the same command window for the settings to take effect. The environment variable persists only as long as the command window is open.

#### UNIX and Mac

To set the `MATLABPATH` environment variable in UNIX and Mac, in a terminal, run the command `export MATLABPATH=folders`, where `folders` is a colon-separated list of folders.

For example, suppose that you want to add two folders, `/home/j/Documents/MATLAB/mine` and `/home/j/Documents/MATLAB/research`, to the `MATLABPATH` environment variable on a UNIX platform. Run the command

```
export MATLABPATH=/home/j/Documents/MATLAB/mine:/home/j/Documents/MATLAB/research
```

Once the environment variable is set, you must start MATLAB from the same shell for the settings to take effect. The environment variable persists only as long as the shell remains open.

---

**Note** If you are using a C shell (`cs`h or `tc`sh), the command for setting the `MATLABPATH` environment variable is `setenv MATLABPATH folders`.

---

To add the folders for all future MATLAB sessions, set the `MATLABPATH` environment variable as part of your shell configuration script.

### See Also

#### More About

- “What Is the MATLAB Search Path?” on page 6-44
- “Change Folders on the Search Path” on page 6-48

## Assign userpath as Startup Folder (Macintosh or UNIX)

This example shows how to assign the *userpath* folder as the startup folder on a Macintosh platform. The procedure is similar for UNIX platforms. Assume that *userpath* is set to the default value on a Macintosh platform where *smith* is the home folder.

Using a bash shell, set the `MATLAB_USE_USERWORK` environment variable so that *userpath* will be used as the startup folder.

```
export MATLAB_USE_USERWORK=1
```

From that shell, start MATLAB. Next, verify the current folder in MATLAB.

```
pwd
```

```
/Users/smith/Documents/MATLAB
```

Confirm that this is the same as the folder defined for *userpath*.

```
userpath
```

```
/Users/smith/Documents/MATLAB;
```

Confirm that the *userpath* is at the top of the search path.

```
path
```

```
/Users/smith/Documents/MATLAB  
/Users/smith/Applications/MATLAB/R2009a/toolbox/matlab/general  
/Users/smith/Applications/MATLAB/R2009a/toolbox/matlab/ops
```

```
...
```

## Path Unsuccessfully Set at Startup

When there is a problem with the search path, you cannot use MATLAB successfully.

Search path problems occur when:

- You save the search path on a Windows platform, and then try to use the same `pathdef.m` file on a Linux platform.
- The `pathdef.m` file becomes corrupt, invalid, renamed, or deleted.
- MATLAB cannot locate the `pathdef.m` file.

When MATLAB starts, if there is a problem with the search path, a message such as the following appears:

```
Warning: MATLAB did not appear to successfully set the search  
path...
```

For problems with the search path, try these recovery steps. Proceed from one step to the next only as necessary.

- 1 Ensure MATLAB is using the `pathdef.m` file you expect:
  - a Run  

```
which pathdef
```
  - b If you want MATLAB to use the `pathdef.m` file at another location, make corrections. For example, delete the incorrect `pathdef.m` file and ensure the correct `pathdef.m` file is in a location that MATLAB can access.
- 2 Look for and correct problems with the `pathdef.m` and `startup.m` files:
  - a Open `pathdef.m` and `startup.m` in a text editor. Depending on the problem, you might not be able to open the `pathdef.m` file.
  - b Look for obvious problems, such as invalid characters or path names.
  - c Make corrections and save the files.
  - d Restart MATLAB to ensure that the problem does not recur.
- 3 Try to correct the problem using the Set Path dialog box:
  - a Restore the default search path and save it. See “Change Folders on the Search Path” on page 6-48. Depending on the problem, you might not be able to open the dialog box.
  - b Restart MATLAB to ensure that the problem does not recur.
- 4 Restore the default search path using functions:
  - a Run `restoredefaultpath`, which sets the search path to the default and stores it in `matlabroot/toolbox/local`.
  - b If `restoredefaultpath` seems to correct the problem, run `savepath`.
  - c Restart MATLAB to ensure that the problem does not recur.

Depending on the problem, a message such as the following could appear:

```
The path may be bad. Please save your work (if desired), and quit.
```

- 5 Correct the search path problems encountered during startup:
  - a Run  

```
restoredefaultpath; matlabrc
```

Wait a few minutes until it completes.

- b** If there is a `pathdef.m` file in the startup folder, it caused the problem. Either remove the bad `pathdef.m` file or replace it with a good `pathdef.m` file. For example, run:

```
savepath('path_to_your_startup_folder/pathdef.m')
```

See “MATLAB Startup Folder” on page 1-14.

- c** Restart MATLAB to ensure that the problem does not recur.

After correcting problems with the search path, make any changes to run your files. For example, add the *userpath* folder or other folders to the search path.

## Errors When Updating Folders on Search Path

You can encounter errors or unexpected behavior when you try to delete, rename, or move folders that:

- Are on the search path
- Contain subfolders that are on the search path

The behavior varies by platform because it depends on the behavior of similar features in the operating system.

If your task fails and the error message indicates it is because the folder is on the search path, then do the following:

- 1** Remove the folder from the search path.
- 2** Delete, rename, or move the folder.
- 3** Add the folder to the search path.

## Troubleshoot Invalid or Unresponsive Windows Change Notification Handles

MATLAB uses a Windows operating system feature called change notification handles to detect when files in an associated folder are modified. Under certain circumstances, Windows fails to provide MATLAB with a valid or responsive Change Notification Handle. The three most common causes for invalid or unresponsive change notification handles are:

- Windows has exhausted its supply of notification handles.
- The specified folder resides on a file system that does not support change notification. (Syntax TAS file server, SAMBA file server, and many NFS file servers are known to have this limitation.)
- Network or file server latency delays the arrival of the change notification so that changes are not detected on a timely basis.

When MATLAB is unable to obtain a valid or responsive Change Notification Handle, it cannot automatically detect changes to files and folders. For example, new functions added to an affected folder might not be visible, and changed functions in memory might not be reloaded.

### Control How MATLAB Detects Changes in Files and Folders

If MATLAB is unable to detect changes to your files and folders due to invalid or unresponsive change notification handles, you can control how MATLAB detects changes in folders.

If your file system updates folder timestamps when files are added to folders, you can set your system remote path policy to detect changes by testing the timestamps of folders. To do so, include these commands in a `startup.m` file. For more information on creating a `startup.m` file, see “Startup Options in MATLAB Startup File” on page 1-18.

```
system_dependent('RemotePathPolicy', 'TimecheckDir');
rehash path;
```

You might notice a performance degradation due to the time required to check the timestamps.

If your file system does not update folder timestamps (such as an NT file system), you can set your system remote path policy to detect changes by rereading the affected folders at frequent intervals. To do so, include these commands in a `startup.m` file.

```
system_dependent('RemotePathPolicy', 'Reload');
rehash path;
```

You might notice a significant performance degradation due to the time required to reread the folders.

To determine how MATLAB detects changes in folders, use this command:

```
system_dependent('RemotePathPolicy', 'Status');
```

In some cases, detecting new files or changed files in folders affected by the invalid or unresponsive change notification handles is not necessary. If detecting changes is not necessary, to provide maximum performance, you can disable your system remote path policy. To do so, include these commands in a `startup.m` file.

```
system_dependent('RemotePathPolicy', 'None');
rehash path;
```

## Clear Functions from Memory

Sometimes, changing your system remote path policy is not effective in preventing problems related to remote file system caching or network latency. If MATLAB is still unable to detect the changes that you have made to a function, you can clear the old copy of the function from memory using the `clear` function. MATLAB reads the updated function the next time it is called.

## Configure Change Notification Handle Warnings

To analyze which folders are affected by invalid or unresponsive Windows change notification handles, you can configure the number of warning messages issued by Windows. To do so, include one of these commands in a `startup.m` file. For more information on creating a `startup.m` file, see “Startup Options in MATLAB Startup File” on page 1-18.

- Show warning messages for all invalid or unresponsive change notification handles.  
`system_dependent('DirChangeHandleWarn', 'Always');`
- Only show the first warning message about invalid or unresponsive change notification handles.  
`system_dependent('DirChangeHandleWarn', 'Once');`
- Never show warning messages about invalid or unresponsive change notification handles.  
`system_dependent('DirChangeHandleWarn', 'Never');`

To determine when Windows warns about invalid or unresponsive change notification handles, use this command.

```
system_dependent('DirChangeHandleWarn', 'Status');
```

## See Also

`addpath` | `rehash`

## More About

- “What Is the MATLAB Search Path?” on page 6-44
- “Startup Options in MATLAB Startup File” on page 1-18



# Editor Preferences

---

- “Editor/Debugger Preferences” on page 7-2
- “Code Analyzer Preferences” on page 7-12

## Editor/Debugger Preferences

### In this section...

"General Preferences for the Editor/Debugger" on page 7-2

"Editor/Debugger Display Preferences" on page 7-3

"Editor/Debugger Tab Preferences" on page 7-4

"Editor/Debugger Language Preferences" on page 7-5

"Editor/Debugger Code Folding Preferences" on page 7-7

"Editor/Debugger Backup Files Preferences" on page 7-7


"Editor/Debugger Autoformatting Preferences" on page 7-8

"Editor/Debugger Autocoding Preferences" on page 7-10

You can customize the visual display and functionality of the Editor, Live Editor, and Debugger using Editor/Debugger preferences.

### General Preferences for the Editor/Debugger

You can specify which editor MATLAB uses, as well as how the MATLAB Editor and Live Editor behaves under various circumstances.

On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **Editor/Debugger**, and then adjust preference options as described in the table below.

Some general preferences are not available in MATLAB Online.


Preference	Usage
<b>Editor</b>	<p>Select which editor you want the MATLAB desktop to use when you edit a file:</p> <ul style="list-style-type: none"> <li>• <b>MATLAB Editor</b></li> <li>• <b>Text editor</b></li> </ul> <p>If you select <b>Text editor</b>, specify the full path for the editor application you want to use, such as Emacs or vi. For example, <code>c:/Applications/Emacs.exe</code>.</p> <p>This preference only applies to plain text files such as files with a <code>.m</code> or <code>.txt</code> extension.</p>
<b>Most recently used file list</b>	<p>In the <b>Number of entries</b> field, type the number of files that you want to appear in the list of recently used files at the bottom of the <b>File</b> menu.</p>
<b>Opening files in editor</b>	<p>Select <b>On restart reopen files from previous MATLAB sessions</b> if you want the Editor and the files it contained during your last MATLAB session to reopen when you restart MATLAB.</p>

Preference	Usage
	Select <b>Automatically open files when MATLAB reaches a breakpoint</b> to open a running program file when MATLAB encounters a breakpoint in that file.
<b>Automatic file changes</b>	Select <b>Save changes upon clicking away from a file</b> if you want the Editor to automatically save changes to a file in the Editor when you click away from the Editor. For the changes to be automatically saved upon clicking away from the Editor, you must have already saved the file at least once.
	Select <b>Reload unedited files that have been externally modified</b> if you want the Editor to automatically reload the version of a file that you opened and edited outside of MATLAB when the file currently open in the Editor has no unsaved changes.
	Select <b>Add line termination at end of file</b> to have MATLAB add a new empty line (sometimes referred to as a <CR>) to the end of a file automatically if the last line in the file is not empty.
	This preference only applies to plain text files such as files with a .m or .txt extension.
<b>Debugging in the Live Editor</b>	Select <b>Only show Step in button for user-defined functions</b> to have the Live Editor only step into user-defined functions and scripts. To have the Live Editor step into MathWorks functions as well, clear the option.

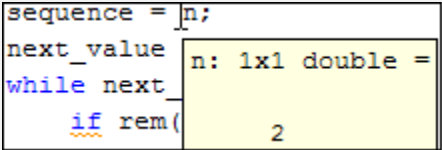
In MATLAB Online, to have MATLAB suggest and complete names automatically when you type the first few characters of the name in the Editor, Live Editor, and App Designer, in the **Suggestions and completions in Editor, Live Editor, and App Designer** section, select **Show automatically**. To have MATLAB suggest and complete names only after you press the **Tab** key select **Show on tab**.

## Editor/Debugger Display Preferences

You can change the appearance of the Editor and Live Editor.


On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **Editor/Debugger > Display**, and then adjust preference options as described in the table below.

Preference	Usage
<b>General display option</b>	Select <b>Highlight Current Line</b> and select a color to highlight the row with the cursor (also called the caret).
	This preference does not apply in the Live Editor.
	Select <b>Show line numbers</b> to display line numbers along the left edge of the Editor and Live Editor window.

Preference	Usage
	<p>Select <b>Enable data tips in edit mode</b> to display data tips when you are editing a MATLAB code file. (Data tips are always enabled in debug mode.)</p>  <p>For details, see “View Variable Value”.</p> <p>This preference does not apply in the Live Editor.</p> <p>Select <b>Display the Open as a Live Script banner</b> if you want the Open as a Live Script banner to appear at the top of documents in the Editor.</p>
<b>Right-hand text limit</b>	<p>Select <b>Show line</b> to display a vertical line with the specified <b>Width</b> and <b>Color</b> at the specified column (<b>Placement</b>) in the Editor.</p> <p>For details, see “Right-Side Text Limit Indicator”.</p> <p>This preference does not apply in the Live Editor.</p>

## Editor/Debugger Tab Preferences

You can specify the size of tabs and indents and details about how tabs behave in the Editor and Live Editor.


On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **Editor/Debugger > Tab**, and then adjust preference options as described in the table below.

Option	Usage
<b>Tab size</b>	<p>Specify the amount of space inserted when you press the <b>Tab</b> key.</p> <p>When you change the <b>Tab size</b>, it changes the tab size for existing lines in that file, unless you also select <b>Tab key inserts spaces</b>.</p>
<b>Indent size</b>	<p>Specify the indent size for <i>smart indenting</i>. Smart indenting is one of the “Editor/Debugger Language Preferences” on page 7-5.</p>
<b>Tab key inserts spaces</b>	<p>Select to insert a series of spaces when you press the <b>Tab</b> key. Otherwise, a tab acts as one space whose length is equal to the <b>Tab size</b>.</p>

Option	Usage
<b>Emacs-style Tab key smart indenting</b>	<p>Specifies an indenting style similar to the style that the Emacs editor uses.</p> <p>Lines indent according to smart indenting preferences when you position the cursor in a line or select a group of lines, and then press the <b>Tab</b> key.</p> <p>Smart indenting is one of the “Editor/Debugger Language Preferences” on page 7-5.</p> <p>If you select this preference, you cannot insert tabs within a line.</p>

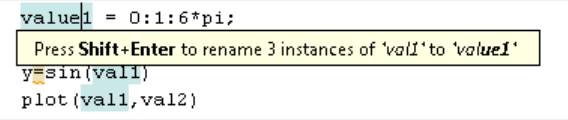
## Editor/Debugger Language Preferences

You can specify how various languages appear in the Editor and Live Editor. MATLAB applies language preferences based on the file extension of the file that is open.

On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **Editor/Debugger > Language**, and then adjust preference options as described in the table below. To set language preferences in MATLAB Online, select **Editor/Debugger > MATLAB Language** or **Editor/Debugger > Other Languages**.

Not all preferences are available for all languages. In addition, some language preferences do not apply in the Live Editor and are not available in MATLAB Online.


Preference	Usage
<b>Language</b>	Select the language for which you want to set preferences.
<b>Syntax highlighting</b>	<p>Select <b>Enable syntax highlighting</b> to have the Editor and Live Editor use different colors for different language constructs. Then, adjust the colors you want to use for each language element.</p> <p>Access color options for the MATLAB language by clicking <b>Set syntax colors</b>.</p> <p>For all other languages, color options appear under <b>Enable syntax highlighting</b>.</p> <p>For details, see “Syntax Highlighting” on page 3-19.</p>

Preference	Usage
<b>Variable and function renaming</b> MATLAB Language only	<p>Select <b>Enable automatic variable and function renaming</b> to have MATLAB prompt you to rename all instances of a function or variable in a file when you rename a function or variable.</p>  <pre>value1 = 0:1:6*pi; y=sin(val1) plot(val1,val2)</pre> <p>For details on when MATLAB prompts you, see “Automatically Rename All Functions or Variables in a File”.</p>
<b>Comment formatting</b> MATLAB Language only	<p>In the <b>Maximum column width</b> field, enter the maximum number of characters you want to allow in a line of comments, and then select where you want counting to begin.</p> <p>Consider selecting:</p> <ul style="list-style-type: none"> <li>• <b>Start from beginning of line</b> when the absolute width of the comments is important. For example, set 75 columns from the start of the line to match the width that fits on a printed page when you use the default font for the Editor.</li> <li>• <b>Start from beginning of comment</b> when comments are indented, and you want each block of comments to have a consistent indent and width.</li> </ul> <p>Select <b>Wrap comments automatically while typing</b> to automatically wrap comments at the <b>Maximum column width</b> value when you type comments in an Editor or Live Editor document.</p> <p>If you clear this option, you can still wrap comments manually, as described in “Add Comments to Programs”.</p>
<b>Indenting</b>	<p>Select <b>Apply smart indenting while typing</b> to automatically:</p> <ul style="list-style-type: none"> <li>• Indent the body of loops within the start and end of the loop statement.</li> <li>• Align subsequent lines with lines you indent using tabs or spaces.</li> <li>• Indent functions as specified with the <b>Function indenting format</b> option.</li> </ul> <p>This is called <i>smart indenting</i>. You also can manually apply smart indenting after you type the code.</p> <p>For more information, see “Indenting Code”.</p>

Preference	Usage
	<p>Select an option from <b>Function Indenting Format</b> (MATLAB Language only) to specify how functions indent in the Editor and Live Editor, as follows:</p> <ul style="list-style-type: none"> <li>• <b>Classic</b> — The Editor and Live Editor align the function code with the function declaration.</li> <li>• <b>Indent nested functions</b> — The Editor and Live Editor indent the function code within a nested function.</li> <li>• <b>Indent all functions</b> — The Editor and Live Editor indent the function code for both main and nested functions.</li> </ul> <p>For more information and examples of each indenting format, see “Indenting Code”.</p>
<b>File extensions</b>	Add one or more file extensions to associate with the <b>Language</b> . The preferences you set for that language apply to all files with the listed extensions.

## Editor/Debugger Code Folding Preferences

Code folding enables you to expand and collapse blocks of MATLAB code that you want to hide when you are not currently working on them.

On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **Editor/Debugger > Code Folding**, and then adjust preference options as described in the table below.


For examples and detailed information about code folding, see “Code Folding — Expand and Collapse Code Constructs”.

Code folding preferences do not apply in the Live Editor.

Option	Usage
<b>Enable Code Folding</b>	Specifies whether you want code folding enabled for the programming constructs that have their corresponding <b>Enable</b> check box selected.
<b>Enable</b>	<p>Specifies whether you want code folding enabled for the corresponding <b>Programming Construct</b>.</p> <p>If you select this option for any construct, but clear the <b>Enable Code Folding</b> option, the construct will not have code folding enabled.</p>
<b>Fold Initially</b>	Specifies whether the corresponding <b>Programming Construct</b> displays collapsed (folded) the first time that you open a MATLAB file.

## Editor/Debugger Backup Files Preferences

You can specify if, when, and how you want MATLAB to automatically back up files that are open in the Editor.


On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **Editor/Debugger > Backup Files**, and then adjust preference options as described in the table below.

Backup files preferences do not apply in the Live Editor and are not available in MATLAB Online.

Preference	Usage
<b>Automatically create backup files while working in the MATLAB Editor</b>	Select to have MATLAB automatically save a copy of the files you are currently editing.
<b>Save options</b>	<p><b>Save the backup every: <math>n</math> minutes</b> specifies how often you want MATLAB to save a copy of the file you are editing.</p> <p><b>Save untitled files</b> saves a copy of new, untitled, files to <code>Untitled.asv</code>.</p> <p>When there is more than one untitled file, each additional file is saved to <code>Untitledn.asv</code> (where <math>n</math> is an integer value).</p> <p>For details, see “Backing Up Files”.</p>
<b>Close options</b>	<b>Automatically delete backup files when the Editor closes</b> directs MATLAB to delete the backup file when you close the source file in the Editor.
<b>File name</b>	<p>Select the naming convention you want MATLAB to use for autosave files. For example:</p> <ul style="list-style-type: none"> <li>If you specify <b>Replace extension with: asv</b>, the backup file for <code>filename.m</code> is <code>filename.asv</code></li> <li>If you specify <b>Append file name with: ~</b>, the backup file for <code>filename.m</code> is <code>filename.m~</code></li> </ul>
<b>Location</b>	<p><b>Source file directories</b> specifies that you want backup files stored in the same folder as the files being edited.</p> <p><b>Single directory</b> specifies that you want autosave files stored in a single folder. Specify the full path to that folder and be sure you have write permissions for it.</p>

## Editor/Debugger Autoformatting Preferences

You can quickly format live scripts and functions using autoformatting markup in the Live Editor. You can enable and disable autoformatting as a whole, or as individual options.

On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **Editor/Debugger > Autoformatting**, and then adjust preference options as described in this table.

Autoformatting preferences do not apply in the Editor.




Preference	Usage
<b>Enable autoformatting in Live Editor</b>	Select to enable autoformatting options in the Live Editor. Once enabled, options can then be enabled or disabled individually.
<b>Text format</b>	Select <b>*italic*</b> , <b>**bold**</b> to enable bold and italic formatting using asterisks (*).
	Select <b>_italic_</b> , <b>_bold_</b> to enable bold and italic formatting using underscores (_).
	Select <b>`monospace`</b> , <b> monospace </b> to enable monospace autoformatting.
<b>Section break</b>	Select <b>%%</b> , <b>***</b> , or <b>---</b> for <b>section break</b> to enable inserting section breaks by entering <b>%%</b> , <b>***</b> , or <b>---</b> and then <b>Enter</b> .
	Select <b>%% text for section break and heading</b> to enable inserting section breaks with heading 1 style headings by entering <b>%%text</b> and then <b>Enter</b> .
<b>Insert Options</b>	Select <b>\$LaTeX\$ for LaTeX equation</b> to enable converting LaTeX expressions into equations using the format <b>\$LaTeX\$</b> .
	Select <b>URL for hyperlink</b> to enable converting internet paths automatically to hyperlinks.
	Select <b>&lt;URL&gt; for hyperlink</b> to enable converting internet paths to hyperlinks using the format <b>&lt;URL&gt;</b> .
	Select <b>[Label](URL) for labeled hyperlink</b> to enable converting internet paths to labeled hyperlinks using the format <b>[Label](URL)</b> .
	Select <b>(TM), (SM), (R), and (C) for trademark, service mark, and copyright symbols</b> to enable inserting trademark and copyright symbols ( <sup>TM</sup> , <sup>SM</sup> , ®, and ©) using the format <b>(TM)</b> , <b>(SM)</b> , <b>(R)</b> , and <b>(C)</b> .
<b>Text Style</b>	Select <b>#text for title</b> to enable inserting titles using the format <b>#text</b> .
	Select <b>##text</b> , <b>###text</b> , or <b>####text for heading</b> to enable inserting headings using the format <b>##text</b> for heading 1, <b>###text</b> for heading 2, or <b>####text</b> for heading 3.
	Select <b>Automatic bulleted lists (*, +, or -)</b> to enable creating bulleted lists by entering <b>*</b> , <b>+</b> , or <b>-</b> followed by a space.
	Select <b>Automatic numbered lists (1., 2., etc.)</b> to enable creating numbered lists by entering <b>1.</b> , <b>2.</b> , and so on, followed by a space.

For more information about autoformatting in the Live Editor, see “Autoformatting”.

## Editor/Debugger Autocoding Preferences

When you enter code in the Live Editor or in App Designer, MATLAB autocompletes block endings, parentheses, and quotes. MATLAB also autocompletes comments, character vectors, and strings when split across two lines. You can enable and disable autocoding as a whole, or as individual options.

On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **Editor/Debugger > Autocoding**, and then adjust preference options as described in this table.

Autocoding preferences do not apply in the Editor, except in MATLAB Online. In MATLAB Online, the Editor behaves the same as the Live Editor and App Designer.

Preference	Usage
<b>Enable autocoding in Live Editor and App Designer</b>	Select to enable autocoding options in the Live Editor and in App Designer. Once enabled, options can be enabled or disabled individually.
<b>Autocomplete parentheses</b>	Select <b>Parentheses ( )</b> to enable autocompletion of parentheses.
	Select <b>Curly braces { }</b> to enable autocompletion of curly braces.
	Select <b>Square brackets [ ]</b> to enable autocompletion of square brackets.
<b>Autocomplete quotes</b>	Select <b>Single quotes ( ' )</b> to enable autocompletion of single quotes.
	Select <b>Double quotes ( " )</b> to enable autocompletion of double quotes.
<b>Autocomplete when splitting</b>	<p>Select <b>Comments (%)</b> to enable autocompletion of comments when split across two lines. For example, pressing <b>Enter</b> with your cursor after the period in the comment</p> <pre>% This is my first comment. This is my second comment.</pre> <p>splits the comments into two lines.</p> <pre>% This is my first comment. % This is my second comment.</pre>
	<p>Select <b>Character vectors ( ' )</b> to enable autocompletion of character vectors when split across two lines. For example, pressing <b>Enter</b> with your cursor after the word Random in the character vector</p> <pre>title('Mean of Random Uniform Data')</pre> <p>splits the character vector into two character vectors across two lines.</p> <pre>title(['Mean of Random' ...       ' Uniform Data'])</pre>

Preference	Usage
	<p>Select <b>Strings (" ")</b> to enable autocompletion of strings when split across two lines. For example, pressing <b>Enter</b> with your cursor after the word <code>long</code> in the string</p> <pre>exist("exceptionally_long_file_name.txt")</pre> <p>splits the string into two strings on two lines.</p> <pre>exist("exceptionally_long" + ...       "_file_name.txt")</pre>
	<p>Select <b>Parentheses ()</b> to enable autocompletion of parentheses when split across two lines. For example, pressing <b>Enter</b> with your cursor after the number <code>10</code> and the comma in the command</p> <pre>plot(x,y,'--gs','LineWidth',2,'MarkerSize',10,'MarkerEdgeColor','b')</pre> <p>splits the command into two lines.</p> <pre>plot(x,y,'--gs','LineWidth',2,'MarkerSize',10, ...       'MarkerEdgeColor','b')</pre>
<b>Autocomplete block endings</b>	<p>Select <b>Control flow statements (if, for, etc.)</b> to enable autocompletion of control flow statements. To autocomplete a statement, enter the statement and press <b>Enter</b>. For a list of control flow statements, see “Loops and Conditional Statements”.</p>
	<p>Select <b>Function and class definitions</b> to enable autocompletion of functions and class definitions. To autocomplete a definition, enter either function or class and press <b>Enter</b>.</p>

## Code Analyzer Preferences


### In this section...


“Code Analyzer Preferences” on page 7-12


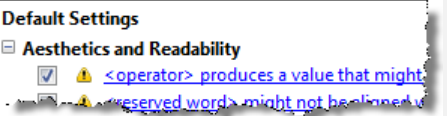
“Search for Messages in the Code Analyzer Preferences” on page 7-13

## Code Analyzer Preferences

You can change how Code Analyzer messages appear in the Editor and Live Editor. With a few exceptions, these preferences apply to messages in the Editor, Live Editor, MATLAB Function Block Editor (if your products use that tool), and Code Analyzer Report.

On the **Home** tab, in the **Environment** section, click  **Preferences**. Select **Code Analyzer**, and then adjust preference options as described in the table below.

Option	Usage
<b>Enabled Integrated Warning and Error Messages</b>	Specify whether you want to display Code Analyzer message indicators, such as the underlining of code and the message indicator bar, for documents open in the Editor.  For more information, see “Automatically Check Code in the Editor and Live Editor — Code Analyzer”.
<b>Underlining</b>	Specify the type of coding issues that you want to have underlined.  Regardless of the underlining menu option you choose, the Editor marks errors and warnings in the message indicator bar.
<b>Autofix</b>	Provides a link to a preference panel that enables you to adjust the color highlighting errors and warnings that MATLAB can autofix. You trigger autofix by clicking the <b>Fix</b> button in a Code Analyzer message.
<b>Active Settings</b>	Select the set of message settings to use. Click the down arrow to select or browse to a previously saved settings file.
Actions button 	Click to open a menu that enables you to select: <ul style="list-style-type: none"> <li>• <b>Save as</b> — Saves the current Code Analyzer message settings to a file.  The default location for settings is the MATLAB preferences folder (the folder returned when you run <code>prefdir</code>).</li> <li>• <b>Restore Defaults</b> — Restores default Code Analyzer message settings.</li> </ul>

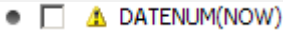


Option	Usage
<p>Search field</p> 	Searches the list of Code Analyzer messages that display below the search field. For details, see “Search for Messages in the Code Analyzer Preferences” on page 7-13.
<p>Code Analyzer message settings</p> 	<p>Select or clear messages to enable or suppress their appearance in your Editor documents.</p> <p>To suppress a message on a line-by-line or file-by-file basis, see “Adjust Code Analyzer Message Indicators and Messages”.</p>

## Search for Messages in the Code Analyzer Preferences

You can search the list of Code Analyzer messages in the Code Analyzer preferences to display only those messages that are currently of interest to you. Use any combination of the methods that the following table presents. Some search methods are not supported in MATLAB Online.

**Note** If you do not have the MATLAB Compiler™ installed, the Code Analyzer preferences pane does not display the **MATLAB Compiler (deployment) messages** category.

To See a List of Messages ...	Perform this action...	Example Scenario
<p>Containing specified text in the:</p> <ul style="list-style-type: none"> <li>• Short message</li> <li>• Extended message</li> <li>• Message category</li> <li>• Message ID</li> </ul>	Type the text in the search field.	<p>You recall seeing a message containing some text that you want to review, but you cannot remember the exact message text.</p> <p>For example, type com in the search field to display those messages that contain that text in the short message, extended message, or message ID.</p>
Corresponding to a given message ID	Type msgid: followed by the message ID in the search field.	<p>You are reviewing the code that someone else wrote and you want to see the message that corresponds to a suppressed one using the %#ok&lt;AGROW&gt; directive.</p> <p>Type msgid:agrow in the search field. Messages IDs containing AGROW display as links. Click each link for more information about the message.</p> <p>Not all Code Analyzer messages have additional information. These messages do not appear as links.</p>

To See a List of Messages ...	Perform this action...	Example Scenario
That you can set using Code Analyzer preferences	Click the down arrow to the right of the search field, and then click <b>Show All</b> .	You want to see the complete list of messages after you have searched the messages for some text or a given search menu option.
Different from the default setting (of enabled or disabled)	Click the down arrow to the right of the search field, and then click <b>Show Messages Modified from Default</b> .  A gray dot precedes a message with a setting different from the default. For example:  	A coworker gave you a settings file and you want to review each message that the coworker changed from its default setting.
In a given category	Click the down arrow to the right of the search field, click <b>Show Messages in Category</b> , and then click the category you want.	You want to review messages that describe coding practices that make it difficult for others to use your code.  Click the down arrow to the right of the search field, select <b>Show Messages in Category</b> , and then select <b>Aesthetics and Readability</b> .  Click the messages that appear as links for more information. Not all messages appear as links.
That are warnings	Click the down arrow to the right of the search field, and then select <b>Show All Warnings</b> . An exclamation point in a yellow triangle  indicates a warning message.	You recall previous warnings that your code generated, but you cannot remember enough details to use the search field to find it. You want to skim all the warning messages to find a particular one of interest.
Are errors	Click the down arrow to the right of the search field, and then select <b>Show All Errors</b> . By default, an X in a red dot indicates an error message,  .	You want to find a message elicited by a script you worked on previously. All you can recall is that it was an error and it involved <code>parfor</code> .  Click the down arrow to the right of the search field, and then select <b>Show All Errors</b> . Then, type a space and <code>parfor</code> in the search field.  The Code Analyzer preference pane displays only error messages that contain the word <code>parfor</code> .
Are disabled	Click the down arrow to the right of the search field, and then select <b>Show Disabled Messages</b> .	You want to see the messages that are disabled by default or you have previously disabled.


### Example of Searching Messages

To display Code Analyzer error messages that contain the word `variable` and are disabled:

- 1 Click the down arrow in the search field, and then select **Show All Errors**.

The search field contains `severity:error`.

- 2 At the end of the text `severity:error`, press the **Space** key, and then type `variable`.
- 3 Click the down arrow in the search field and select **Show Disabled Messages**.

The search field now contains `severity:error variable enabled:false`. Only the messages that fulfill those requirements appear in the Preferences pane. To restore the list of all messages, click the clear search button .

The **Show All Errors** and **Show Disabled Messages** options are not available in MATLAB Online.

### See Also

#### More About

- “Check Code for Errors and Warnings”





## Add-Ons

---


## Get and Manage Add-Ons

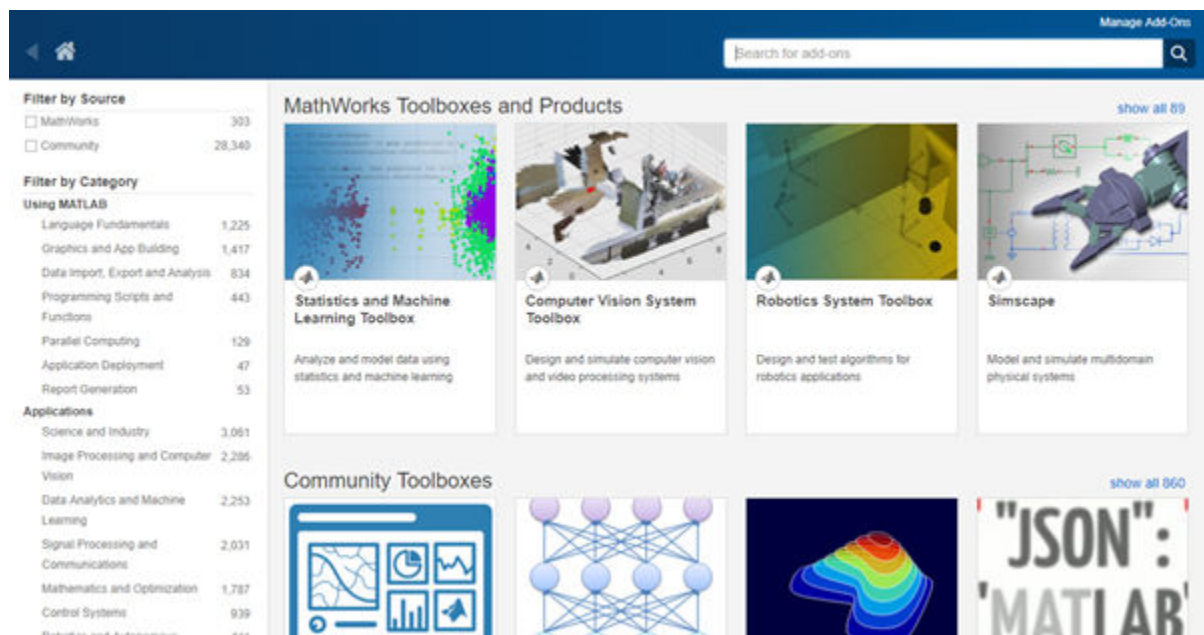
### In this section...

“Get Add-Ons” on page 8-2  
 “Install Add-Ons from File” on page 8-3  
 “Default Add-On Installation Folder” on page 8-3  
 “Manage Add-Ons” on page 8-4  
 “Update Add-Ons” on page 8-4  
 “Run Apps” on page 8-4

Add-ons encompass a wide variety of resources, including products, apps, support packages, and toolboxes. They extend the capabilities of MATLAB with functionality for additional tasks and applications.

### Get Add-Ons

To find and install add-ons, go to the **Home** tab and, in the **Environment** section, click the  **Add-Ons** icon. The Add-On Explorer opens and displays the list of available add-ons.



To find add-ons, use the search bar, or browse through the available categories on the left side of the Add-On Explorer window. Select an add-on from the list to view additional information about it, such as what files it includes and what documentation is available.

To install an add-on, select it from the list. Then, select from the available install actions. After you install an add-on, MATLAB manages the MATLAB path for you. This lets you start using it without adjusting your desktop environment.

For some add-ons, you also can download the files from the Add-on Explorer without installing them. This is useful if you want to install the add-on on a system without an internet connection. To download the add-on without installing, select **Install > Download Only**.

## Install Add-Ons from File

You can install some add-ons manually using an installation file. This is useful in several situations:

- The add-on is not available for installation through the Add-On Explorer, for example, if you create a custom add-on yourself or receive one from someone else.
- You downloaded the add-on from the Add-On Explorer without installing it.
- You downloaded the add-on from the File Exchange at MATLAB Central™.

Valid add-on installation files include `.mltbx` files (for toolboxes), `.mlappinstall` files (for apps), and `.mlpkginstall` files (for hardware support packages). To install an add-on from one of these files, in the MATLAB Current Folder browser, double-click the file. An installer opens to guide you through the installation process.

---

**Note** Make sure to double-click the installation file in the MATLAB Current Folder browser. Double-clicking to install the add-on from the system file browser is not supported on all operating systems.

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You also can install some add-ons programmatically. For more information, see `matlab.addons.install`.

## Default Add-On Installation Folder

The install location of an add-on depends on its type. MATLAB installs MathWorks products in the `matlabroot` folder and hardware support packages and some additional packages in a custom location specified by the package. For more information about a specific support package install location, see the documentation for the package.

MATLAB installs all other add-ons in a default installation folder specific to the platform.


- Windows— `C:\Users\username\AppData\Roaming\MathWorks\MATLAB Add-Ons`
- Linux — `~/MATLAB Add-Ons`.
- Mac — `~/Library/Application Support/MathWorks/MATLAB Add-Ons`
- MATLAB Online — `/MATLAB Add-Ons`


To change the default installation folder:

- 1 On the **Home** tab, in the **Environment** section, click **Preferences > MATLAB > Add-Ons**.
- 2 In the **Installation Folder** field, specify a folder name to which you have write access.

If you change the default installation folder, add-ons installed in the previously selected folder are no longer accessible from within MATLAB. Changing the default installation folder or customizing installed add-ons is not supported in MATLAB Online.

## Manage Add-Ons

To view and manage installed add-ons, go to the **Home** tab and select  **Add-Ons > Manage Add-Ons**. The Add-On Manager displays all add-ons that are installed in the add-ons installation folder, as well as MATLAB products and hardware support packages.

To manage an individual add-on, click the options button  to the right of the add-on and select from the available actions:

- **Open Folder**
- **Open Documentation**
- **View in Add-on Explorer**
- **View Getting Started Guide**
- **Setup**
- **Version**
- **Enabled**
- **Uninstall**

Not all actions are available for all add-ons.


To customize your MATLAB environment, use the **Enabled** action to enable and disable add-ons. You also can enable or disable add-ons using the `matlab.addons.enableAddon` and `matlab.addons.disableAddon` functions.

If an add-on has multiple versions installed, only one version can be enabled. To view the currently enabled version, select **Version**. MATLAB displays a check mark next to the currently enabled version. To enable a different version, click it. For more information about installing multiple versions of an add-on, see `matlab.addons.install`.

## Update Add-Ons

You can update installed add-ons as well as your current installed version of MATLAB using the Add-On Manager. On the **Home** tab, click **Help > Check for Updates**. The Add-On Manager opens with the **Updates** tab selected. View and install any available updates.

## Run Apps

An app is a self-contained MATLAB program with a user interface. To view and interact with the user interface after installing the app, run it. Go to the **Apps** tab and expand the apps gallery by clicking the down arrow  on the far right. Then, navigate to your installed app and click the icon. Custom apps that you write or receive from someone else appear in the **My Apps** section. You can run multiple custom apps concurrently, including multiple instances of the same app.

## See Also

`matlab.addons.enableAddon` | `matlab.addons.install` |  
`matlab.addons.installedAddons` | `matlab.addons.isAddonEnabled`

## **Related Examples**

- “Package Apps From the MATLAB Toolstrip”
- “Create and Share Toolboxes”



# Internationalization

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- “Locale Setting Concepts for Internationalization” on page 9-2
- “Limitations to International Character Support” on page 9-4
- “Set Locale on Microsoft Windows Platforms” on page 9-5
- “Set Locale on macOS Platforms” on page 9-7
- “Set Locale on Linux Platforms” on page 9-8
- “Unexpected Behavior on macOS Platforms” on page 9-9
- “Characters Incorrectly Displayed on Windows Systems” on page 9-10
- “datetime Might Not Return Correct Value” on page 9-11
- “Numbers Display Period for Decimal Point” on page 9-12
- “File or Folder Names Incorrectly Displayed” on page 9-13
- “Script Compatibility” on page 9-14
- “MATLAB Desktop Language Preference” on page 9-15
- “X Servers and International Keyboard Layouts” on page 9-16

## Locale Setting Concepts for Internationalization

### In this section...

“Default Locale Setting” on page 9-2

“Supported Character Sets and Encodings” on page 9-2

“Platform-Specific Localized Formats for Current Folder Browser” on page 9-3

The locale setting defines the language of your user interface and the display formats for information like time, date, and currency. MATLAB uses the user-specified locale on all platforms.

If MATLAB does not correctly display characters in your language, you might have a locale setting problem. Locale is composed of individual settings that you can control. Each platform uses different parameters to specify the locale setting. These terms are relevant to understanding locale settings:

- **locale** — Format: *language\_territory.codeset*

For example, for the U.S. English locale setting `en_US.UTF-8`, `en` means that the display language is English. `US` indicates that time and date displays use U.S. conventions. `UTF-8` is the character encoding (codeset) used to display text.

- **ASCII** (American Standard Code for Information Interchange) — Nearly universal character encoding for US English and control characters.
- **Unicode** — A universal character set that “provides a unique number for every character, no matter what the platform, no matter what the program, no matter what the language.”
- **UTF-8** — A variable width character encoding for Unicode that is backwards compatible with ASCII. It has become the dominate encoding for the World Wide Web and anywhere else that cross-platform, cross-locale interoperability is required.
- **user locale setting** — Setting on your computer that specifies the locale that you want to use when running MATLAB. If your user-specified locale is not supported, MATLAB uses the default locale `en_US_POSIX.US-ASCII`.
- **system locale setting** — Setting on Microsoft Windows platforms. The user locale and system locale must be the same value. If these values are not the same, you might see garbled text or incorrectly displayed characters.
- **i18n** — Short for the word *internationalization*, where *18* stands for the number of letters between the letters *i* and *n*.

### Default Locale Setting

MATLAB does not support every locale setting. If the user-specified locale is unsupported, MATLAB uses the default locale `en_US_POSIX.US-ASCII`, also known as C locale.

### Supported Character Sets and Encodings

MATLAB uses Unicode as its internal character set so that it can represent all letters and symbols, regardless of platform, language, or locale. MATLAB uses UTF-8 as its default character encoding to ensure that all Unicode code points can be correctly represented in files and byte streams. MATLAB also supports other character encodings for backwards compatibility and interoperability.



## **Platform-Specific Localized Formats for Current Folder Browser**

In the Current Folder Browser, MATLAB usually uses platform-neutral localized formats and rules. You can, however, use the operating system short date format to control the format for displaying file date and time data.

### **See Also**

### **Related Examples**

- “Set Locale on Microsoft Windows Platforms” on page 9-5
- “Set Locale on macOS Platforms” on page 9-7
- “Set Locale on Linux Platforms” on page 9-8

## Limitations to International Character Support

MATLAB does not support non 7-bit ASCII characters in the following features:

- MATLAB C/C++ and Fortran engine library functions and the `loadlibrary` function cannot find files located in folder names that contain non 7-bit ASCII characters.
- MATLAB C/C++ and Fortran engine library functions and the `calllib` function used to call C library functions cannot convert Unicode®-compatible input arguments of type `char*` to MATLAB character arrays.
- The `matlab.wsdll.createWSDLClient` function cannot read non 7-bit ASCII characters in Web Services Description Language (WSDL) documents.

When you have a file containing text that has characters in a different encoding than that of your platform, when you save or publish your file, MATLAB displays those characters as garbled text.

## Set Locale on Microsoft Windows Platforms

MATLAB reads the user locale and system locale on Windows platforms. The user locale and system locale must be the same value. If these values are not the same, you might see garbled text or incorrectly displayed characters.

MATLAB does not support every locale setting. If your locale is not supported, MATLAB uses the default locale `en_US_POSIX.US-ASCII`, also known as C locale.

When you change the system locale, restart your system. Otherwise, you might see unexpected behaviors.

### Locale on Windows 10 Platforms

These instructions are based on Windows 10 Version 1809. Refer to your version of Windows 10 documentation for information about setting region information using the **Settings** app.

- 1 From **Time & Language**, select **Region**.
- 2 Under **Related Settings**, select **Additional date, time, & regional settings**.
- 3 Select **Region** to change location.
- 4 On the **Formats** tab, select a target locale from the **Format** drop-down list, and then click **Apply**. This action sets the user locale.
- 5 On the **Administrative** tab, click **Change system locale....**
- 6 Select a target locale from the **Current system locale** drop-down list. This action sets the system locale.
- 7 Exit each dialog box by clicking **OK**.
- 8 Restart the system.

### Using UTF-8 on Windows 10 Platforms

As of Windows 10 1803, Microsoft added the ability to specify UTF-8 as the character encoding used by Windows itself. This feature can be enabled using the instructions shown above, however, after step 6, select the check box next to **Use Unicode UTF-8 for worldwide language support**. If this setting is enabled, MATLAB uses UTF-8 as both its default and its locale-specific character encoding.

---

**Note** It is not necessary to enable this option in order to use UTF-8 with MATLAB. MATLAB uses UTF-8 as the default encoding independent of this setting. Therefore, most users do not need to enable this Windows option; however, MATLAB works correctly if it is enabled.

---

### Locale on Windows 7 Platforms

#### User Locale

- 1 Select **Start > Control Panel > Clock, Language, and Region > Region and Language**.
- 2 Open the **Formats** tab.
- 3 Select a target locale from the **Format** drop-down list.

### System Locale

- 1 Select **Start > Control Panel > Clock, Language, and Region > Region and Language**.
- 2 Open **Administrative** tab.
- 3 In the **Language for non-Unicode programs** section, click **Change system locale....**
- 4 Select a target locale from the **Current system locale** drop-down list.
- 5 Restart the system.

## Set Locale on macOS Platforms

On the Apple macOS platform, MATLAB reads the user locale setting. MATLAB automatically chooses a codeset for each combination of language and territory.

If you customize the locale setting, MATLAB ignores the customized portion. MATLAB ignores the `LANG` environment variable and the Terminal application locale setting.

MATLAB does not support every locale setting. If your locale is not supported, MATLAB uses the default locale `en_US_POSIX.US-ASCII`, also known as C locale.

### See Also

## Set Locale on Linux Platforms

Use the LANG environment variable to specify the locale to be used by MATLAB.

MATLAB does not support every locale setting. If your locale is not supported, MATLAB uses the default locale `en_US_POSIX.US-ASCII`, also known as C locale.

### See Also

### More About

- “Numbers Display Period for Decimal Point” on page 9-12

## Unexpected Behavior on macOS Platforms

If you customize the locale setting, MATLAB ignores the customized portion.

MATLAB ignores the LANG environment variable and the Terminal application locale setting.

### See Also

### Related Examples

- “Set Locale on macOS Platforms” on page 9-7

## **Characters Incorrectly Displayed on Windows Systems**

The user locale and system locale must be the same value on the Microsoft Windows platform. If these values are not the same, you might see garbled text or incorrect characters.

### **See Also**

### **Related Examples**

- “Set Locale on Microsoft Windows Platforms” on page 9-5



## datenum Might Not Return Correct Value

The results of the `datenum` function vary depending on the locale. To ensure the correct calculation of functions using date values associated with files and folders, replace `datenum` function calls with the use of the `dir` function `datenum` field.

For example, look at the modification date of your MATLAB `license_agreement.txt` file:

```
cd(matlabroot)
f = dir('license_agreement.txt')
```

MATLAB displays information similar to:

```
f =

      name: 'license_agreement.txt'
      date: '10-May-2015 17:48:22'
     bytes: 5124
    isdir: 0
   datenum: 7.3317e+005
```

If your code uses the `date` field of the `dir` command, similar to:

```
n = datenum(f.date);
```

replace it with the `datenum` field:

```
n = f.datenum;
```

### See Also

`dir`

## Numbers Display Period for Decimal Point

MATLAB reads the user locale for all categories except for the `numeric` category (which is equivalent with `LC_NUMERIC`). This category controls numeric data formatting and parsing. MATLAB always sets `LC_NUMERIC` to the C locale.

MATLAB uses a period for a decimal point, regardless of the format specified by the user locale. For example, the value of `pi` can be displayed as `3,1416` or `3.1416`, depending on the format used by a locale. MATLAB always displays `3.1416`.

The MATLAB language reserves the use of commas to the cases described in the Symbol Reference topic.

### See Also

#### More About

- Symbol Reference: Comma

## File or Folder Names Incorrectly Displayed

On Windows and Linux platforms, characters used in file or folder names must be in the supported character set.

On macOS platforms, for files and folders used by MATLAB, characters in the file or folder name must be in the 7-bit ASCII character set.

### See Also

### More About

- “Locale Setting Concepts for Internationalization” on page 9-2

## Script Compatibility

As of R2020a, plain text files, such as MATLAB scripts or functions, that are encoded using UTF-8 (note that all 7-bit ASCII files **are** de facto UTF-8 encoded), work seamlessly across all platforms and all locales. Plain text files created with an earlier version of MATLAB that are not UTF-8 encoded also work if they were created in the same locale that the current MATLAB is using. Under most circumstances, MATLAB also operates correctly with plain text files encoded in one of the locale-specific CJK (Chinese, Japanese, or Korean) encodings.

## MATLAB Desktop Language Preference

MathWorks provides localized versions of MATLAB for selected non-English platforms. For these products only, you can choose the language in which the MATLAB desktop appears. Desktop items (such as dialog boxes, button names, and menu items) and error and warning messages appear in the language that you select. For information about this preference, see the **Desktop language** (selected non-English systems only) option in the General Preferences panel. If you change the preference, the change applies only to the MATLAB desktop.

Most desktop elements and Apps use the language selected in the **Desktop language** preference. However, system dialog messages, such as file selectors or color pickers, use the operating system display language.

### See Also

### More About

- “Translated Documentation” on page 4-14
- “General Preferences” on page 2-38

## **X Servers and International Keyboard Layouts**

Simulink requires the XKEYBOARD extension to detect the keyboard layout that is currently active. Some older X servers do not support this extension. If this extension is absent or disabled, then Simulink assumes a default layout. When the default layout does not match the keyboard layout, some keys might not produce the expected characters.

Suppose you are using a Linux based computer with a German keyboard. Without the XKEYBOARD extension, Simulink uses the default layout, which is English, and can therefore produce incorrect characters. MATLAB correctly recognizes the keyboard as German.

If you encounter this issue, try enabling the XKEYBOARD extension, or use an X server that supports this extension.

# MATLAB Online

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- “What Is MATLAB Online?” on page 10-2
- “Restore Files in MATLAB Online” on page 10-4

## What Is MATLAB Online?

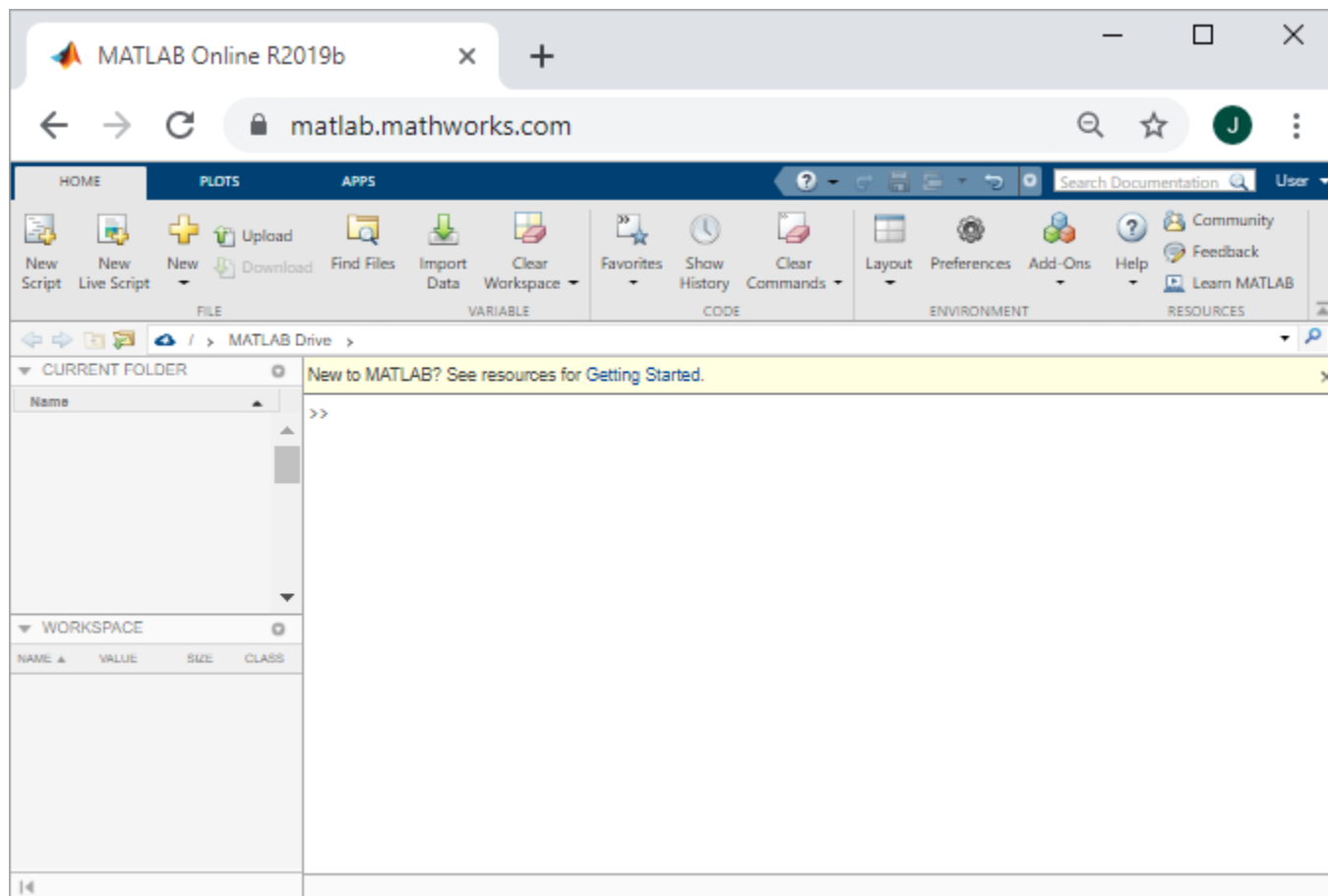
MATLAB Online provides access to the latest version of MATLAB from a standard web browser using MathWorks hosted computing resources and storage.

With MATLAB Online, you can:

- Access the latest version of MATLAB with all the latest features available to you through your current license.
- Use MATLAB in your web browser without any downloads, installation, or maintenance.
- Store up to 5 GB of MATLAB files in your MATLAB Drive.
- Collaborate with other MATLAB users by giving them view-only or can-edit access to your MATLAB files.
- Create a link to your work and share it globally.
- Synchronize your desktop files with MATLAB Online and MATLAB Drive using the MATLAB Drive Connector.

To start using MATLAB Online, go to <https://matlab.mathworks.com/>.

For more information about MATLAB Online, including supported license types, specifications, limitations, and system requirements, see MATLAB Online Overview.





## **See Also**

## **More About**

- “Share Folders in MATLAB” on page 6-33
- “Use Keyboard Shortcuts to Navigate MATLAB” on page 2-18
- MATLAB Drive

## Restore Files in MATLAB Online

MATLAB Online on page 10-2 provides access to MATLAB from a standard web browser. In MATLAB Online, each time you save a program file, MATLAB stores the contents of your program in the version history. To recover a previous version of a file, select the **File Versions** tab.

The file version history appears, as shown in the following figure.



Browse for the file you want by selecting from the list, or by clicking **Older** or **Newer**. When you find the file, click **Restore as Latest**. MATLAB adds the restored file to the top of your history with a new timestamp and version number.

### See Also

#### More About

- “Share Folders in MATLAB” on page 6-33
- “Manage Files and Folders” on page 6-30

## Post-Installation Tasks

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## Configure the MATLAB Startup Accelerator

When you install MathWorks products on your computer, the installation includes a utility program that can speed up MATLAB startup, called the MATLAB Startup Accelerator. By default, the installer configures this utility as a scheduled task on your computer that runs several times each day.

While you are not required to modify this configuration, the startup accelerator works best if you coordinate when it runs with your particular MATLAB usage patterns. For example, by default, the startup accelerator runs at 8:00 a.m. and again at 1:00 p.m. every day, or whenever you log on to your computer. To take full advantage of the startup accelerator, schedule it to run at a time just before you typically start MATLAB.

To modify this configuration, use the Windows Task Scheduler. In the Windows Task Scheduler, these start times are called triggers. You can modify these triggers to customize when the startup accelerator runs. You can also add triggers, delete triggers, or delete the startup accelerator task completely. The following section shows how to change when the startup accelerator runs using the Windows Task Scheduler. For more information about the Task Scheduler, see Windows documentation.

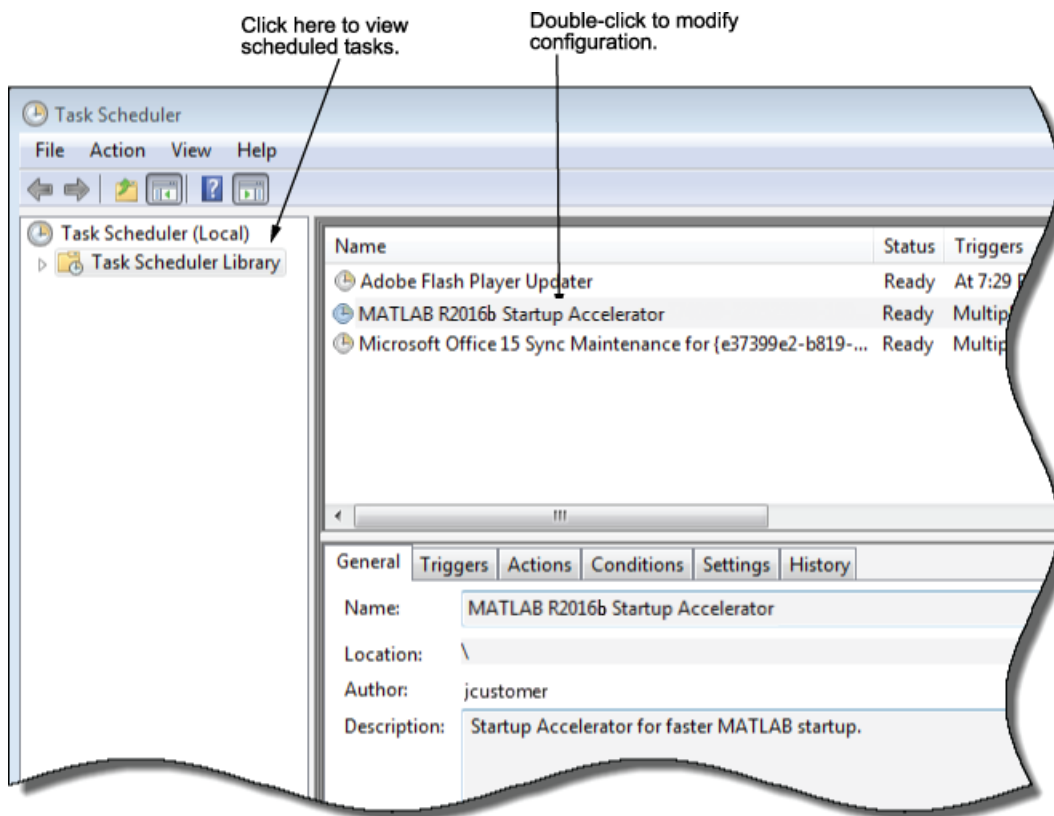
### Change When the MATLAB Startup Accelerator Runs

To change when the MATLAB Startup Accelerator runs on your computer, use the Windows Task Scheduler.

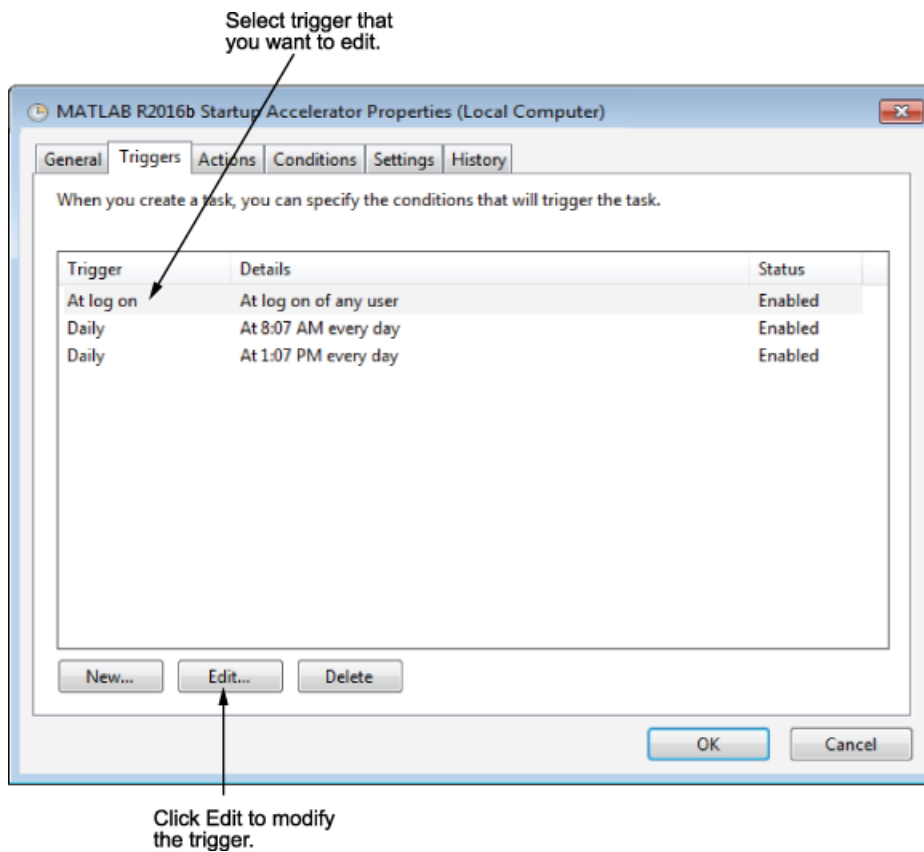
- 1 Start the Windows Task Scheduler.

On the Windows Start menu, search for the phrase “task scheduler” and press **Enter**.

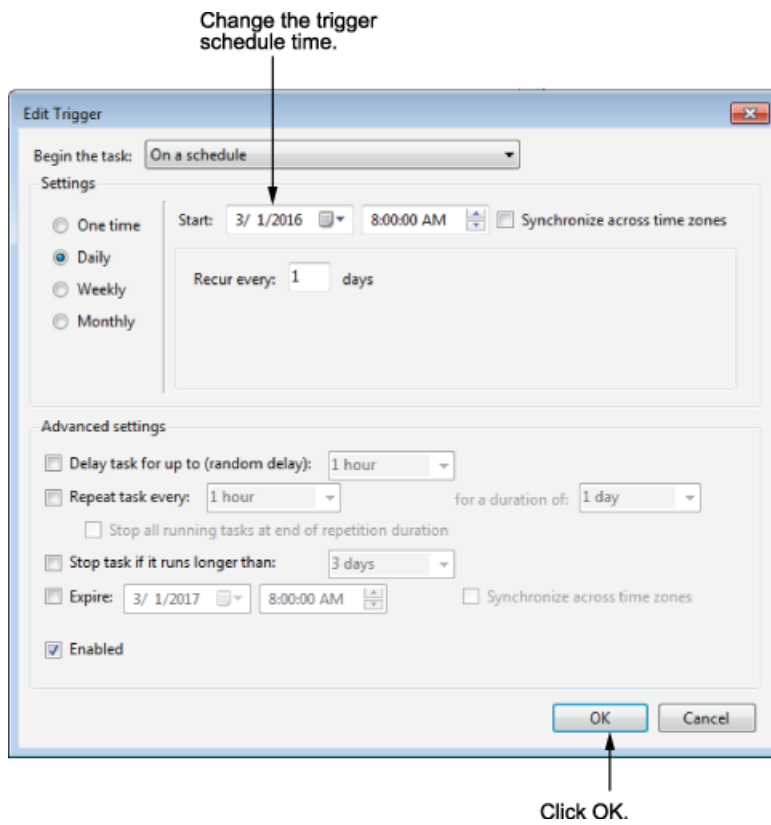
- 2 Click **Task Scheduler Library** in the Console tree to view scheduled tasks and double-click the name of the startup accelerator to change the configuration.



- 3 To change when the task is scheduled to start, click the Trigger tab in the task properties dialog box. In the list of triggers displayed, select the trigger you want to change, and click **Edit**.



- 4 To change the time the task is scheduled to run, enter a new time and click **OK**.







# MATLAB Cloud Computing

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## Run MATLAB from Azure Marketplace

This topic describes how to use the Azure Marketplace to quickly deploy and run MATLAB on Azure. The elasticity of the cloud infrastructure combined with MATLAB enables you to leverage greater computing resources and keep your calculations close to your data.

Anyone with a valid MATLAB license and an Azure account can run MATLAB on the cloud. This is called *MATLAB (BYOL)* because you "Bring Your Own License."

### Deploy MATLAB Resources on Azure

#### Requirements

To complete these instructions, you need:

- MATLAB License on page 12-2
- Microsoft Azure Account
- Remote Desktop client for Windows Desktop (typically preinstalled on most Windows systems)
- A working knowledge of Azure Resource Manager

#### Licensing

By default, the MATLAB (BYOL) offering on Azure Marketplace uses online licensing. This table summarizes which licenses support running MATLAB on the cloud.

License Type	Cloud Availability
Individual (a license that only you use that is in your name; not a Home or Student license)	Your license is already configured for MATLAB on the cloud.
Campus-Wide License (a license that you use that belongs to your academic institution)	Your license is already configured for MATLAB on the cloud.
Home and Student (that only you use and is in your name)	These license types are not eligible to use MATLAB on the cloud. However, you can use MATLAB Online on page 10-2.
All other license types, including Concurrent and Network Named User	<p>Contact your license administrator.*</p> <p>The license administrator might need to make some changes to the license to enable running MATLAB on the cloud.</p> <p><b>Administrators:</b> For more information on this process, see "MATLAB Licensing in the Cloud".</p>
*Not sure who the license administrator is? Sign in to your MathWorks Account, click the license you are using, then click the tab marked "Contact Administrators".	

#### Configure and Deploy Template from Marketplace

To configure and deploy MATLAB (BYOL) resources in a resource group:

- 1 Navigate to <https://portal.azure.com> and login to your Azure account.

- 2 From the Portal, click **Create a Resource**.
- 3 Search for “matlab” in the marketplace and click on the **MATLAB (BYOL)** offering.
- 4 Click **Create** on the offering page to begin setup.



- 5 The setup process uses a Resource Manager template to help you configure the virtual machine and networking settings. To make setup easy, many of the fields come prepopulated with acceptable values. This table describes how to set the various options in each menu of the template. Click **Next** at the end of each step to proceed to the next menu.

Menu	Option	Description
<b>Basics</b>	Subscription	Select an Azure subscription to use.
	Resource group	You can select an existing resource group from the drop-down menu, or click <b>Create New</b> to create a new resource group. If you select an existing resource group, then it must not have any currently deployed resources.
	Location	Select a location from the drop-down list.
<b>Virtual Machine Settings</b>	Virtual Machine name	Select a name for the VM resource. The default name is <code>matlab-desktop</code> .
	Virtual Machine size	Select the VM size. The default size (D3 v2) is sufficient for most purposes and safely satisfies the minimum requirements for MATLAB, but you can select a different size if necessary. Note that the size of the VM you choose affects your costs.
	Username	Select a username for the VM. You will use this username to login to the VM with Remote Desktop later.

Menu	Option	Description
	Password	Select a password for the VM. Note that the password must have at least 8 characters and can only include letters and numbers.
	Confirm password	Retype your chosen password.
	IP addresses	Select the range of IP addresses that are authorized to connect to the VM. This is the public IP address for your computer which can be found by searching for "What is my IP address" on the web. This field uses CIDR notation of the form: <i>100.100.100.100/20</i> . The mask determines the number of IP addresses to include.
	Network License Manager port@server	If you are using a Network Licensing Manager, enter the port and hostname or IP address. For more information, see "MATLAB Licensing in the Cloud".
Networking	Virtual network	<p>The <b>Virtual network</b> field is prepopulated with a new virtual network resource named vnet01.</p> <ul style="list-style-type: none"> <li>You can configure the name, address space, or subnets of the new virtual network resource by clicking <b>Create new</b>.</li> <li>You can select an existing virtual network resource in the drop-down menu. If you choose to use an existing resource, then the template does not create any new virtual network resources.</li> </ul>

Menu	Option	Description
	Subnets	<p>The <b>Subnet</b> field is prepopulated with a new subnet named <code>subnet - 1</code> and an associated subnet address.</p> <ul style="list-style-type: none"> <li>You can select a different subnet of the selected virtual network in the drop-down menu.</li> <li>If you selected an existing virtual network rather than creating a new one, then you can click <b>Manage subnet configuration</b> to configure the subnets for the network.</li> </ul>
	Public IP Address for the VM	<p>The <b>Public IP Address for the VM</b> field is prepopulated with a new Public IP resource named <code>matlab-desktop-ip</code>. The resource uses a basic SKU and dynamic assignment.</p> <ul style="list-style-type: none"> <li>You can configure the name, SKU, and assignment protocol by clicking <b>Create new</b>.</li> <li>You can select an existing Public IP resource in the drop-down menu. If you choose to use an existing resource, then the template does not create any new Public IP resources.</li> </ul>

Menu	Option	Description
	DNS Prefix for the Public IP Address	<p>The <b>DNS Prefix for the Public IP Address</b> field is prepopulated with an acceptable DNS prefix, but you can edit it if necessary. The selected DNS name is used to connect to the VM with Remote Desktop.</p> <ul style="list-style-type: none"><li>• If you edit the DNS prefix, then note that it must be globally unique on Azure.</li></ul>

Menu	Option	Description
<b>Review and Create</b>	—	<p>When you advance to the <b>Review and Create</b> menu, Azure automatically runs some final validation checks on the information entered on previous screens. If Azure finds any errors, then you need to fix them before proceeding.</p> <p>After the validation completes successfully, review the MathWorks Terms of use and Privacy policy. You are responsible for all associated costs once you deploy MATLAB on Azure.</p> <p>Once you are satisfied with the values you have entered, click <b>Create</b> to finalize setup and begin deploying the selected resources, or <b>Download a template for automation</b> to get a copy of the completed template.</p> <ul style="list-style-type: none"> <li>• The deployment can take several minutes. You will get a notification in the Azure Portal once the deployment is complete.</li> <li>• When the deployment is complete, follow the instructions in “Connect to VM and Run MATLAB” on page 12-7 to use the virtual machine you set up.</li> </ul>

### Connect to VM and Run MATLAB

Once you have successfully configured and deployed the MATLAB (BYOL) resources, use these steps to connect to the virtual machine you set up. You can either create a prepopulated Remote Desktop file, or run Remote Desktop and manually fill out the DNS name.

- 1 From the Azure Portal, navigate to the resource group with the resources you deployed.
- 2 Click the `matlab-desktop` virtual machine resource to view its details. (If you renamed the virtual machine resource, then select the resource corresponding to that name.)
- 3 Click the **Connect** button to see a list of connection options, and then select **RDP** from the drop-down menu.

- 4 On the **Connect with RDP** screen, the **IP address** and **Port number** fields are prepopulated. Click **Download RDP file** to download a Remote Desktop file that automatically connects to the virtual machine.
- 5 Run the RDP file you downloaded to connect to the virtual machine, accepting any intermediate dialogs.
- 6 Once Remote Desktop Connection connects to the VM, sign in to the virtual machine using the username and password that you previously configured in **Virtual Machine Settings**. (See “Configure and Deploy Template from Marketplace” on page 12-2 for more information.)
- 7 You are now at the desktop of the Linux VM. Double click the MATLAB icon to launch MATLAB.

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**Note** Launching MATLAB for the first time in this setting can take several minutes.

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- 8 After you launch MATLAB, you are prompted to login to your MathWorks account and select a MATLAB license to use.

#### Manual Connection

- 1 To manually connect to the virtual machine with Remote Desktop, you need the full DNS name of the machine. The `matlab-desktop` and `matlab-desktop-ip` resources both list the full DNS name. Open one of those resources and copy the DNS name.
- 2 Open the **Remote Desktop Connection** software.
- 3 To populate the **Computer** field, paste the DNS name that you copied.
- 4 Click **Connect** to proceed.
- 5 Follow steps 6–8 in “Connect to VM and Run MATLAB” on page 12-7 to sign in to the VM and launch MATLAB.

## Delete MATLAB Resources from Azure

You can remove the resource group and all associated resources when you are done with them to help save on costs.

- 1 Login to the Azure Portal.
- 2 Select the resource group containing the MATLAB (BYOL) resources you deployed.
- 3 Select the **Delete resource group** icon to delete all resources deployed in the group.
- 4 You will be prompted to confirm the deletion.

The deletion is final, and files do not persist between deployments. (See “File Persistence on Azure” on page 12-8 for more information.) You need to create the resources to make them available again.

## File Persistence on Azure

As you use MATLAB on Azure, all your files and changes are stored locally on the virtual machine. The files persist until you terminate the virtual machine or delete the resource group. However, stopping or shutting down the instance does not destroy the data on the virtual machine, so it is safe to shutdown the instance when you are not using it.

If you use MATLAB Drive to store your files on the cloud, you can install the MATLAB Drive Connector on the virtual machine to gain access to your files. See “Install MATLAB Drive Connector” (MATLAB Drive) for instructions to install the Connector on Linux.

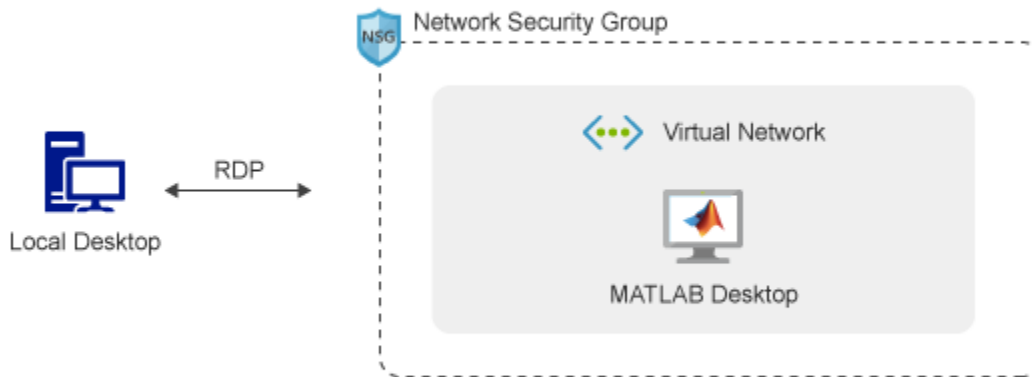


## Azure Architecture and Resources

Deploying MATLAB on Azure creates several resources in your resource group. The deployment sets up a single Azure virtual machine (VM) running Linux and MATLAB, a network interface with a public IP address to connect to the VM, a network security group that controls network traffic, and a virtual network for communication between resources. This table summarizes the resources that are created.

Resource Name	Default Resource Name in Azure	Description
Virtual machine	matlab-desktop	The VM instance with pre-installed desktop MATLAB. The name you choose for this virtual machine resource acts as the root of the names for the Public IP address and Disk resources.
Public IP address	matlab-desktop-ip	Public IP address to connect to the VM running MATLAB. If you select an existing Public IP resource, then the template does not create this resource.
Disk	matlab-desktop- <code>&lt;unique id&gt;</code>	The disk attached to the VM.
Network interface	matlab-nic	Enables the VM to communicate with the internet, Azure, and on-premises resources.
Network security group	matlab-rdp-nsg	Allows or denies traffic to and from sources and destinations.
Virtual network	vnet01	Enables resources to communicate with each other. If you select an existing virtual network resource, then the template does not create this resource.

The architecture of these resources is summarized in this diagram.



### VM Software

A preconfigured Ubuntu® VM is provided to make deployment easy. The VM contains this software:

- MATLAB, Simulink, toolboxes, and support for GPUs.

The license used to run MATLAB determines which products and toolboxes are available for you to use. However, all products are installed on the VM, so the `ver` command returns a list of all products. To add new products to your license, see [Products and Services](#).

- Add-Ons: Deep Learning Toolbox™ Model for AlexNet Network, Deep Learning Toolbox Model for GoogLeNet Network, and Deep Learning Toolbox Model for ResNet-50 Network.

### Marketplace vs. Reference Architecture

The Azure Marketplace offering only runs the latest release of MATLAB. If you need to run older releases of MATLAB, or customize the templates and automation scripts more extensively, then you can use the Reference Architecture for Microsoft Azure instead.

### Support

If you encounter an unexpected problem, search MATLAB Answers for solutions first. Most likely, other people have run into the same problem and resolved it already.

If the problem persists, or there are not any relevant posts on MATLAB Answers for the issue, contact Technical Support.

## **See Also**

### **External Websites**

- [“MATLAB Licensing in the Cloud”](#)
- [Use MATLAB in the Cloud](#)
- [Reference Architecture for Microsoft Azure](#)

