

Things Every Developer Should Know



with examples and
hands-on exercises

WEBUCATOR

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Class Files

Download the class files used in this manual at

<https://static.webucator.com/media/public/materials/classfiles/DEV101-1.1.1.zip>.

Errata

Corrections to errors in the manual can be found at <https://www.webucator.com/books/errata/>.

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LESSON 1

Zip Files

Topics Covered

- Creating and extracting zip files on a Windows computer.
- Creating and extracting zip files on a Mac.

Introduction

In this lesson, you will learn to create and extract zip files on a Windows computer and on a Mac.



1.1. What is a Zip File?

Zip files (also known as *archived* or *compressed* files) are compressed copies of one or more files or folders.

Zip files are used to:

- Send files to remote servers.
- Share files by email.
- Make backup copies of files.

Exercise 1: Zip Files on Windows

⌚ 5 to 10 minutes

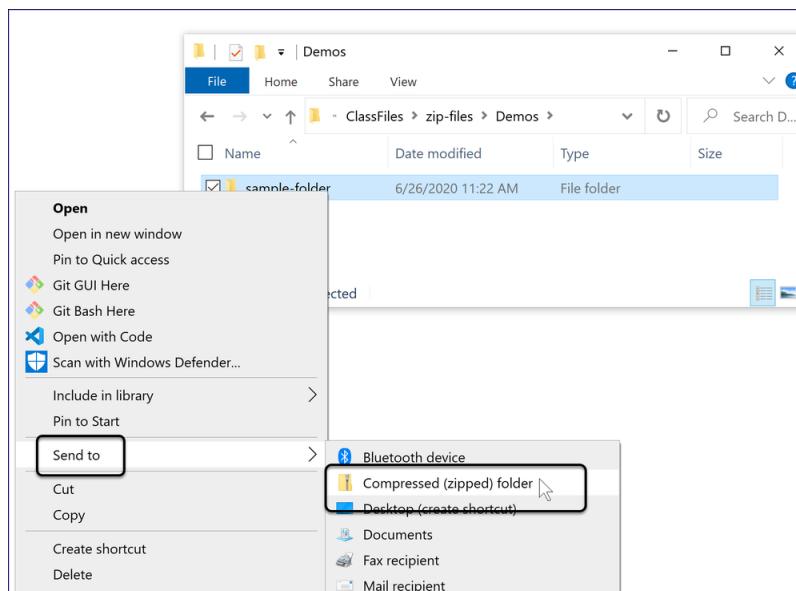
Windows Only

If you are not using Windows, you can skip this activity.

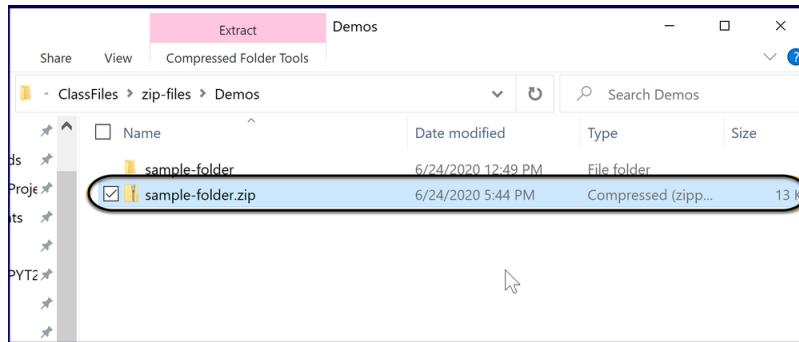
In this exercise, you will zip up a folder and then unzip the resulting archive.

❖ E1.1. Zip It Up

1. Navigate to `zip-files/Demos/sample-folder` in Windows Explorer and right-click the folder.
2. Select **Send to** and then **Compressed (zipped) folder**:



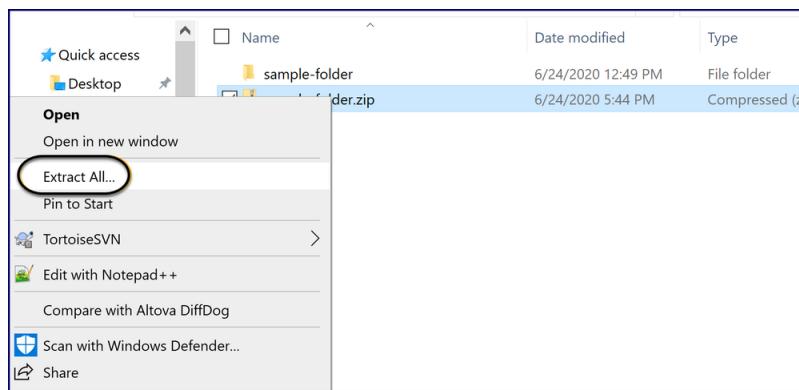
The zip file will now appear in the current directory with the same name as the zipped folder and with an extension of `.zip`:



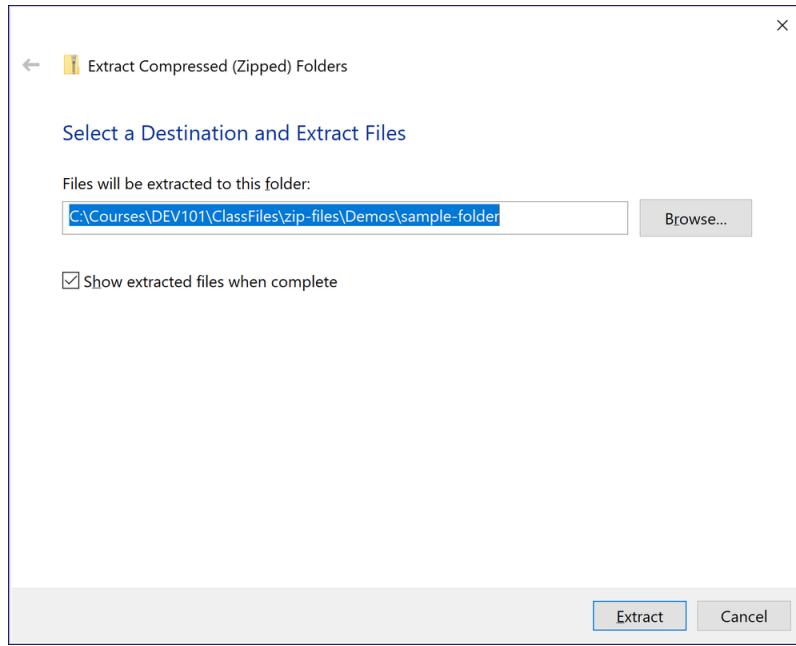
Notice that the folder was compressed significantly: from 93 kilobytes to 13 kilobytes.

❖ E1.2. Unzip It

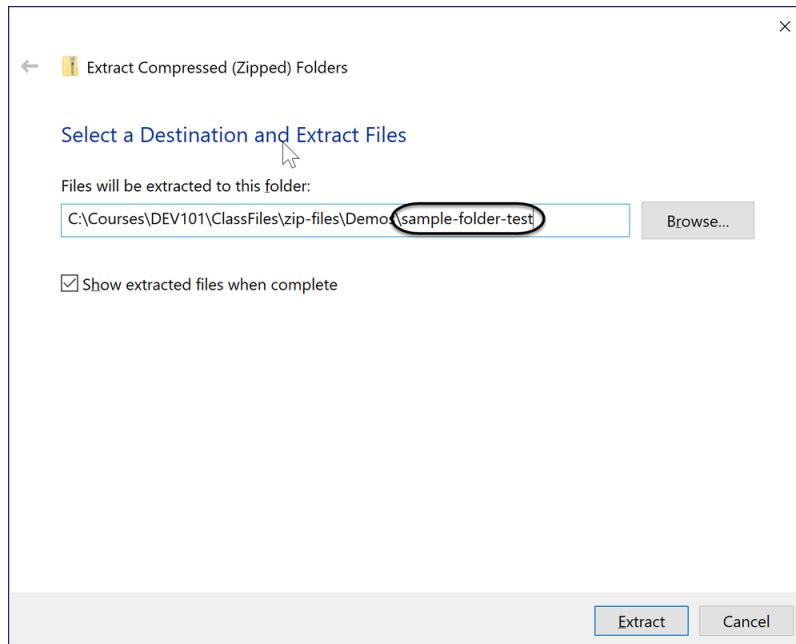
1. In Windows Explorer, right-click the archive you just created (`zip-files/Demos/sample-folder.zip`).
2. Select **Extract all...** :



You should see the following dialog box:



3. By default the extracted folder will be placed in the current directory. If a folder by the same name already exists in the current directory, then the contents of the zip file will be merged with the existing folder. Click **Browse...** to select a different location to which to extract the archived files. Change the name of the extracted file folder to **sample-folder-test** as shown below:



4. In the dialog box, click **Extract**.
5. Verify the extracted folder is in the current directory with the new name.

Exercise 2: Zip Files on Mac

 5 to 10 minutes

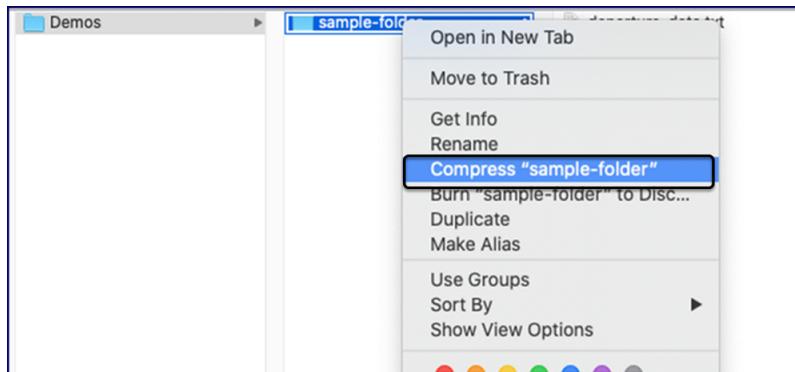
Mac Only

If you are not using a Mac, you can skip this activity.

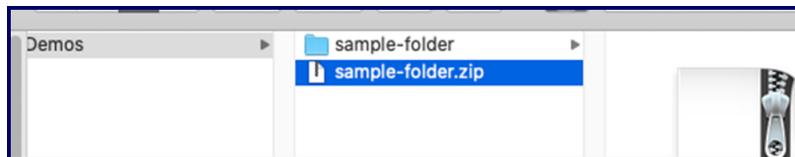
In this exercise, you will zip up a folder and then unzip the resulting archive.

❖ E2.1. Zip It Up

1. Navigate to `zip-files/Demos/sample-folder` in Finder and control-click the folder.
2. Select **Compress "sample-folder"**:



The zip file will now appear in the current directory with the same name as the zipped folder and with an extension of `.zip`:



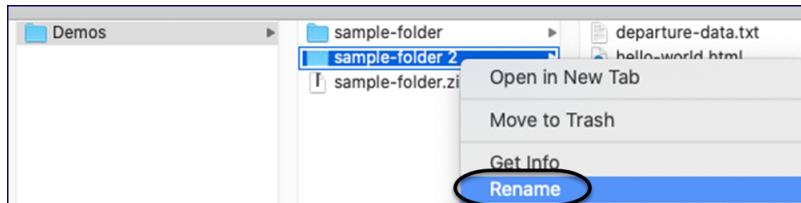
❖ E2.2. Unzip It

1. In Finder, double-click the archive you just created (`zip-files/Demos/sample-folder.zip`).

2. The extracted folder will be placed in the current directory. The name of the folder is suffixed with a " 2":



3. Rename the folder by control clicking the folder and then selecting Rename:



4. Over type the highlighted text with sample-folder-copy and press **Enter**:



The file has now been renamed.

Conclusion

In this lesson, you have learned how to create and extract zip files on Windows and Mac.

See [https://en.wikipedia.org/wiki/Zip_\(file_format\)](https://en.wikipedia.org/wiki/Zip_(file_format)) for more details on zip files.

LESSON 2

Showing Extensions

Topics Covered

- Showing extensions on a Windows computer.
- Showing extensions on a Mac.

Introduction

In this lesson, you will learn how to show file extensions on a Windows computer and on a Mac.



2.1. What is an Extension?

An *Extension* is the last part of a file name and is separated from the rest of the file name by a "." (period).

In the file listing below, we have highlighted the extensions:

-  `hello-world.html`
-  `hello-world.css`
-  `hello-world.js`
-  `hello_world.py`
-  `HelloWorld.class`
-  `hello-world.txt`

Extensions are used to:

- Identify the type of file.
- Associate an application with a file.

Exercise 3: Show Extensions on Windows

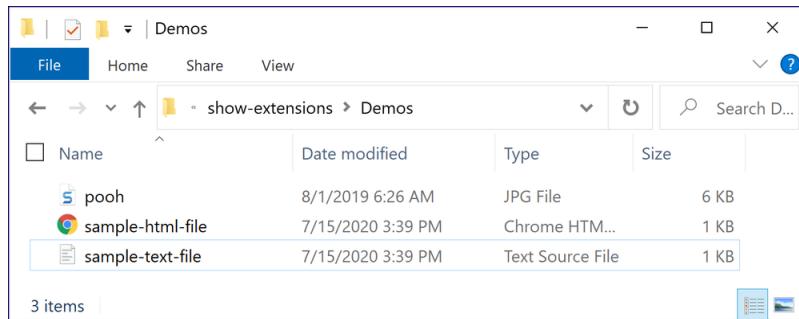
 10 to 15 minutes

Windows Only

If you are not using Windows, you can skip this activity.

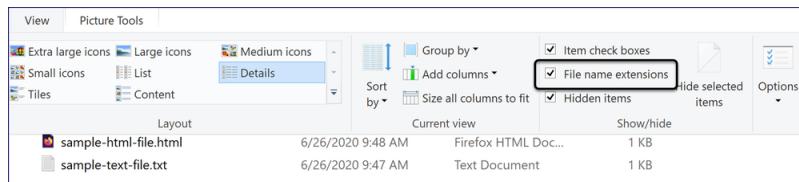
In this exercise, you will show and then hide the extensions of files.

1. Navigate to show-extensions/Demos in Windows Explorer.
2. You will see three files. The **View** menu option is above the list of files:

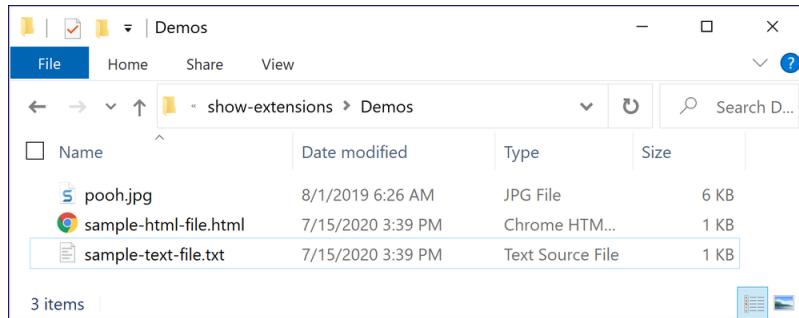


Click the **View** menu option

3. Check **File name extensions** to show extensions:



Extensions should now be showing:



If you ever want to hide extensions, you can uncheck the **File name extensions**, but we recommend you always have extensions showing.

Exercise 4: Show Extensions on Mac

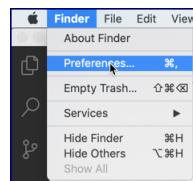
⌚ 10 to 15 minutes

Mac Only

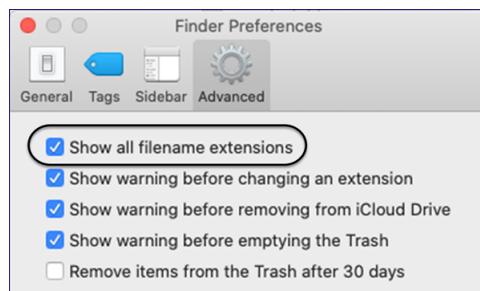
If you are not using a Mac, you can skip this activity. If you are using a Mac, the file name extensions are probably already showing and you can skip the activity. If the extensions are hidden, then complete this activity.

In this exercise, you will show extensions of files.

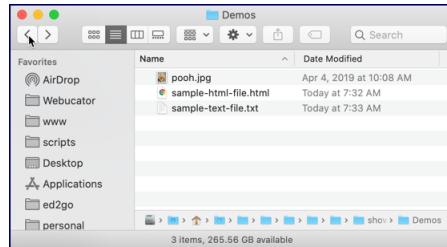
1. Navigate to `show-extensions/Demos` in Finder.
2. You will see three files. Select **File > Preferences** from the Finder menu:



3. Check `Show all file name extensions`:



Extensions should now be showing:



Conclusion

In this lesson, you have learned how to show extensions on Windows and Mac.

LESSON 3

Taking Screenshots

Topics Covered

- Taking screenshots on a Windows computer.
- Taking screenshots on a Mac.

Introduction

In this lesson, you will learn how to take screenshots on a Windows computer and on a Mac.



3.1. What is a Screenshot?

A *screenshot* is an image of your computer screen. Screenshots are also known as *screen grabs* or *screen captures*.

Screenshots are used to:

- Capture error output, e.g., compiler errors.
- Document procedures and processes, e.g., compiling a program.

Exercise 5: Taking Screenshots on Windows

 10 to 15 minutes

Windows Only

If you are not using Windows, you can skip this activity.

In this exercise, you will use the Snip & Sketch tool to take a screenshot.

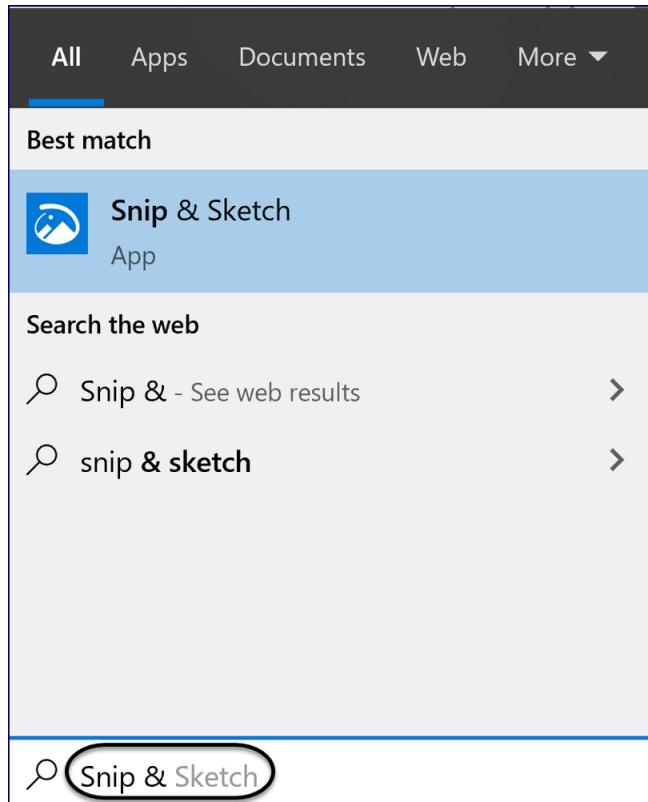
❖ E5.1. Take Screenshot

Windows Only

If you are using an older version of Windows, you should use the Snipping tool.

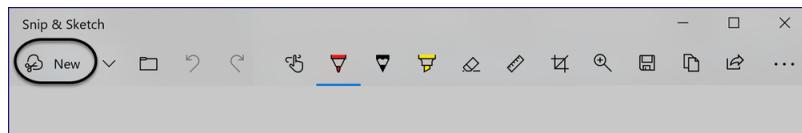
See <https://support.microsoft.com/en-us/help/13776/windows-10-use-snipping-tool-to-capture-screenshots> for more details on the Windows Snipping tool.

1. Click the Windows **Start** button and then start typing "Snip &":
2. The Snip & Sketch Tool app should appear under **Best match**:



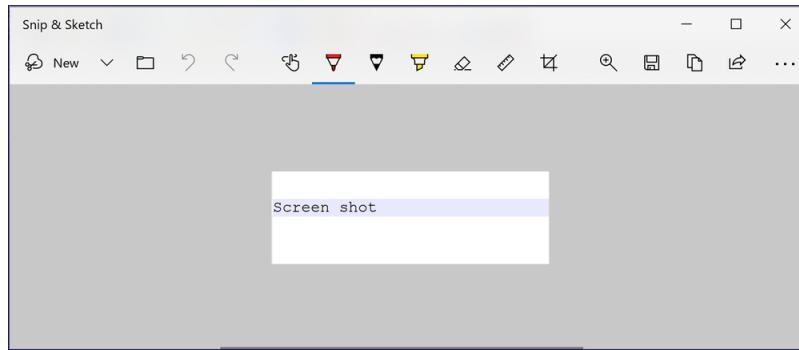
Click the app.

3. You are now in the Snip & Sketch tool. To take a screenshot, click the **New** toolbar button:

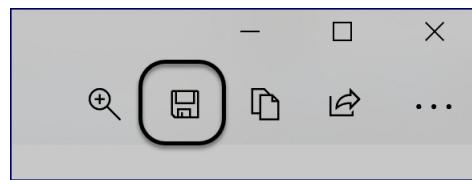


Now you can drag the mouse and “lasso” a rectangular piece of the screen you want to capture. Other options are available on the toolbar that appears at the top of the screen including freeform piece and fullscreen capture.

4. Release the mouse when you have selected the desired piece of the screen. You are back in the Snip & Sketch tool:



5. To save your work, click the “diskette” icon:



A dialog box will appear. You can save your screenshot as a .png file in the directory of your choosing.

See <https://support.microsoft.com/en-us/help/4488540> for more details on the Windows Snip & Sketch tool.

Exercise 6: Taking Screenshots on Mac

 10 to 15 minutes

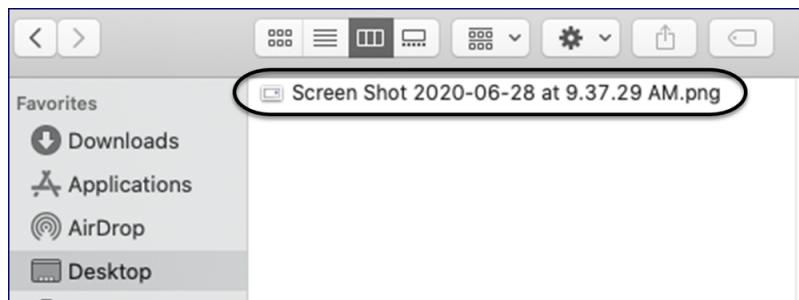
Mac Only

If you are not using a Mac, you can skip this activity.

In this exercise, you will use the built-in tool to take a screenshot.

❖ E6.1. Take Screenshot

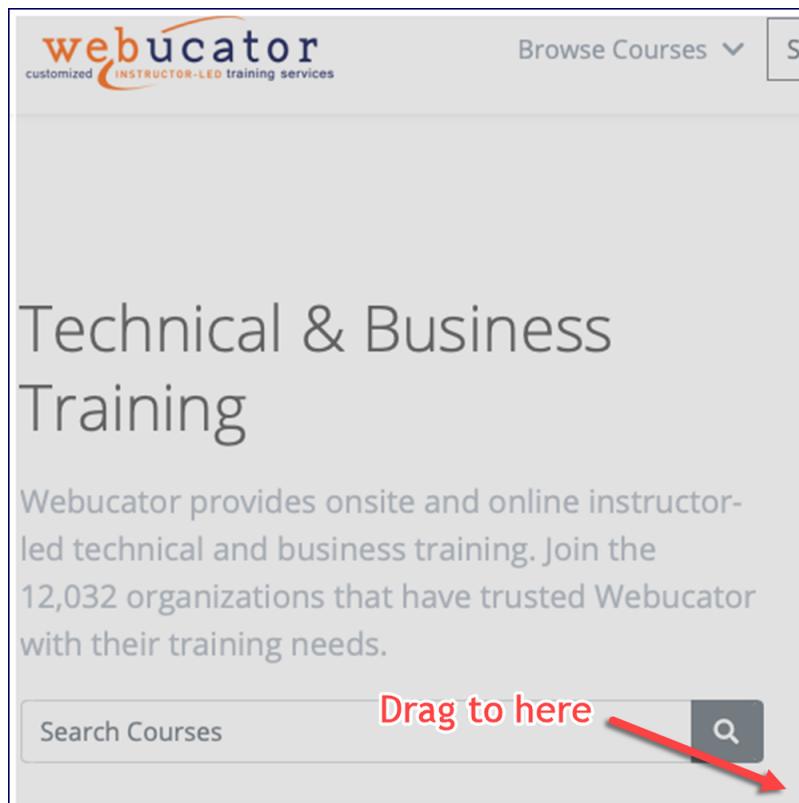
1. Open <https://www.webucator.com> in your browser.
2. Press **Shift+Command+3**. This action results in a full screen screenshot.
3. Go to the Desktop folder in Finder to verify your file has been created. Your screenshot has been saved with a file name beginning with “Screen Shot” followed by the date and time the screenshot was taken and ending with an extension of .png:



4. Return to the Webucator web page displayed in your browser.
5. Press **Shift+Command+4**. This action results in a “cross hairs” icon appearing on your screen at the location of the cursor:



6. Drag the cross hairs icon to the location indicated in the image to select the summary and then release the mouse:



When you release the mouse, the selected portion of the screen is saved to a file.

7. Go to the Desktop folder in Finder. Once again, your screenshot of the selected portion of the web page has been saved with a file name beginning with “Screen Shot” followed by the date and time the screenshot was taken. The file has an extension of .png.

See <https://support.apple.com/en-us/HT201361> for more details on taking screenshots on a Mac.

Conclusion

In this lesson, you have learned how to take screenshots on Windows and Mac.

LESSON 4

Using Command Line Shell

Topics Covered

- Using CMD on Windows.
- Using PowerShell on Windows.
- Using bash on Mac.
- Using zsh on Mac.
- Learning basic commands in each shell.

Introduction

In this lesson, you will learn to use command line shells on Windows and on Mac.



4.1. What is a Command Line Shell?

Command line shells permit the developer to enter operating system commands in a *line-oriented mode*, i.e., a non-GUI (Graphical User Interface) mode.

Command line shells are useful to:

- Navigate among folders.
- Create and remove directories and files.
- Compile and run programs.

The names “prompt,” “command prompt,” “shell,” and “terminal” are used interchangeably. They all refer to the *command line shell*.

Exercise 7: CMD and PowerShell on Windows

 15 to 25 minutes

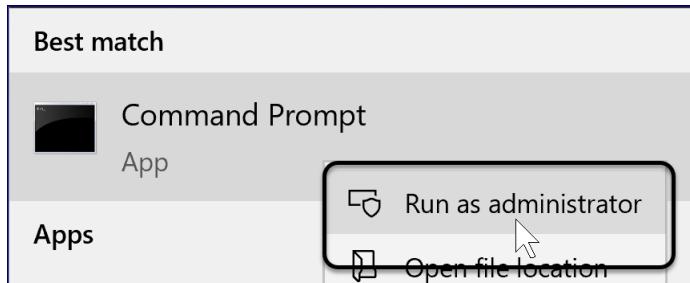
Windows Only

If you are not using Windows, you can skip this activity.

In this exercise, you will learn to use the CMD and PowerShell command line shells.

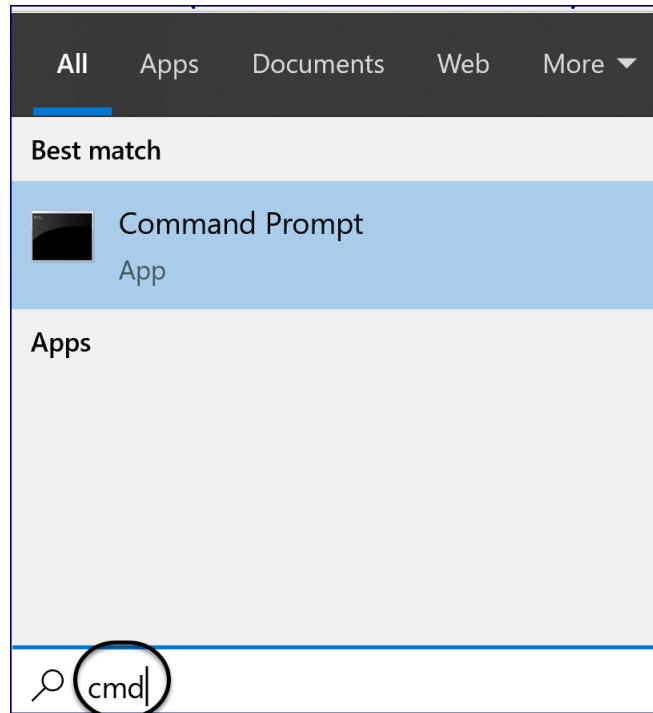
Run as administrator

If you ever get an “Access is Denied” error at the command line, close the command prompt and reopen with administrative privileges by right-clicking and selecting **Run as administrator**:



❖ E7.1. CMD

1. In the **Search** text box next to Windows Start, type cmd:



Click **Command Prompt** under **Best match**.

2. In the command prompt, you run commands by typing the command and pressing **Enter**. Change directory (i.e., folder) to the C drive using the **cd** command (for **change directory**):

```
cd c:\
```

```
cmd - Microsoft Windows [Version 10.0.18363.900]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\withr>cd c:\
```

A screenshot of a Command Prompt window. The title bar says 'cmd - Microsoft Windows [Version 10.0.18363.900]'. The window displays the command 'cd c:\' being typed. The text 'C:\Users\withr>' is followed by the command 'cd c:\'. The 'cd' part is highlighted with a red oval.

3. Create a new directory called **test-directory** under the C drive using the **md** command:

```
md test-directory
```

```
C:\ Command Prompt
Microsoft Windows [Version 10.0.18363.900]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\withr>cd c:\
c:\>md test-directory
c:\>
```

4. Change directory to **test-directory** using the **cd** command:

```
cd test-directory
```

```
C:\ Command Prompt
Microsoft Windows [Version 10.0.18363.900]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\withr>cd c:\
c:\>md test-directory
c:\>cd test-directory
c:\test-directory>
```

Notice how the prompt now contains the name of the new directory.

5. Use the **cd** command to move up one level, back to the C drive:

```
cd ..
```

```
C:\ Command Prompt
Microsoft Windows [Version 10.0.18363.900]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\withr>cd c:\
c:\>md test-directory
c:\>cd test-directory
c:\test-directory>cd ..
c:\>
```

The prompt now contains only the drive letter.

6. Use the `rd` command (for `remove directory`) to remove (delete) `test-directory`:

```
| rd test-directory
```

A screenshot of a Windows Command Prompt window titled "Command Prompt". The window shows the following text:
Microsoft Windows [Version 10.0.18363.900]
(c) 2019 Microsoft Corporation. All rights reserved.
C:\Users\withr>cd c:\
c:\>md test-directory
c:\>cd test-directory
c:\test-directory>cd ..
c:\>**rd test-directory**
c:\>

The directory has been removed. If you try to change directory to `test-directory`, you will get a message like this one:

```
| The system cannot find the path specified.
```

7. Run `cls` to clear the screen:

```
| cls
```

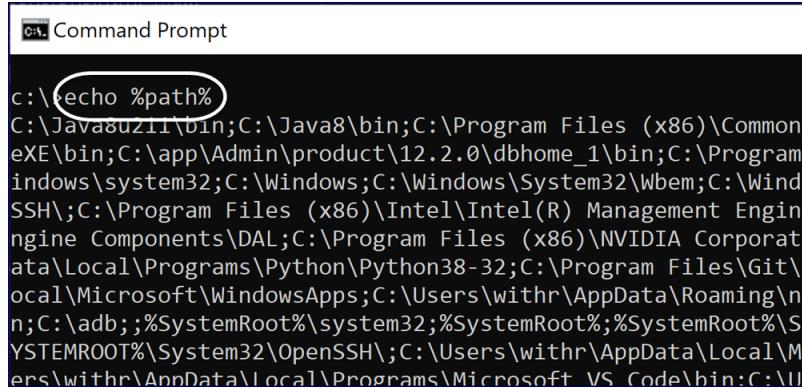
8. Run `set` to display your system's *environment variables*:¹

A screenshot of a Windows Command Prompt window titled "Command Prompt". The window shows the following text:
c:\>**set**
ALLUSERSPROFILE=C:\ProgramData
APPDATA=C:\Users\withr\AppData\Roaming
CommonProgramFiles=C:\Program Files\Common Files
CommonProgramFiles(x86)=C:\Program Files (x86)\Common Files
CommonProgramW6432=C:\Program Files\Common Files
COMPUTERNAME=DESKTOP-H20R0GQ
ComSpec=C:\WINDOWS\system32\cmd.exe
DriverData=C:\Windows\System32\Drivers\DriverData
ERLANG_HOME=C:\Program Files (x86)\erl8.1
FPS_BROWSER_APP_PROFILE_STRING=Internet Explorer
FPS_BROWSER_USER_PROFILE_STRING=Default

1. You will learn about environment variables in the Environment Variables lesson (see page 43).

The output contains all of the environment variables and the value of each variable. Your results will likely be different.

9. To display a particular environment variable, e.g. path, run echo %path%:



```
c:\>echo %path%
C:\Java8u21\bin;C:\Java8\bin;C:\Program Files (x86)\Common
eXE\bin;C:\app\Admin\product\12.2.0\dbhome_1\bin;C:\Program
indows\system32;C:\Windows;C:\Windows\System32\Wbem;C:\Wind
SSH\;C:\Program Files (x86)\Intel\Intel(R) Management Engine
ngine Components DAL;C:\Program Files (x86)\NVIDIA Corporat
ata\Local\Programs\Python\Python38-32;C:\Program Files\Git\c
ocal\Microsoft\WindowsApps;C:\Users\withr\AppData\Roaming\np
n;C:\adb;%SystemRoot%\system32;%SystemRoot%;%SystemRoot%\S
YSTEMROOT%\System32\OpenSSH\;C:\Users\withr\AppData\Local\M
ers\withr\AnnData\local\Programs\Microsoft VS Code\bin;C:\UI
```

The output displays the value of the path environment variable. Your results will likely be different.

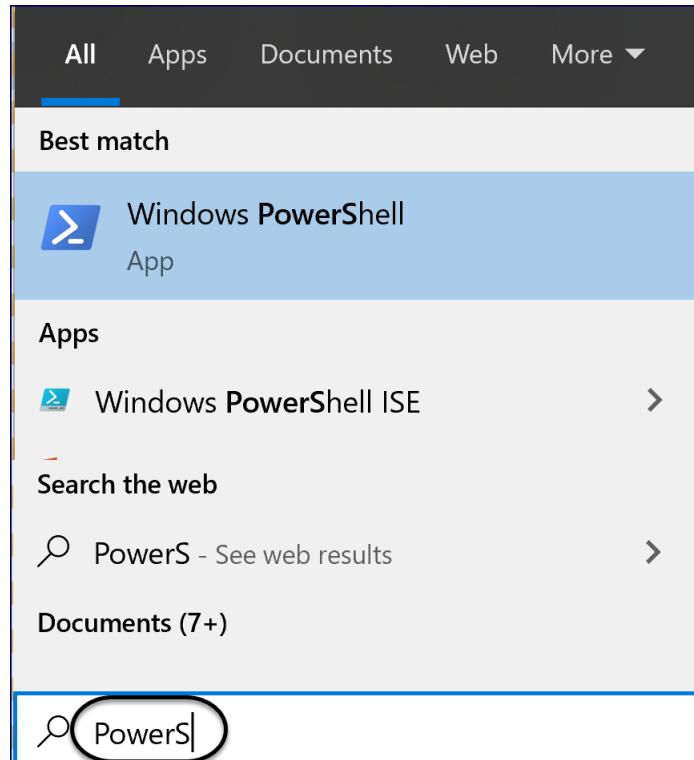
10. To exit the command prompt window, run exit.

❖ E7.2. PowerShell

PowerShell and CMD directory commands

The commands in PowerShell to create and remove a directory are identical to the commands used in CMD.

1. In the **Search** text box next to Windows Start, type **PowerShell**:



Click **Windows PowerShell** under **Best match**.

2. Use the `pwd` command to output the **present working directory** (also known as the *current directory*):

```
pwd
```

```
Windows PowerShell
PS C:\Users\withr> pwd
Path
-----
C:\Users\withr

PS C:\Users\withr>
```

A screenshot of a Windows PowerShell window. The command `pwd` is typed into the input field and highlighted with a yellow oval. The output shows the current path as `C:\Users\withr`. The prompt `PS C:\Users\withr>` is visible at the bottom.

The current directory is displayed in the response from the command. Note that the directory is also displayed in the prompt after PS.

3. Run `Get-ChildItem env:` to display all of the environment variables (all commands in PowerShell are case-sensitive):

PS C:\Users\withr> Get-Childitem env:	
Name	Value
_CONDAXE	C:\users\withr\anaconda3\Scripts\conda.exe
_CONDAROOT	C:\users\withr\anaconda3
ALLUSERSPROFILE	C:\ProgramData
APPDATA	C:\Users\withr\AppData\Roaming
CommonProgramFiles	C:\Program Files\Common Files
CommonProgramFiles(x86)	C:\Program Files (x86)\Common Files
CommonProgramW6432	C:\Program Files\Common Files

The output contains all of the environment variables and the value of each variable. Your results will likely be different.

4. Run `clear` to clear the screen:

```
clear
```

5. To display a particular environment variable (e.g., Path), run `Get-Childitem env:Path`

PS C:\Users\withr> Get-Childitem env:Path	
Name	Value
Path	C:\users\withr\anaconda3\condabin;C:\Java8u21
PS C:\Users\withr>	

The output displays the value of the Path environment variable. Your results will likely be different.

6. To exit the PowerShell window, run `exit`.

Exercise 8: zsh on Mac

⌚ 15 to 25 minutes

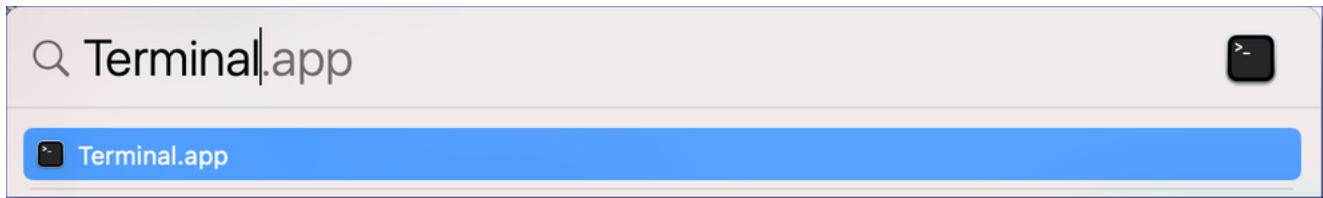
Mac Only

If you are not using a Mac, you can skip this activity.

In this exercise, you open a command line shell using zsh.

❖ E8.1. zsh

1. To open the terminal, press **Cmd + Space**:



Then, press **Return**:



You will know that you are in the **zsh** shell by the % sign in the prompt.

Older Macs

If you are using an older Mac, then you will probably be placed in the bash shell by default. Run the following command to use zsh instead:

```
chsh -s /bin/zsh
```

- Notice that the percentage sign in the prompt is preceded by a squiggly line (~), which is called a *tilde*. The tilde represents your home directory. If you ever want to get back there, you can run:

```
cd ~
```

The cd command stands for **c**hange **d**irectory. From your home directory, you can change to your **D**ocuments directory:

```
cd Documents
```

Notice that **Documents** now appears in the prompt. It will read something like:

```
natsdunn@Nats-MBP Documents %
```

- Use the pwd command to output the **p**resent **w**orking **d**irectory (also known as the *current directory*):

```
natsdunn@Nats-MBP Documents % pwd  
/Users/natsdunn/Documents
```

- You can list the contents of a directory by using the ls command. If you try this in your **D**ocuments directory, you may get a warning that the terminal wants access to that directory. You can allow this.
- Using a combination of ls and cd, try to change directory into your class files.
- Run env to display the environment variables on your computer:² The output will contain all of the environment variables and the value of each variable.

Conclusion

In this lesson, you have learned how to use command line shells such as CMD, PowerShell, bash, and zsh. You have also learned basic commands in each shell.

². You will learn about environment variables in the Environment Variables lesson (see page 43).

LESSON 5

Relative and Absolute Paths

Topics Covered

- Navigating the File System using relative paths and absolute paths.
- Using relative paths and absolute paths on the command line.

Introduction

In this lesson, you will learn to navigate the File System on a Windows computer and on a Mac using relative and absolute paths.



5.1. What is a Path?

A *path* is the location of a directory or file on your computer solid state or hard drive. The location consists of a hierarchical arrangement of directories, also known as folders. A directory may contain one or more files in addition to one or more subdirectories, also known as subfolders.

The hierarchical arrangement of directories is referred to as the *file system*. The highest level is referred to as the *root*. On Windows, a drive letter (e.g., C:\) represents the file system root. On Mac, the root is represented by a single forward slash: /.

5.1. Types of Paths

A path can be *relative* or *absolute*.

In Windows, each level in the path is separated from the next level by either a “\” (backslash) or a “/” (forward slash). On Mac, each level in the path is separated from the next level by a “/” (forward slash) only.

A *relative path* is a path that is dependent on the current directory. For example, . ./Exercises means “go up one directory level from the current location and then go down one level to the Exercises subdirectory.”

An *absolute path* is a path that is **not** dependent on the current directory. An absolute path always begins with a drive letter (Windows) or a / (Mac). For example, C:\Webucator\DEV101\ is an absolute path in Windows:

- C:\ is the drive letter and is located at the *root* level.
- Webucator is located one level down from the root.
- DEV101 is one level beneath Webucator and is a subdirectory of Webucator, its *parent directory*.

Exercise 9: Paths on Windows

⌚ 15 to 25 minutes

Windows Only

If you are not using Windows, you can skip this activity.

In this exercise, you will explore relative and absolute paths.

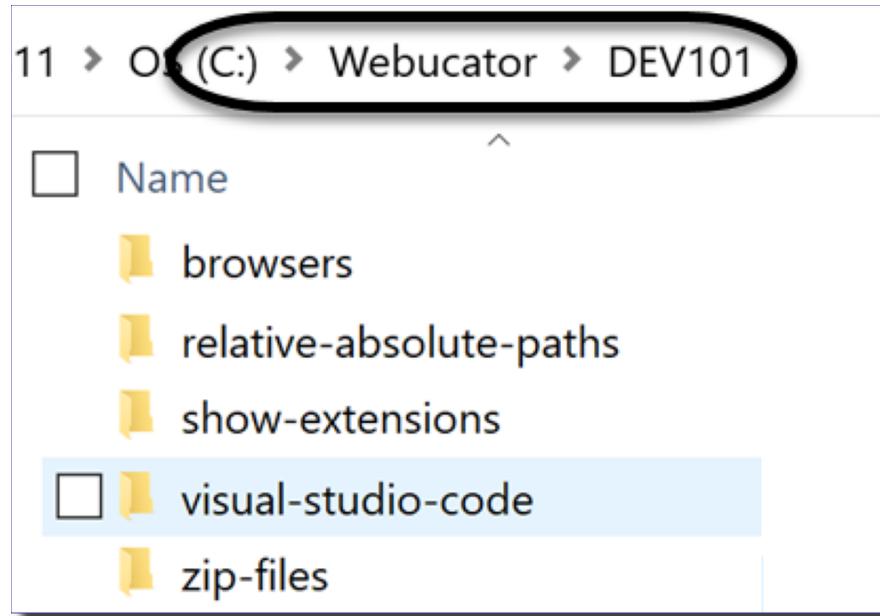
❖ E9.1. Working with Relative and Absolute Paths on Windows

1. Open Windows Explorer and, using the navigation pane on the left, select C:\Webucator. You will see Webucator in the location bar at the top of the main window pane and the DEV101 folder in the main window pane:



Note that in the location bar you see the drive letter, e.g. C: and the directory name. This represents the absolute path to Webucator which can be written as C:\Webucator.

2. Double-click the DEV101 folder. Now you see the lesson subfolders of DEV101:

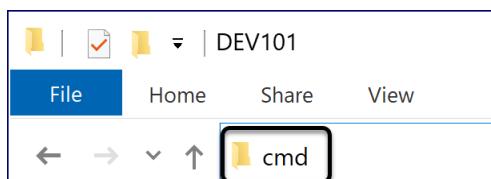


Again, in the location bar you see a representation of the absolute path to DEV101 which is C:\Webucator\DEV101.

3. Click in the empty space in the location bar anywhere to the right of the DEV101 folder. The location bar text will be highlighted:



Now, overtype the highlighted text with cmd or powershell but do not press **Enter** yet:



4. Now press **Enter** and you are placed in a command prompt in C:\Webucator\DEV101:

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.18363.900]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Webucator\DEV101>
```

Note that the prompt contains the absolute path of the current folder. The > is the end of the prompt string.

5. Run the `dir` command to see the contents of the directory:

```
dir
```

```
C:\Webucator\DEV101>dir
Volume in drive C is OS
Volume Serial Number is A4CE-54A1

Directory of C:\Webucator\DEV101

07/02/2020  01:43 PM    <DIR>      .
07/02/2020  01:43 PM    <DIR>      ..
06/24/2020  12:32 PM    <DIR>      browsers
07/02/2020  01:02 PM    <DIR>      relative-absolute-paths
07/02/2020  01:00 PM    <DIR>      show-extensions
06/24/2020  12:32 PM    <DIR>      visual-studio-code
07/02/2020  01:00 PM    <DIR>      zip-files
              0 File(s)      0 bytes
              5 Dir(s)   685,224,419,328 bytes free

C:\Webucator\DEV101>
```

You see the directories that match the directories displayed in Windows Explorer. Two additional items appear at the beginning of the output:

- A. . – one dot is a reference to the current directory.
- B. .. – two dots is a reference to the parent directory.

6. Use the `cd` command with a relative path to change to the `relative-absolute-paths` directory:

```
C:\Webucator\DEV101>cd relative-absolute-paths
C:\Webucator\DEV101\relative-absolute-paths>
```

Note that the prompt now contains the absolute path of C:\Webucator\DEV101\relative-absolute-paths>, verifying that you moved down one directory level.

7. Run `dir` to list the contents of the directory:

```
C:\Webucator\DEV101\relative-absolute-paths>dir
Volume in drive C is OS
Volume Serial Number is A4CE-54A1

Directory of C:\Webucator\DEV101\relative-absolute-paths

07/02/2020  01:02 PM    <DIR>        .
07/02/2020  01:02 PM    <DIR>        ..
07/02/2020  01:03 PM    <DIR>        Exercises
          0 File(s)           0 bytes
          3 Dir(s)  685,218,811,904 bytes free
```

The output displays the subdirectory **Exercises**.

8. Use the `cd` command with a relative path to change to the **relative-absolute-paths** directory:

```
| cd Exercises
```

Then, run `dir` to see the contents of the **Exercises** directory:

```
C:\Webucator\DEV101\relative-absolute-paths>cd Exercises
C:\Webucator\DEV101\relative-absolute-paths\Exercises>dir
Volume in drive C is OS
Volume Serial Number is A4CE-54A1

Directory of C:\Webucator\DEV101\relative-absolute-paths\Exercises

07/02/2020  01:03 PM    <DIR>        .
07/02/2020  01:03 PM    <DIR>        ..
07/02/2020  01:03 PM           27 sample.txt
          1 File(s)           27 bytes
          2 Dir(s)  685,219,323,904 bytes free
```

In the output you see one file named **sample.txt**.

9. Run `type sample.txt`, where `sample.txt` is a relative path, to display the contents of the file:

```
C:\Webucator\DEV101\relative-absolute-paths\Exercises>type sample.txt
This is a sample text file.
C:\Webucator\DEV101\relative-absolute-paths\Exercises>
```

The file contains one line:

```
| This is a sample text file.
```

10. Use `cd ..` to move up a directory:

```
C:\Webucator\DEV101\relative-absolute-paths\Exercises>cd ..  
C:\Webucator\DEV101\relative-absolute-paths>
```

Note that the prompt now contains the absolute path of `C:\Webucator\DEV101\relative-absolute-paths`, verifying that you moved up one level. The `..` notation is the reference to the parent directory of the current directory.

11. The `.` notation is the reference to the current directory. Running `cd .` will keep you at the same level:

```
C:\Webucator\DEV101\relative-absolute-paths>cd .  
C:\Webucator\DEV101\relative-absolute-paths>
```

You're unlikely to do this. We just want to demonstrate that `"."` references the current directory.

12. Move up two levels with this command:

```
| cd ../../
```

```
C:\Webucator\DEV101\relative-absolute-paths>cd ../../  
C:\Webucator>
```

Note that the prompt now contains the absolute path of `C:\Webucator`, verifying that you moved up two levels from `C:\Webucator\DEV101\relative-absolute-paths`.

13. Run type `C:\Webucator\DEV101\relative-absolute-paths\Exercises\sample.txt`, where `C:\Webucator\DEV101\relative-absolute-paths\Exercises\sample.txt` is an absolute path, to display the contents of the file:

```
C:\Webucator>type C:\Webucator\DEV101\relative-absolute-paths\Exercises\sample.txt  
This is a sample text file.  
C:\Webucator>
```

The absolute path is not dependent on the current directory.

14. Type `exit` to exit the command prompt window.

Exercise 10: Paths on Mac

⌚ 15 to 25 minutes

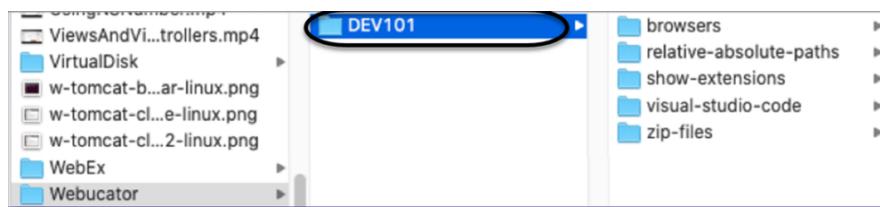
Mac Only

If you are not using Mac, you can skip this activity.

In this exercise, you will explore relative and absolute paths.

❖ E10.1. Working with Relative and Absolute Paths on Mac

1. Open Finder and select the Documents folder in the navigation pane on the left. Next, select the Webucator folder from the list of directories in your Documents folder and then select DEV101 in the main window pane:

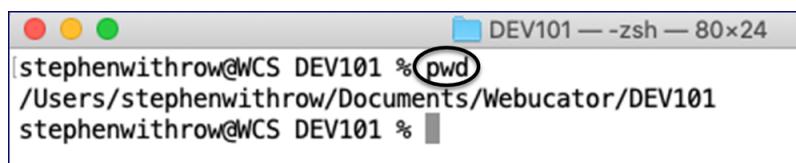


Note the subfolders in DEV101 displayed to the right of the directory.

2. Control-click DEV101 and select **New Terminal at Folder**:



3. You are now in a Terminal window with DEV101 as the current (working) directory. To verify that, run pwd:



The output displays the absolute path to DEV101. Note that the prompt contains the relative path of the current folder. The “%” is the end of the prompt string.

4. Run `ls` to see the contents of the directory:

```
stephenwithrow@WCS DEV101 % ls
asking-good-questions    show-extensions      visual-studio-code
browsers                  stack-overflow        zip-files
environment-variables    taking-screenshots
relative-absolute-paths   use-command-line-shell
stephenwithrow@WCS DEV101 %
```

You see the directories that match the directories displayed in Finder.

5. Use the `cd` command with a relative path to change to the `relative-absolute-paths` directory:

```
stephenwithrow@WCS DEV101 % cd relative-absolute-paths
stephenwithrow@WCS relative-absolute-paths %
```

Note that the prompt now contains the relative path of `relative-absolute-paths`, verifying that you moved down one directory level.

6. Run `ls` to list the contents of the directory:

```
stephenwithrow@WCS relative-absolute-paths % ls
Exercises
stephenwithrow@WCS relative-absolute-paths %
```

The output displays the `Exercises` folder.

7. Run `cd Exercises` to move down one level, and then run `ls` to see the contents of the directory:

```
stephenwithrow@WCS relative-absolute-paths % cd Exercises
stephenwithrow@WCS Exercises % ls
sample.txt
stephenwithrow@WCS Exercises %
```

In the output you see one file named `sample.txt`.

8. Use `cd ..` to move up a directory:

```
stephenwithrow@WCS Exercises % cd ..
stephenwithrow@WCS relative-absolute-paths %
```

Note that the prompt now contains the relative path of `relative-absolute-paths`, verifying that you moved up one level. The `..` notation is the reference to the parent directory of the current directory.

9. The . notation is the reference to the current directory. Running cd . will keep you at the same level:

```
[stephenwithrow@WCS relative-absolute-paths % cd .  
stephenwithrow@WCS relative-absolute-paths % ]
```

You're unlikely to do this. We just want to demonstrate that “.” references the current directory.

10. Move up two levels with this command:

```
cd ../../
```

```
[stephenwithrow@WCS relative-absolute-paths % cd ../../  
stephenwithrow@WCS Webucator % ]
```

Note that the prompt now contains the relative path of Webucator, verifying that you moved up two levels from Webucator/DEV101/relative-absolute-paths.

11. Run cat followed by the absolute path /Users/your_user_name/Documents/Webucator/DEV101/relative-absolute-paths/Exercises/sample.txt. The contents of sample.txt will be displayed:

```
stephenwithrow@WCS Webucator % cat /Users/stephenwithrow/Documents/Webucator/DEV  
101/relative-absolute-paths/Exercises/sample.txt  
This is a sample text file.  
stephenwithrow@WCS Webucator % ]
```

The file contains one line:

```
This is a sample text file.
```

The absolute path is not dependent on the current directory.

Conclusion

In this lesson, you have learned how to work with relative and absolute paths on Windows and on Mac.

LESSON 6

Environment Variables

Topics Covered

- Role of environment variables.
- Looking up and modifying Path on Windows.
- Looking up and modifying Path on Mac

Introduction

In this lesson, you will learn to work with the Path environment variable on a Windows computer and on a Mac.



6.1. What is an Environment Variable?

Environment variables are named objects that store a value that can be referenced by programs running on your computer.

Environment variables are used to:

- Identify home directories of software.
- Specify the command line prompt string.
- Identify a path of directories that contains executable files (Path variable).

In this lesson we will focus on the Path environment variable because of its importance to developers. The Path variable is used by the operating system to resolve references to executable files (compiled programs and scripts), so that those executable files can be run from any directory on the computer using a simple command. For example, imagine that you have a program on your computer that plays an audio file of a voice counts in any language. The executable file that runs this program is called `count.exe` and is located at `C:\Program Files\Counter\bin\count.exe` on your Windows computer and at `/Applications/Counter/count.app` on your Mac. You want to be able to run this file from the command line prompt from any directory by just running a command like this one:

```
count 100 spanish
```

or

```
count 10 german
```

To do this, you would add `C:\Program Files\Counter\bin` (on Windows) or `/Applications/Counter` (on Mac) to the Path variable.

When you run a command and get an error like one of the following ones, it may mean the executable doesn't exist, but it also could mean that you need to add a path to it to the Path:

```
'count' is not recognized as an internal or external command, operable program or batch file.
```

```
command not found: count
```

```
count : The term 'count' is not recognized as the name of a cmdlet, function, script file, or operable program.
```

Important Note on Exercises

Students on Windows should read through the Mac exercise, and students on Mac should read through the Windows exercise so that you understand how Path works on both operating systems.

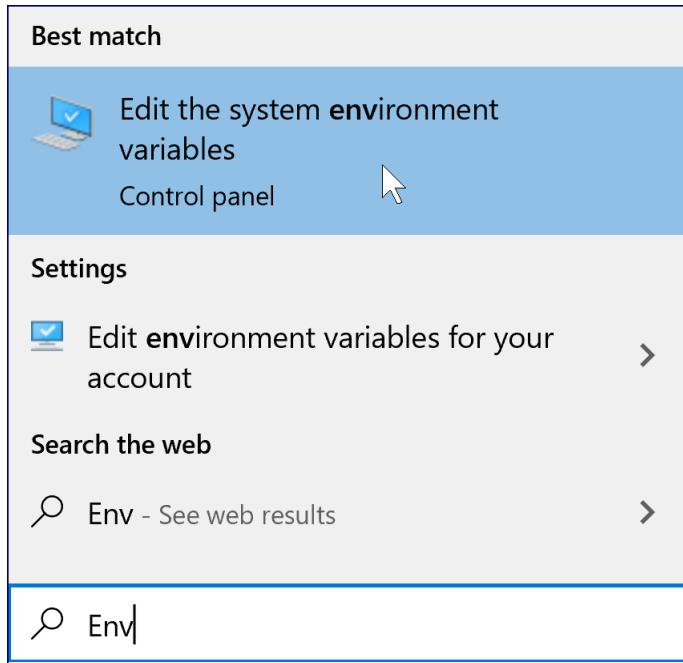
Exercise 11: Path Environment Variable on Windows

 15 to 25 minutes

In this exercise, you will learn how to lookup and modify the value of the Path environment variable on your Windows computer.

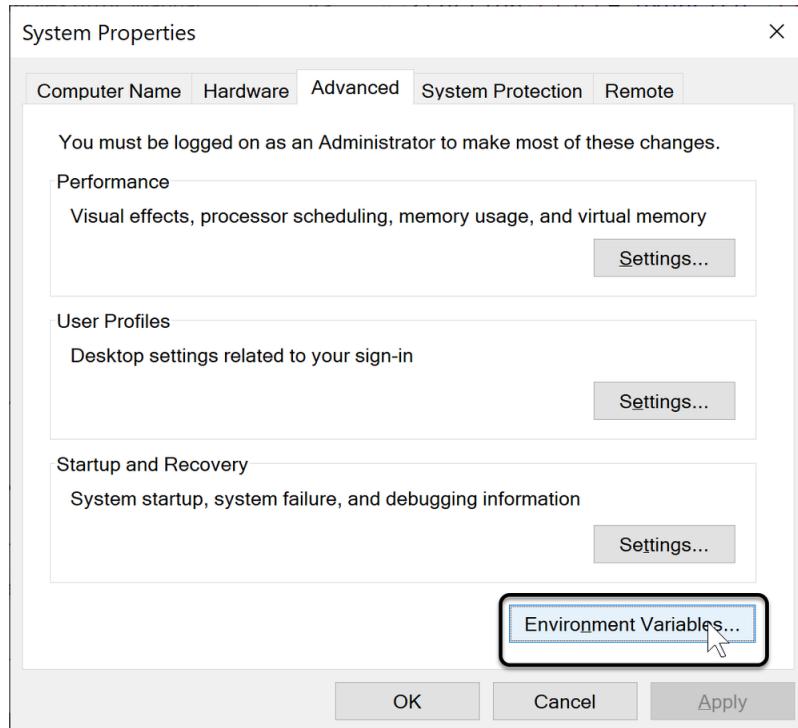
❖ E11.1. Looking up the Value of the Path

1. Click the Windows **Start** button and type “Env”:
2. An option to edit environment variables should appear under **Best match**:

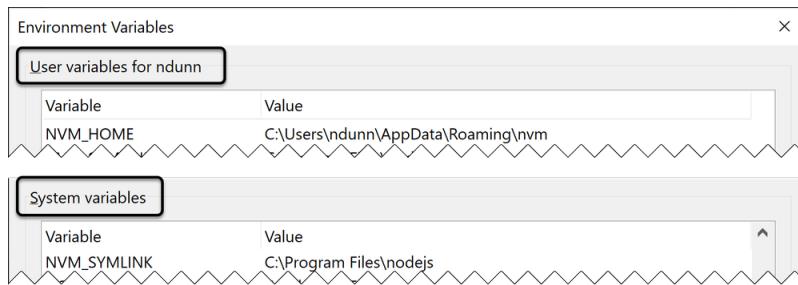


Click the option.

3. In the resulting dialog, click the **Environment Variables** button:

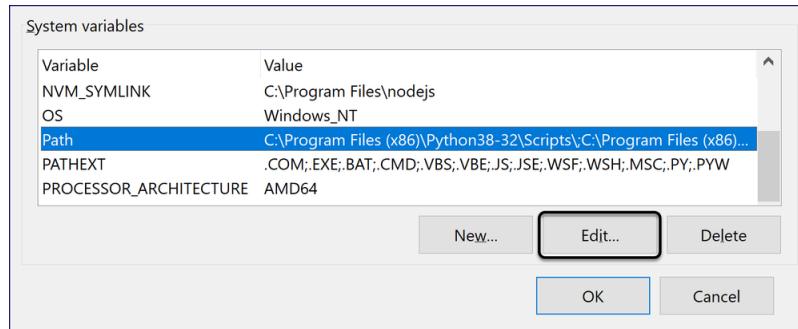


4. You see the environment variables for the current user labeled as **User variables for username** and the environment variables shared by all users labeled as **System variables**:

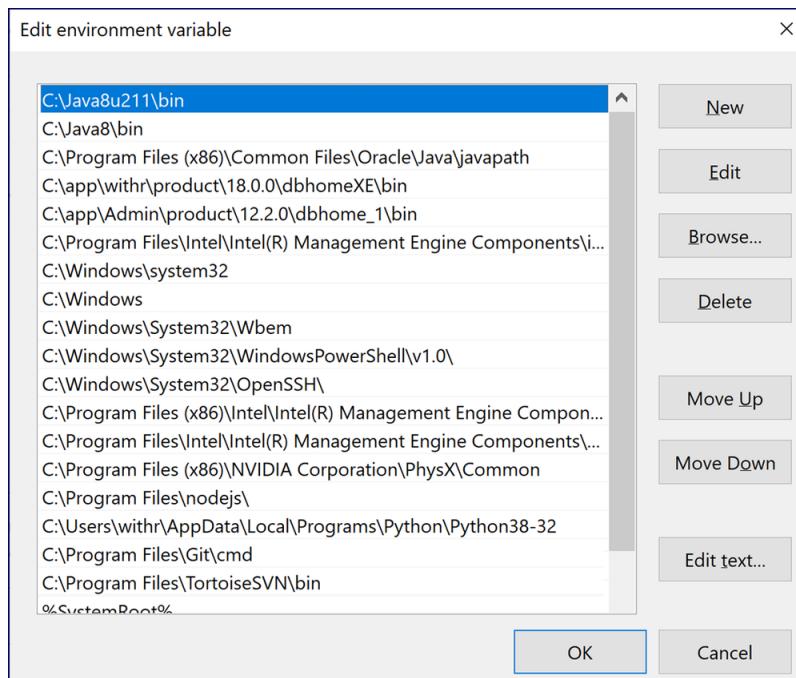


❖ E11.2. Modifying the Path Environment Variable

1. Select **Path** under **System variables** and then click **Edit**:



2. The environment variables panel displays all of the paths associated with the Path system environment variable in a scrollable pane:



You can add, edit and delete paths using the buttons on this panel.

3. Check the list for the following path:

C:\Users\USERNAME\AppData\Local\Programs\Microsoft VS Code\bin

where USERNAME is your user name. If this path is present in your list, click the path to highlight it and then click the **Delete** button to remove it. We will add it back shortly.

4. Click the **OK** button to close the panel.
5. Select the **Path** variable under **User variables for username** and then click **Edit**:

User variables for ndunn	
Variable	Value
NVM_HOME	C:\Users\ndunn\AppData\Roaming\nvm
NVM_SYMLINK	C:\Program Files\nodejs
OneDrive	C:\Users\ndunn\OneDrive
Path	C:\Program Files (x86)\Python38-32\Scripts;C:\Program Files (x86)...
TEMP	C:\Users\ndunn\AppData\Local\Temp
TMP	C:\Users\ndunn\AppData\Local\Temp

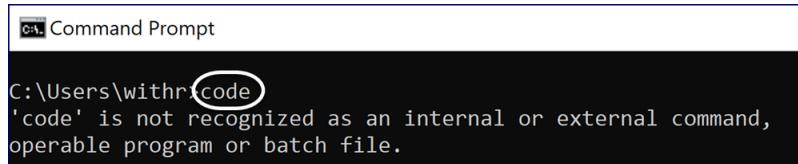
New... Edit... Delete

- Check the list for the following path:

```
C:\Users\USERNAME\AppData\Local\Programs\Microsoft VS Code\bin
```

where USERNAME is your user name. If this path is present in your list, click the path to highlight it and then click the **Delete** button to delete it.

- Click the **OK** button to close the panel.
- Click **OK** to close the environment variables dialog box.
- Click **OK** to close the system properties dialog box.
- Open a command prompt or Powershell window. Type code. You will get an error:



```
Command Prompt

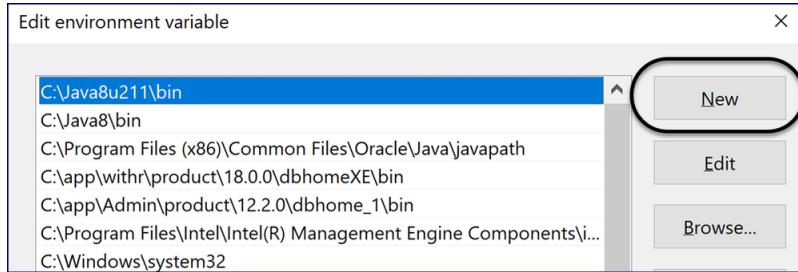
C:\Users\withr\code
'code' is not recognized as an internal or external command,
operable program or batch file.
```

- Open the environment variables panel as you did earlier in the exercise. Select the **Path** variable under **System variables** and click **Edit**:

System variables	
Variable	Value
ComSpec	C:\WINDOWS\system32\cmd.exe
DriverData	C:\Windows\System32\Drivers\DriverData
ERLANG_HOME	C:\Program Files (x86)\erl8.1
JAVA_HOME	C:\Java8u211
NUMBER_OF_PROCESSORS	12
OS	Windows_NT
Path	C:\Java8u211\bin;C:\Java8\bin;C:\Program Files (x86)\Common File... .COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC
PATHEXT	

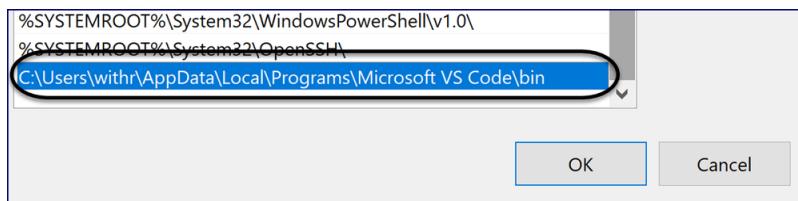
New... Edit... Delete

- Click **New** from the list of buttons on the right:



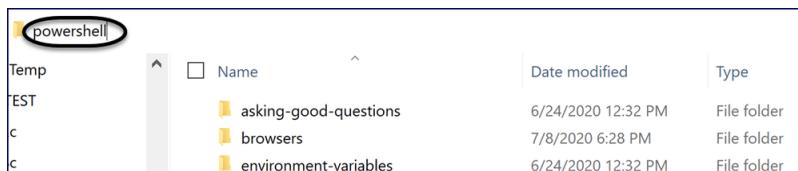
13. A text box appears at the bottom of the paths listed in the scrollable pane. Enter the following path, replacing **USERNAME** with your user name:

```
C:\Users\USERNAME\AppData\Local\Programs\Microsoft VS Code\bin
```



Alternatively, you can click the **Browse** button and select a path from the file system. Click **OK** to save the path in the Path variable.

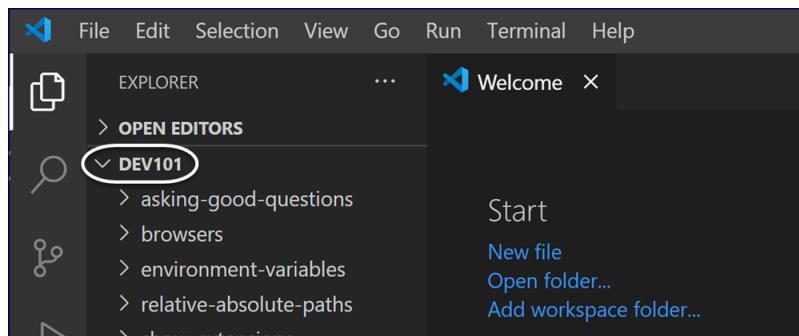
14. Click **OK** to close the environment variables dialog box.
15. Click **OK** to close the system properties dialog box.
16. In File Explorer, navigate to c :\Webucator\DEV101. Click anywhere to the right of the path in the location bar. The path will be highlighted. Type **powershell**:



17. Press **Enter**. You are now in PowerShell and the current folder is c :\Webucator\DEV101. Type code .. The . (dot) directs Visual Studio Code to open the current folder:



18. Visual Studio Code opens with C:\Webucator\DEV101 displayed in Explorer:



You successfully added a folder to the system Path environment variable, allowing you to run the code executable file from anywhere on your computer.

Exercise 12: Path Environment Variable on Mac

⌚ 15 to 25 minutes

In this exercise, you will learn how to lookup and change the value of the Path environment variable in a Terminal window on your Mac.

❖ E12.1. Looking up the Value of the Path

1. Open a Terminal window.
2. Run echo \$PATH:



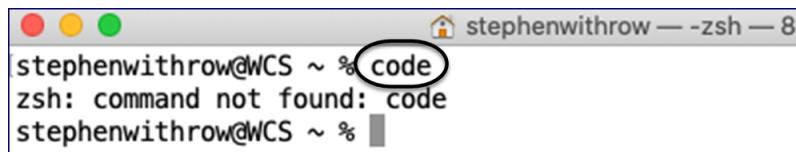
```
stephenwithrow@WCS ~ % echo $PATH
/fictitious/path:/usr/local/bin:/usr/bin:/bin:/usr/sbin:/sbin
stephenwithrow@WCS ~ %
```

A screenshot of a macOS Terminal window titled "stephenwithrow — zsh — 80x24". The window shows the command "echo \$PATH" entered in the input field, followed by its output: "/fictitious/path:/usr/local/bin:/usr/bin:/bin:/usr/sbin:/sbin". The output line is highlighted with a blue rectangle and a red circle around the word "PATH".

The output shows the paths associated with the Path environment variable on your Mac.

❖ E12.2. Modifying the Path Environment Variable

1. In the Terminal window, type code and press **Enter**. You will likely get an error:



```
stephenwithrow@WCS ~ % code
zsh: command not found: code
stephenwithrow@WCS ~ %
```

A screenshot of a macOS Terminal window titled "stephenwithrow — zsh — 80x24". The window shows the command "code" entered in the input field, followed by the error message "zsh: command not found: code". The command "code" is highlighted with a blue rectangle and a red circle around it.

If instead of getting an error, Visual Studio Code opens up, then you already have code in your path. In this case, read through, but **don't do** step 2 and pick up at step 3.

2. Run the following command:

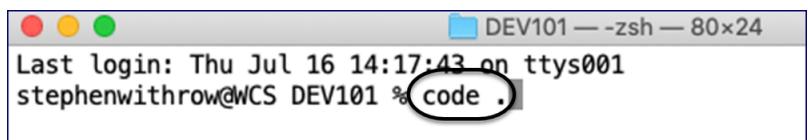
```
sudo ln -s /Applications/Visual\ Studio\ Code.app/Contents/Resources/app/bin/code
/usr/local/bin
```

Notice that the spaces are preceded by backslashes (\). This command will create a *symbolic link* (symlink) to the Visual Studio Code executable file. Press **Return**:

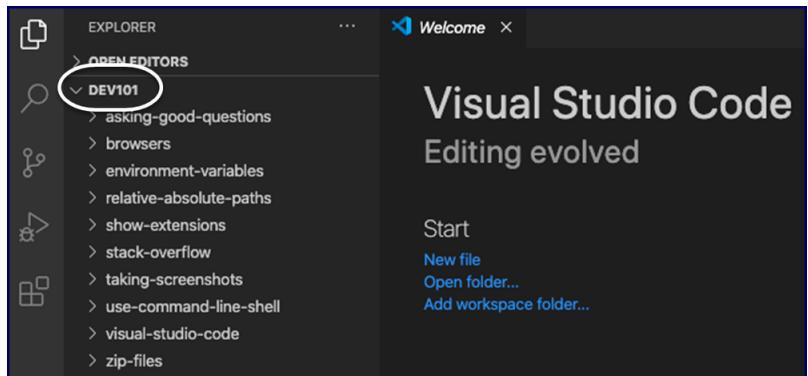
```
stephenwithrow@WCS ~ % sudo ln -s /Applications/Visual\ Studio\ Code.app/Contents/Resources/app/bin/code /usr/local/bin  
Password:  
stephenwithrow@WCS ~ %
```

You will be prompted for your Mac user password because you prefixed the `ln` command with `sudo`, meaning that you are running the command in “super user” mode, which may be necessary to create symbolic links. Enter your password at the prompt.

3. In Finder, navigate to `/Users/USERNAME/Documents/Webucator/DEV101`. Control-click `DEV101` and select **New Terminal at Folder**. You are now in a terminal window with `DEV101` as the working directory.
4. Type `code .` and press **Enter**:



5. Visual Studio Code displays the current directory in the Explorer view:



You have successfully added the Visual Studio Code executable file to the `Path` variable.

Conclusion

In this lesson, you have learned about environment variables and how to view and edit the `Path` environment variable on Windows and Mac.

LESSON 7

Browsers

Topics Covered

- Understanding the URL (Uniform Resource Locator).
- Using query strings.
- The difference between local paths and server paths.
- Using Chrome Developer Tools for multiple device screens.
- Learning about Chrome caches and hard refreshing.

Introduction

In this lesson, you will learn about query strings, local and server paths, and developer tools using the Chrome browser .



7.1. URL

A **URL** (**U**niform **R**esource **L**ocator) is an address of a resource on the Internet. URLs are sent from a *browser*. A browser is **g**raphical **u**sers **i**nterface (GUI) software used for displaying HTML documents.

The following is an example of a URL:

```
https://www.webucator.com/index.cfm
```

1. HTTPS is the protocol the browser will use to request the web page. The part of the URL that identifies the protocol is known as the *scheme*. For web pages, the protocol will either be HTTP (**H**yper**T**ext **T**ransfer **P**rotocol) or HTTPS (**H**yper**T**ext **T**ransfer **P**rotocol **S**ecure).
2. webucator.com is the *domain name* pointing to the web server hosting the web page.

3. `www` is the subdomain. It is the most common subdomain used on the Internet, but some websites use different subdomains. For example, Wikipedia uses subdomains to indicate the language of the page:

```
https://en.wikipedia.org/wiki/Subdomain
```

```
https://es.wikipedia.org/wiki/Subdominio
```

Universities often use subdomains to indicate the branch of the university. For example, Harvard uses `hms` for its medical school and `hls` for its law school:

```
https://hms.harvard.edu/
```

```
https://hls.harvard.edu/
```

4. `index.cfm` is the actual web page. When the web page is omitted (e.g., `https://www.webucator.com`), a default web page will be sent. Often, this page is named `index` and has an extension indicating the language used to create the page (e.g., `html`, `php`, `cfc`, etc.).

You type in the URL in the *location bar* of the browser. The location bar is a text field displayed above the content area where the web page will be displayed.

Note that you can provide a *port number* after the domain name, separated by a : (colon):

```
https://www.webucator.com:443
```

Web servers *listen* for requests on specific ports. To see this in action, enter the following URL in the location bar of your browser:

```
https://www.google.com:443
```

Google will load, because Google's web server is listening for requests on port 443.

Now, enter the following URL:

```
https://www.google.com:81
```

This time, the page will not load, because Google's web server is not listening for requests on port 81. 443 is the default port number for https requests and can be omitted from the URL.

❖ 7.1.1. Query Strings

Query strings contain parameters that are sent to a server-side program. Query strings are appended to the URL with a ? (question mark):

```
https://www.google.com/search?q=webucator
```

On the server-side, programs use the query string to determine how to respond. For example, Google uses the value of the q parameter to determine what to search for.

Multiple parameters in the query string are separated with ampersands (&). For example:

```
https://www.google.com/search?q=webucator&tbo=isch
```

❖ 7.1.2. Local Path

A *local path* is a URL that is resolved on your computer's file system. The URL will begin with the File:/// protocol as shown in the example below:

```
file:///C:/Webucator/DEV101/browsers/Demos/simple-form.html
```

❖ 7.1.3. Server Path

A *server path* is a URL that is resolved by a web server. The web server can be remote (located on a physically separate computer) or running locally on your computer.

The URL will begin with the HTTP or HTTPS protocol as shown in the example below:

```
https://www.webucator.com
```

When typing in the URL in your browser's location bar, you can usually omit the protocol.

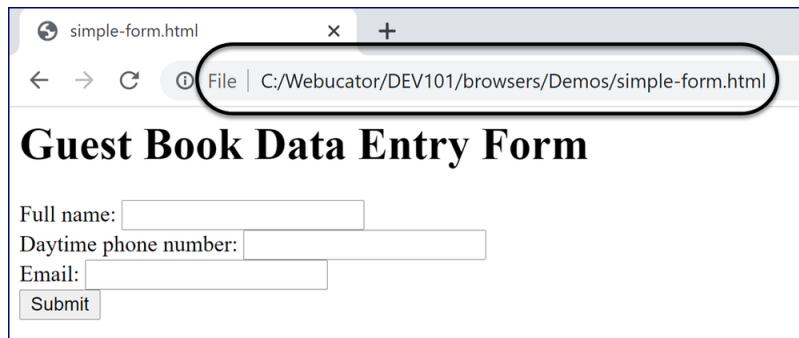
Exercise 13: Paths on the Chrome Browser

 15 to 25 minutes

In this exercise, you will learn how to use local and server paths using the Chrome browser.

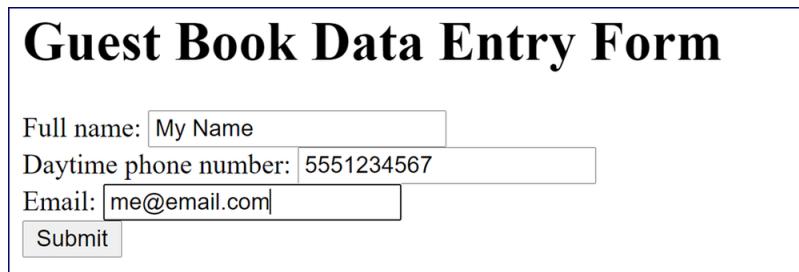
❖ E13.1. Local and Server Paths

1. Open your Chrome browser.
2. Press **Ctrl+O** (Windows) or **Command+O** (Mac) and navigate to `C:/Webucator/DEV101/browsers/Demos/simple-form.html` (Windows) `/Users/user_name/Documents/Webucator/DEV101/browsers/Demos/simple-form.html` (Mac) and click the **Open** button.
3. The form is displayed:



Note that **File** indicates the web page is located on the file system, indicating that the URL corresponds to a local path.

4. Fill in the form as shown and then click the **Submit** button:



A screenshot of a "Guest Book Data Entry Form" with the following data entered:
Full name: My Name
Daytime phone number: 5551234567
Email: me@email.com
A "Submit" button is at the bottom.

5. A query string is now appended to the URL:

'Demos/simple-form.html?fullname=My+Name&phone=5551234567&email=me%40email.com

The query string begins with ? and contains the name and value of each form field. The name/value pairs are separated by &. In a production environment, the name/value pairs would be sent to a server-side program that would likely store the values in a database.

6. Click the location bar of Chrome. The URL will be highlighted. Overtype the URL with the remote path shown below and then press **Enter**:

```
https://www.webucator.com
```

The web page stored on the remote server is displayed. In practice, you can omit https: because this is the default protocol used by the browser.

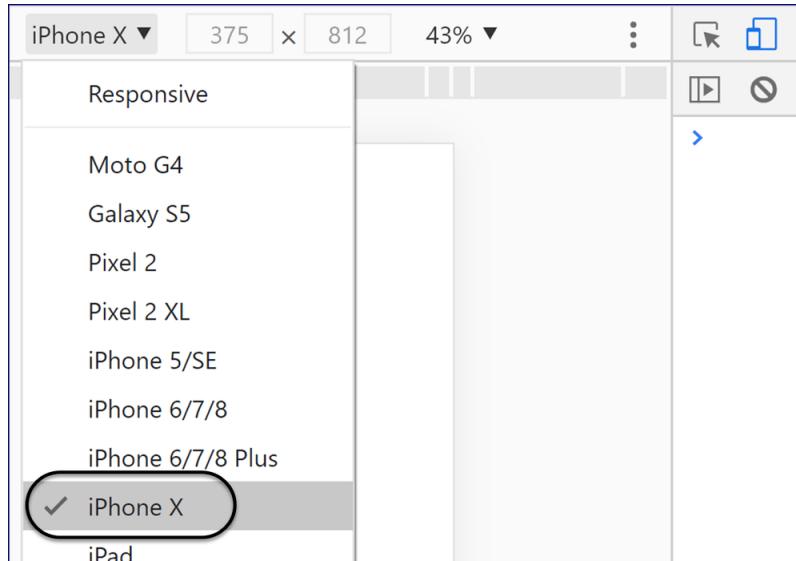
❖ E13.2. Developer Tools for Multiple Device Screens

1. In Chrome, re-open simple-form.html as you previously did.
2. Open Developer Tools by pressing **Ctrl+Shift+I** (Windows) or **Command+Option+I** (Mac):

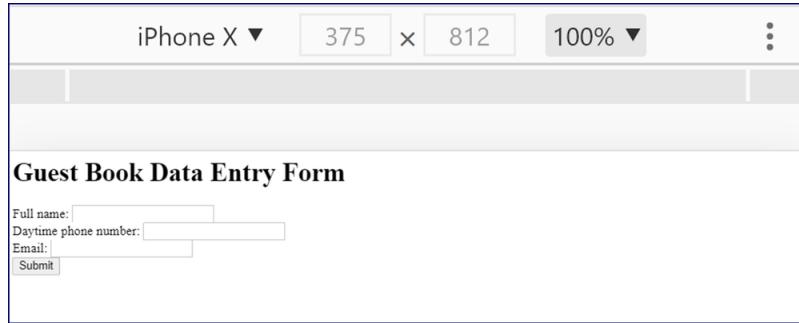


The Developer Tools will appear in a panel on the right or bottom of the browser. Note the icon to toggle the device screen, highlighted above. Click this icon.

3. You now see the web page displayed on a specific device screen. Select **iPhone X** from the dropdown list of devices:



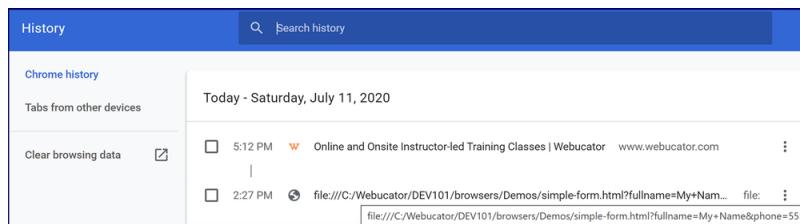
4. The web page is rendered as if it were displayed on an iPhone X:



This is a great way to see how web pages will look on different devices. JavaScript and CSS can be used to arrange the HTML elements for various screen sizes.

❖ E13.3. Cache and Hard Refresh

1. In the Chrome browser, press **Ctrl+H** (Windows) or **Command+Y** (Mac). The history of the web pages requested by the browser is displayed on a separate tab:



Each web page retrieved is stored in its own area of *cache* memory. Cache memory is used to reduce the number of requests made by the browser for a web page. Close the tab by pressing the **X** in the tab.

2. In the original tab, type the following URL and press **Enter**:

www.webucator.com

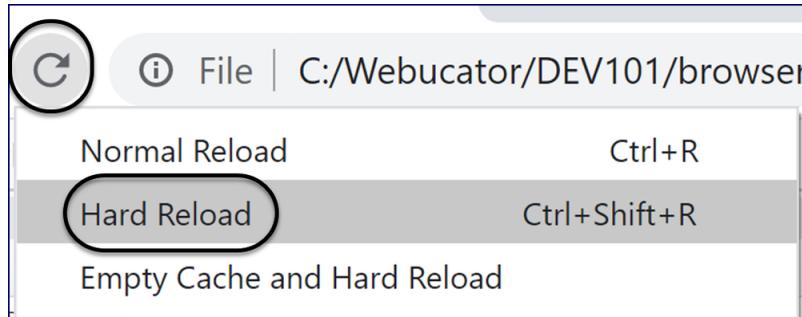
The web page is displayed.

3. Reload the web page by clicking the reload icon highlighted in the following screenshot:



The screen is refreshed using the cached web page.

4. A *hard refresh* compels the browser to delete the cached web page and request a new page from the remote server. To perform a hard refresh on Chrome, open Developer Tools as described earlier and right-click (Windows) or control click (Mac) the reload icon. Then click **Hard Reload**:



The screen is refreshed with the web page as sent from the server. Any changes made to the web page since the last request will be reflected on the page.

Conclusion

In this lesson, you have learned about URLs, local and server paths, query strings and caching and how to use these items on the browser.

LESSON 8

Visual Studio Code

Topics Covered

- Creating workspaces and adding folders to the workspace.
- Specifying workspace and user settings.
- Opening a terminal view.
- Revealing in File Explorer.
- Comparing files.
- Installing extensions.

Introduction

Visual Studio Code is a free code editor that supports development and testing of many of today's popular programming languages.

In this lesson, you will learn how to use Visual Studio to create a workspace, open a terminal view, compare files and install extensions.

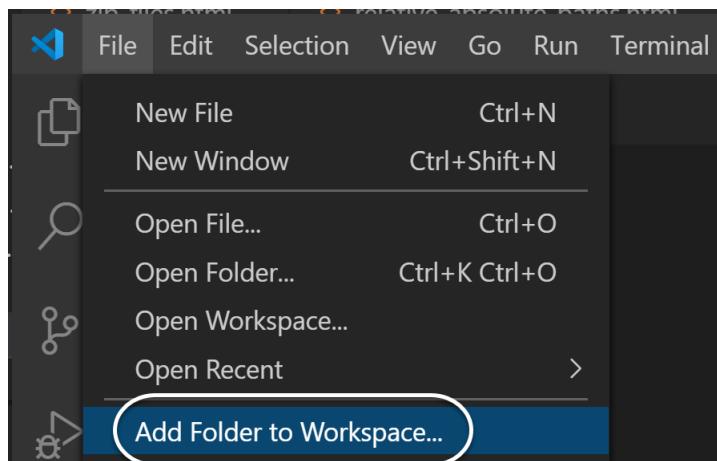
Visual is one of the easiest code editors to get up and running with quickly. However, it is also an extremely powerful, full-featured integrated development environment (IDE). We recommend you bookmark <https://code.visualstudio.com/docs/editor/codebasics>, and return to it after you feel comfortable using Visual Studio Code's basic features to learn how to use some of its more advanced features.

Exercise 14: Creating a Workspace

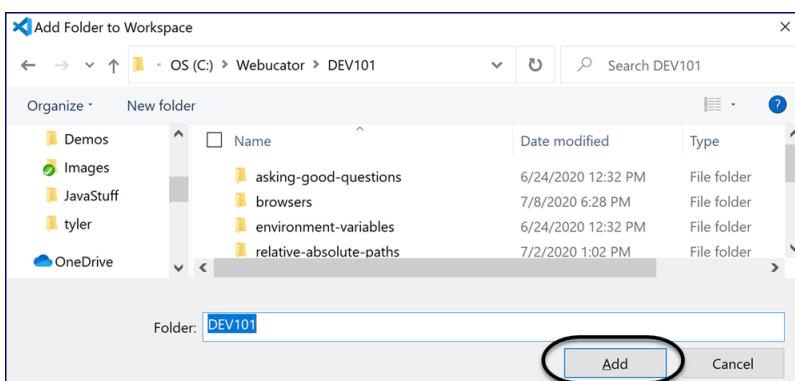
⌚ 15 to 25 minutes

In this exercise, you will create a workspace and add a folder to the workspace.

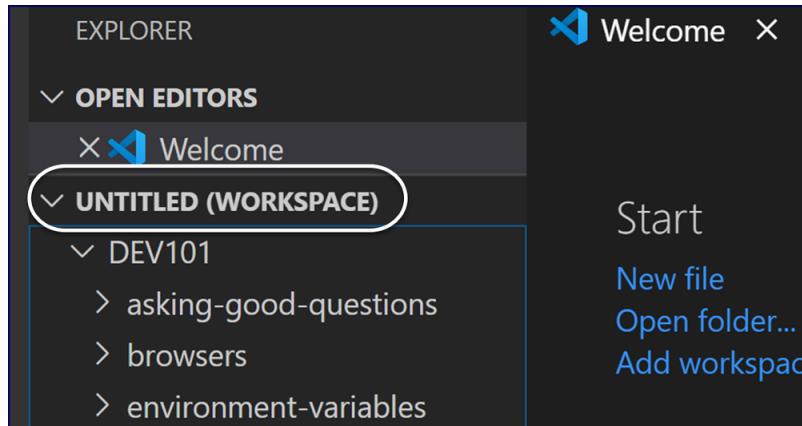
1. If you already created a workspaces folder as part of setting up for this class, you should skip this step and just use the workspaces folder you already created. Create a new folder in your Documents folder (or somewhere where you'll remember where it is) named workspaces, vs-code-workspaces, or something similar.
2. Open Visual Studio Code.
3. From the menu at the top of the screen, select **File > Add Folder to Workspace...:**



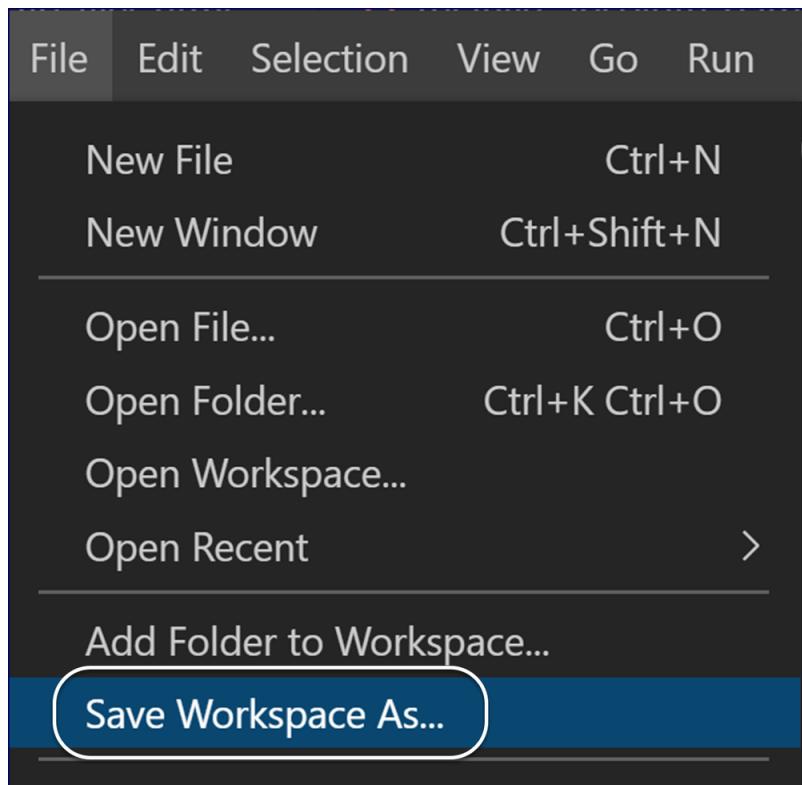
4. Navigate to the DEV101 folder and then click **Add**:



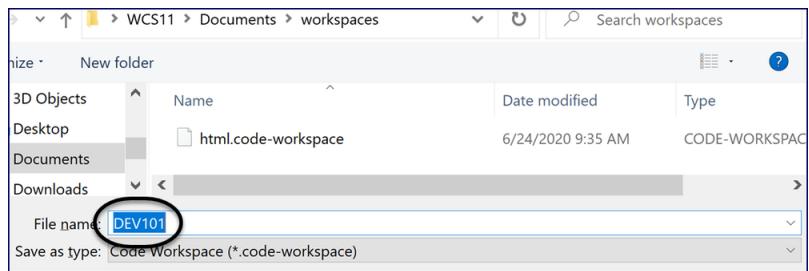
5. The untitled workspace is shown in the Explorer panel:



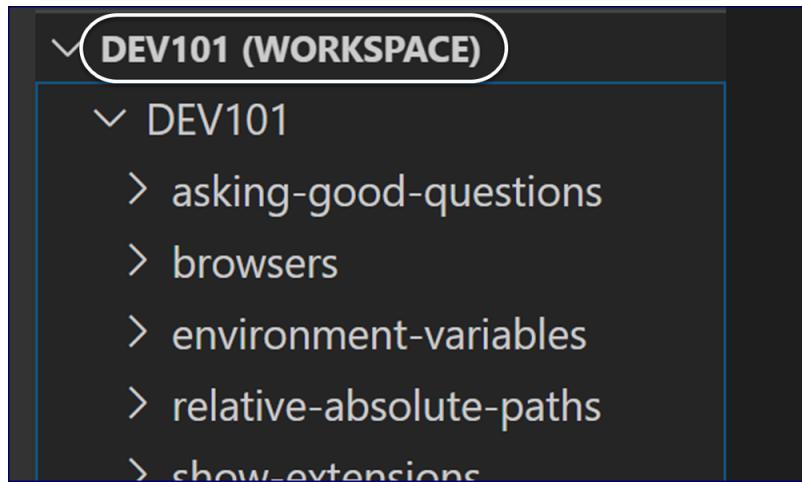
6. From the menu at the top of the screen, select **File > Save Workspace As...:**



7. Navigate to the folder you created in step 1 and type DEV101 as the workspace name. Then click Add:



8. Your workspace now has a name:



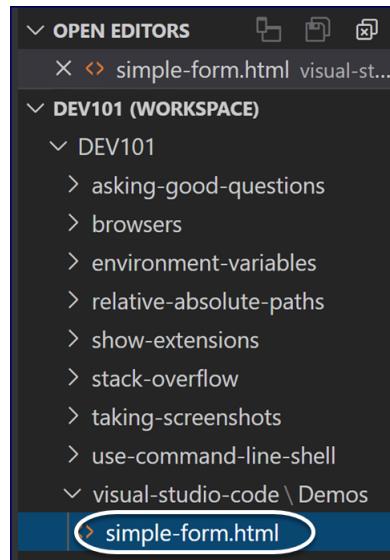
Exercise 15: Reveal in File Explorer and Open Terminal View

 15 to 25 minutes

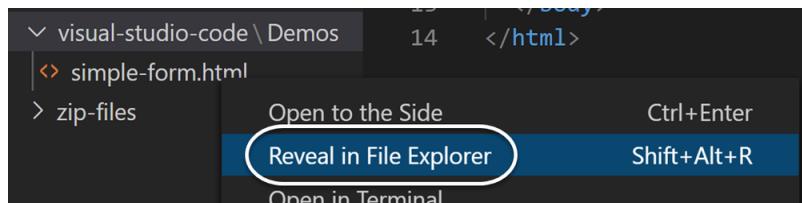
In this exercise, you will reveal a file in File Explorer and open a terminal view.

❖ E15.1. Reveal File in File Explorer

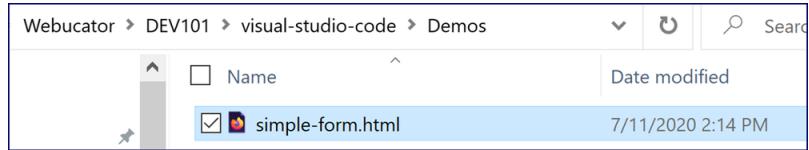
1. Expand the `visual-studio-code` folder by clicking the arrow to the left of the folder name. You now see the `Demos` folder. Expand this folder and then click `simple-form.html`. The file will appear in the editor panel:



2. Right-click `simple-form.html` in the Explorer panel and click **Reveal in File Explorer**:

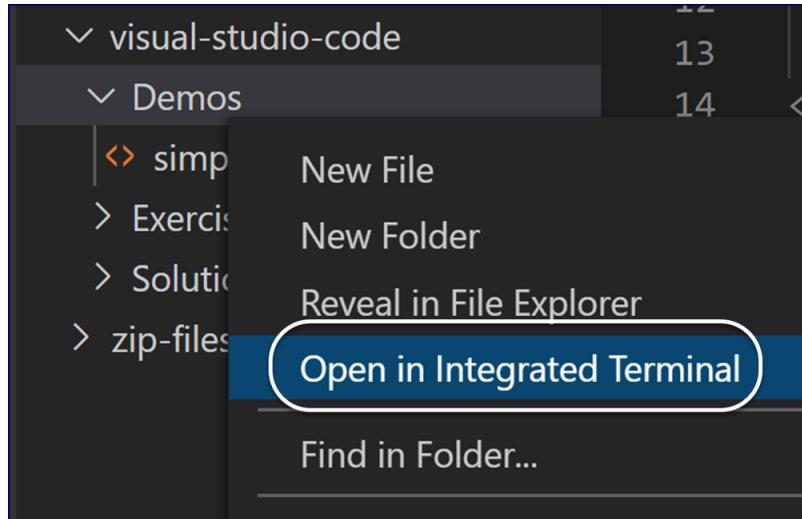


3. The file is displayed in File Explorer:

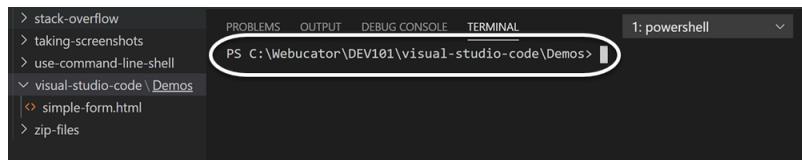


❖ E15.2. Open a Terminal View

1. Right-click the Demos folder and click **Open in Integrated Terminal**:

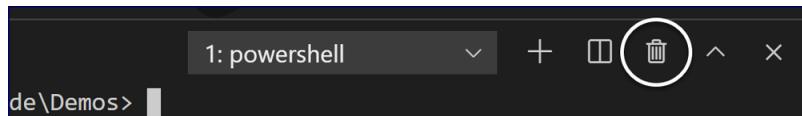


2. A terminal view opens in the right-hand panel:



The current folder in the terminal view is Demos.

3. Close the terminal view by clicking the “trash can” icon on the tool bar:



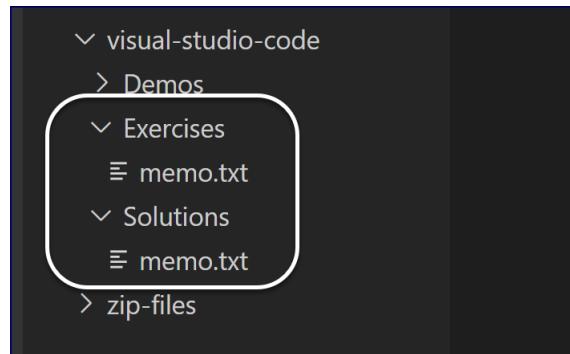
Exercise 16: Compare Files

⌚ 15 to 25 minutes

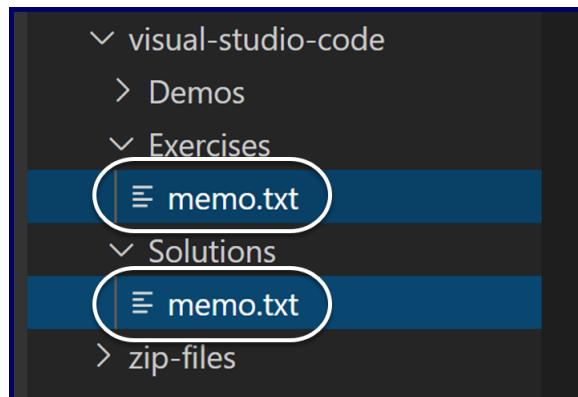
In this exercise, you will compare an exercise file with its solution file.

❖ E16.1. Compare Selected

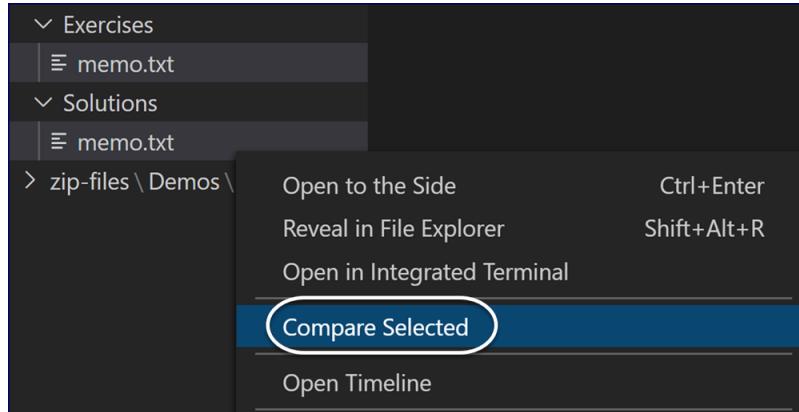
1. Expand `visual-studio-code/Exercises` and `visual-studio-code/Solutions` in the Explorer panel:



2. Click `Exercises/memo.txt` to select it. Hold down **Ctrl** (Windows) or **Command** (Mac) and click `Solutions/memo.txt`. Both files are selected:



3. Right-click `Exercises/memo.txt` and then click **Compare Selected**:



In this way, Visual Studio Code will compare your exercise file against the solution file and highlight any "diffs" (differences).

4. The diffs are shown below. The exercise file is displayed in the left hand panel and the solution file is displayed in the right hand panel:

```

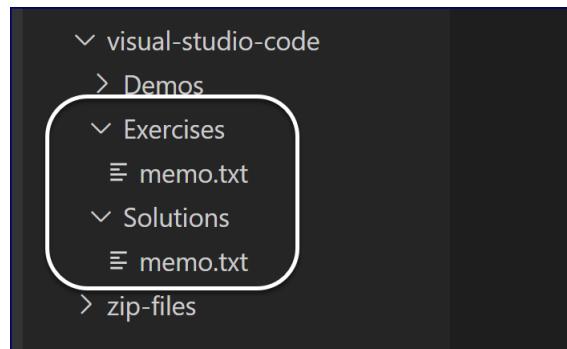
memo.txt      visual-studio-code\Exercises\memo.txt ↔ visual-studio-code\Solutions\memo.txt
DEV101 > visual-studio-code > Solutions > memo.txt
1- To: Sam Smith
2 From: Stephen Withrow
3
4- Please order the Java Script training for me
5
6 Thank you
7
1+ To: Stan Smith
2 From: Stephen Withrow
3
4+ Please order the JavaScript training for me
5
6 Thank you
7

```

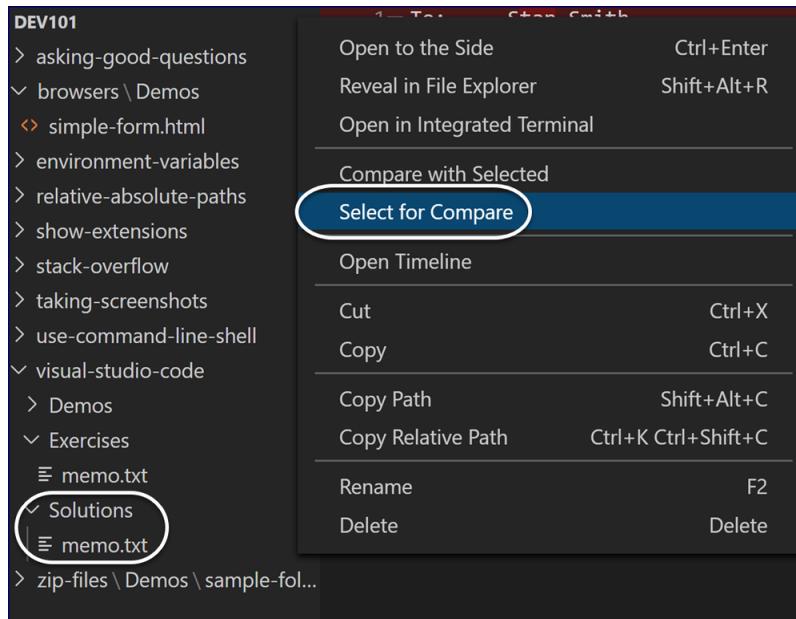
You can use the arrow keys in the upper right hand corner to navigate to the next or previous diff.

❖ E16.2. Select for Compare

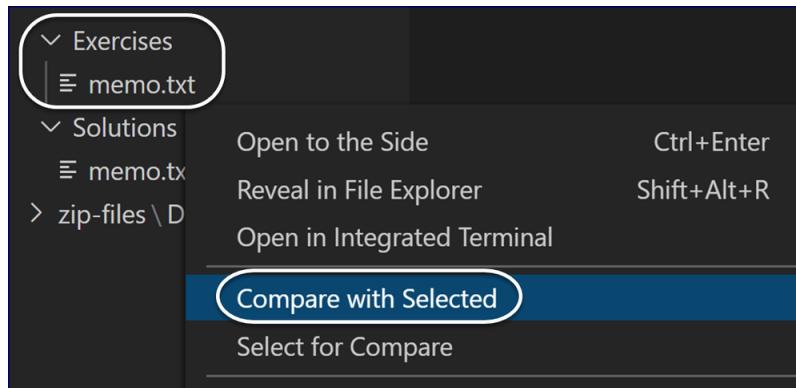
1. Expand `visual-studio-code/Exercises` and `visual-studio-code/Solutions` in the Explorer panel:



2. Right-click (Windows) or Ctrl click (Mac) `Solutions/memo.txt` to select it. Click **Select for Compare**:



3. Right-click (Windows) or Ctrl click (Mac) `Exercises/memo.txt` to select it. Click **Compare with Selected**:



Visual Studio Code will compare your exercise file against the solution file and highlight any diffs.

4. The diffs are shown below. The exercise file is displayed in the left hand panel and the solution file is displayed in the right hand panel:

```
10.txt      visual-studio-code\Exercises\memo.txt ↔ visual-studio-code\Solutions\memo.txt ↑ ↓  
DEV101 > visual-studio-code > Solutions > memo.txt  
1- To: Sam Smith  
2 From: Stephen Withrow  
3  
4- Please order the Java Script training fo  
5  
6 Thank you  
7
```

```
1+ To: Stan Smith  
2 From: Stephen Withrow  
3  
4+ Please order the JavaScript tra  
5  
6 Thank you  
7
```

You can use the arrow keys in the upper right hand corner to navigate to the next or previous diff.

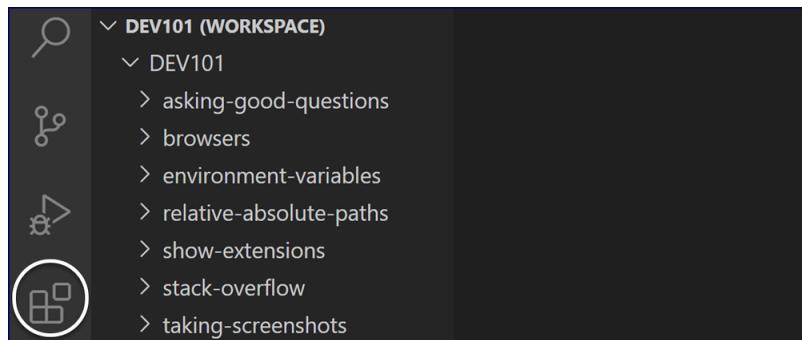
Exercise 17: Install Spell Check and Open in Default Browser Extensions

⌚ 15 to 25 minutes

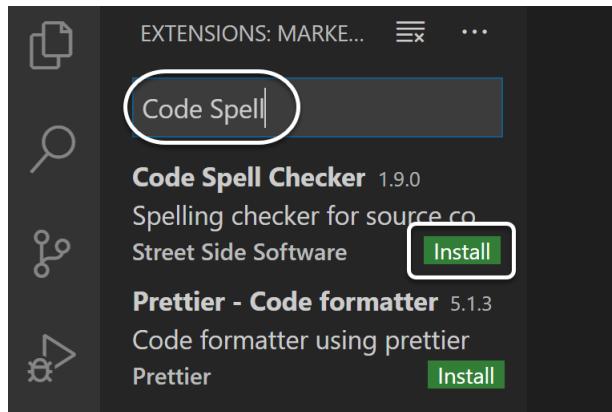
In this exercise, you will install two extensions to Visual Studio Code.

❖ E17.1. Code Spell Checker Extension

1. Click the **Extensions** icon:



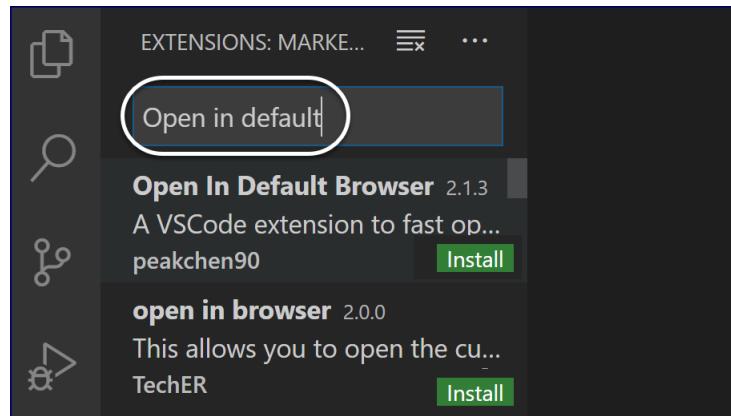
2. Start typing “Code Spell Checker” in the search box until **Code Spell Checker** appears at the top of the list of extensions. Then click the green **Install** button to install the extension:



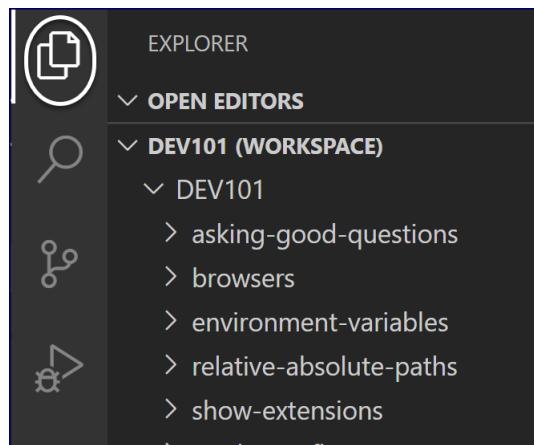
This extension will check your spelling in the text editor and has sensitivity to naming conventions that are common in programming.

❖ E17.2. Open in Default Browser Extension

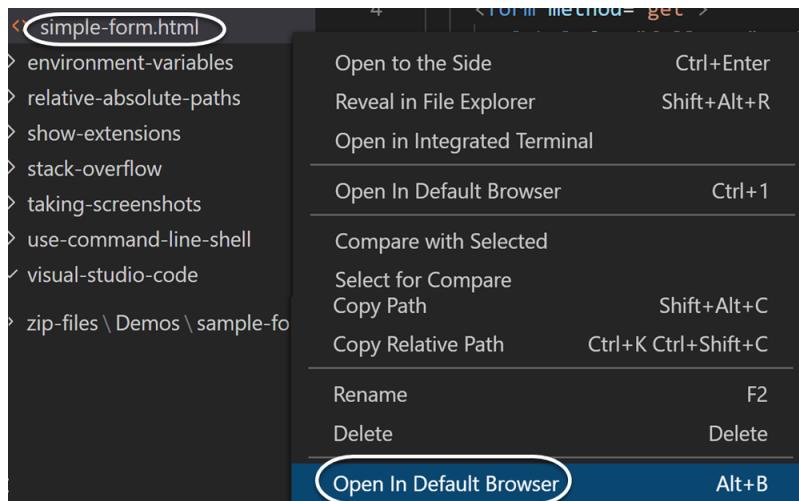
1. Type “Open in default browser” in the Extensions search box until **Open In Default Browser** appears at the top of the list of extensions. Then click the green **Install** button to install the extension (if you don’t have it installed already):



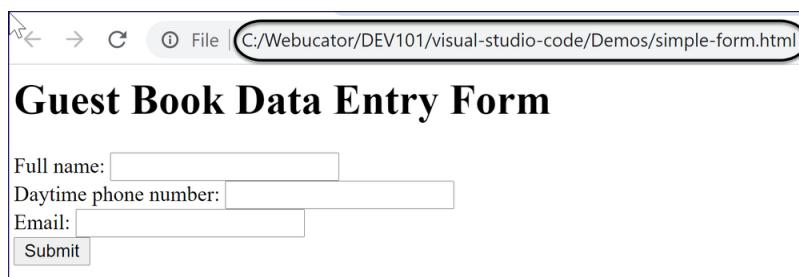
2. Click the **Explorer** icon to display the Explorer in the left hand panel:



3. To test the extension, right-click `simple-form` and then click **Open in Default Browser**:

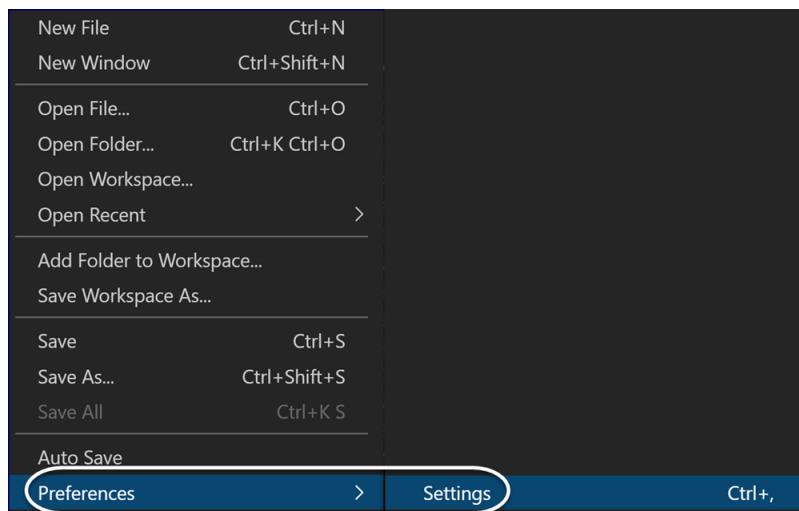


4. The web page is displayed in Chrome:



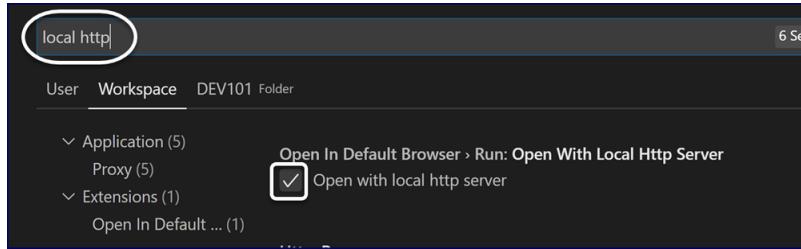
Notice the local path in the location bar of the browser. The file is being served from the file system.

5. To set up a local server path, click **File** (Code on Mac) > **Preferences** > **Settings**:



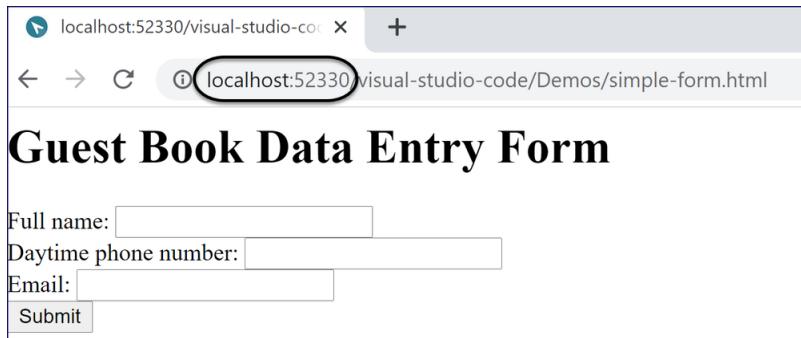
The Settings tab will be displayed.

6. Start typing "local http server" until **Open With Local Http Server** appears. Check the box adjacent to **Open With Local Http Server**:



Note that you can specify individual settings for Workspace and User. User settings would apply to all of your workspaces, unless overridden at the workspace level.

7. Right-click `simple-form` and then click **Open in Default Browser**. The web page is displayed and the location bar contains the server path, localhost and port number, indicating the file is being served by the local HTTP server:



Conclusion

In this lesson, you have learned how to use Visual Studio Code to create a workspace, specify workspace and user settings, reveal in File Explorer, compare files, and install extensions.

LESSON 9

Stack Overflow

Topics Covered

- Searching for answers.
- Getting an account.
- How to ask a good question.

Introduction

Stack Overflow is a website where questions on a wide variety of technologies can be asked and answered. In this lesson you will learn how to use Stack Overflow to get answers to your questions.



9.1. How to Ask a Good Question

To ask questions on Stack Overflow, you must register for an account. Click the **Sign up** button in the upper-right-hand corner and go through the registration process.

❖ 9.1.1. First, Search Existing Questions

Before asking a question, make sure you have tried to solve the problem yourself first. This involves searching Stack Overflow (and possibly other sites) for a solution, and reading through similar questions and the responses given. There is a very good chance that someone else experienced the same problem you are experiencing and has asked and received an answer to their question. To illustrate, imagine you want to learn how to move the Developer Tools in Google Chrome:

1. Search Stack Overflow for “reposition Chrome Developer Tools”:

Products reposition Chrome Developer Tools

Search Results

Results for reposition chrome developer tools

reposition Chrome Developer Tools

8 results

489 votes **8** answers

Q: How to reposition Chrome Developer Tools

The tools are opened on the bottom of the chrome window per default. This is a rather bad choice for a wide screen display since there is plenty of empty space to the right but not much vertical ... space to spare. Unfortunately, I have found no way to **reposition the tools**. I would like to have them on the side, similar to firebug. The only option similar to what I want is to detach the dev tools ...

asked Apr 5 '12 by kostja

Click the first question to see the provided responses.

2. Start by reading the question thoroughly to make sure it's the same or similar to the question you have.
3. When reading through the answers to a question, start with the accepted answer (if there is one). It will have a green check mark next to it:

Chrome 46 or newer

895 Click the vertical ellipsis button (:) then c

700 ms 750 ms 800 ms

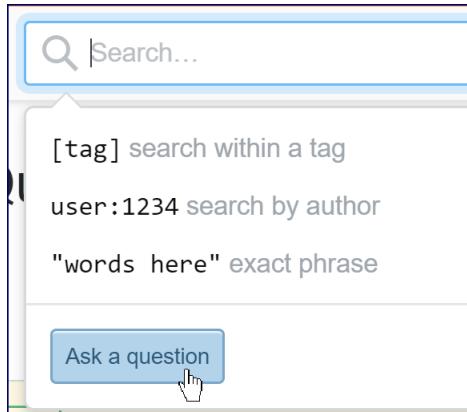
If this answers your question, great. But if not, take a look at some of the other responses. Sometimes, there are newer responses that came in after the accepted answer was accepted by the **original poster (OP)**. Pay attention to the number of up votes an answer has received, the date the answer was given, and the reputation of the user answering:



4. Do not use comments to ask a different question, but you can use comments to respond to a user's answer. For example, if their solution doesn't work for you, you can respond explaining what happened when you tried it. They might respond with a further explanation.

❖ 9.1.2. Asking Your Question

If you were not able to find the answer to your particular question, you can ask a new question:



Here are some tips for asking good questions:

1. The title of the question should clearly summarize the problem you are experiencing.
2. Clearly state what you are trying to do.
3. If relevant, say what operating system and software (including versions) you are using.
4. Explain what you have tried, and what you expected to happen when you tried it.
5. Explain what actually happened. Include any error messages or error codes that you get.

6. Consider including screenshots.
7. Keep your question as concise as possible, but don't leave out anything that might be important. This can be tricky. You will get better with practice.
8. If you found one or more similar questions whose answers didn't work for you, link to them and explain why your question is different.
9. On rare occasions, people will respond rudely. Don't let that get you down. You can edit your question if it's not getting the response you want.
10. Read through the suggestions at <https://stackoverflow.com/help/how-to-ask>.
11. Read the checklist at <https://codeblog.jonskeet.uk/2012/11/24/stack-overflow-question-checklist/> on how to ask a good question.
12. Use Markdown to add formatting to your question. See <https://stackoverflow.com/editing-help> for details.

It is impossible to overstate how useful a tool Stack Overflow is for developers. Often, you will find that you discover the solution to the problem you are experiencing while working through how to best explain the problem in your question.

Conclusion

In this lesson, you have learned how to search for answers and how to ask a good question on Stack Overflow.

LESSON 10

Asking Good Questions

Topics Covered

- Asking a good question while taking a self-paced course.

Introduction

You are bound to have questions while taking a self-paced course and we encourage your questions! In this activity, we provide some guidance on how to ask questions in a way that will help your instructor help you the most.



10.1. The Basics

A good question is focused on a particular sentence or image (e.g., a code example) in the reading.

Some not-so-good “questions” are:

- I’m lost!
- I just don’t understand this activity.
- What’s going on in this code?

The “questions” above are not specific and therefore do not identify the issue(s) you are experiencing. Your instructor is likely to respond by asking for more details, which means it will take longer for you to get the help you need.

It will be easier for your instructor to help you if your question:

1. Is clear and concise.
2. References specific instructions or lines of code in the activity.
3. Includes one or more screenshots if relevant.
4. Includes one or more attachments of code you have written or modified. There is no need to attach unmodified class files. Instead, just reference the file and the piece of code within the file that is causing confusion.

Here is a portion of a JavaScript exercise activity:

INTRODUCTION TO JAVASCRIPT TRAINING > JAVASCRIPT BASICS

Alerts, Writing, and Changing Background Color

In this exercise, you will practice using JavaScript to pop up an alert, write text to the screen, and set the background color of the page.

1. Open `JavaScriptBasics/Exercises/alert-write-bgcolor.html` for editing.
2. In the `head` of the file, add a JavaScript alert which pops up the message "Welcome to my page!" when the page loads.
3. Add `click` handlers to the two buttons to allow the user to change the background color of the page to red or to blue.
4. In the `script` at the bottom of the page, use JavaScript to write the text "This text was generated by JavaScript." to the page.
5. Test your solution in a browser.

 Solution: `JavaScriptBasics/Solutions/alert-write-bgcolor.html`

[Expand Source](#)

 Back

Next 



Now, let's imagine you experience an error while working on the exercise and you are not able to figure out the issue.

1. Click the **Ask a Question!** button in the bottom right of the screen (outlined in orange in the screenshot above).
2. A message form pops up. Write a clear message including screenshots and attachments if appropriate:

Ask a Question!

— ↗ ✖

Activity: Exercise: Alerts, Writing, and Changing Background Color

RE: Alerts, Writing Insert Image Attach File



My solution to the exercise does not display the message. I have attached the HTML source file for my solution. Here is a screenshot of what happens when I launch the file in the browser:

 Send

3. Including a screenshot of the error is generally quite helpful. To insert a screenshot in the message, click the **Insert Image** icon in the toolbar and browse to the image.
 4. Click the **Send** button to submit your question. Your instructor will get back to you within one business day.



10.2. Getting the Most Out of Your Questions

As evidenced by the thriving Stack Overflow community, developers constantly have questions. Learning to ask really good questions will help you become a better developer. So, you should consider each question you ask as a learning experience itself. Before submitting the question, ask yourself these questions:

1. Have I tried to work through this problem more than once?
2. Have I re-read my own question to make sure that it is clear?
3. Have I let the instructor know what I tried to do to fix the problem myself?
4. If I think there is a bug in the class code, have I explained that. **Note**, we do our best to make the demo, exercise, and solution files bug-free, but we are not perfect, and students have sometimes found bugs. If you find a bug, we definitely want to know about it, so please do report it.
5. If I am confused by an instruction or explanation, have I made clear where I became confused. **Note**, sometimes a student will say something like “I just don’t understand this.” While that can be understandable, it is difficult for the instructor to know how to help. If you find yourself confused, go back to the point before you were confused and move forward from there slowly. Try to identify the exact point at which you got lost. Then when you ask your question, let the instructor know what you understand and where you became confused.

Further Reading

For further reading and a video on asking good technical questions, see <https://www.webucator.com/article/how-to-ask-good-technical-questions/>.



10.3. Responding to Responses

It is super helpful if you respond to your instructor’s responses to your questions. If you submit an exercise and have done everything correctly, your instructor will likely just respond “Good job with this.” or something to that effect. There is no need for you to respond to those responses. However, if you ask a question, and your instructor responds to your question either with an answer or a request for more details, please respond to that response. Let your instructor know if their response was helpful or whether you are still confused. If you are still confused, be sure to explain what about their response confuses you.

❖ 10.3.1. Have a New Unrelated Question on a Different Activity? Start a New Thread.

Do not respond to your instructor's response with unrelated questions about different activities. All questions should relate to the activity on which they are asked. If your question isn't specific to an activity, try to find the activity that is most relevant and ask your question there.



10.4. Questions Unrelated to Activities

❖ 10.4.1. Non-technical Questions

From time to time, you may have questions that are unrelated to activities. For questions related to career advice, certificates, the amount of time you have left in the course, or other logistics of the course, your instructor will be unlikely to be able to help you, but if you don't know whom to contact with those questions, your instructor might be able to point you to the right person.

❖ 10.4.2. Above and Beyond

If you have done extra work above and beyond the course requirements, kudos to you! You are welcome to share that work with your instructor, but if you have questions about the extra work you have done, that provides you with a great opportunity to practice asking questions on Stack Overflow. Your instructor is available to you for the length of the course, but Stack Overflow is available to you even after you have finished the course. So, if you have a technical question unrelated or beyond the scope of the course you're taking, please ask it first on Stack Overflow. Feel free to share a link to your question on Stack Overflow with the instructor. They can give you feedback on the question.



10.5. What if I Don't Get a Response?

Your instructor will get back to every one of your questions within one business day. You should receive an email notification of the response. If you don't receive an email notification within one business day, log into the student portal to check if your instructor has responded. If your question has not been answered, it is possible the instructor missed it due to a glitch in the system or human error. This is rare. If it happens to you more than once, please report it to ayop@webucator.com.

Conclusion

In this lesson, you have learned how to ask good questions while taking a self-paced course.