Installing Windows on a Mac

If you are using a Mac, and you want to complete the component of Chapter 5 that uses Microsoft Access Database files using the Python pyodbc package the way that we cover the material, you can use the Microsoft Windows operating system. This document serves as a guide to installing a Windows 10 operating system alongside your macOS operating system. There is also a detailed guide at https://support.apple.com/guide/bootcamp-assistant/install-windows-newer-mac-boot-camp-bcmp173b3bf2/mac.

This process will take some time from start to finish, so you will want to ensure your computer is plugged in. Also a few of the steps will take some time, but you generally don't have to monitor constantly (for example, you can do something else while the large Windows 10 disk image downloads). However, your computer will have to restart at least once over the course of these steps, so generally it's best before beginning these steps to save anything else you have open on your computer, and close unrelated programs.

Step 0. (prerequisite) Make sure your Mac has the latest updates.

If you open System Preferences via Spotlight Search (command + space bar), you can check and apply updates via the Software Update menu:

Also ensure your computer's hard drive has enough free space to make a partition large enough for Windows. For Windows 10, the 32-bit version requires 16 GB or more, and the 64-bit version requires 20 GB or more (per system requirements detailed at https://support.microsoft.com/en-us/help/4028142/windows-10-system-requirements).

If you click the Apple logo at the top left of your screen, you can then click on "About this Mac" and then on System Report to see a detailed report about various aspects of your device and system:

Under “Software” you can click “Preference Panes”. On this submenu, you will see “Kind” under Accessibility, which will either read “32-Bit” or “64-Bit”.

Next go to “Storage” under “Hardware”, which will tell you about free space on your hard drive. If you don’t have at least 16 GB* of free space (for a 32-bit implementation) or

20 GB* of free space (for 64-bit implementations), you will want to clear space by removing files and/or applications. Be sure and back up anything to an external drive and/or cloud data backup service that you want to keep.

***Note** that you’ll probably want more than this amount of available space, due to how partitioning works. The Boot Camp Assistant utility (in a later step) will alert you if there is insufficient free space.

Step 1. Download the Windows 10 iso file from [https://www.microsoft.com/en-us/software-download/windows10ISO.](https://www.microsoft.com/en-us/software-download/windows10ISO) Select your desired language, and then download the 32-bit or 64-bit option depending on the value in the previous step. The download could take a while, from a few minutes to an hour or more, depending on your internet connection.

Step 2. Open the Boot Camp Assistant utility

Once the download has completed, open the Boot Camp Assistant utility (type “boot camp” in Spotlight Search to find it). Note that an alternative is to install a virtual machine in which you could install windows, however a virtual machine will run slower since it is running inside your operating system.

Step 3. Select the Windows disk image (.iso file) you downloaded.

If you have sufficient space on your hard drive, the utility will automatically determine an amount of GB for the new Windows partition. Note that you can drag the slider to the left or right to change this amount. Be sure to allocate more than the minimum amount so there is space to download Python and the other requirements and files we will use.

Step 4. Click "Install".

The process will take some time (at least a few minutes with newer computers, and possibly longer for older computers).

The program will ask for your password (or fingerprint if you have Touch ID enabled). And it will close open applications and restart your computer.

Step 5. Activate Windows.

Windows will ask you a few questions as it is setup for the first time. The first will be language, time, and keyboard settings. The next question will involve a product activation key. If you are affiliated with an academic institution or workplace, you may be able to get a Windows key through the IT department. Otherwise, you can click “I don’t have a product key” and still install Windows. An un-activated Windows will have some limitations, but will be sufficient for the uses in the book. You can always activate in the future, too.

Step 6. Install Operating System.

The next question will ask what version of the operating system to install. “Windows 10 Home” is sufficient, but if you have a product key (see previous step), select the version associated with the key.

Step 7. Complete Windows install steps.

The Windows install will have a few more steps, including accepting the notices and license terms and various privacy settings. You will also create login details if you do not already have a Microsoft account.

Step 8. Log in with Boot Camp Installer.

When you log in for the first time, you will be greeted with a dialog that says “Welcome to the Boot Camp installer”. This program will install features on Windows that integrate with the Boot Camp software on macOS. When the installer finishes, it will recommend you restart your computer.

After the restart, an icon will become available in the bottom right taskbar (note you may have to click the ^ symbol to see it). Clicking this icon gives options including restarting into your macOS partition.

Step 9. Apply Windows Updates.

When you are logged-in to Windows again, the first thing you'll want to do is apply updates. Security updates and other patches are released regularly, and there may be a number of vulnerabilities that have been fixed since the image file we downloaded earlier was created. Use the search box at the bottom left of the screen to find the "Check for updates" menu:

Clicking "check for updates" will show you a window with a button similar to that shown below:

The updates will likely require another restart. After the restart, it is good practice to check for updates *again*, as sometimes when a number of updates are done at once, some finish and others are still waiting.

Step 10. Install Python.

The next step is to install Python! You can see the instructions starting on page 4 of the textbook, and there are also Installation Instructions for Python on Windows found on the publisher website.

Visit https://www.python.org/downloads/windows to download the Python installer. Note that since the book has been published, there are a number of newer versions of Python. We recommend installing version 3.7.9, to ensure code used throughout the textbook runs as expected.

When you run the installer, be sure and check the box that adds Python to your PATH.

After the installer finishes, you can test to ensure it worked by opening a Command Prompt window (use the search bar or press command + r and type “cmd” and hit enter).

If you run the command `python`, you should see the python shell like so:

Note that in the illustration above we can see that we have installed a 64 bit version of Python.

Step 11. Install the Python pyodbc package.

Now that we know Python has been installed successfully, you can type `exit()` to exit the Python shell, or open a new Command Prompt window.

Run `pip install pyodbc` to install the pyodbc package, which as we discuss on pages 102-104 will enable the interface between Python and ODBC drivers to allow us to work with databases.

Step 12. Install Microsoft Access Database Engine 2010 Redistributable.

The steps to install are explained on page 104 of the text. To install, first download the version that matches your Python implementation (32-bit or 64-bit) via [https://www.microsoft.com/en-US/download/details.aspx?id=13255.](https://www.microsoft.com/en-US/download/details.aspx?id=13255)

Step 13. Verify that the Microsoft Access driver is now available.

Once the installer completes, we can verify the driver is available using the code from Figure 5.19 on page 103. This code may be downloaded from the course website (https://study.sagepub.com/researchmethods/statistics/kaefer-intro-to-python).

Open IDLE by clicking on Start (The window icon on the bottom left of the screen) and scrolling down through the program list to Python 3.7. Select the IDLE program (see illustration below).

Once you have opened IDLE, open the Figure 5.19 code displayed below. And select Run from the menu.

Fig 5_19 Python code to see which drivers are installed.py - C:\Users\fredk\AppData\Local\

File Edit Format Run Options Window Help

```
import pyodbc
for x in pyodbc.drivers():
    if x.startswith('Microsoft Access Driver'):
        print(x)
```

The output of executing the code in Figure 5.19 is shown below, illustrating that the Microsoft Access Driver with the *.accdb extension has been installed:

Python 3.7.9 Shell

File Edit Shell Debug Options Window Help

```
Python 3.7.9 (tags/v3.7.9:13c94747c7, Aug 17 2020, 18:58:18) [MSC v.1900 64 bit (AMD64)
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\fredk\AppData\Local\Packages\Microsoft.MicrosoftEdge_8wekyb3d8bbwe\
Files\Chapter 5\Fig 5_19 Python code to see which drivers are installed.py
Microsoft Access Driver (*.mdb, *.accdb)
>>> |
```

Step 14. Confirm that Python code using a Microsoft Access database executes correctly

Lastly you should execute some Python code that uses an Access database file to confirm that it executes correctly. Open the Python code for Figure 5.22 in IDLE (shown below) and click on Run from the IDLE menu.

Fig 5_22 Print table list from Access file using cwd.py - C:\Users\fredk\AppData\Local\Packages\Microsoft.MicrosoftEdge_8w

File Edit Format Run Options Window Help

```
import pyodbc
import os

# Obtain current working directory information using os module getcwd function
cwd = os.getcwd()

# Specify connection string using current working directory
conn_str = (
    r'DRIVER={Microsoft Access Driver (*.mdb, *.accdb)};'
    r'DBQ='+cwd+'\TaxiTripsDatabase.accdb;'
    )
cnxn = pyodbc.connect(conn_str)
crsr = cnxn.cursor()
for table_info in crsr.tables(tableType='TABLE'):
    print(table_info.table_name)
```

You should see the output shown below (which shows the tables in the Access database file) in the Python Shell window:

Python 3.7.9 Shell

File Edit Shell Debug Options Window Help

```
Python 3.7.9 (tags/v3.7.9:13c94747c7, Aug 17 2020, 18:58:18) [MSC v.1900 64 bit
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\fredk\AppData\Local\Packages\Microsoft.MicrosoftEdge_8wekyb
Files\Chapter 5\Fig 5_22 Print table list from Access file using cwd.py
Communities
Community_Zip
Taxi_Trips
ZipCodes
>>> |
```

Final note:

Now that you have Windows installed, you will need to specify which operating system to load when your computer boots. When you restart your computer, hold the "option" key during the restart sequence to select which partition to boot.

See https://support.apple.com/guide/bootcamp-control-panel/start-up-your-mac-in-windows-or-macos-bcmp29b8ac66/mac for more details.

One neat feature is that you can access your files from your Windows partition via Finder on your macOS partition: