

Can My Computer Run ArcGIS Pro?

This companion document to **Introduction to GEOG 2090H Web Course Exercises and Assignments** provides introductory information about the course prior to starting on any course computer work. Please read that companion document before reading this one.

This document focuses on **requirement 4: Access to a computer with ArcGIS Pro software**, where three options are described to run ArcGIS Pro, and we recommend students run it on their own computer.

ArcGIS Pro software is available free to Trent students via the Trent University MaDGIC Unit (<https://www.trentu.ca/library/madgic>), but students must have a computer that will support this Windows-only software. Here we focus on helping you determine if your computer can run ArcGIS Pro, by having you answer some questions about your system that will determine your options.

Question 1. Identify Your Operating System

- i. **Windows (any version)** → [Go to Section A: Windows Computers](#)
- ii. **Mac OS X / MacOS (any version)** → [Go to Section B: Apple Computers](#)
- iii. **ChromeOS and any Other Operating System**

While it is possible to run Windows virtually in other operating systems, **this is not recommended on a Chromebook**. Chromebooks lack the system requirements needed to work with virtualization well. And Chromebook hardware is typically difficult to impossible to upgrade.

For users of other operating systems, we can't provide much support.

- **Linux users:** This article may help. **How To Run Windows 11 and macOS Virtual Machines in Linux.** <https://www.tomshardware.com/how-to/run-windows-11-and-mac-os-virtual-machines-in-linux>
- **Tablets and smartphones** cannot run ArcGIS Pro.

Your remaining options include:

- Find another computer or purchase a new computer that can run ArcGIS Pro, or
- Use Option B (or C if necessary) to access ArcGIS Pro as described in the companion document.

Section A: Windows Computers

Question 2. What version of Windows is your computer running?

a) Windows 8.1 or earlier

A computer old enough to still be running Windows 8.1 or earlier is not worth upgrading to have it run Windows 10 and ArcGIS Pro (if even possible), because the hardware is too old (up to 8 years or more). Your alternatives include:

- Find another computer or purchase a new computer that can run ArcGIS Pro, or
- Use Option B (or C if necessary/possible) to access ArcGIS Pro, as described in the companion document **Introduction to GEOG 2090H Web Course Exercises and Assignments**.

b) Windows 10 or 11

If your computer is running Windows 10 or 11, it meets ArcGIS Pro's operating system requirements.

Next you should confirm that your computer meets ArcGIS Pro's hardware requirements (<https://pro.arcgis.com/en/pro-app/latest/get-started/arcgis-pro-system-requirements.htm>), as described in the following table.

Computer Component	ArcGIS Pro Requirements	How to Check in Windows 10/11
Processor/ CPU	Minimum 2 cores; 10 is optimal. Hyperthreading/multithreading required.	Start > Settings > System > About , look for Device specifications > Processor .
Storage	Minimum 32 GB of free space; SSD (solid state drive) recommended (standard on most modern computers). Remember to include that your storage should have at least 15-20% free space.	Start > Settings > System > Storage . "Local Storage" will list both the size of your internal C: disk and the amount used. It will also list any other disks.
RAM	Minimum 8 GB of RAM; 32 GB or more is recommended.	Start > Settings > System > About , look for Device specifications > Installed RAM .
Graphics Memory	Recommended: 4 GB or more. Notebook computers with less will benefit from more RAM.	Start > Settings > System > Display . Under Multiple Displays select Advanced Display Settings . Under "Display Information" the graphics card vendor and model will be listed.

Upgrading any of these components will require referring to your computer's documentation, available from your computer manufacturer's support website. Some upgrades are complex and may best be completed at an authorized computer repair centre.

- **Processor:** This critical computer component is not generally upgradeable. For computers where a CPU upgrade is possible, use of an authorized computer repair centre is recommended.
- **Storage:** If you are short on disk space, you should be able to upgrade the internal storage (C:) to increase storage space, and possibly also upgrade storage speed. You'll be using storage to store the application and to store GIS data:

- ArcGIS Pro software must be installed on **C: drive**. If your C: drive lacks sufficient space (accounting for keeping 15-20% of drive storage free) you may be able to replace the drive with a larger, faster drive.
- GIS data can be stored anywhere, on the internal boot drive or an internal or external disk.

Recommended drive types include:

- **NVMe SSD** (solid state drive): the fastest drive type but may be incompatible with some computers. Example: Samsung 970 EVO Plus.
- **SATA SSD**: not as fast, but compatible with vast majority of computers. Example: Crucial MX500
- **External SSD**: these drives connect via a port on your computer. This has limited benefit, helping with data storage but not with the ArcGIS Pro application. Example: the Samsung T7

Avoid older HDD (hard disk drive) types (have spinning platters) as they are quite slow.

- **RAM:** If your computer lacks sufficient RAM, it should be upgradeable. RAM is sold by many 3rd party vendors and tends to be inexpensive. Read your computer's documentation to learn:
 - the maximum RAM your computer can support,
 - the specifications of the RAM your computer uses, and
 - how to add or replace RAM in your computer.
- **Graphics Memory:** If your computer does not meet ArcGIS's graphics memory requirements, it may be possible to upgrade. For computers that support a replacement, this may involve the purchase of a video card that is compatible with your computer.

Summary of Options: for Computers Running Windows 11/10

If your computer meets all these hardware requirements, you can obtain and install ArcGIS Pro as described in the companion document.

If it does not, you may be able to upgrade the components needed to meet ArcGIS Pro's requirements.

If you are unable/unwilling to upgrade your computer to meet ArcGIS Pro hardware requirements, then your current computer will not support ArcGIS Pro. Your options include:

- Find another computer or purchase a new computer that can run ArcGIS Pro, or
- Use Option B (or C if necessary) to access ArcGIS Pro as described in the companion document.

Section B. Apple Computers

Question 3. What type of Apple computer do you have?

Select **Apple > About This Mac** and look for the description of the processor.

- Apple Silicon (M1/M2/M3, also called ARM) Mac** → [Go to Section B1: Apple Silicon Macs](#)
As of August 2023 all current Macs are ARM-based.
- Newer Intel-based Mac** with a core i5, i7, or i9 processor
and running MacOS Big Sur 11.6.7 or higher → [Go to Section B2: Newer Intel Macs](#)
- Older Intel-based Mac** with a core i3 processor **OR** running MacOS Catalina 10.15 or older:

These older Macs are not capable of running a useable Windows environment or ArcGIS Pro. Mac processor upgrades are not generally possible, so your remaining options include:

- Find another computer or purchase a new computer that can run ArcGIS Pro, or
- Use Option B (or C if necessary) to access ArcGIS Pro as described in the companion document.

Section B1: Apple Silicon Macs

Apple Silicon Macs (running M1, M2, or M3 processor families) can now run Windows 11 Pro written to work on ARM processors using the virtualization software Parallels. As of February 16, 2023, Microsoft authorized Parallels Desktop for using ARM versions of Windows 11 on Mac with Apple Silicon <https://www.parallels.com/windows-11-arm-apple-m-series/>. And with the latest release of Parallels in August 2023, enhancements have been made that specifically address ArcGIS Pro (<https://www.parallels.com/blogs/parallels-desktop-19/>).

This works via virtualization: Parallels Desktop creates a virtual disk image of Windows 11, saved as a file on Mac storage. The Parallels application then opens the virtual disk, presenting Windows 11 in its application window on the Mac. Windows 11 runs normally within that window.

Setting this up requires the purchase of the following software (unless you already own):

- Parallels Desktop software version 17 or later (current version is 19, cost \$130 Cdn; coupons/sales may be available), &
- Microsoft Windows 11 Pro for ARM processors. If you own a valid unused Windows 11 Pro licence it may be used. See the **Section D: Purchasing the Windows 11/10 Operating System**.

Your Apple Silicon Mac should meet these system requirements to properly run Windows 11 via Parallels:

- Minimum 4 GB of RAM; 8 GB or more strongly recommended for using ArcGIS Pro in Windows virtualized via Parallels.
- Minimum 17 GB of storage space for virtualization software and Windows 11 virtual disk; 100 GB on an SSD drive (standard on all Silicon Macs) is recommended to allow for a larger Windows disk.

Summary of Options: For Apple Silicon Macs

You can purchase Parallels Desktop and Windows 11 Pro for ARM processors and run Windows and ArcGIS Pro virtually.

Without virtualization software your Mac will not run Windows or ArcGIS Pro. Alternatives include:

- Find another computer or purchase a new computer that can run ArcGIS Pro, or
- Use Option B (or C if necessary) to access ArcGIS Pro as described in the companion document.

Section B2: Newer Intel Macs

Students with Intel-based Apple computers approximately 2014-2015 and newer (running MacOS Big Sur 11.6.7 and later), with core i5, i7, or i9 processors, have two choices for running Windows 10 on their Mac:

- **Boot Camp** (choose to start up your computer in Mac or Windows), or
- **Virtualization** (run Windows 10/11 virtually in a window in MacOS).

Question 4. How much RAM memory & disk space does your Mac have?

Computer RAM	Free Disk Space on Internal Boot Drive *be sure to account of keeping at least 15-20% of your disk free of data	
	< 100 GB free	≥ 100 GB free
≤ 4 GB	Go to Section B2a: Newer Intel Mac with Few Resources	Go to Section B2c: Boot Camp
> 4 GB	Go to Section B2d: Virtualization	Go to Section B2b: Boot Camp & Virtualization Possible

Section B2a: Newer Intel Mac with Few Resources

One of either disk space or RAM would have to be upgraded to run Boot Camp or Virtualization, and unfortunately these are challenging to upgrade on most Mac computers:

- The internal hard disk may be replaceable with a larger disk (SSD recommended if compatible). Hiring an authorized Apple service agent is recommended.
- A few Macs can have their RAM upgraded, including iMac 27" any year, iMac 21.5" from 2015 & 2016, all Mac Pro models, and Mac Mini 2018 (Apple service agent recommended).

So your options include:

If you upgrade one of either your internal drive (allows for Boot Camp) or RAM (allows for Virtualization), you can then proceed with setting up Windows on your Mac computer. See the sections **B2c: Boot Camp** and **B2d: Virtualization** for details.

If you do not upgrade, your computer as is cannot run Windows. Your remaining options include:

- Find another computer or purchase a new computer that can run ArcGIS Pro, or
- Use Option B (or C if necessary) to access ArcGIS Pro as described in the companion document.

Section B2b: Boot Camp & Virtualization Possible

Your computer has the resources to run either Boot Camp or Virtualization. Here's how each work:

- **Boot Camp: Choose to run Mac or Windows when booting your Mac.**
With Boot Camp you divide your internal drive (from which your Mac starts up) into 2 partitions and install Windows on its own partition. Then, when you start your computer, you choose whether to start in Windows 10/11 or MacOS; this means to change operating systems you must restart the computer. Apple provides a free utility called Boot Camp to help with the setup and installation.

- **Virtualization: Run Windows in a virtual environment.**

Here virtualization software creates a virtual disk image of Windows 10/11, saved as a file on the Mac storage. When you run the virtualization application it opens the virtual disk, presenting Windows in the application window on the Mac. Windows runs normally within that window.

This table briefly describes the advantages and disadvantages of each.

Factor	Advantage Goes To...
Performance	Boot Camp , because the computer is managing one operating system at a time, and the operating system has direct access to computer hardware. Also, virtualization goes through a type of data translation that slows its performance somewhat.
Cost	Tie or edge to Boot Camp: Boot Camp software is free, while some good virtualization software is free and others cost. In both cases a valid Windows 10/11 license still must be available or purchased. See Section D. Purchasing the Windows 10/11 Operating System.
Computer Disk Use	Virtualization , because the file containing the Windows operating system can be placed on any disk (including an external disk) and does not require partitioning of the internal hard drive (like Boot Camp).
Functionality	Virtualization , because MacOS and Windows run side-by-side in real time, while Boot Camp requires one to restart the computer. Virtualization even allows one to copy data between the operating systems.

The following reference may help you further in deciding between Boot Camp and Virtualization:

- **How to install Windows on Mac.** Cliff Joseph, MacWorld. <https://www.macworld.co.uk/how-to/install-windows-mac-3497251/>

Once you make your choice, proceed to the appropriate section for further details:

- **Section B2c: Boot Camp**
- **Section B2d: Virtualization.**

Section B2c: Boot Camp

Boot Camp's requirements (<https://support.apple.com/en-ca/HT201468>) include:

- A newer Intel-based Mac computer. Boot Camp does not work with any Apple silicon Macs.
- Minimum 64 GB space on our internal startup drive; 128 GB is strongly recommended. Boot Camp partitions this disk and sets up Windows on one of the partitions, making that space unavailable for MacOS. Remember to also keep at least 15-20% of any disk free.
- Minimum 4 GB of RAM; 16 GB or more is preferred (to run ArcGIS Pro on top of Windows).
- Video card with 256 MB of RAM or higher recommended

The basic Boot Camp setup process includes:

- Download and use the free Boot Camp Assistant to create a Windows partition on your Mac disk.
- Format the Windows (BOOTCAMP) partition.
- Install Windows. This requires a valid Windows 10/11 license; see **Section D. Purchasing the Windows 10/11 Operating System.**
- Use Boot Camp in Windows to complete the install (sets up your Mac hardware in Windows).
- Install ArcGIS Pro, as described in the companion document.

To use Windows on a Mac with Boot Camp you must start up in Windows.

Additional helpful references on Boot Camp:

- **Boot Camp Support.** Apple. <https://support.apple.com/en-ca/boot-camp>
- **How to install Windows 10 on your Mac using Boot Camp.** Cale Hunt, iMore. <https://www.imore.com/how-install-windows-your-mac-boot-camp>

Section B2d: Virtualization

Virtualization requirements are higher because it is running MacOS and Windows simultaneously. The following is based on Parallels' requirements (<https://www.parallels.com/ca/products/desktop/resources/>):

- Intel Core i5, i7, i9 or Xeon processor.
- Minimum 16 GB of RAM (allows for 8 GB for each operating system).
- About 1 GB for the Parallels application, with the start-up drive an SSD type.
- At least 100 GB disk space (on any disk connected to the Mac) for the virtual machine file.

The virtual machine file that contains the Windows operating system can be stored on any storage device, but it is probably best stored on the start-up drive in its default location.

There are a several virtualization applications available, with three main contenders:

- **Parallels.** Must be purchased. Provides good performance. <https://www.parallels.com/ca/>
- **VMWare Fusion Player.** Free for educational purposes to download, install, and use (requires VMWare account setup). Decent performance. <https://www.vmware.com/ca/products/fusion.html>
- **VirtualBox.** This free, open-source software may not offer quite as many options and performance as the first two but has always been free. <https://www.virtualbox.org>

This reference may help with choosing: **Best virtual machine software for Mac 2023.**

<https://www.macworld.com/article/668848/best-virtual-machine-software-for-mac.html>

Once you have chosen your virtualization software, the basic process of set up includes:

- Download and install the virtualization software (a Mac application).
- Open the virtualization software and use it to set up a Windows virtual machine file on your disk of choice. This requires a valid Windows 10/11 copy with license; see **Section D. Purchasing the Windows 10 Operating System.**
- Install ArcGIS Pro within Windows, as described in the companion document **Introduction to GEOG 2090H Web Course Exercises and Assignments.**

Section C. Purchasing the Windows 11/10 Operating System

Depending on your situation you may need to purchase a copy of Windows:

- If your current computer already has a running copy of Windows 10 or 11 you don't need to purchase a Windows license.
- If purchasing a new Windows computer, ensure it comes with Windows 11 (Pro recommended).
- If you want to run Windows 11/10 on your Mac, and you don't already have available a valid licenced copy of Windows 11/10 that is unused, you will need to purchase a legitimate copy of Windows 11/10.

Windows 10 and 11 both come in several different editions. For this course **Windows Home** is sufficient, although you might want Windows Pro for other reasons.

- Microsoft provides a comparison of Windows 11 Pro vs. Home: <https://www.microsoft.com/en-us/windows/compare-windows-11-home-vs-pro-versions>
- Wikipedia provides a table comparing the different "editions" of Windows 10: https://en.wikipedia.org/wiki/Windows_10_editions.

Windows 11 is available:

- On Microsoft's Canada Education web-based store (educational discounts available for some products) at <https://www.microsoft.com/en-ca/store/b/student>
- On Microsoft's Canada (non-education) web-based store at <https://www.microsoft.com/en-ca/>
- From several third-party resellers (prices vary, but sales do happen).

Please return to and complete your reading of the companion document before you start any course work.

Questions? Contact a course instructor (see Blackboard for a list) or Robert Loney (rloney@trentu.ca).