✓ There is too much any human being can remember during the first week so making notes, reviewing, and retracing steps is recommended. So is giving yourself a break.

✓ A good place to start for most things at Seneca is at https://students.SenecaPolytechnic.ca/ The Wiki Index to Pages and the search feature are useful in accessing or finding many Seneca resources. Students must set up Microsoft Authenticator and enroll in MFA (Multi-Factor Authentication) – it is a bother, but it is secure. Do you bother to lock your car or front door?

✓ Our school tries to be operating system agnostic. We believe in the existence of one true and eternal Turing Machine. When it comes to implementation, faith and beliefs may vary but all are respected: Windows, macOS, Linux, Android, iOS, …

✓ There are times when a particular operating system is necessary and when it is, this course uses Microsoft Windows. Hello, Apple macOS people, welcome…we mean you no harm. That goes for you Linux gurus, too. We admire Apple users for their good taste in hardware and Linux geeks for their virtue of nerdiness. Windows runs about 90% of the desktop/laptop market worldwide. Microsoft PCs dominate 95% of the *business* world's desktops. Why? Apple is a *consumer* product company.

✓ **The Visual Studio Community IDE used for your C programming course runs only under a Windows operating system**. **VS Code can be a viable option for macOS and Linux users.** *(There is a "Visual Studio for Mac" but it is similar in name only; VS for macOS does not support C/C++ programming.)* Visual Studio IDE is the most used integrated development environment among professional programmers.

✓ For weekly activities, please feel free to talk about the activity with your colleagues but use only your own words in your answers. Share ideas, not files. Talk all you want, don't record anything or share files.

✓ A suggested format for file naming:
    *term*_course_W*nn*_*content*.docx
where W*nn* is the week number and *content* describes what is in the file, e.g.
    *term*_CPR101_W*01*_*File systems-VisualStudio*.docx
It's a good file name if, six months from now, you don't have to open the file to know what's in it.

✓ **How will your answers be evaluated? What about the content and expression of your answers?**

- Marks are given only for your original work. Paraphrasing someone else's work does not count as your original work. If you paraphrase, you must cite and reference.

- Marks are awarded for your clear explanation of concepts and ideas. Without proper spelling, good grammar, and appropriate usage, the explanation of concepts and ideas will suffer and accordingly so will the marks.

- See the course marking rubric. Straightforward answers get straightforward marks. Answering with *why*, in addition to *what* or *how*, gets more marks. In the A and A+ grade range, your professor has found you provided responses beyond or below the surface of the questions. (e.g. how to "delete a file from a PC permanently so it cannot be recovered"? There is more than one way.) An A+ submission is easy to read and insightful. It communicates your answers clearly, correctly, completely, concisely, concretely, and with consideration for your reader; creativity is always welcomed. An A+ answer has the quality of articles you might read on reputable news sites or in print.

Part 1: Visual Studio Community IDE introduction (33.3%)

Complete the traditional first program, Hello World, as specified in the **CP4P_Visual-Studio-demo** document found on the CPR101 web page. That is the *only* version that gets marks on this week's assignment, AKA "activity".

The demo, like IPC144, uses Use Visual Studio IDE (Integrated Development Environment) because that is the source code editor most used by IT professionals. It is available on all Seneca lab PCs and can also be installed on your own Windows PC. See the CP4P_Visual-Studio-Installation document on the CPR101 web page.

Alternatively, Visual Studio Code is a lighter weight cross-platform editor that runs on Windows, macOS, and Linux. (macOS users who know about Xcode are already fine with that editor.) You will have to translate and adapt the Visual Studio IDE instructions to your editor of choice.

Answer these ➔ questions you see below in the ..._Activity-Answers.docx Explanations and approaches to these questions is found in this instructions document. Skipping the details in the instructions skips marks.

➔ 1. What platform are you working on: Windows, macOS, Linux?
   What code editor / IDE did you use to create the demonstration `helloWorld.c` source file?

Becoming comfortable using the file system on servers, and your own computer, is a starting requirement for IT professionals. You are now an IT professional because you are being paid to do this, paid in marks, but paid nevertheless.

➔ 2. Where is your helloWorld.c source file? Find the file and paste its Full Path according to the file system your computer is using:

- Windows users: hints at using File Explorer to find your Visual Studio project's files are in the VS demo document.

- macOS users: this may be useful "Find the Absolute Path to a folder or directory in Mac OS X", also THIS – see Part 1: 1. 4. 5. and ignore the rest.

➔ 3. What is in the helloWorld.c file? Source code, of course. Copy the text of your customized source statements as per the Visual Studio demo instructions and paste in the box in your answers document.

N.B. there is no need to submit the VS project or the .c source file itself with this week's activity...just your C source code.

Part 2: Source Code editing (33.3%)

➔ 4. Explain what your editor's code completion feature does for you and how you use it when writing code. E.g. IntelliSense

➔ 5. Other than the system wide shortcuts (e.g. Ctrl+ Save, Z undo, X cut, Copy, V paste, Find), what three shortcuts will you find useful in your source code editor and explain why.

➔ 6. Compare the efficiency of using a mouse verses a keyboard when editing source code. (Sure, you are probably faster using a mouse now. But after thousands of lines of code compared to someone who uses mostly keyboard shortcuts?)
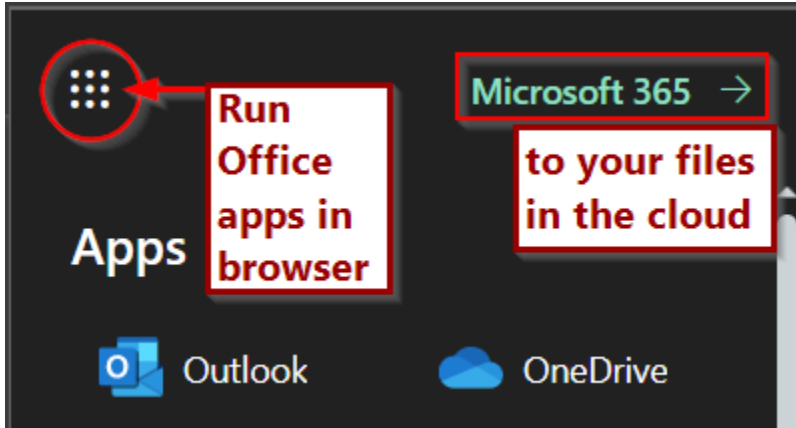
Part 3: Managing and Backing up your files (33.4%)

There are three questions way below, but there's backstory to be covered beforehand.

MS 365, Office apps

Sign on to mySeneca.ca, click on the grid in the top left which opens the Office Apps menu for online / browser access – useful for basic editing of files stored on

OneDrive in the cloud.

Clicking on Microsoft 365 takes you to office.com. Look near the top right. You'll see the control to "Install apps" locally on your computer. Compared to the online version, locally installed Office apps are faster and have more features.
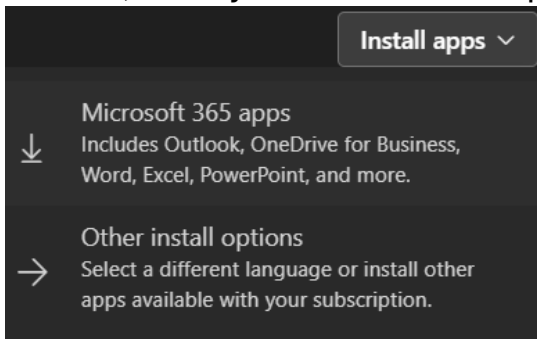
You can use either online or local Office apps to access your files 'in the cloud', i.e. on OneDrive.

ICT professionals organize files on servers and their own computers in folders/directories on drives. Both Windows and macOS have default folders set up for common use cases of personal files (Downloads, Documents) kept distinct from application and operating system folders. ICT people further subdivide those parent folders into child- or sub-folders to group files according to category, concept, or a logical / practical relationship.

As for files, first is the *active* file, the one you change such as a ___.c source code file.

Where do you keep the active or working version of your files?

There are options:

- on your own computer
  - Your laptop is fine if you don't mind taking it and its power brick with you everywhere.

- Microsoft 365 OneDrive is available wherever you have a network connection *and* your phone so you can sign on using second factor authentication (2FA)
  - If you haven't yet tried Microsoft 365 OneDrive at Seneca, now is the time to use that 1TB of cloud storage available to you.
  - Install OneDrive on your computer – even your smartphone – or, in a pinch, click and drag from local folders to the web app.
- on a USB removable drive for portability between home and school
  - great for independence from computer platforms, communications and networking
  - easy to carry but easy to lose

Decide where the active or working version of your files will reside.

Next, backup the active files *twice*:

- One copy is in an easily accessible location *apart from* the one your active file resides on. It is restored from backup if your active file becomes unworkable and you need to go back to its original version quickly. Ideally, this copy is available if an Internet connection is not.
  Location examples:
  - a different cloud service than the one the active file is on
  - a cloud folder called "BACKUP" which is not synchronized
  - a (second) portable USB drive
  - NAS at home
- The other copy is stored offline and offsite relative to both your active file and the accessible copy. This is the disaster recovery backup copy that exists after
  the active file and the accessible copy both cease to exist.
  For example, it is the backup you can retrieve after...
  - your house burns down while you are on a cruise when your smartphone went overboard with all your cloud account credentials and your computer was stolen from your office.

Warning: synchronization of your PC's files with a cloud data service makes your system *inter*dependent with the cloud. The files *coexist* in two or more places at the same time. This is very handy when working between school and a home desktop, or lab PC and laptop, or other combinations. *But synch is neither a copy nor a backup* because your computer and the cloud are not independent; what happens on one is reflected on the other – *delete it here and it is gone there*.

> Microsoft OneDrive has a feature they call "Sync and backup" to "Back up important PC folders to OneDrive." **There is no such thing as both sync *and* backup, it is either / or, it cannot be both.** What **OneDrive** calls backup **is pure synchronization**. See [THIS](#) but ignore their software pitch for server backup / replication.

Will the cloud itself fail? Not likely. Can your file evaporate in a cloud? Oh yes, *[it has happened](#)*. Even cloud files need to be backed up to a different cloud.

Made a decision? Time to backup.

A good backup software option is [Duplicati](#). Search [reviews](#).

Who does the backup? You do, or you've set up an automatic backup job.

When? When files are changed. This likely happens every day.

What? A backup is TWO *COPIES* in addition to the original active file.

Where? At least one copy is in a geographically separate location on an independent system. Neither copy is on the system with the original active file.

- If Godzilla wrecks your building, your backup is safe in an offsite location. (The movie always ends before Godzilla wrecks the offsite location, too.)

- Cloud storage is a good option. Email works in a pinch.

- Encrypt offsite backups. E.g. use 7zip archives with AES-256 encryption then copy the .7z file offsite.

- an independent system = once the backup is done, the backup device / drive / location is disconnected from the source of active files.

  - This means the external drive is unplugged. The cloud data storage location is *not* synchronized with your computer's file system.

  - If the copy is on the same drive, a plugged-in USB drive, or is in an available network location / mapped network drive, then it is on a *dependent* system and is subject to accidental deletion, ransomware encryption, and other misfortunes.

  - If two clouds are used for backup, they are likely in geographically different locations and not connected to each other (that's good), but because neither is available without an Internet connection (that's bad), there is a critical dependency over which you have no control: your ISP. Thus the need for a locally available copy.

Why? Has the storage location with your active files ever failed on you?
> No? When it does, then you'll know why you should have had backups.
> Have you ever accidently lost or deleted a file and could not get it back?
> Never mind, we all know the answer to that one.

➔ 7. How will you manage your `source.c`, `-Activity-Answers.docx`, and other files so that you work only with the active files whether at home or school?

➔ 8. Where are the locations of your two backup copies? How frequently do you backup active files? Exactly how does the backup get done? (click and drag? script? backup utility?)

➔ 9. If your active files became completely unavailable tomorrow morning because your computer is somehow unavailable or there is no network connection or the files are corrupted/deleted/gone!, i.e. you are unable to work the way you expected, *what would you do then?*

Notes

Make a copy of all your programming projects by storing the `/repos` or `/Projects` folder in an encrypted .zip archive, then copy/move the archive file to a geographically separate, independent system.

Some (will) use GitHub for backup. DO. NOT. DO. THAT.
Not convinced? https://devops.com/why-do-you-need-github-backup/
TL;DR Don't do it.

> The principle of GitHub is synchronizing repos for software development. Its use case and feature set never included backup. Google it and all you'll find is how to back up your GitHub repos outside of GitHub. If you are not paying for a private GitHub repo, then it's public. Anyone can fork your project and then you'll be forked. Doing a commit and push does the job...sort of. Sure, you can roll back to prior versions, but that will get crazy messy with different mixes of files in each push. Getting push versus pull mixed up at 4am or discovering the many ways as yet unknown to shoot yourself in the foot while kludging GitHub as ersatz backup...please let us know how that went for you.

Backup is a place where your data does not change unless you upload another backup version. Even then, at least one previous version should be maintained.

<u>When things go wrong</u> (not if)

Windows File History (and macOS Time Machine) backs up and provides a generational version history of files and folders referenced in "[Libraries](#)". This is a good option for your accessible backup copy. Note that its storage location is independent of your computer's file system **only after** unplugging the target external drive or disconnecting from the target server.

Libraries, seen in File Explorer, are virtual containers of files and folders on the local computer. Windows, by default, has Libraries which reference your Documents and other commonly used folders. External drives and other folders or locations to be included in File History must be referenced in a new or existing library. Removable / portable, as opposed to external, drives can be referenced in a library, but beware, they are not included in the File History.

USB flash drives are wonderfully portable which makes them easily losable. If you do lose your drive, usually by forgetting it in the lab PC, how will it ever get back to you?

> *Little Bo-Bleep*
> *has lost her USB-flash-drive-with-files-on-each-of-her sheep,*
> *And doesn't know where to find it;*
> *Without her name,*
> *Home ne'er it came,*
> *But would have if she had signed it.*
>
> (Sadly, she didn't have a backup.)

- Rename your USB drive's volume label to your name.
- Put a `!!_PLEASE_RETURN_TO_!!.txt` file in the root with your email address, contact information, and a nice message promising a reward. (coffee, at least)
- Put your phone number or email on the outside of the USB drive.
- And it might come home wagging its data behind it.