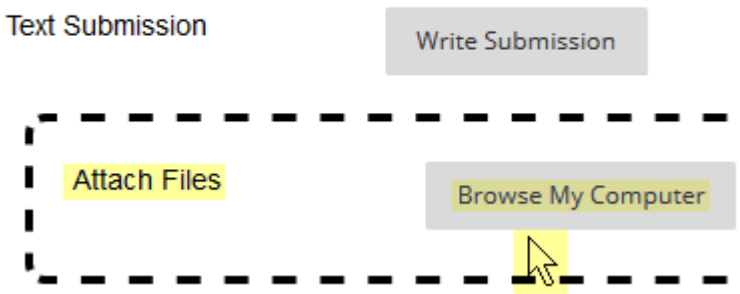
- ✓ There is too much any human being can remember during the first week so reviewing and retracing steps is recommended as is giving yourself a break.
- ✓ ICT is a discipline which often needs much explanation (ICT = Information and Communications Technology) and always requires attention to detail such as reading all the documentation *carefully*. There is no TL;DR in ICT. (TL;DR = Too Long; Didn't Read) **If ICT was simple, easy, and quick, no one would pay us to do it.** This course is no exception and you are being paid to do it, paid in marks, but paid nonetheless so you are now a professional ICT person.
- ✓ The School of ICT 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.
- ✓ 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 at least 85% of the desktop/laptop market worldwide and, despite what you see in North America, macOS is 9% to 15%. Microsoft PCs dominate 95% of the business world's desktops. Windows PCs are more compatible with business systems (servers and multi-user software) than macOS. Why? macOS is a consumer product; there is no server macOS (Apple tried), and systems development organizations don't care that your iTunes stuff is nicely integrated across all your Apple devices.
- ✓ ***The Visual Studio Community IDE used for your C programming course runs only under a Windows operating system. VS Code may be a viable option for macOs and Linux users.*** *There is a "Visual Studio for macOS" but it is similar in name only; VS for macOS does not support C/C++ programming**.** Visual Studio IDE is the most used development environment among professional programmers.*
- ✓ You do not need a personal Windows machine to be successful at Seneca. Our programs cover all major Operating Systems (IBM, *nix, Windows, with some Apple specific courses); Seneca labs give you access to all OS flavours. There will be times when it is necessary to work on the native OS platform or at least within a virtual Windows machine. Visual Studio IDE is one of those times as is Part 3 below.
- ✓ Ensure you are working with the unzipped files from any downloaded Blackboard zip file. Extract the files from the zip archive to a Desktop or Download folder and then delete the .zip file to avoid confusion. (Yes, you can double click to open a file within the zip archive—the OS automatically decompresses it to a deeply buried

temporary work folder—but you cannot easily do the following activity with those temp files.)

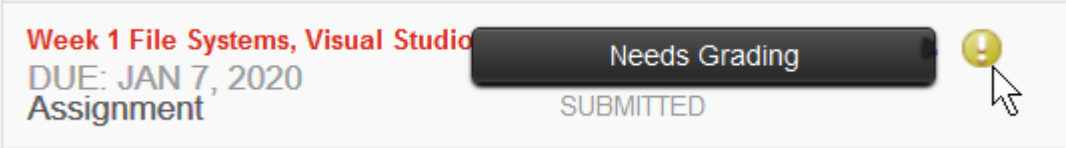
- ✓ For weekly activities, please feel free to talk about the activity with your colleagues but use only your own words in your answers. Share ideas, not files. Talk all you want, don't record anything.
- ✓ The suggested format of your document's filename is
  *your-SenecaID*_course_W*nn*_*content*.docx
  where W*nn* is the week number and *content* describes what is in the file, e.g.
  *tmckenna*_CP4P_*W01_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.
- ✓ **Submit only the completed activity file in *MS Word .docx format* through Blackboard via the weekly topic link in Course Documents.** Your instructor may charge you up to 25% for the effort of dealing with anything else. No need to enter any "Submission Text" or add comments...they just slow down both our processes. There is no need to also include your Visual Studio project or source code file. Your instructor already has these instructions; please omit from your submission.

  Week 1 File Systems and Visual Studio ← **click this link and scroll down to…**
  ASSIGNMENT SUBMISSION

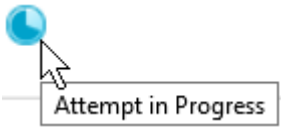


Click [Submit] and look for the success message near the top of the screen; review the contents of the submitted file. To make a correction, click [Start New] and resubmit. Only the most recent submission will be marked.

Wait until you see the Success! message near the top of the page and confirm your submission is rendered properly. A "Submission received" email is also sent. Go to **My Grades** to confirm. If you see an exclamation mark symbol, you are done; it ready to be marked by your instructor.



If you see a blue clock icon in My Grades,



then it did not work usually because the tab / browser / computer was closed during the submission process. Resubmit.

Tip: copy this arrow ➔ character, Ctrl+F to find, Ctrl+V to paste the arrow, and search both this activity document and your answer document to ensure you have completed all the questions.

✓ **Note for any course**: answers copied and pasted without citation and referencing will result in a minimum of zero marks **FOR THE ENTIRE SUBMITTED WORK**, may incur a penalty (a negative mark), and may be subject to Academic Integrity review. Please DO discuss details of the activity with your colleagues and instructor but create the answer in your own words according to your own understanding. The rule is: you can **talk all you want but don't copy/paste** *anything* without attribution, citation, and references. Share ideas, not files.

✓ **So, what about the content and expression of your answers? How will your answers be evaluated?**

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 instructor 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"? "Empty the recycling bin." is one way. There is at least one more 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.

Part 1 of 4: Visual Studio Community introduction (25%)

Complete the Visual Studio project creation and Hello World program using the Visual Studio 2019 IDE (Integrated Development Environment) or your own code editor if you must. See the CP4P_Week1_VS_2019 demo.docx within the zip file where you found

this document, and **see the Getting Started page via the C programming course's home page. It contains guided videos and useful setup instructions for other utilities needed in C programming.** For diploma programs, see **https://ict.senecacollege.ca/~ipc144/pages/startup/index.html** or for the degree program, see **https://ict.senecacollege.ca/~btp105/pages/startup/index.html**

Do not modify this document –> Use and submit the …_Activity_Answers.docx

Student Name Click or tap here to enter text. Student Number Click or tap here to enter text. UserID Click or tap here to enter text. @mySeneca.ca
Special Notes to Instructor Click or tap here to enter text.

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

```
OS platform:
code editor/IDE:
```

➔ Where is your helloWorld.c source file? Find the file and paste its Full Path in the box:

(Hints at using File Explorer to find your Visual Studio project's files are in the VS demo document.)

➔ What is the content within the helloWorld.c file? Your source code, of course. Copy the text of your customized source statements from the Visual Studio editor and paste in the box below using the Paste Option to either Merge Formatting (M) or Keep Text Only (T).

***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 code above.*

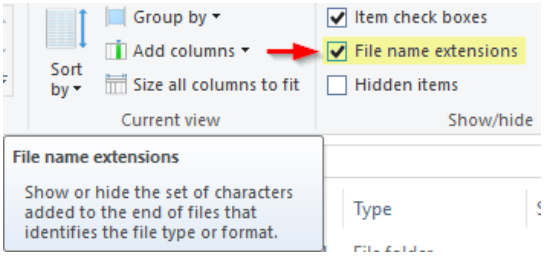
Part 2 of 4: Proper naming convention and having correct file extensions (25%)

Four files can be found in the "CP4P_Week1_Activity_WorkFiles" subfolder. Those files all have the wrong file extension. Your task is to add the correct extension to those file names so the system can properly process those files.

- **IF** the filename extensions are **not** being displayed in File Explorer:

i. Press Alt-V to activate the View menu: 

ii. Click to turn on the display of "File name extensions"



Normally, when you right-click a file, a number of options are available to process that file. E.g. Preview, Open, Open with > [optional applications]. These options are based on the file's extension which the system relates to an application. Double clicking a file name opens it using the default application.

file**.txt** ⇨ Notepad file**.html** ⇨ Web Browser
file**.bmp** ⇨ Paint graphics file**.jpg** ⇨ Windows Picture Viewer

If there is a problem with the data within the file, the default application may issue an error message or, as many manuals say, "results may be unpredictable".

Click and drag the file from File Explorer and drop it into a browser; any browser can render any of these file types but only if the file's content matches its file extension. Firefox gives the best feedback when there is a problem. If nothing happens when you click and drag, you are probably dragging a compressed file from the .zip. Software applications work only with uncompressed file data.

➔ What happens and what do you see when each lunamoth file is dropped into Firefox (preferred) or any other browser. It will not be as expected from the file extension.

lunamoth.bmp →

lunamoth.html →

lunamoth.jpg →

lunamoth.txt →

To see the file's data which is causing problems, open those files with Notepad to inspect their content:
Start Notepad (⊞ + "Notepad"), Open the file (Ctrl+O or File / Open) or just click and drag the file from File Explorer and drop into Notepad. This will display the file's binary

data as characters. Examine the raw data and determine what the file's extension should be.

- Text files (.txt) can contain any characters but usually contain human readable information formatted with little more than TAB and newline special characters.
- Web pages are text files with **HyperText Markup Language** (.html, .htm) that browsers use to display content. Visit https://en.wikipedia.org/wiki/HTML#Markup to see what HTML files look like.
- Find out what a **JPEG** (.jpg) photo file and a **bitmap** (.bmp) graphics file begin with. See https://en.wikipedia.org/wiki/List_of_file_signatures for data used to identify the content of a file.

➔ What are the proper extensions for those files, **and** how did you know?

`lunamoth.bmp to lunamoth.____` How did you know to use that extension?
`lunamoth.html to lunamoth.____` How did you know to use that extension?
`lunamoth.jpg to lunamoth.____` How did you know to use that extension?
`lunamoth.txt to lunamoth.____` How did you know to use that extension?

Our task is to rename those files from *file.ext1* to *file.ext2*, from *file.ext2* to *file.ext3*, from file.*ext3* to *file.ext4*, from *file.ext4* to *file.ext1* so the files' content will be processed by the proper application.

One challenge is you cannot rename *file.ext1* to *file.ext2* while *file.ext2* exists or *file.ext4* to *file.ext1* while *file.ext1* exists.

Another challenge is we must assume there are scripts in the system referencing the original file names (right now, with the wrong content). So, we cannot just make up new names.

➔ Now that you know what the file extensions *should* be, what are the logical steps to rename the lunamoth files?

`Rename from to`

➔ What does this experience tell you about the importance of file names and their extensions? Did the renaming of these files have an effect on the data contained within the files?

Part 3: Working with a removable USB drive and a local drive while doing common file/directory operations (25%)

- Open File Explorer and navigate to your folder containing the above Week 1 files.

In the left hand pane within the folder tree, use right-click…

- Create a new folder somewhere on the C: drive, e.g. under Desktop or Downloads.
- Create a new folder on another drive, e.g. your USB drive or the D: drive on a lab PC if you don't have a USB drive (*get one soon*)

➔ What happens when you select the lunamoth files in your original folder, then drag and drop them to the new folder on your **USB drive or the D: drive, i.e. when the target drive is *different* from the source drive**…
are the files MOVED or COPIED?

➔ What happens when you select the lunamoth files in your original folder, then drag and drop them in the new folder on the **C: drive, i.e. when dragging to a different folder within the *same* drive**…
are the files MOVED or COPIED?

➔ Drag a file anywhere within the same drive, and while continuing to hold the left mouse button, press the Ctrl key, then release the Ctrl key, then press the Ctrl key. How does the message displayed near the mouse pointer change?

Programmers almost always click, drag, and drop using the **right** mouse button.

➔ What happens when you drag and drop a file using **right** mouse button?

!!! Operating systems default for file copy versus move:
- a file dropped within the **same** file system is **moved**. E.g. from and to C: drive
- a file dropped in a **different** instance of file system is **copied**. E.g. from C: to D:

➔ After deleting a file from the PC's internal drive, can you restore it? If so, how?

➔ How can a file on the PC's internal drive be deleted permanently?

There are two types of USB drives: Removable (small solid-state "thumb" drives) and External ("desktop" versions have their own power supply, "portable" versions are USB powered). To determine the type of a USB drive, Right-click on it under "This PC". If the pop up menu shows an "Eject" option, the drive is Removable; otherwise, it is an External type drive. Deleting a file from one type of USB drive allows recovery of deleted files, but deleting a file from the other does not. Right-click Recycle Bin > Properties to see drives with deletion protection.

➔ Is your USB drive the Removable or External type?
After deleting a USB file, can you restore it? If so, how?

Part 4: Backing up your files (25%)

All done? Time to backup.

A proper backup is TWO copies, at least one of which is in a geographically separate location on an independent system.

- TWO copies
  - The first copy is somewhere outside your computer.
  - A second copy can be on a nearby removable / external / network attached storage drive.
  - The active file on your computer does not count. It is the original, not a copy.
  - A copy stored on the same computer as the active file does not count.
- geographically separate location for storing the first copy = a safe place nowhere near your computer.

    - If Godzilla wrecks your place, your backup is available in an offsite location.
    - Cloud storage is a good option. Email works in a pinch.
    - Encrypt offsite backups. E.g. use 7zip archives with AES-256 encryption.
- an independent system = once the backup is done, the backup location has been disconnected from your computer.
    - 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.

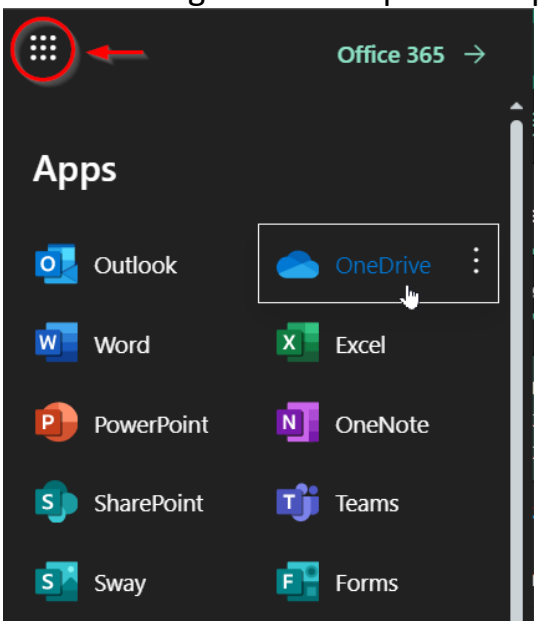
You can work with your Visual Studio projects directly on your own laptop, a USB drive, a personal OneDrive, or your Office 365 OneDrive. Make one of those your standard practice as the active version. Make a copy of all your programming projects by storing the `/repos` or `/Projects` folder in a .zip archive, then copy/move the archive file to a geographically separate, independent system.

Synchronization of your PC's files with a cloud data service makes your system interdependent with the cloud; the synchronization is convenient but the systems are not independent. Although separated by geography, you have one file coexisting in two places. That is neither a copy nor a backup until you disconnect from the cloud service – only then are the two systems independent. As soon as you reconnect, files are sync'd and you once again have neither a copy nor a backup. If a file is deleted in one system, it will be deleted from all other sync'd systems.

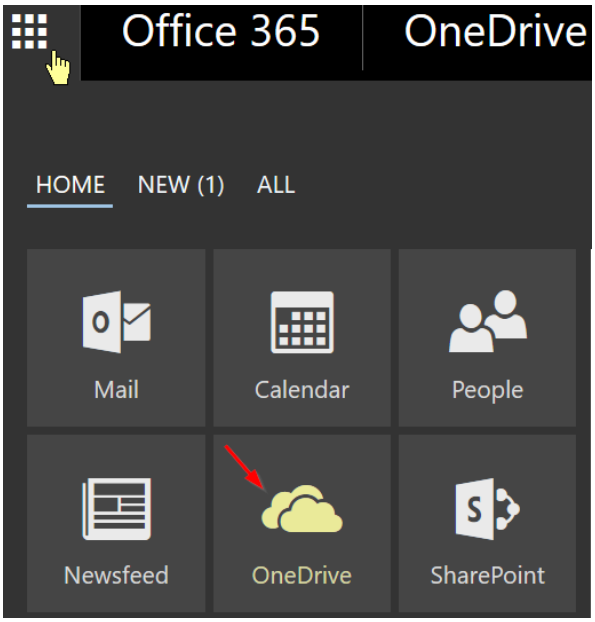
Windows File History (macOS version is Time Machine) backs up and provides a generational version history of files and folders referenced in "Libraries". This is a good option for your second backup copy because its storage location can be independent of your computer's file system. Libraries, seen in 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 drives can be referenced in a library, but beware, they are not included in the File History.

Geographically separate storage is available by going to **mySeneca.ca** and opening Office 365's OneDrive.

Click on the grid in the top left to open the menu and click on OneDrive.



or this older version:



For the next question, if you do not have a USB drive – explain why, then work only with OneDrive.

➔ Can you edit a text, source code, and/or MS Office file stored…

- directly on your USB drive? (If you don't have one, why?)
  - If so, how? If not, what must you do to edit a file stored there?

- directly on Office 365's OneDrive?
  - If so, how? If not, what must you do to edit a file stored there?

You can store and work with your Visual Studio projects (in **`repos`** or **`Projects`** folder) directly on a USB drive or your Office 365 OneDrive at Seneca.

➔ It takes effort to copy files and directories from a USB drive or OneDrive to the local drive, work with and save them locally, and then transfer the local files back. Is it worth the effort? Why or Why not? What are the benefits and risks in having the same file on both your local system and also on a removeable drive or a remote system?

➔ What are the two locations of your backup and how frequently do you do a backup?

Miscelleaneous Notes

Tip: select this arrow ➔ character, Ctrl-F to find, paste the arrow and search both this activity document and your answer document to ensure you have completed all the questions before submitting.

USB file recovery: Web pages suggesting the use of CHKDSK and ATTRIB to recover USB file deletions always offer an option "if that doesn't work" to "buy our software". That is because CHKDSK and ATTRIB simply will not and *cannot* recover *deleted* files. That is *not* what those DOS/Windows operating system commands can do. This site is the only one we've seen that is honest about exactly what those commands do, but those are for rare cases, not simple file deletion.

Make sure you have a proper backup before restarting or shutting down a Seneca lab PC – when it starts, the PC is reset to its default state. That is, all files from the previous session are gone. At the start of term, it is worth confirming that that the PC is correctly configured: the D drive should indeed be temporary, and C:\Users\ should have retained none of your files.

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.
- Put your name on the outside of the USB drive.
- And it just might come home wagging its data behind it.

There are three frogs on a lily pad, and one decides to jump in the water.
How many frogs are now on the lily pad?