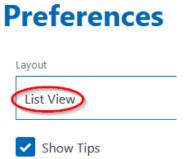
# Contents

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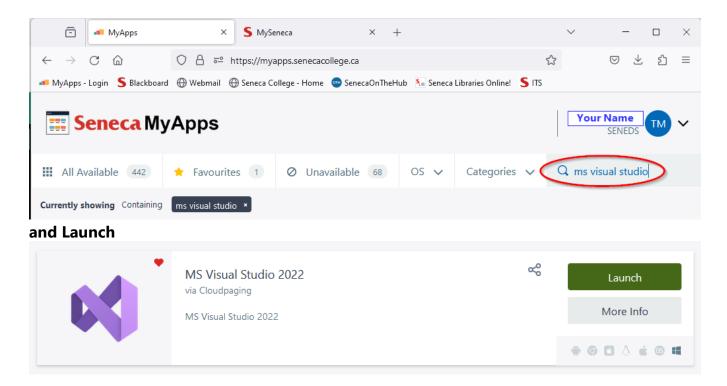
# Visual Studio via MyApps on Seneca lab PCs

Seneca's computer lab and other PCs on campus launch Visual Studio from **myApps**. Use the desktop link or <u>https://myapps.SenecaPolytechnic.ca/</u>. Sign on may be required:

📰 Seneca My	Your Name SENEDS	F
	Preferences User Profile Menu	
Sign in via	Take the Tour	
	App Lists	
Login	€ Log out	



Search for "ms visual studio"



#### Troubleshooting myApps:

If you see "Validation Required" instead of "Launch", backtrack and sign on. Be patient, the app...is...being...downloaded...from the cloud. After running out of patience, try reloading the page. If your UserID will not validate or the Visual Studio item itself needs validation, visit the ITS Service Desk in the Learning Commons: there may be a problem with your user account's permissions.

# **Run Visual Studio**

On a lab PC, select the Visual Studio shortcut you see in File Explorer and press Enter.

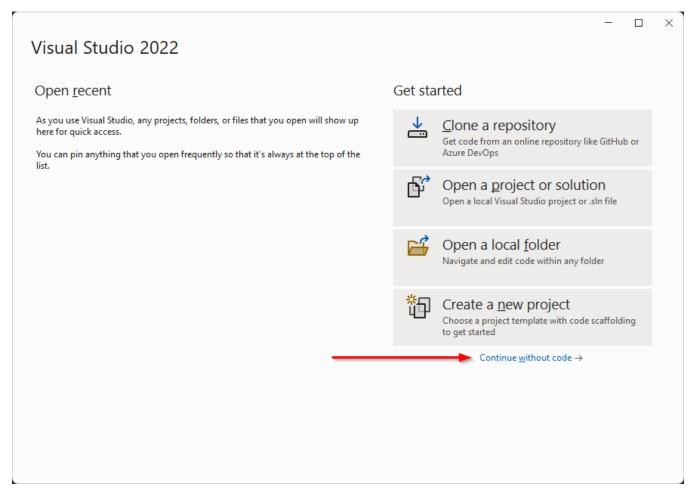
Show these notes on one side of your screen: Windows key  $\blacksquare + \rightarrow$  [right arrow] then select Visual Studio from among the other open windows to display it on the other side.

Windows key **+ up | down | left | right arrows** will help to organize one or more open windows.

Because Visual Studio (VS) can manage various types of projects, it is one of the industry standards for systems development. As such, it is far more than just a programming code editor. Thus, the next few steps require your careful attention to set up the VS project for the type of program we will be creating.

From Visual Studio's Get started window, click

Continue without code →



#### Just close this licencing dialog when on a lab PC. Create an account if installed on your PC.

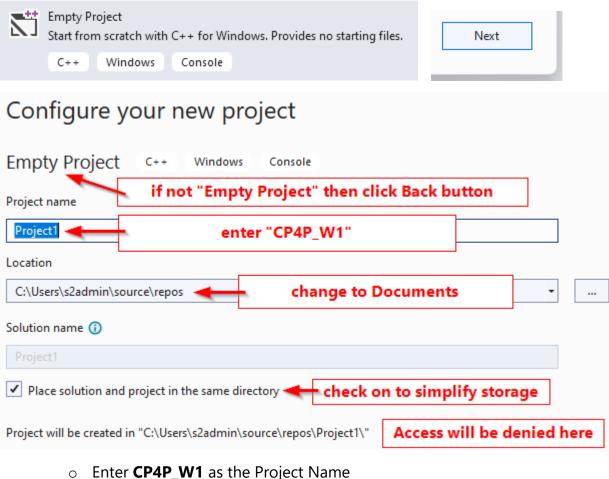
	<u>^</u>
Sign in to Visual Studio	Visual Studio
- Sync settings across devices	Community 2022
- Collaborate in real time with LiveShare	
- Integrate seamlessly with Azure Services	License: Product key applied
Learn more	
Sign in No account? Create one!	
Account options	
17.7.1	<u>C</u> lose

# Create a new project dialog,

use VS menu: select **<u>File</u> | <u>New</u> | <u>P</u>roject** [Alt + FNP or Ctrl+Shift+N]

00	<u>F</u> ile	<u>E</u> dit	<u>V</u> iew	<u>G</u> it	<u>P</u> roject	<u>D</u> ebug	4	A <u>n</u> alyz	e <u>T</u> ools	E <u>x</u> tensions	<u>W</u> indo	ow <u>H</u> elp	0
		<u>N</u> ew					•	御	Project			Ctrl+Shif	t+N
~ ~		<u>O</u> pen					۲	<del>گ</del> ۹	Repository	/			
Wha	4	Clon <u>e</u> R	epository	/				*	<u>F</u> ile			Ctrl+N	
	<u>۵</u>	Start <u>W</u> i	ndow						Project Fro	om <u>E</u> xisting Co	de		
		<u>C</u> lose						3	From <u>C</u> oo	kiecutter			
Create a new project Search for templates (Alt+S)													
Rece	ent p	project t	template	es		C++			• Wir	ndows	•	Console	

~



Enter CP4P\_W1 as the Project Name
 (Computer Principles *for* Programmers in Week 1)
 The Location must be overridden.

# Hello World program

#### Create a C language source code file...

VS menu: select Project | Add new Item [Ctrl+Shift+A]

	<u>F</u> ile <u>E</u> dit	View	Project	Build	Debug		Solution Explorer	<b>~</b> ₽>	< j
		-	Lidjeer	Dana	Depug		📲   🗿 • 🖘 🗐 🖆   🎤 🛋		
т	Retarget soluti	on					Search Solution Explorer (Ctrl+;)	Q	•
枕	Add Class						Solution 'Project1' (1 of 1 project)		
+	_			~			▲ the Project1		
B.	Class Wizard	Wizard Ctrl+Shift+X					▷ 마□ References		
枕	Add Resource					External Dependencies			
							🖶 Header Files		
<b>*</b> D	Add Ne <u>w</u> Item		N	Ct	rl+Shift+A		Resource Files		- 12
<b>*</b> n	Add Existing Ite	em	42	Sh	ift+Alt+A		Ctrl+Shift+A Add		•
-						or	Curronintra Line		

We will add a new item called "helloWorld.c"

You may see th	is dialog	or the one that follows.	
Add New Item		×	
Project1/ hello	World.c	override file ext to .c	
Show All <u>T</u> empla	tes	<u>A</u> dd <u>C</u> ancel	
Add New Item - CP4P	_W1		? ×
Installed		Sort by: Default	Search (Ctrl+E)
<ul> <li>Visual C++</li> <li>Code</li> <li>Formatting</li> <li>ATL</li> </ul>		C++ File (.cpp)       Visual C++         Header File (.h)       Visual C++	<b>Type:</b> Visual C++ Creates a file containing C++ source code
Data Resource Web Utility Property Shee Test HLSL Graphics	ts	Check that Visual C++ is selected on the le C++ File (.cpp) in the center pane is select Enter <u>helloWorld.c</u> as the file Name <i>Ensure file extension is ".c", not the defa</i>	ted. <b>ult .cpp</b> ( C++ )
▶ Online		This tells Visual Studio to use the C langua	ge code editor and compiler.
<u>N</u> ame:	helloWorld.	c	
Location:	C:\Users\us	erid\source\repos\CP4P_W1\	Browse
			<u>A</u> dd Cancel

# Source Code

- Copy & paste the source code for the classic first program, "Hello World".
   → Change yourNameHere and other unique identifiers to yours.
  - o See Hello World, The History of 'Hello, World', The Hello World Collection
- If the first line of comments is not wrapping,
   O VS menu: <u>E</u>dit > Ad<u>v</u>anced > Word W<u>r</u>ap [Alt + E V R] or [Ctrl + EW]

```
/* Thanks to Brian Kernighan, 'Hello World' is the traditional first C program. It became
legendary with the publication of "The C Programming Language" by Kernighan and Ritchie (1978).
Now, Hello World is the canonical test of any programming language. */
Full Name :
                   yourNameHere
Student ID# :
                    123456789
UserID / Email : UserID username@mySeneca.ca
#include <stdio.h> // header file with Input/Output functions
int main(void)
                     // main() is automatically called to start a C program
{
    printf("Hello, World!\n"); // output greeting
    /*
       insert printf statements here using code completion to answer Why I came to Seneca...
       (*What* you came to Seneca for was to learn programming, but you can do that anywhere. WHY
here?)
    return 0; // normal end of program
}
```

Add code using IntelliSense, Microsoft's name for its code completion feature.

- Position the cursor on a new line above the return statement
- Type pr
  - Notice the code completion suggestions appear
  - Pressing [ TAB ] will complete printf
- Type ( then "
  - $\circ$   $\;$  Notice how the matching paired characters ) " are inserted
- Type I am yourNameHere.\n
  - o printf("I am yourNameHere.\n")
- press [ End ] key
- Type ; // output your name

   printf("I am yourNameHere.\n"); // output your name

## Use the above steps to add one or more printf statement(s) to answer, Why did you come to Seneca?

Type as much text as you like between the double quote marks.

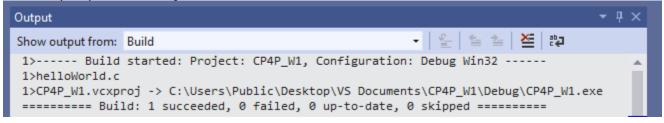
• Save the source file [Ctrl+S]

Compile your C program...

• VS menu: select **<u>B</u>uild | Build Solution** 

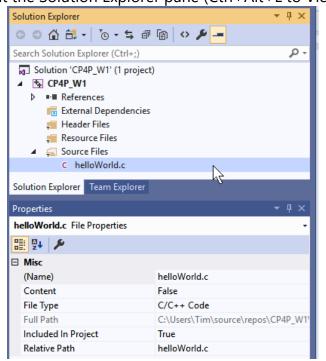
	<u>B</u> uild	<u>D</u> ebug	Te <u>s</u> t	A <u>n</u> alyze	<u>T</u> ools	E <u>x</u> tensions	<u>W</u> indow	<u>H</u> elp
Build Solution Ct						Ctrl+	·Shift+B	G .
ļ	<u>R</u> e	build Solu	tion					

The Output pane below your code should show Build: 1 succeeded



# Troubleshooting

**If the Build failed** and your source code exactly matches the above, look at the Solution Explorer pane (Ctrl+Alt+L to View it)



- Only one source file should exist in the project
  - delete all except helloworld.c
- Check that helloworld ends with the extension .c and not .cpp

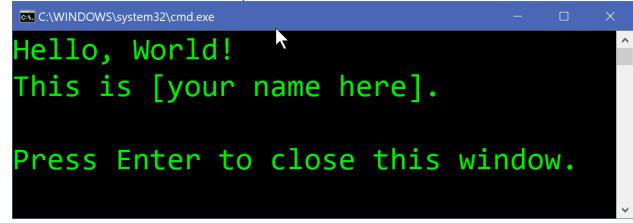
- Use the Solution Explorer / Properties pane to rename the file to end in .c
- ...and run Build Solution again.
- If all else fails, it is best to start again.
  - Exit Visual Studio
  - Use File Explorer to find the CP4P\_W1 folder under ...\repos\
  - Delete the CP4P\_W1 folder
  - Then recreate the project as per the above notes.

When the compile was successful, run your program.

VS menu: select Debug | Start without Debugging

ſ	<u>D</u> eb	oug	Te <u>s</u> t	A <u>n</u> alyze	<u>T</u> ools	E <u>x</u> tensions	Window		
4	<u>W</u> indows								
		Graphi <u>c</u> s •							
		<u>S</u> tar	t Debug	iging		F5			
ł	$\triangleright$	Star	t Wit <u>h</u> o	ut Debuggir	Ctrl+F5	j .			

• a terminal console window will open with



The appearance of the window varies.

Customize by clicking the icon in the top left / Properties.

• Close the window when you've sufficiently admired your work.

Microsoft has notes for <u>Getting Started with Visual Studio for C and C++ Development</u> which you can explore.

## Locating VS repository and source file

#### Now, where is that helloWorld.c source file?

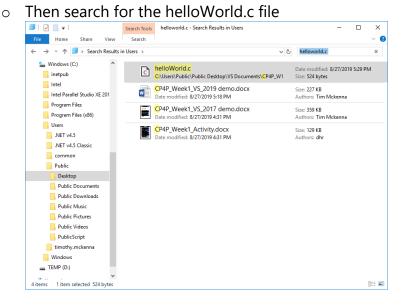
You may have seen the full pathname when your program ran in the terminal window. Source files are located under the VS Project name folder. And where is that? There are several ways to find it.

You can use Visual Studio:

- Hover the mouse pointer over the **helloWorld.c** tab in the editing pane and the full path will appear.
- Right click on the **helloWorld.c** tab in the editing pane for more options.
- In the Solution Explorer pane, right click on the project name and select Open Folder in File Explorer and search from there.

You can use the Windows File Explorer ( 🗮 + E )

- File Explorer has a Search feature but if you search "This PC" for **file:helloWorld.c**, your patience will be tested. Before searching...
- Use the left pane to navigate to Windows (C:) and click on the Users folder





You can start from the file's location and work your way up the folder structure:

- Press the Windows key **#** and type the filename **helloWorld.c**
- Right clicking on the matched filename may give you a list of options such as Open file location, Copy full path.

# Transfer, Compile, and Test on matrix

matrix.SenecaPolytechnic.ca is a Linux <u>cluster</u> which is the host server for your completed C programs in IPC144.

# **Connection Requirements**

- install <u>GlobalProtect VPN</u> (Virtual Private Network).
   Being signed on to the VPN and using <u>multi-factor authentication</u> is necessary for access to many systems at Seneca including matrix.
- You must reconnect to the VPN every time you restart your computer and after periods of *inactivity*. This will require Second-Factor Authentication (2FA, aka MFA).
- macOS users might save time by reading this first: <u>https://tech.wayne.edu/kb/security/wsu-virtual-private-network/500214</u>
- <u>Troubleshooting</u>

## Methods of Connection

# See the "Visual Studio Terminal cmd line" document for steps with command line utilities probably already on your computer. Be brave. Life is better without a mouse.

• <u>SSH</u> / <u>SFTP</u> / <u>SCP</u> to matrix

Other methods follow below.

• install a Secure SHell Telnet (SSH) client which is a terminal app to sign on and use a Unix/Linux server like Matrix.

- Windows use Windows Terminal or install PuTTY using the .MSI Package
- macOS -- use the built-in SSH Terminal (Finder, Go -> Utilities), or other options
- Linux -- use the preinstalled <u>OpenSSHspan></u> terminal, or <u>other options</u> including <u>PuTTY</u>

• install a Secure File Transfer Protocol (SFTP) GUI app for transferring files from your system to a server

• Windows -- install WinSCP. Its UI can launch PuTTY if it was previously installed.

• macOS / Linux / Windows -- install <u>FileZilla</u> for a cross-platform app similar to WinSCP Upload your C source code file to matrix via an SFTP application (Secure File Transfer Protocol) such as WinSCP or Filezilla. Next, compile and run the program on matrix using a terminal program with SSH (Secure SHell). Steps to do this follow below.

Host name is matrix.SenecaPolytechnic.ca on port 22 for SFTP and SSH terminal. Use your Seneca UserID and password as for other Seneca systems.

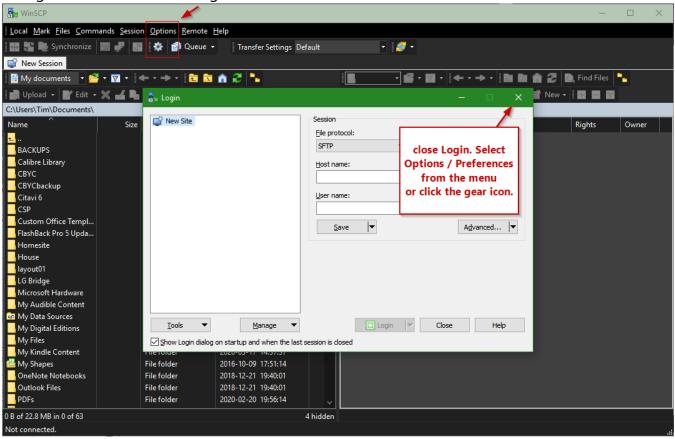
**N.B. ensure you input your UserID in lower case**. Unix/Linux/\*nix regards 'a' and 'A' as different characters in UserIDs, directory/file names, and on the command line unlike many other Operating Systems (OS) which are case independent in those instances. Passwords are *always* case sensitive in any OS.

## Transfer source via SFTP

Regardless of the SFTP client you use, it is CRITICAL that C source files are **Transferred** in **TEXT** mode. **Automatic** mode transfer works only if \*.c and \*.cpp file extensions are included in the FTP client's list of text file masks. There are small but important differences in the way different operating systems encode plain text files such as your .c source code files; use TEXT mode and FTP will take care of <u>End of Line</u> & <u>line termination</u> differences. Transferring files in Binary mode *ignores* all differences and will cause you grief.

# Configure WinSCP

Starting WinSCP for the first time will show this. Close the Login dialog and make the following changes to the WinSCP settings...



WinSCP Options / Preferences

Preferences		? ×
Environment Interface	Transfer settings presets	
Window	Preset description	Auto
Commander	Default	
Explorer Languages Panels File colors Remote Local Editors Internal editor Transfer Drag & Drop Background Endurance Network Security	Text Binary New and updated files only Exclude directories	No No No
	Transfer type: Binary	
Logging Integration	Add	Up
Applications Commands Storage Updates	Remove     Duplicate       ✓ Announce when transfer settings preset is autoselected	Down
	OK Cancel	Help

• Transfer, Edit **Default** in 'Transfer settings presets'

#### It is CRITICAL that you change the **Transfer** preset for **Default** to **Automatic**.

There are small but important differences in the way different operating systems encode plain text files such as your .c source code files. Transferring files in Binary mode *ignores* 

those differences and will cause you grief.

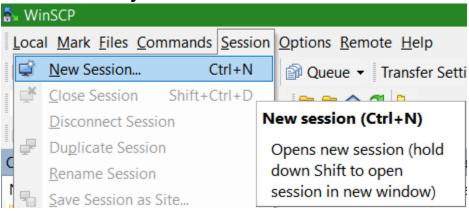
Transfer settings	? ×				
Transfer mode          Image: Transfer mode         Image: Transfer following files in text mode:	Filename modification   No change				
*.*html; *.htm; *.txt; *.php; *.php3;	○ Lower case <u>8</u> .3 *. ∨ Replace '\:*?'				
Upload options	Common options				
Set permissions:         rw-rr (+x)         Ignore permission errors         Clear 'Archive' attribute         Remove BOM and EOF marks         ☑ Encrypt new files	Preserve timestamp Including directories Calculate total size Speed (KB/s): Unlimited  Download options Preserve read-only				
Other File <u>m</u> ask:					
	<ul> <li>✓ <u>E</u>dit</li> </ul>				
	mask hints				
New and updated files only       Exclude hidden files         Exclude empty directories					
OF	K Cancel Help				

• WinSCP can open a PuTTY terminal window automatically when you open an SFTP session to transfer a source file. This will save you a step later. Change the following settings in Preferences / Integration / Applications. (WinSCP Integration with PuTTY)

#### documentation)

references		?	×
Environment Interface Window Commander Explorer Languages Panels File colors Remote Local Editors	External applications PuTTY/Terminal glient path: %ProgramFiles%\PuTTY\putty.exe patter 2 Remember session password and pass it to PuTTY 2 Open Telnet sessions in PuTTY for FTP sessions 2 Automatically gpen new sessions in PuTTY 2 PuTTY registry key:		
Internal editor Iransfer Iransfer Background	Software\SimonTatham\PuTTY		~
	OK Cancel	Help	

• Set up a New Session in the Site Manager for the Seneca server at **matrix.SenecaPolytechnic.ca** 



Ensure your Username is input in lower case.

ᡖ Login	- 🗆 X
Vew Site	Session Eile protocol: SFTP ~
matrix.senecacollege.ca	Host name: Port number: matrix.senecacollege.ca 22
must be lower case	User name: Password: Save Cancel Advanced ▼
	Use the Advanced / Environment / Directories to set your Local directory to your Visual Studio project repository location
<u>T</u> ools ▼ <u>M</u> anage ▼ Show Login dialog on startup and when the last se	El Login Close Help

- Save the Session
- Ensure your <u>Student VPN</u> is installed and you are signed in.
- Select **matrix.SenecaPolytechnic.ca** then click the Login button. You will see the following the first time you contact matrix. Accept the host key.

Warning	? ×						
	Continue connecting to an unknown server and add its host key to a cache?						
	The server's host key was not found in the cache. You have no guarantee that the server is the computer you think it is.						
	The server's Ed25519 key details are:						
	Algorithm:         ssh-ed25519 255           SHA-256:         P4aR/dDHF3wGvBdQzX+2SdvGAsOrLrD+G6Vf2GVRLKw=           MD5:         23:b0:bb:c7:4a:c0:b0:4f:bc:ff:fe:e8:4b:d1:68:bb						
	lf you trust this host, press ूिंड. To connect without adding host key to the cache, press No. To abandon the connection press Cancel.						
	<u>C</u> opy key fingerprints to dipboard						
	Yes ▼ No Cancel Help						

## Transfer source via WinSCP

• From this point onward, you can click and drag your .c source file from the left to the right side. Consider first creating a directory on matrix to contain your .c files.

In the right-hand panel, click New, then Directory, and



Enter a directory/folder name, e.g. w01 (for "Week 1")

Create fold	er				?	$\times$				
New <u>f</u> older name:										
W01	_									
Attributes										
Set pe	_									
<u>O</u> wner	✓ R	⊻ w	⊻ X	Set UID						
Group	🗹 R	W	🗹 X	Set GID						
Others	🗹 R	W	∠ X	Sticky bit						
Octal:	0755									
Use same settings next time										
		OK		Cancel	Hel	p				

Double click your new directory/folder name to make it your current directory/folder

W01 Acceptable-Use-Policy

Find your helloWorld.c source file using the left panel, click on your source file and drag/drop it to the right panel. This will transfer your source file from your local computer to the directory named w01 on the matrix server.

Make sure the files are transferred in Text mode, **not** binary. See above notes on this.

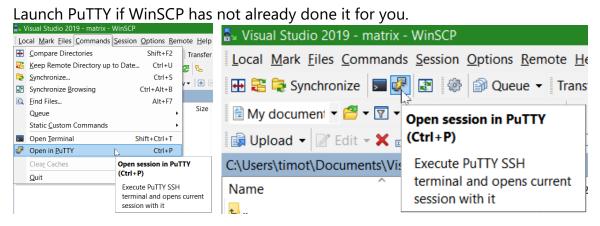
U	lpload	?	×
	Upload file 'helloWorld.c' to remote directory: /home/timothy.mckenna/W01/*.*		~
	Transfer settings Transfer type: Text		
	Transfer in <u>b</u> ackground (add to transfer queue)	He	lp
	Custom	_	
L	Set as Default		
1	Presets		
	Default		
	New and updated files only		
	Iext		
	Binary VC		

Double click on the file in the right-hand panel to see the file's contents. Close that window.

### Compile and Run on matrix – GUI tools

Compile and run your program on matrix using a traditional telnet terminal and command line interface.

## Compile and Run on matrix – GUI tools



See the **PuTTY documentation** for details.

🔀 PuTTY Configuration		?	×
Category: Session Logging Terminal Keyboard Bell Features Window Appearance Behaviour Translation Selection Colours Connection Proxy Telnet Rlogin SSH Serial	Basic options for your PuTTY set         Specify the destination you want to connect         Host Name (or IP address)         matrix.senecacollege.cal         Connection type:         Raw       Ielnet         Raw       Ielnet         Raw       Ielnet         Raw       Ielnet         Raw       Ielnet         Raw       Ielnet         Save or delete a stored session         Saved Sessions         Default Settings         Seneca matrix         Close window on exit:         Always         Never         Only on close	ct to Port 22 Cont Cont Cont Cont Cont Cont Cont Cont	
<u>A</u> bout <u>H</u> elp		<u>C</u> ance	ł

To customize PuTTY for the "WinSCP temporary session", launch PuTTY, open that Session, change settings in the Category tree (Window / Appearance / Font is a favourite to be changed), and remember to return to Session and Save.

```
login as: yourUserID
# Welcome to Matrix
<snip>
# All activities on this system are governed by
# Seneca Information Technology Acceptable Use Policy
# For complete ITAU policy visit http://www.SenecaPolytechnic.ca/policies/itau.html
yourUserID@matrix.SenecaPolytechnic.ca's password: yourPassword
Last login: Thu Sep 13 17:42:46 2018 from 174.93.86.94
[yourUserID@mtrx-node02pd ~]$ cd w01 <u>c</u>hange to the <u>d</u>irectory containing your source file
[yourUserID@mtrx-node02pd w01]$ 1s List the current directory-is your source file there?
helloWorld.c
[yourUserID@mtrx-node02pd w01]$ gcc helloWorld.c -o helloWorld
                                                         compile your source file
                                                         with the <u>anu</u> <u>c</u>ompiler
[yourUserID@mtrx-node02pd w01]$ helloWorld
                                                         run your program
Hello, World!
This is yourNameHere.
[yourUserID@mtrx-node02pd w01]$ logout
                                        sign off
```