

NM180100 Software Development Toolchain Setup

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2. Toolchain Installation Steps

To develop software for the NM180100, you will need to install and setup a toolchain that can build, program, and debug code for the Ambiq Micro Apollo 3 processor in the NM180100. This guide will help you setup the development environment on your system.

2.1. Linux

This section assumes that you are running Ubuntu or similar Debian environment.

2.1.1. Pre-requisite

Check if the default development tools are installed. If not, issue the following commands in a terminal:

```
sudo apt-get update
```

```
sudo apt-get upgrade
```

```
sudo apt install build-essential make openocd gdb-multiarch
```

```
sudo apt install python3
```

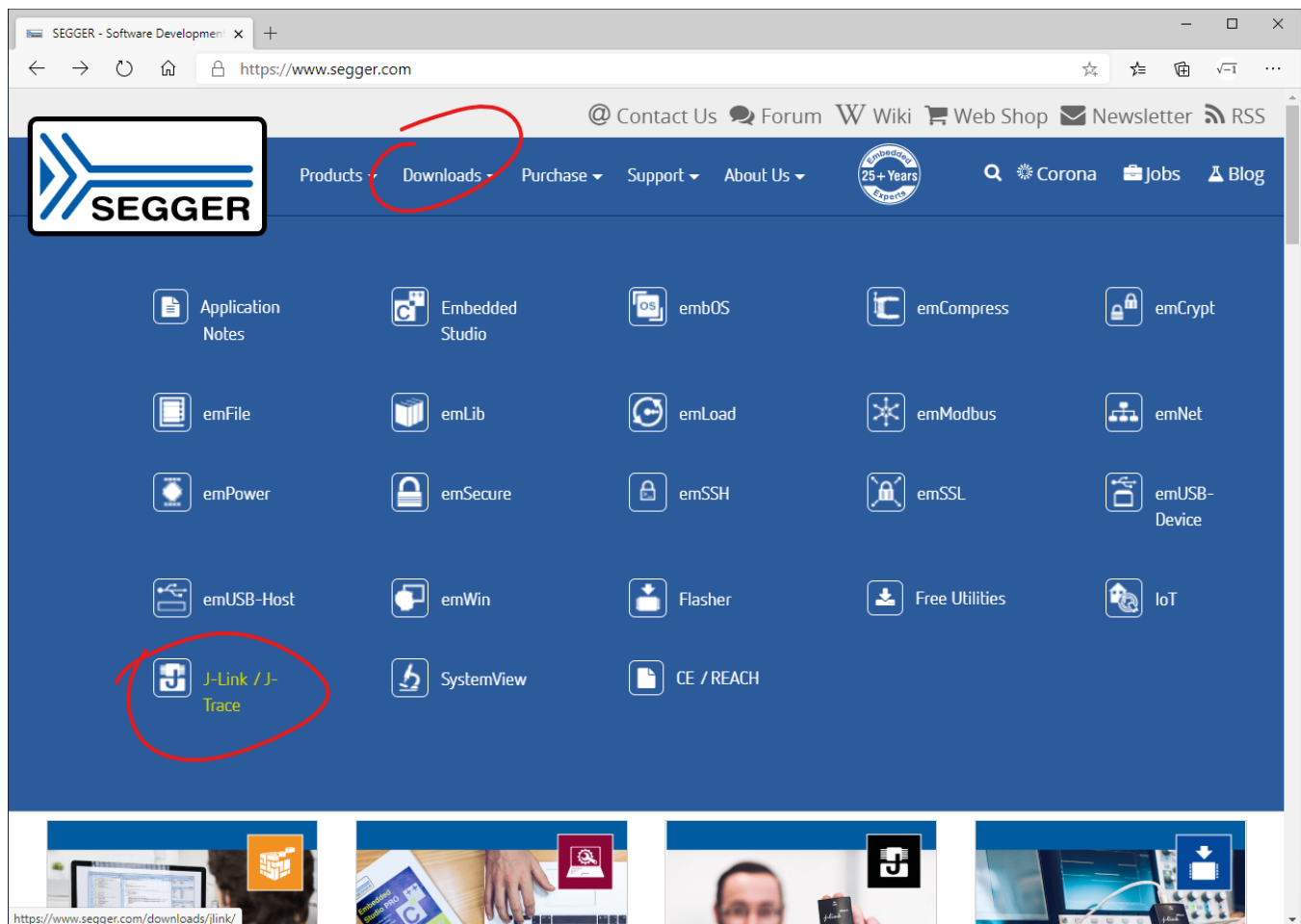
2.1.2. Java Development Kit

This is optional and is only required if you plan on developing with Eclipse.

```
sudo apt install default-jdk
```

2.1.3. SEGGER J-Link Installation

- Visit <https://www.segger.com>
- Select J-Link / J-Trace under Downloads



- Scroll to J-Link Software and Documentation and expand the section by clicking on the + sign.

The screenshot shows a web browser window with the URL <https://www.segger.com/downloads/jlink/#J-LinkSoftwareAndDocumentationPack>. The page features the SEGGER logo and a navigation menu with links for Products, Downloads, Purchase, Support, About Us, Corona, Jobs, and Blog. A '25+ Years' anniversary badge is also present. The main content area is divided into sections, each with a document icon and a plus sign to expand it. The first section is titled 'Documentation'. The second section is titled 'J-Link Software and Documentation Pack' and is circled in red. It contains a list of bullet points: 'All-in-one debugging solution', 'Can be downloaded and used free of charge by any owner of a SEGGER J-Link, J-Trace or Flasher model. Not all features of it may be available on all J-Link / J-Trace / Flasher models.', 'Updated frequently', 'Release Notes', and 'More information'. Below the list is a link that says 'Click for downloads'. The third section is titled 'J-Link Software and Documentation Pack [Beta version]' and also contains a list of bullet points: 'All-in-one debugging solution' and 'Can be downloaded and used free of charge by any owner of a SEGGER J-Link, J-Trace or Flasher model.'

- Download the appropriate file for your OS. If you are running Ubuntu 64-bit for example, download the Linux, DEB installer, 64-bit.

The screenshot shows the SEGGER website's download page for J-Link software. The page features a navigation bar with the SEGGER logo and various menu items. Below the navigation bar, there is a table listing several software packages. Each row includes a description of the package, a version dropdown menu (all set to V6.80b), a date in brackets (all [2020-06-05]), a file size in KB, and a 'DOWNLOAD' button with a download icon.

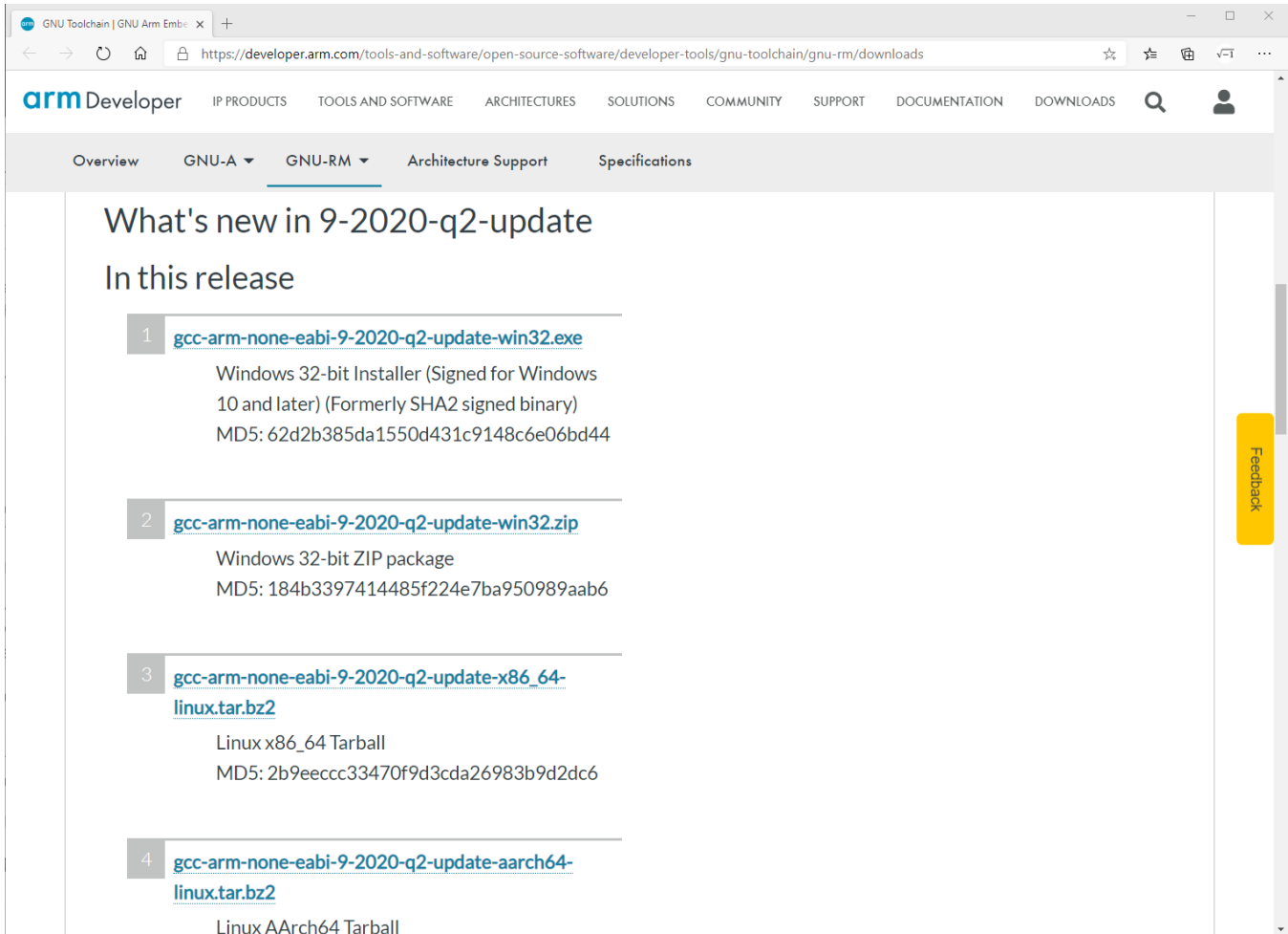
Description	Version	Date	Size	Action
J-Link Software and Documentation pack for macOS	V6.80b	[2020-06-05]	34,311 KB	DOWNLOAD
J-Link Software and Documentation pack for Linux, DEB installer, 32-bit	V6.80b	[2020-06-05]	32,637 KB	DOWNLOAD
J-Link Software and Documentation pack for Linux, DEB installer, 64-bit	V6.80b	[2020-06-05]	43,171 KB	DOWNLOAD
J-Link Software and Documentation pack for Linux, RPM installer, 32-bit	V6.80b	[2020-06-05]	32,650 KB	DOWNLOAD
J-Link Software and Documentation pack for Linux, RPM installer, 64-bit	V6.80b	[2020-06-05]	38,365 KB	DOWNLOAD
J-Link Software and Documentation pack for Linux, TGZ archive, 32-bit	V6.80b	[2020-06-05]	32,702 KB	DOWNLOAD
J-Link Software and Documentation pack for Linux, TGZ archive, 64-bit	V6.80b	[2020-06-05]	43,247 KB	DOWNLOAD
J-Link Software and Documentation pack for Linux ARM systems	V6.80b	[2020-06-05]	22,189 KB	DOWNLOAD

- In a terminal, navigate to the directory where you have downloaded the installer and type the following `sudo apt install installer_file_name.deb`

In Ubuntu, this will install JLink under `/opt/SEGGER/JLink`. You can optionally add this directory to your search path so that J-Link is accessible anywhere.

2.1.4. GNU ARM Embedded Toolchain Installation

- Visit <https://developer.arm.com/open-source/gnu-toolchain/gnu-rm/downloads>
- Download the corresponding file for your OS.



The screenshot shows the ARM Developer website's 'What's new in 9-2020-q2-update' page. The page is titled 'What's new in 9-2020-q2-update' and 'In this release'. It lists four items:

- 1 [gcc-arm-none-eabi-9-2020-q2-update-win32.exe](#)
Windows 32-bit Installer (Signed for Windows 10 and later) (Formerly SHA2 signed binary)
MD5: 62d2b385da1550d431c9148c6e06bd44
- 2 [gcc-arm-none-eabi-9-2020-q2-update-win32.zip](#)
Windows 32-bit ZIP package
MD5: 184b3397414485f224e7ba950989aab6
- 3 [gcc-arm-none-eabi-9-2020-q2-update-x86_64-linux.tar.bz2](#)
Linux x86_64 Tarball
MD5: 2b9eccc33470f9d3cda26983b9d2dc6
- 4 [gcc-arm-none-eabi-9-2020-q2-update-aarch64-linux.tar.bz2](#)
Linux AArch64 Tarball

- In a terminal, extract the file to a location of your choice. For example, if the file is downloaded to your Downloads directory under your home folder and you want to install the toolchain in /opt, then type the following:

```
cd /opt
```

```
sudo bunzip2 ~/Downloads/gcc-arm-none-eabi-9-2020-q2-update-x86_64-  
linux.tar.bz2
```

2.1.5. Eclipse Installation

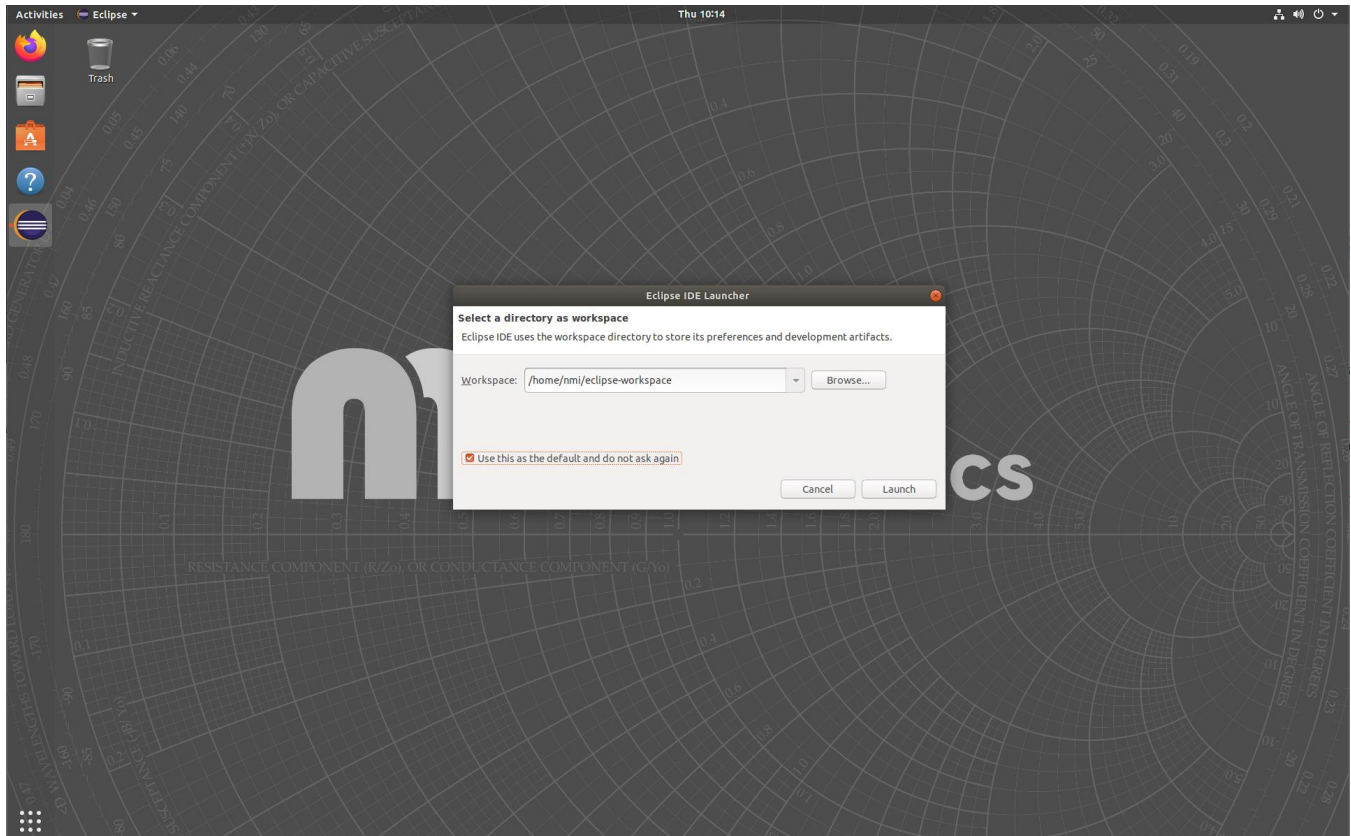
- To install Eclipse, open a terminal and type the following

```
sudo snap install eclipse --classic
```

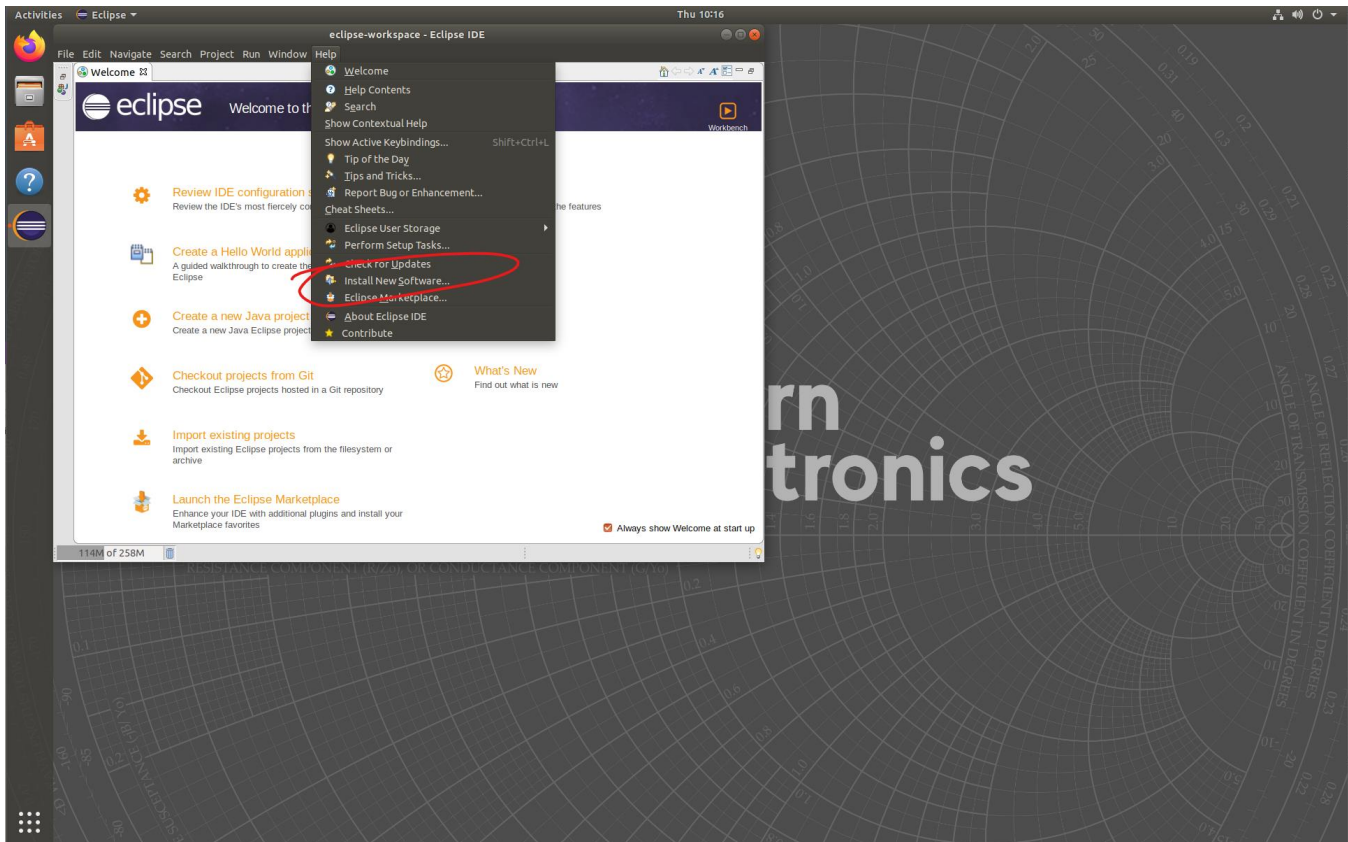
- If you already have Eclipse installed and need to update to the latest version, type the following. Otherwise skip to the next step.

```
sudo snap refresh eclipse
```

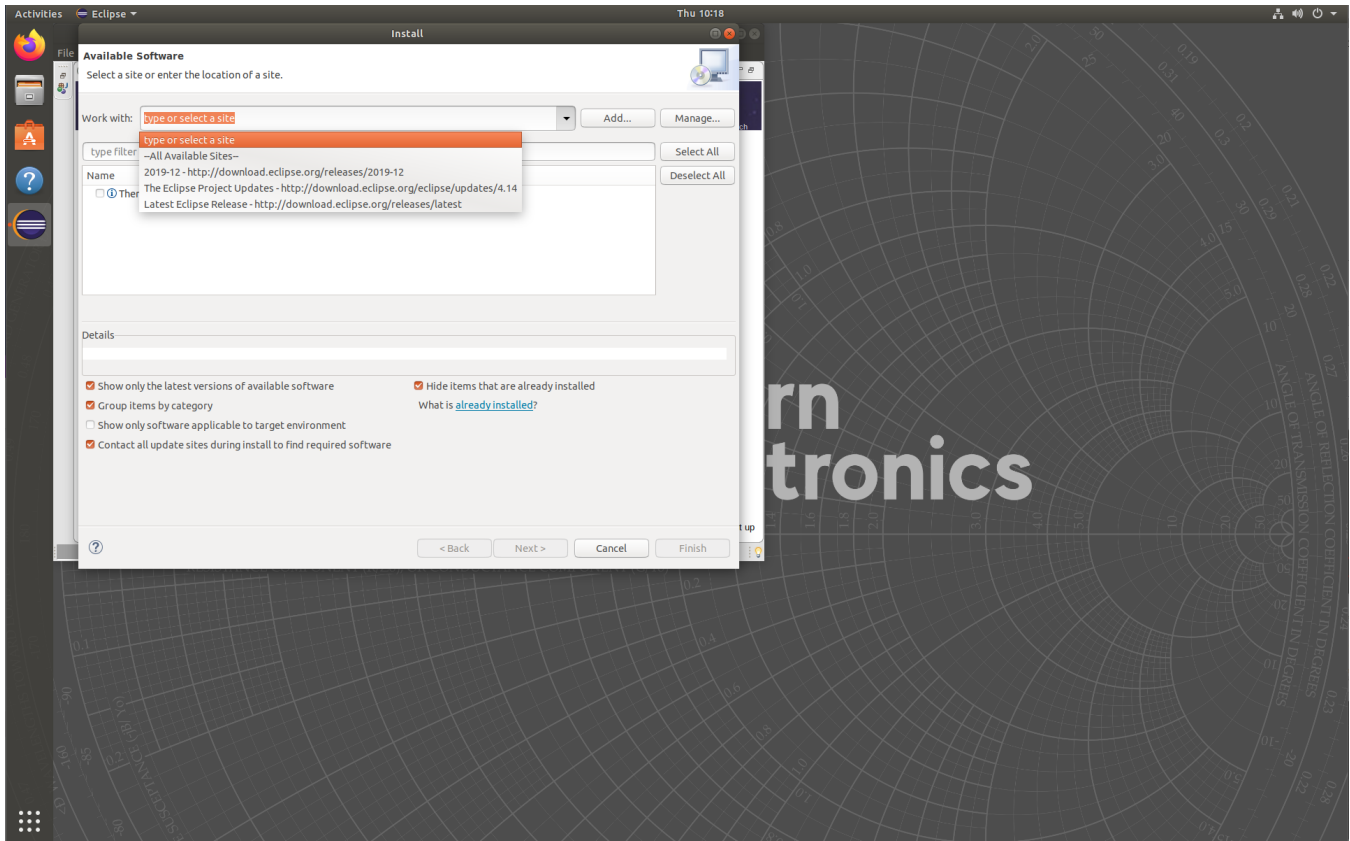
- Once Eclipse is installed, start the program. If this is the first time you are running Eclipse, it will ask you for a location for the workspace. Mark the checkbox and select “Launch”



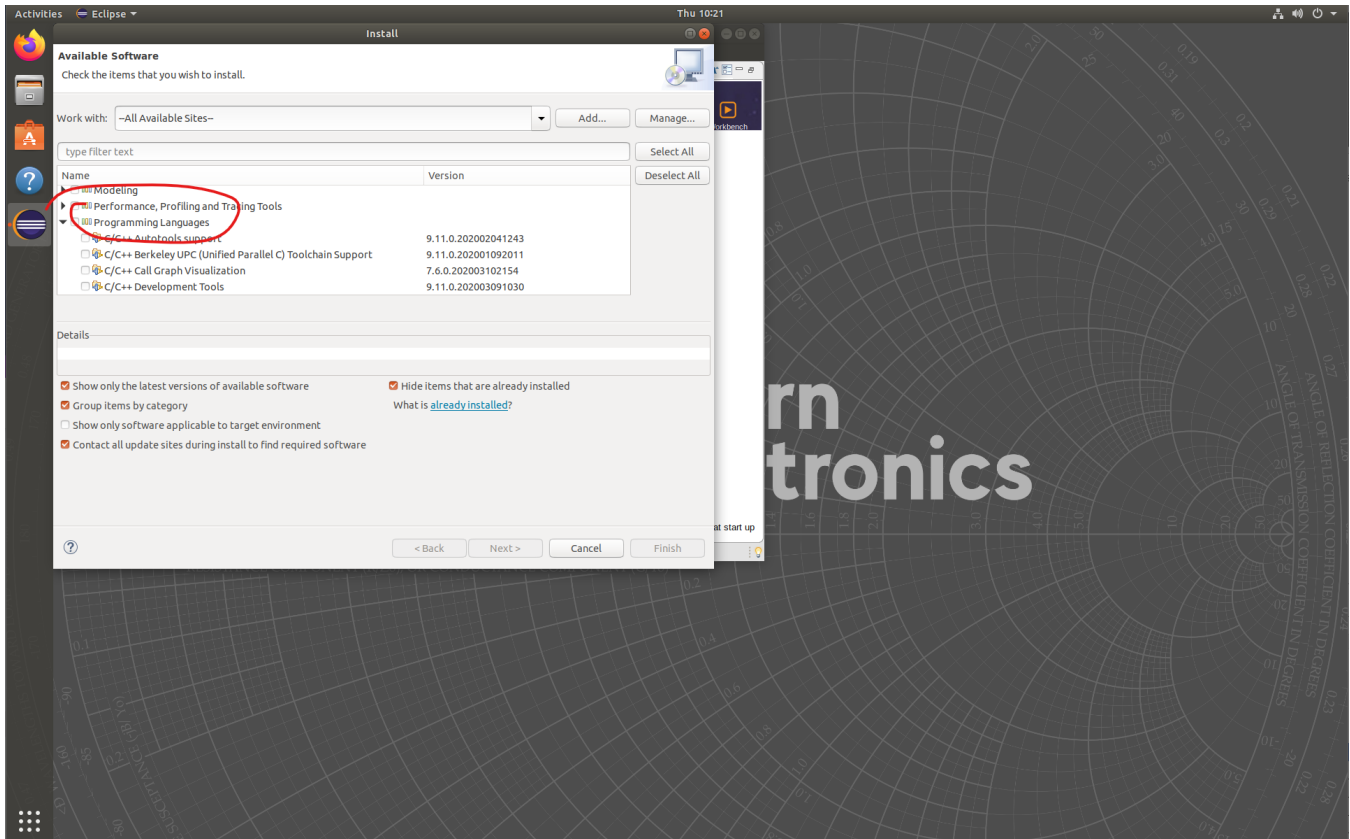
- We will now install the C/C++ Development Tools necessary for firmware development. With Eclipse opened, click “Help” in the menu bar and then select “Install New Software...”



- This will open a new window. Click the “Work with” drop down box and select “—All Available Sites—”

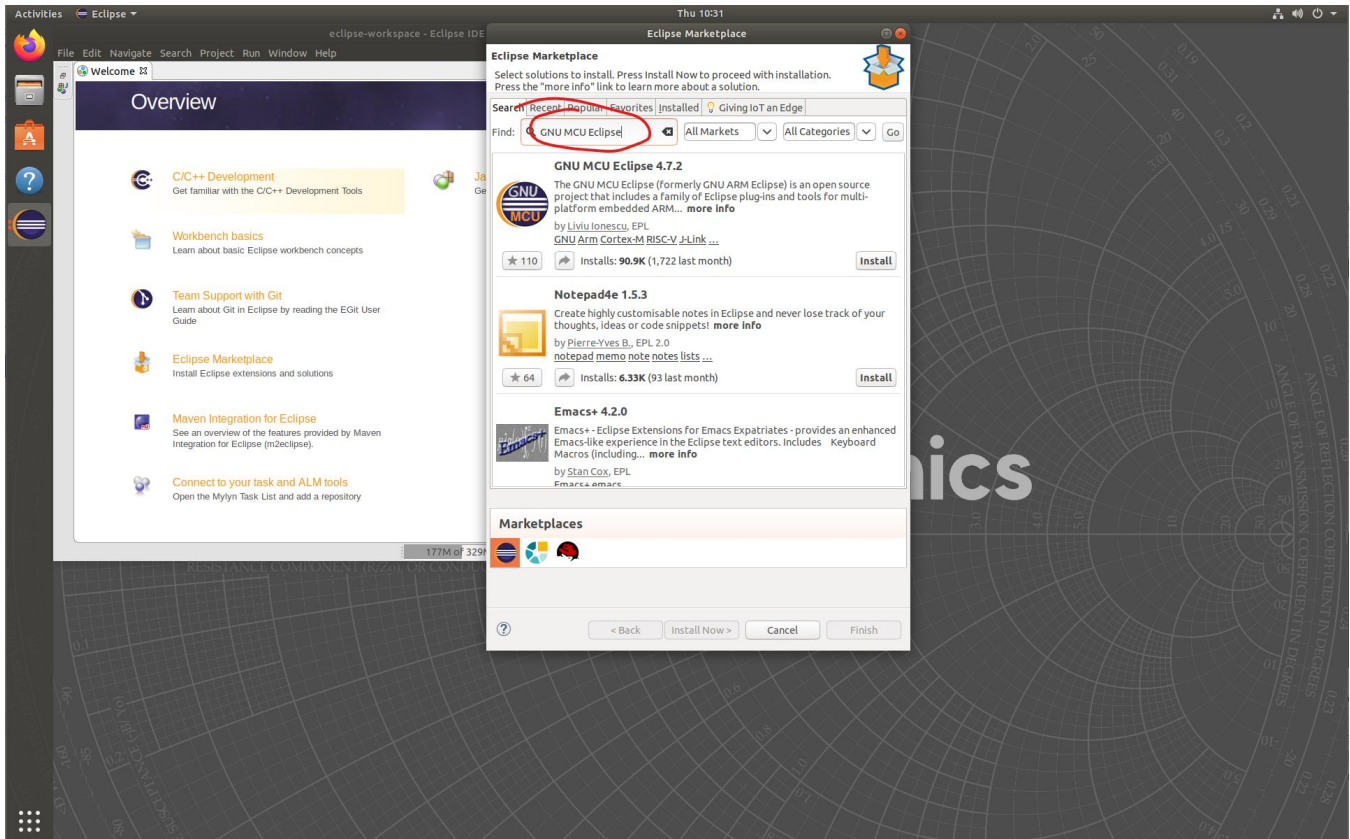


- Once the loading is complete, scroll to the line called “Programming Languages” and expand the item.

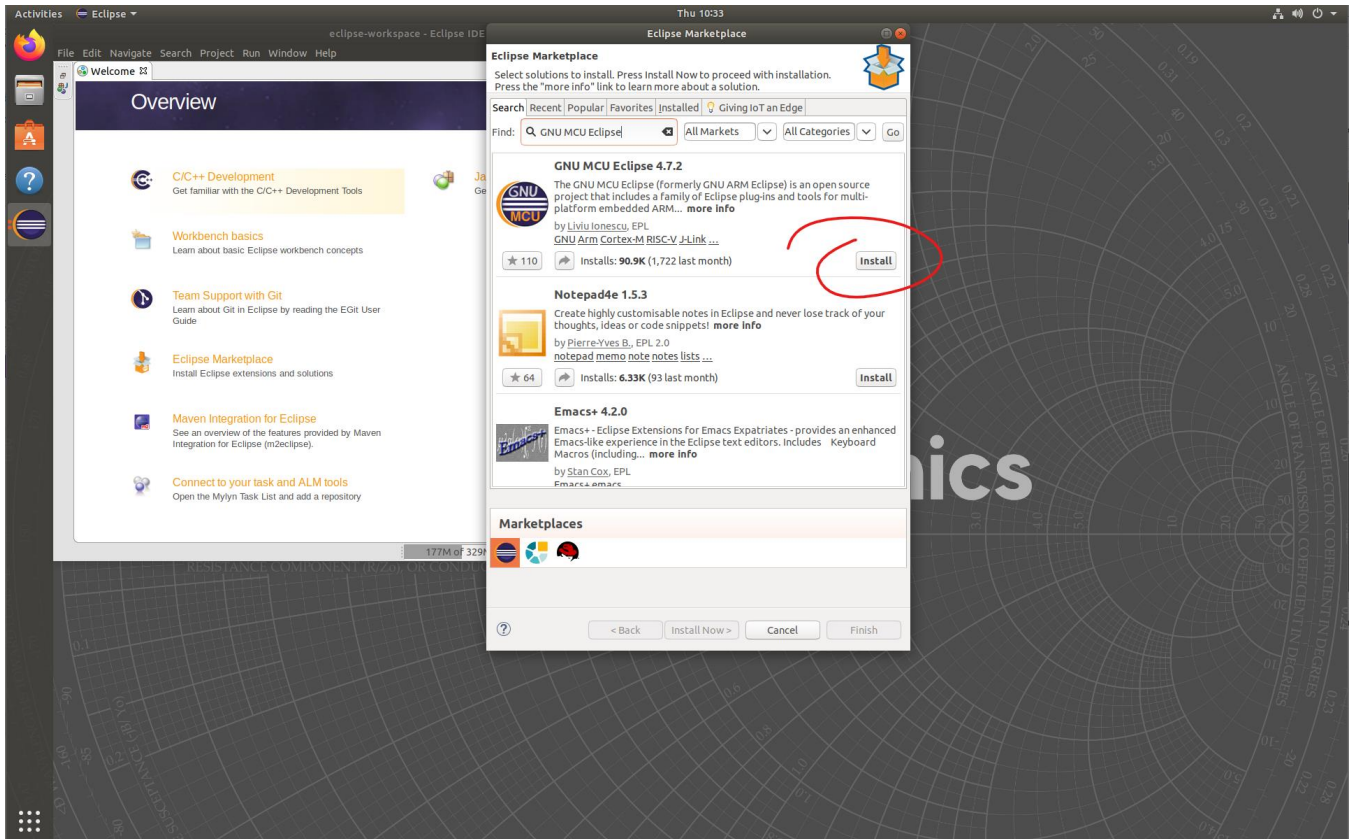


- Mark the checkbox for “C/C++ Development Tools”
- Click Next to proceed and follow the on-screen instructions to complete.
- Once the installation is completed, Eclipse will prompt for a restart. Click “Restart Now” to continue.
- We will now install the GNU MCU Eclipse plugin for cross platform embedded ARM development. With Eclipse open, click “Help” in the menu bar and then select “Eclipse Marketplace...” A new window will open.

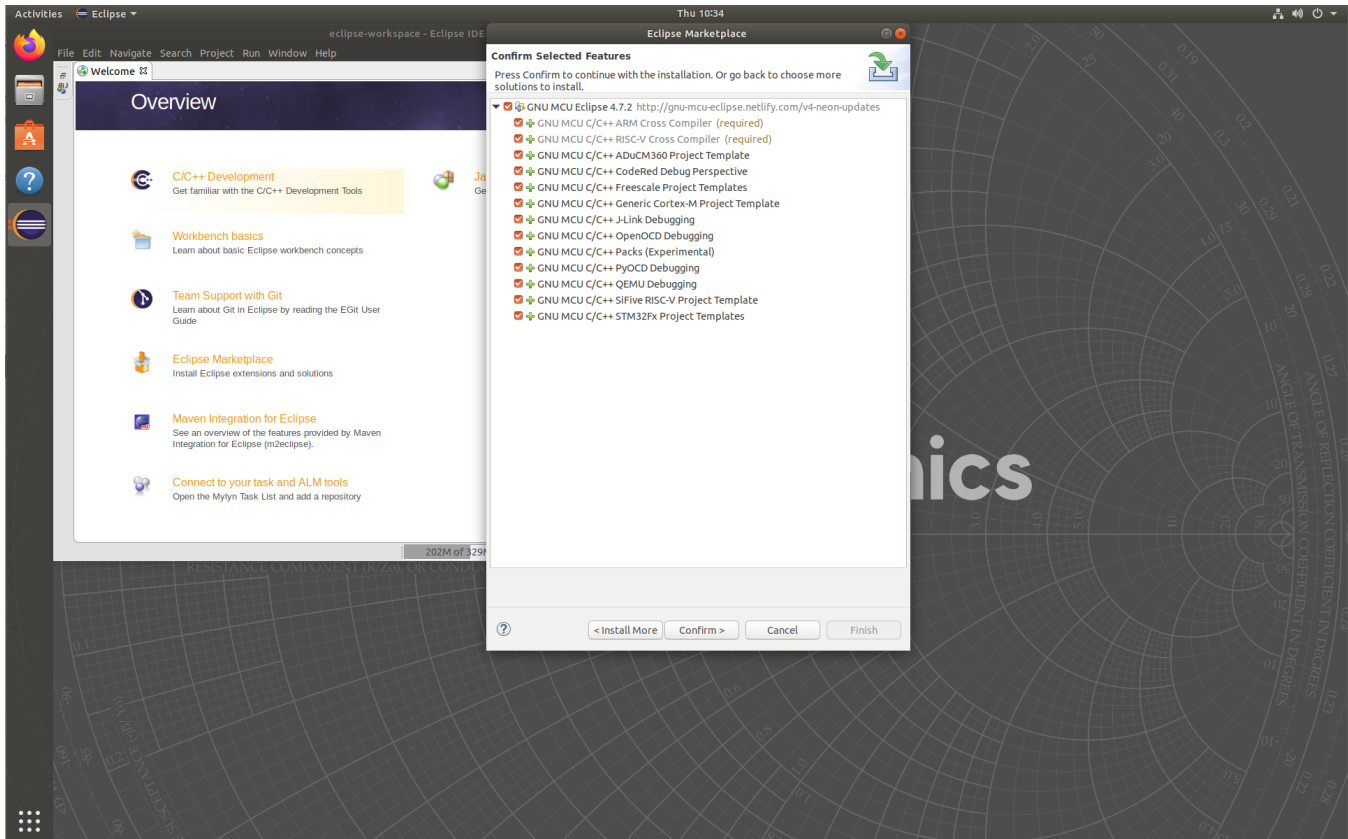
- In the Find text box, type “GNU MCU Eclipse” without the quotes and press ENTER.



- When the search results are loaded, find the entry “GNU MCU Eclipse” and click on the “Install” button



- Accept the default selection and click “Confirm”



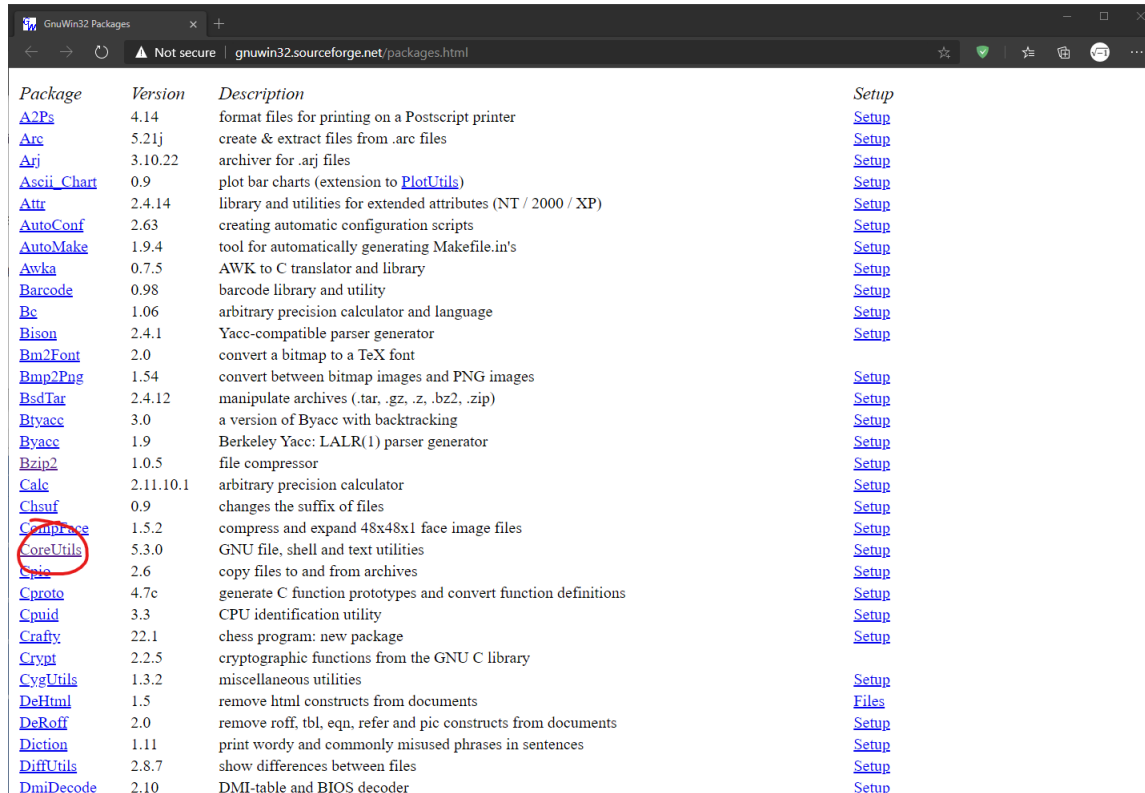
- Follow the on-screen instructions to complete. A security warning may pop-up indicating that the plugin contains unsigned content. Select “Install anyway” to complete the installation.
- Once the plugin is completed, Eclipse will prompt you to restart. Click “Restart now” to complete the eclipse development environment and toolchain installation.

2.2. Windows

2.2.1. Pre-requisite

There are four commands required from GnuWin32: cp, mkdir, rmdir, make, and sed. They can be obtained from the packages CoreUtils and Make. There are other alternatives including but not limited to Cygwin, MinGW, or Windows Subsystem for Linux.

- Visit <http://gnuwin32.sourceforge.net/packages.html>
- Click on the package CoreUtils



Package	Version	Description	Setup
A2Ps	4.14	format files for printing on a Postscript printer	Setup
Arc	5.21j	create & extract files from .arc files	Setup
Arj	3.10.22	archiver for .arj files	Setup
Ascii_Chart	0.9	plot bar charts (extension to PlotUtils)	Setup
Attr	2.4.14	library and utilities for extended attributes (NT / 2000 / XP)	Setup
AutoConf	2.63	creating automatic configuration scripts	Setup
AutoMake	1.9.4	tool for automatically generating Makefile.in's	Setup
Awka	0.7.5	AWK to C translator and library	Setup
Barcode	0.98	barcode library and utility	Setup
Bc	1.06	arbitrary precision calculator and language	Setup
Bison	2.4.1	Yacc-compatible parser generator	Setup
Bm2Font	2.0	convert a bitmap to a TeX font	Setup
Bmp2Png	1.54	convert between bitmap images and PNG images	Setup
BsdTar	2.4.12	manipulate archives (.tar, .gz, .z, .bz2, .zip)	Setup
Byacc	3.0	a version of Byacc with backtracking	Setup
Byacc	1.9	Berkeley Yacc: LALR(1) parser generator	Setup
Bzip2	1.0.5	file compressor	Setup
Calc	2.11.10.1	arbitrary precision calculator	Setup
Chauf	0.9	changes the suffix of files	Setup
CmpImage	1.5.2	compress and expand 48x48x1 face image files	Setup
CoreUtils	5.3.0	GNU file, shell and text utilities	Setup
Cpio	2.6	copy files to and from archives	Setup
Cproto	4.7c	generate C function prototypes and convert function definitions	Setup
Cpuid	3.3	CPU identification utility	Setup
Crafty	22.1	chess program: new package	Setup
Crypt	2.2.5	cryptographic functions from the GNU C library	Setup
CygUtils	1.3.2	miscellaneous utilities	Setup
DeHtml	1.5	remove html constructs from documents	Files
DeRoff	2.0	remove roff, tbl, eqn, refer and pic constructs from documents	Setup
Diction	1.11	print wordy and commonly misused phrases in sentences	Setup
DiffUtils	2.8.7	show differences between files	Setup
DmiDecode	2.10	DMI-table and BIOS decoder	Setup

- Download the setup package. If you choose manual installation, make sure that you download both the binaries and the dependencies.

CoreUtils for Windows

Not secure | gnuwin32.sourceforge.net/packages/coreutils.htm

- uname - Print system information.
- users - Print current user names.
- who - Print a list of all users currently logged in.
- whoami - Print effective user id.
- yes - Print a string repeatedly.

Homepage

<http://www.gnu.org/software/coreutils>

Download

If you download the [Setup program](#) of the package, any requirements for running applications, such as dynamic link libraries (DLL's) from the dependencies as listed below under Requirements, are already included. If you download the package as Zip files, then you must download and install the [dependencies zip file](#) yourself. Developer files (header files and libraries) from other packages are however not included; so if you wish to develop your own applications, you must separately install the required packages.

Description	Download	Size	Last change	Md5sum
• Complete package, except sources	Setup	6439882	21 April 2005	5a3e9d30b906dadf54de0635522fd62c
• Sources	Setup	3527755	21 April 2005	64b8f7c03895de29c6ee669c9092fe1b
• Binaries	Zip	5176996	21 April 2005	aa7ce7f1f2befb930fb156bddea41bc4
• Dependencies	Zip	706641	21 April 2005	6cf05855b6902dfffa2cf4ba8b90e82e6
• Documentation	Zip	4540924	21 April 2005	ee0b456daf011d6e348cc64adafe968a
• Sources	Zip	9371720	21 April 2005	5cbd86c56e6eb29b6af2810849d08c8c

You can also download the files from the GnuWin32 [files page](#).

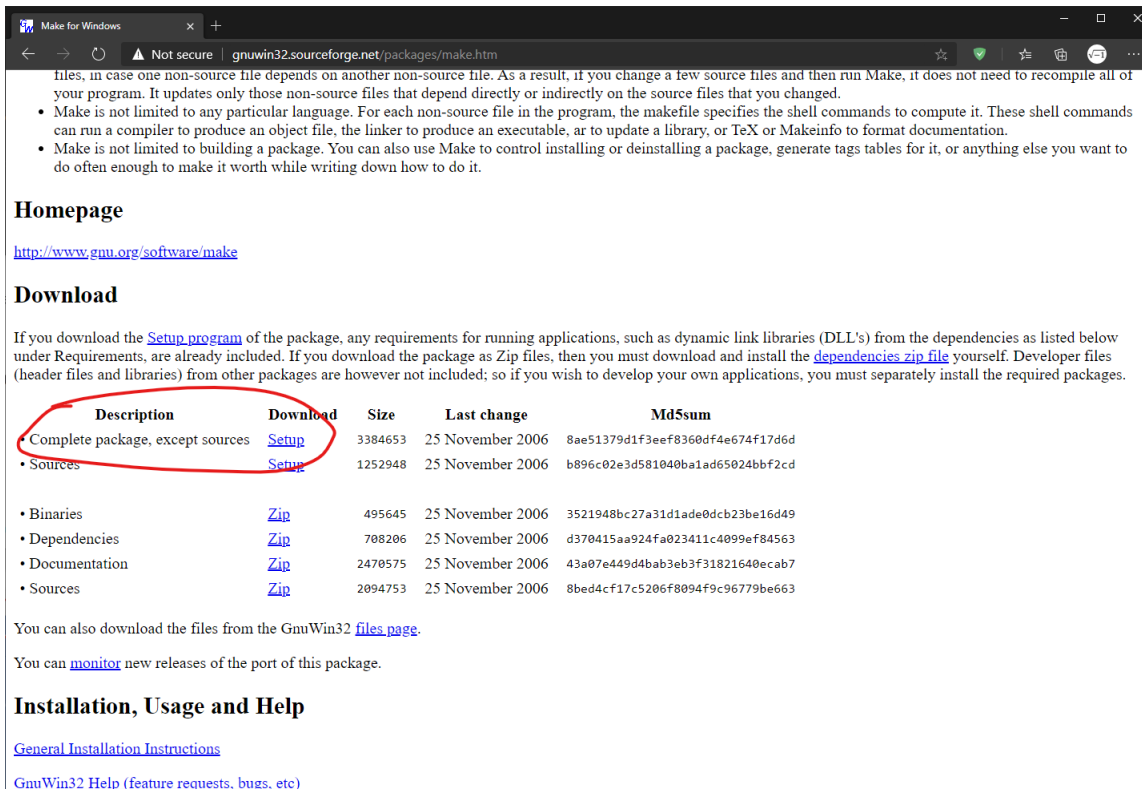
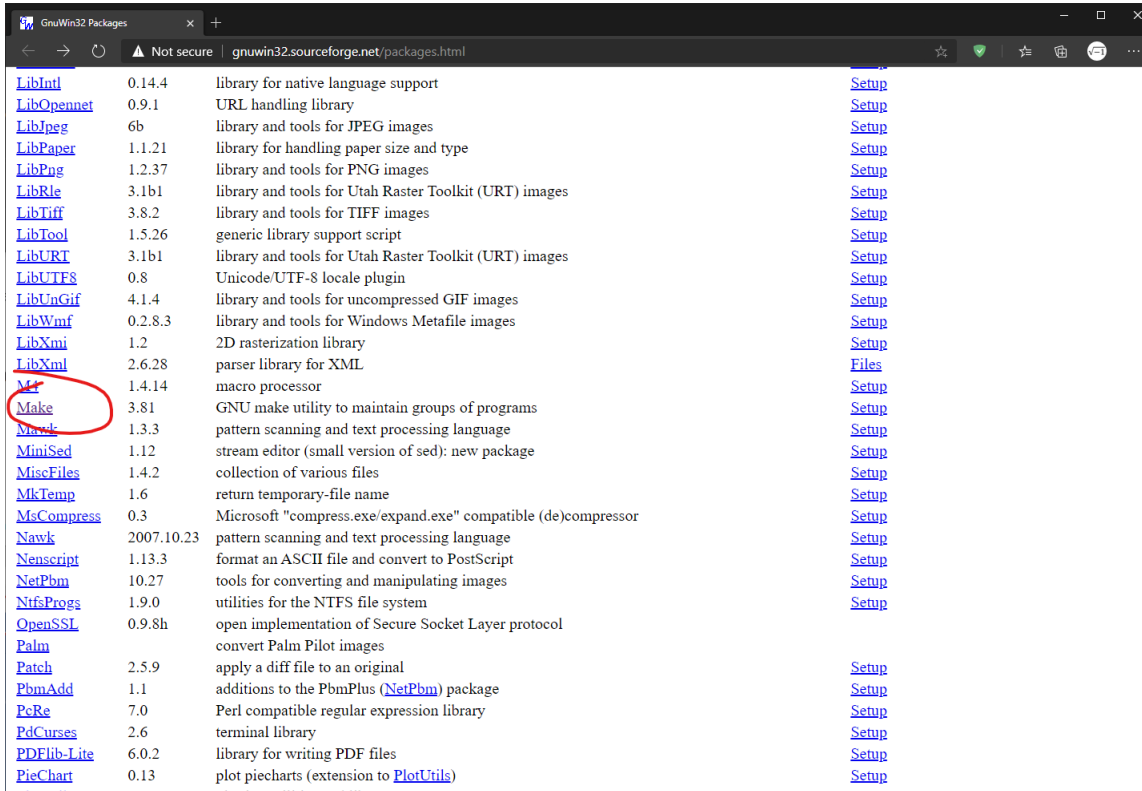
You can [monitor](#) new releases of the port of this package.

Installation and Usage

The MS-Windows version of ln implements soft links as MS-Windows shortcuts. If necessary, it adds the extension .lnk Hard links are implemented as copies on MS-Windows-95 / 98 / ME, and as hard links on MS-Windows-NT / 2000 / XP.

[General Installation Instructions](#)

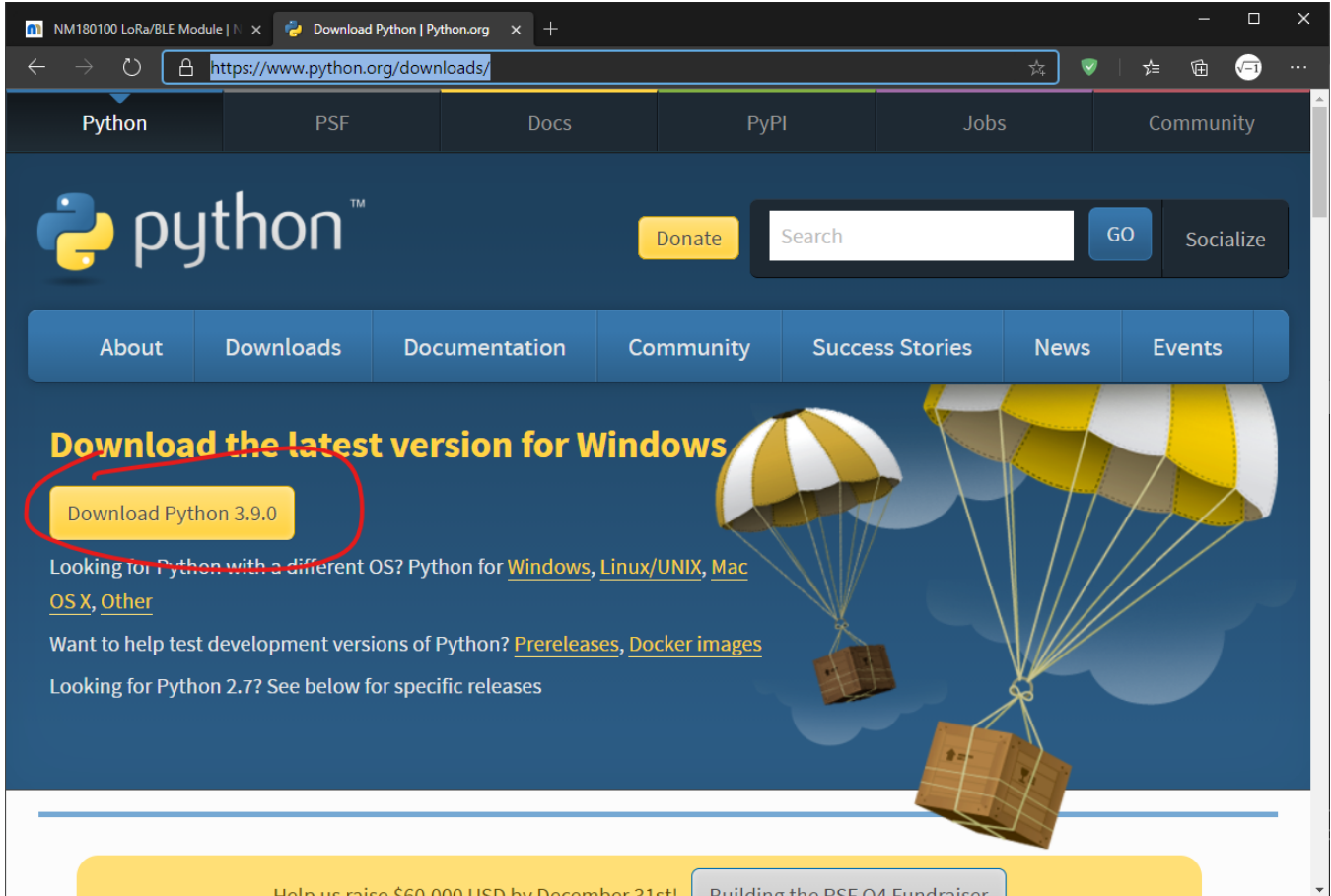
- Repeat the above two steps for make and sed.



2.2.2. Python Installation

Python is needed to dynamically generate the board support package including the pin definition header and source files.

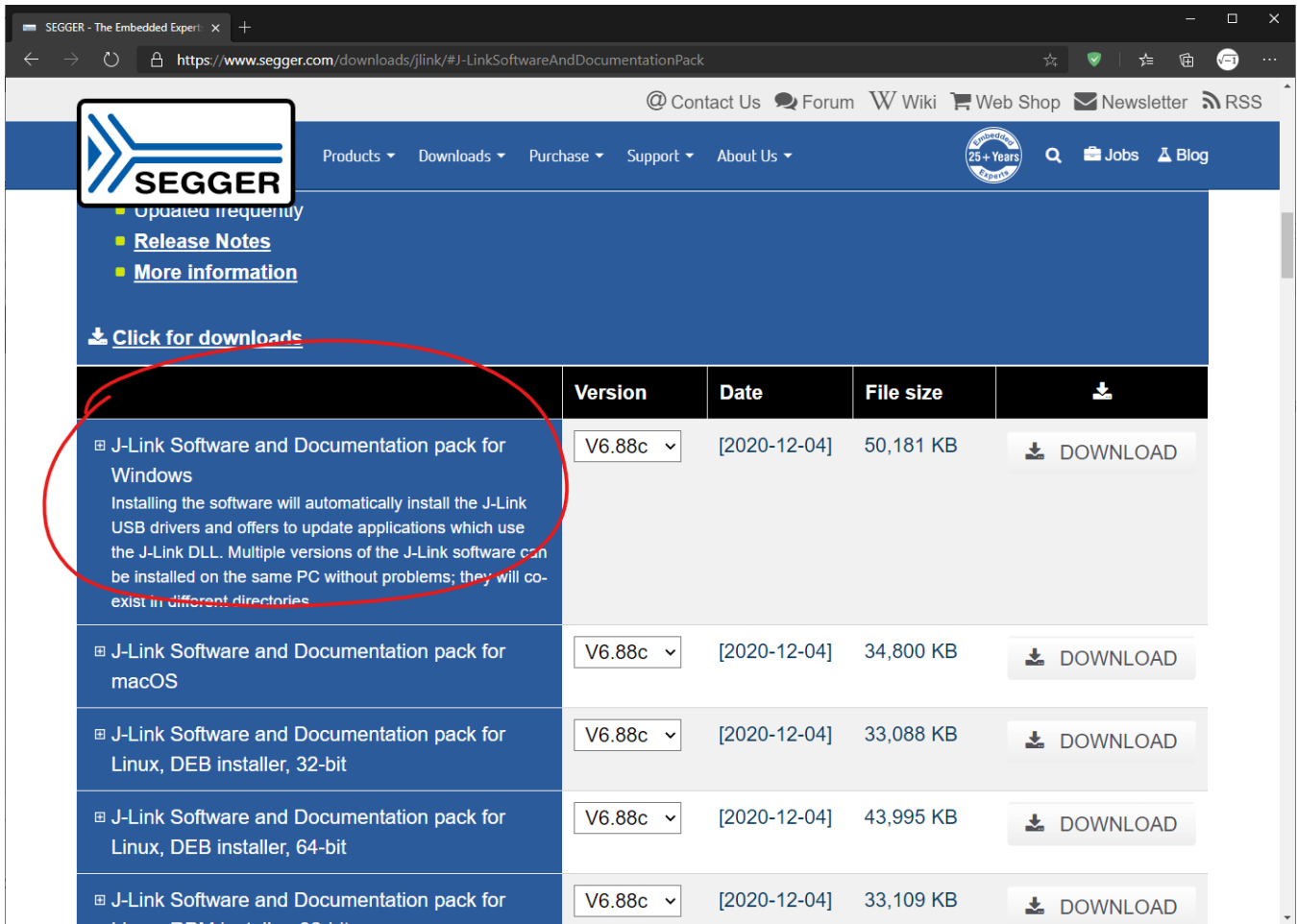
- Visit <https://www.python.org/downloads/>
- Download the latest version for Windows and follow the on-screen instructions.



2.2.3. SEGGER J-Link Installation

Follow the steps in 2.1.3 and download the Windows version of J-Link at

<https://www.segger.com/downloads/jlink/#J-LinkSoftwareAndDocumentationPack>



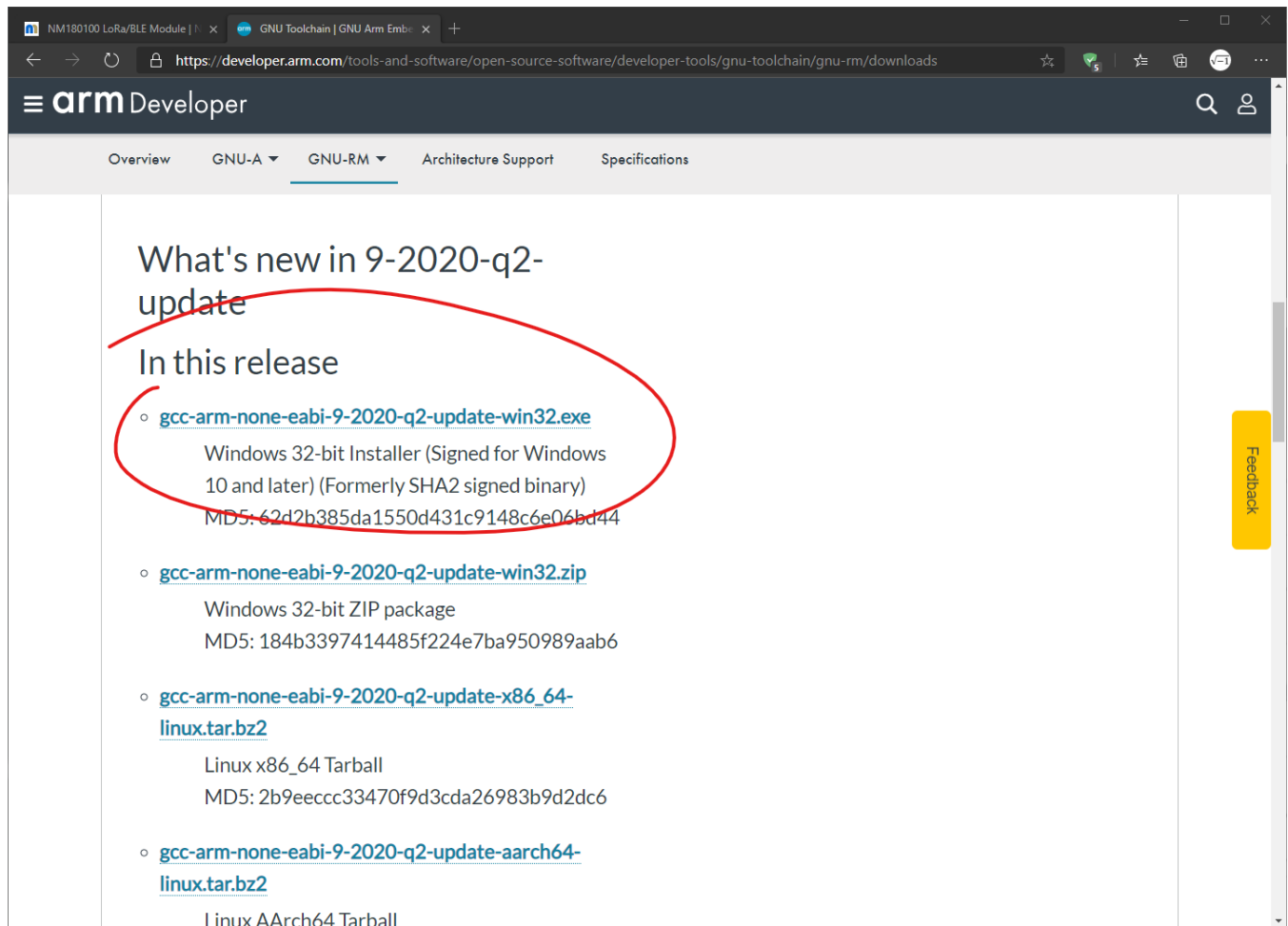
The screenshot shows the Segger website's download page for J-Link software. The page features a navigation menu with options like 'Products', 'Downloads', 'Purchase', 'Support', and 'About Us'. A 'Click for downloads' link is highlighted. Below this, a table lists various software packages for different operating systems and architectures. The first row, for Windows, is circled in red.

	Version	Date	File size	
<input type="checkbox"/> J-Link Software and Documentation pack for Windows Installing the software will automatically install the J-Link USB drivers and offers to update applications which use the J-Link DLL. Multiple versions of the J-Link software can be installed on the same PC without problems; they will co-exist in different directories.	V6.88c	[2020-12-04]	50,181 KB	DOWNLOAD
<input type="checkbox"/> J-Link Software and Documentation pack for macOS	V6.88c	[2020-12-04]	34,800 KB	DOWNLOAD
<input type="checkbox"/> J-Link Software and Documentation pack for Linux, DEB installer, 32-bit	V6.88c	[2020-12-04]	33,088 KB	DOWNLOAD
<input type="checkbox"/> J-Link Software and Documentation pack for Linux, DEB installer, 64-bit	V6.88c	[2020-12-04]	43,995 KB	DOWNLOAD
<input type="checkbox"/> J-Link Software and Documentation pack for Linux, RPM installer, 64-bit	V6.88c	[2020-12-04]	33,109 KB	DOWNLOAD

2.2.4. GNU ARM Embedded Toolchain Installation

Follow the steps in 2.1.4 and download the Windows version of GNU toolchain at

<https://developer.arm.com/tools-and-software/open-source-software/developer-tools/gnu-toolchain/gnu-rm/downloads>

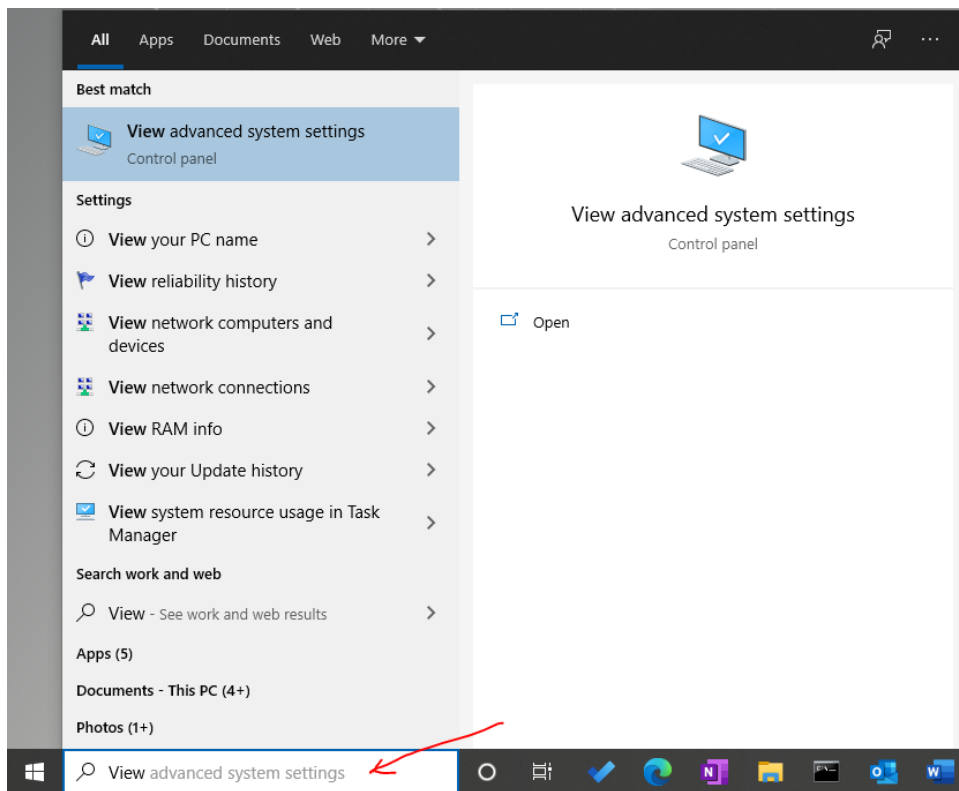


The screenshot shows the ARM Developer website with the following content:

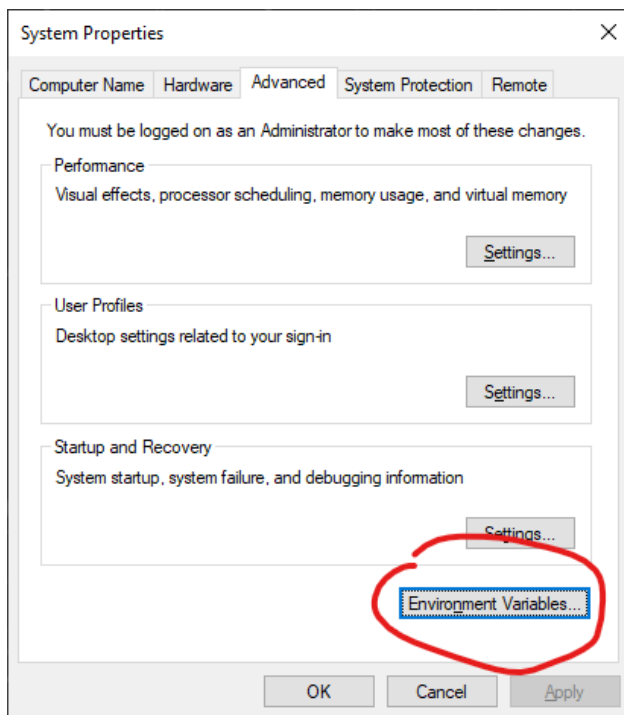
- Navigation: Overview, GNU-A, GNU-RM, Architecture Support, Specifications
- Section: What's new in 9-2020-q2-update
- Sub-section: In this release
- Bullet points:
 - [gcc-arm-none-eabi-9-2020-q2-update-win32.exe](#)
Windows 32-bit Installer (Signed for Windows 10 and later) (Formerly SHA2 signed binary)
MD5: 62d2b385da1550d431c9148c6e06bd44
 - [gcc-arm-none-eabi-9-2020-q2-update-win32.zip](#)
Windows 32-bit ZIP package
MD5: 184b3397414485f224e7ba950989aab6
 - [gcc-arm-none-eabi-9-2020-q2-update-x86_64-linux.tar.bz2](#)
Linux x86_64 Tarball
MD5: 2b9ecccc33470f9d3cda26983b9d2dc6
 - [gcc-arm-none-eabi-9-2020-q2-update-aarch64-linux.tar.bz2](#)
Linux AArch64 Tarball

2.2.5. Executable Search Path

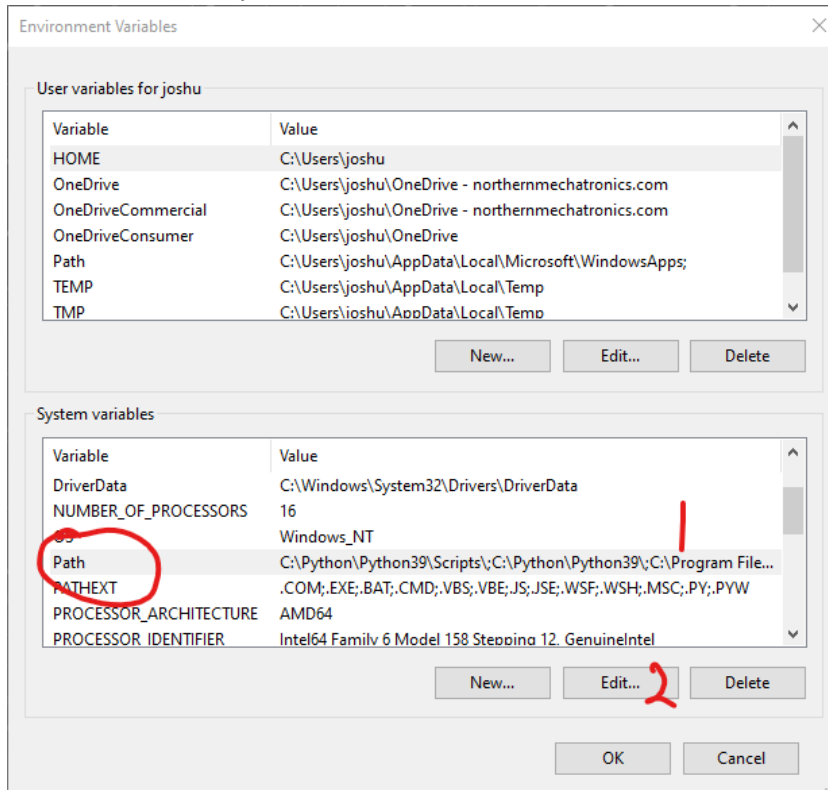
- Finally ensure that the paths to all the executables are added to your search path.
 1. Type “View Advanced System Settings” in the Windows search bar



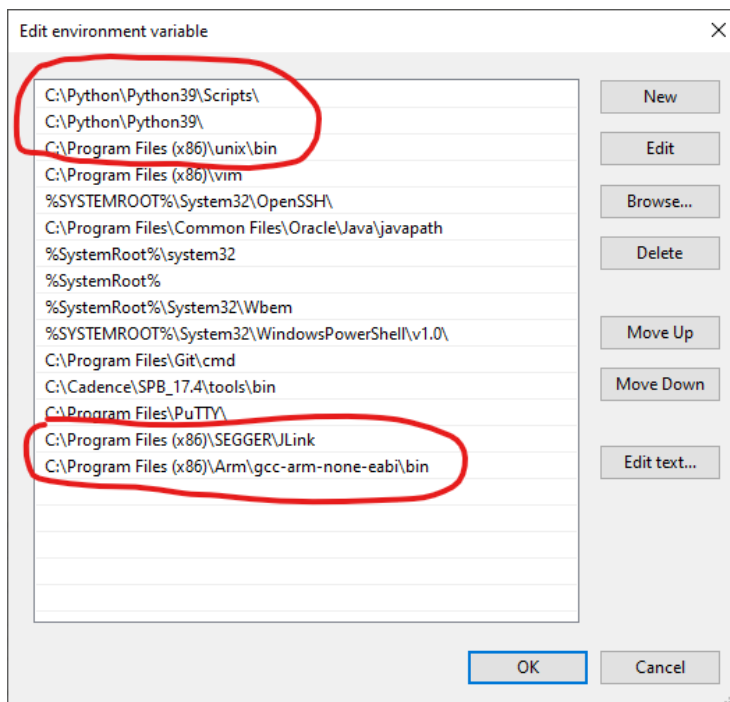
2. Click on Environment Variables



3. Select Path under System variables and click "Edit..."



4. If not done already, add the paths where you have installed Python, GnuWin32, J-Link and Arm GNU Toolchain

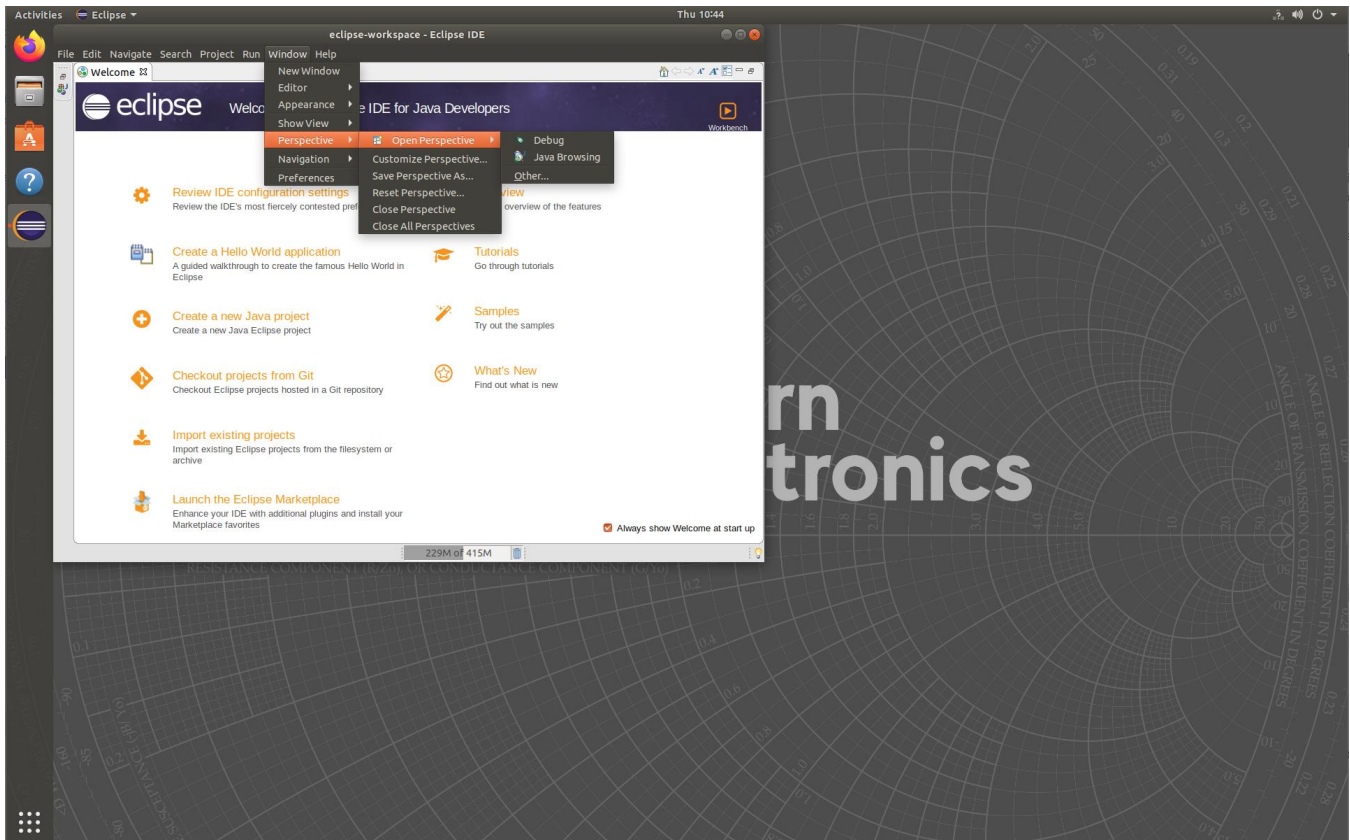


3. Eclipse Configuration

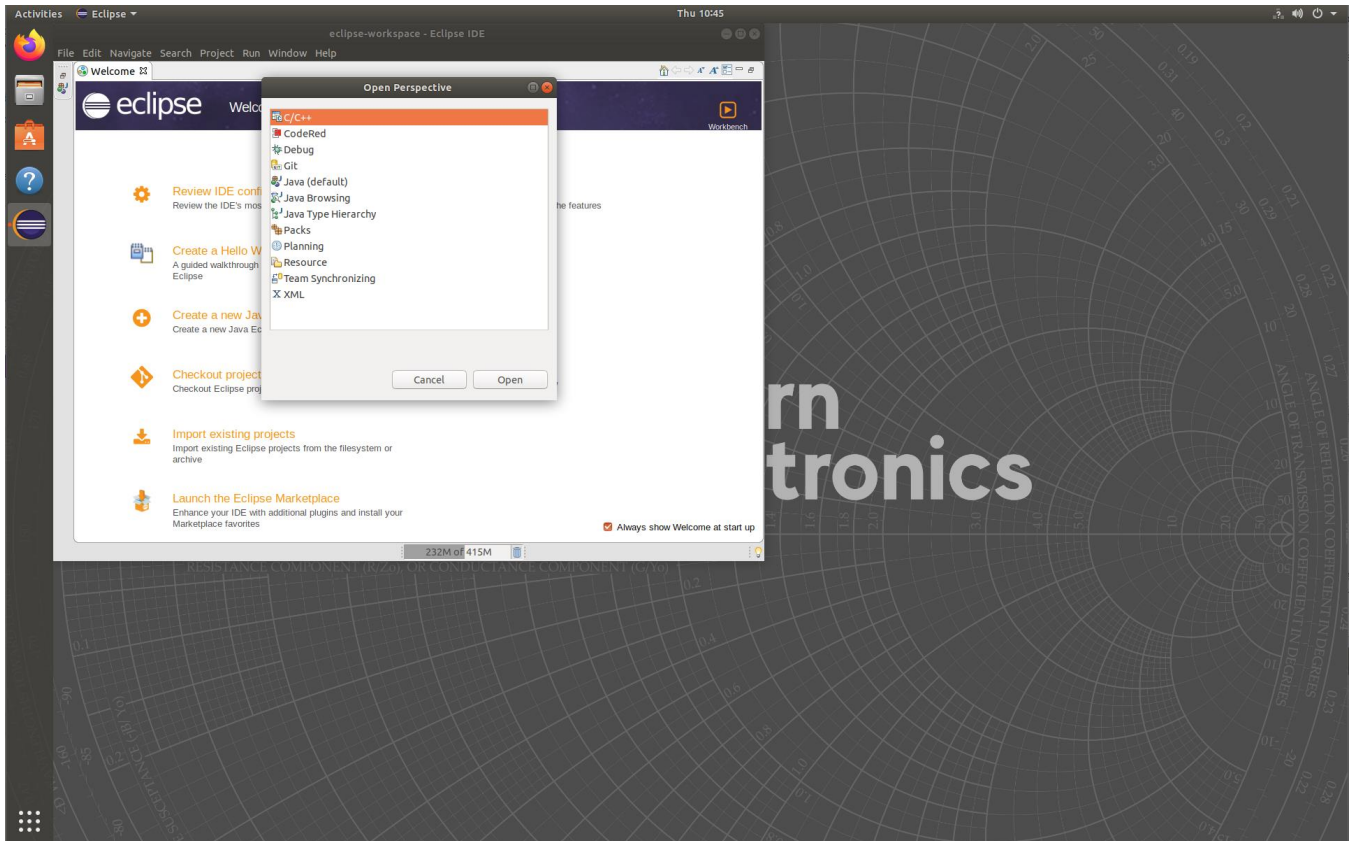
3.1. C/C++ Environment Setup

Eclipse defaults to the Java language development environment. You can change this by opening the C/C++ perspective.

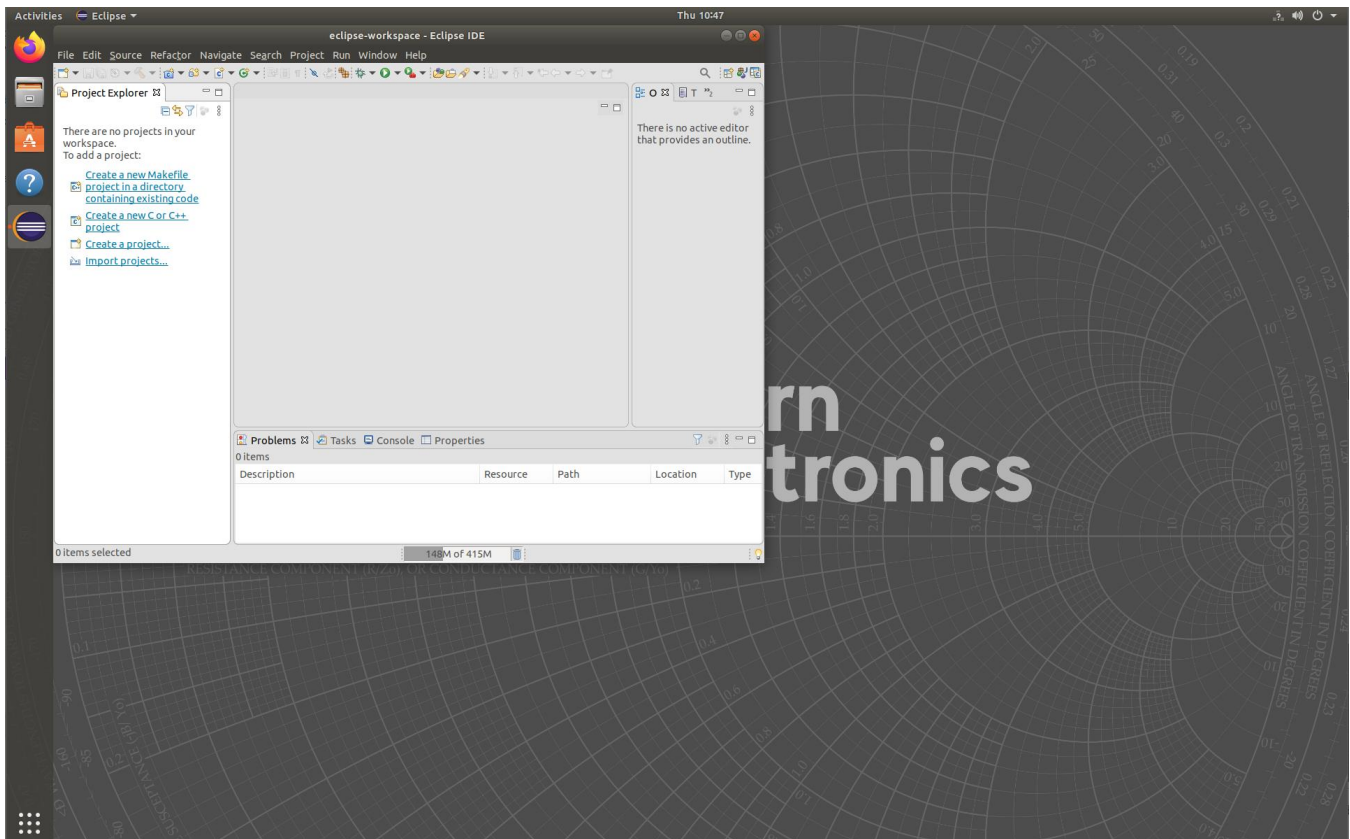
- With Eclipse opened, click on “Window”, “Perspective”, “Open Perspective”, and finally “Other...”



- This opens a new Window. Select “C/C++” and click “Open”



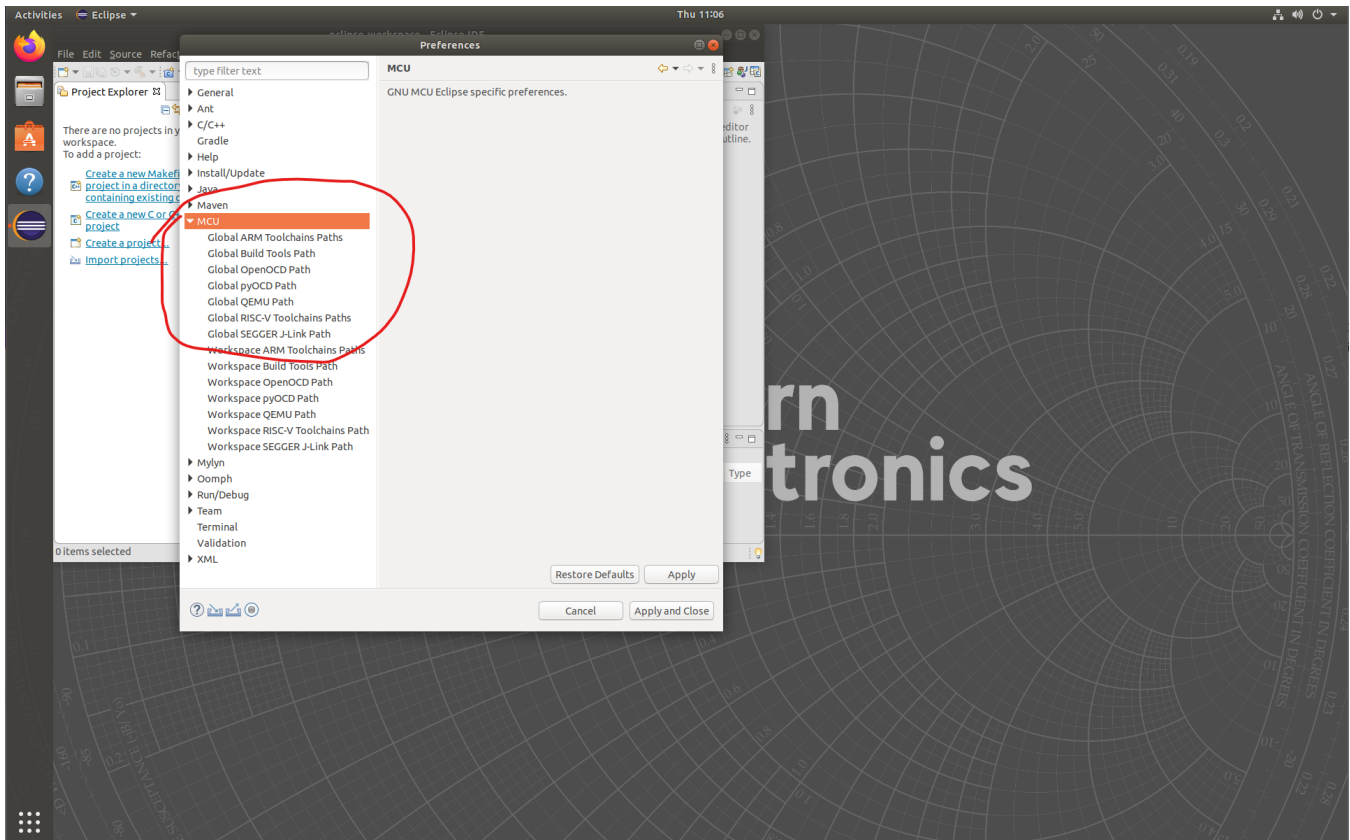
- Close or minimize the “Welcome” tab and you will be presented with the C/C++ environment.



3.2. Eclipse Embedded C/C++ Configuration

Finally, we will configure the MCU plugin by specifying the location of the GNU ARM toolchain installation location.

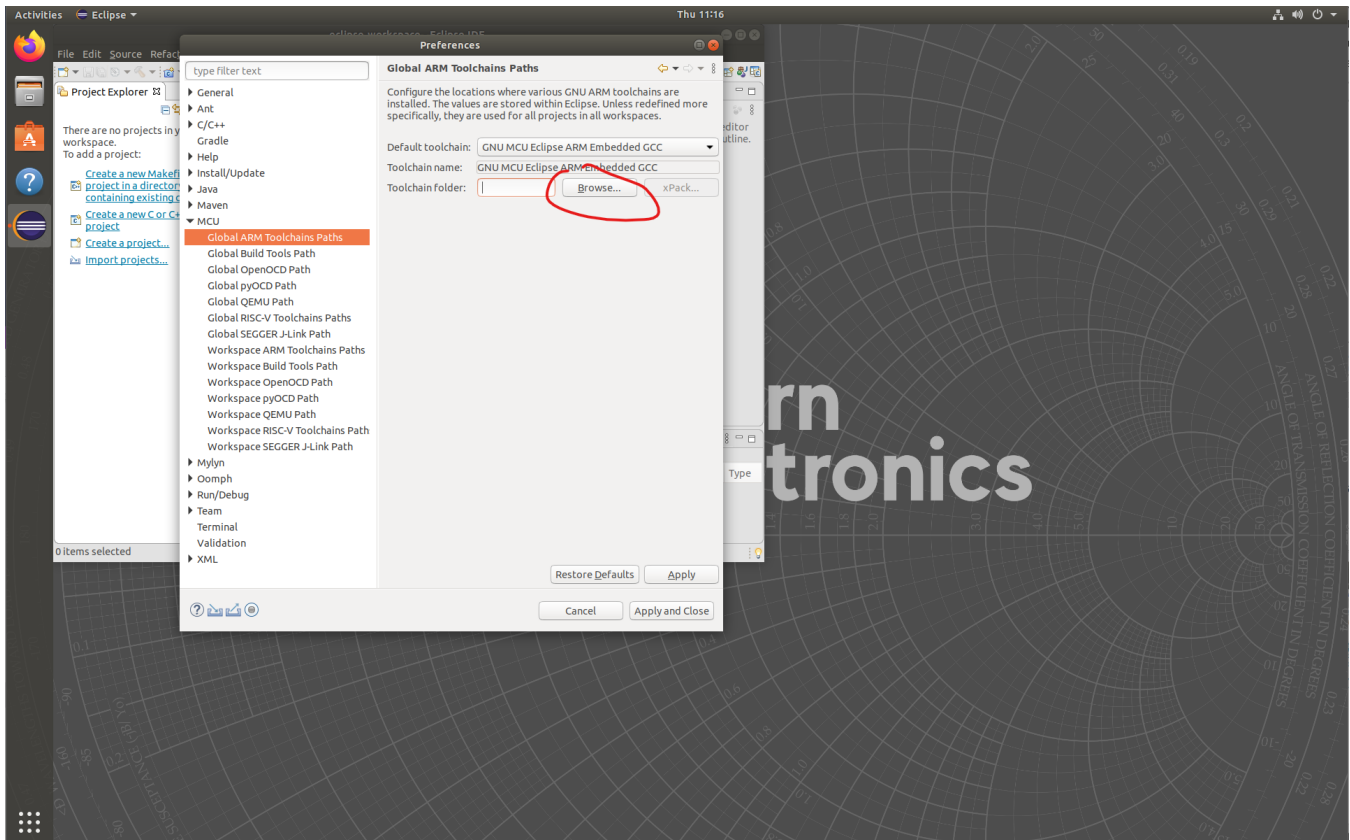
- With Eclipse open, click “Window” in the menu bar and select “Preferences”



- Find and expand the row containing “MCU”
- The items under “MCU” are prefixed by either “Global” and “Workspace”. We will focus on the Global settings right now. These settings are the global default.
- There are two paths we need to configure:
 - Global ARM Toolchains Paths
 - Global SEGGER J-Link Path

3.2.1. Global ARM Toolchains Paths Configuration

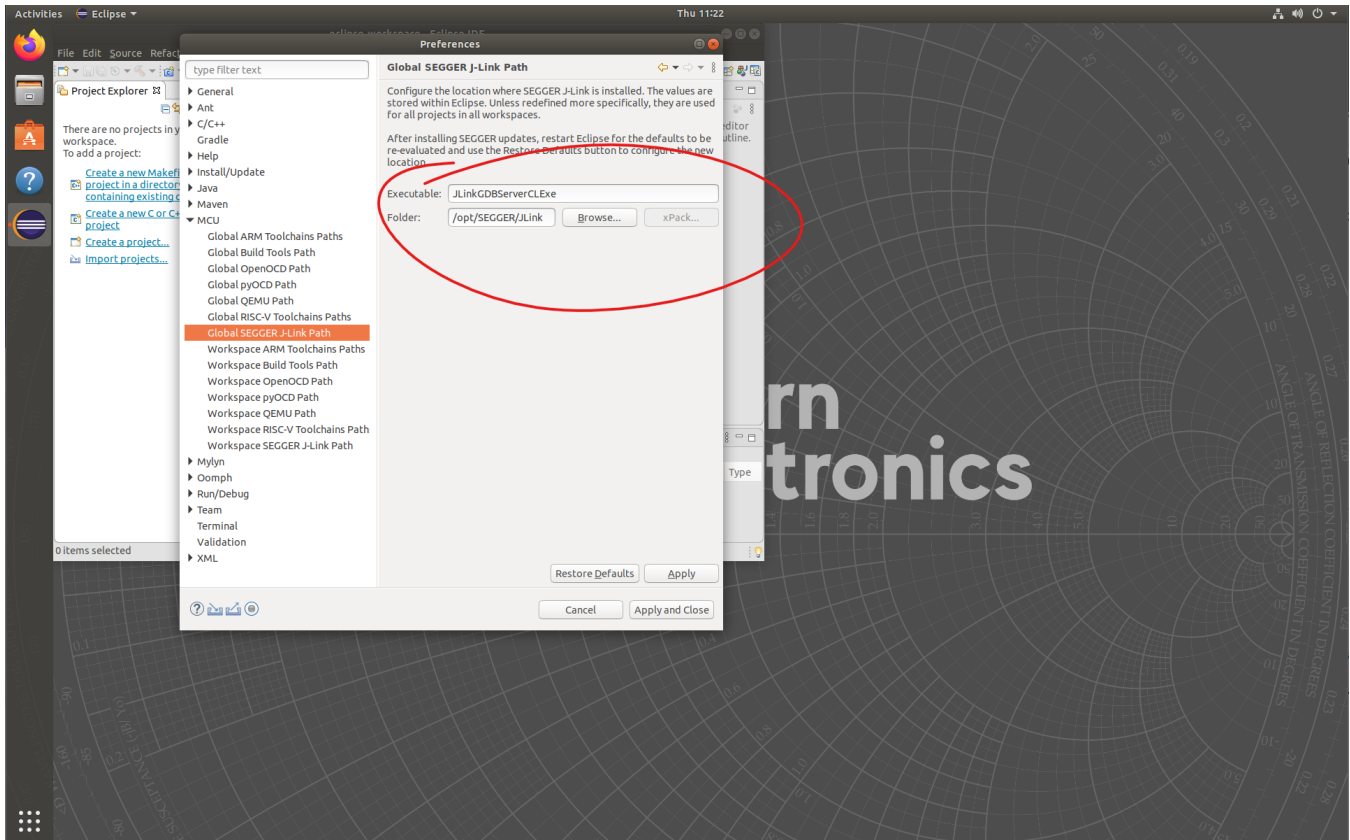
- With the Preference dialog window open, select “Global ARM Toolchains Paths” under MCU and click on “Browse”



- Browse to the location where the ARM toolchain was installed in 2.1.4. In our example, this is located under
`/opt/gcc-arm-none-eabi-9-2020-q2-update/bin`
- click “Apply” to apply the changes.

3.2.2. Global SEGGER J-Link Path Configuration

- With the Preference dialog window open, select “Global SEGGER J-Link Path” under MCU.



- The plugin should automatically detect the SEGGER J-Link installation. If not, enter the values into the Executable and Folder text boxes as shown in the screenshot.

Executable: JLinkGDBServerCLExe

Folder: /opt/SEGGER/JLink (or the path where you have installed SEGGER Jlink)

- Click “Apply and Close” to apply the changes.
- The Eclipse development environment is now completely configured.

4. Document Details

Parameter	Value
Name	NM180100 Software Development Toolchain Setup
Number	2000012
Revision	A.9
Life Cycle State	Released