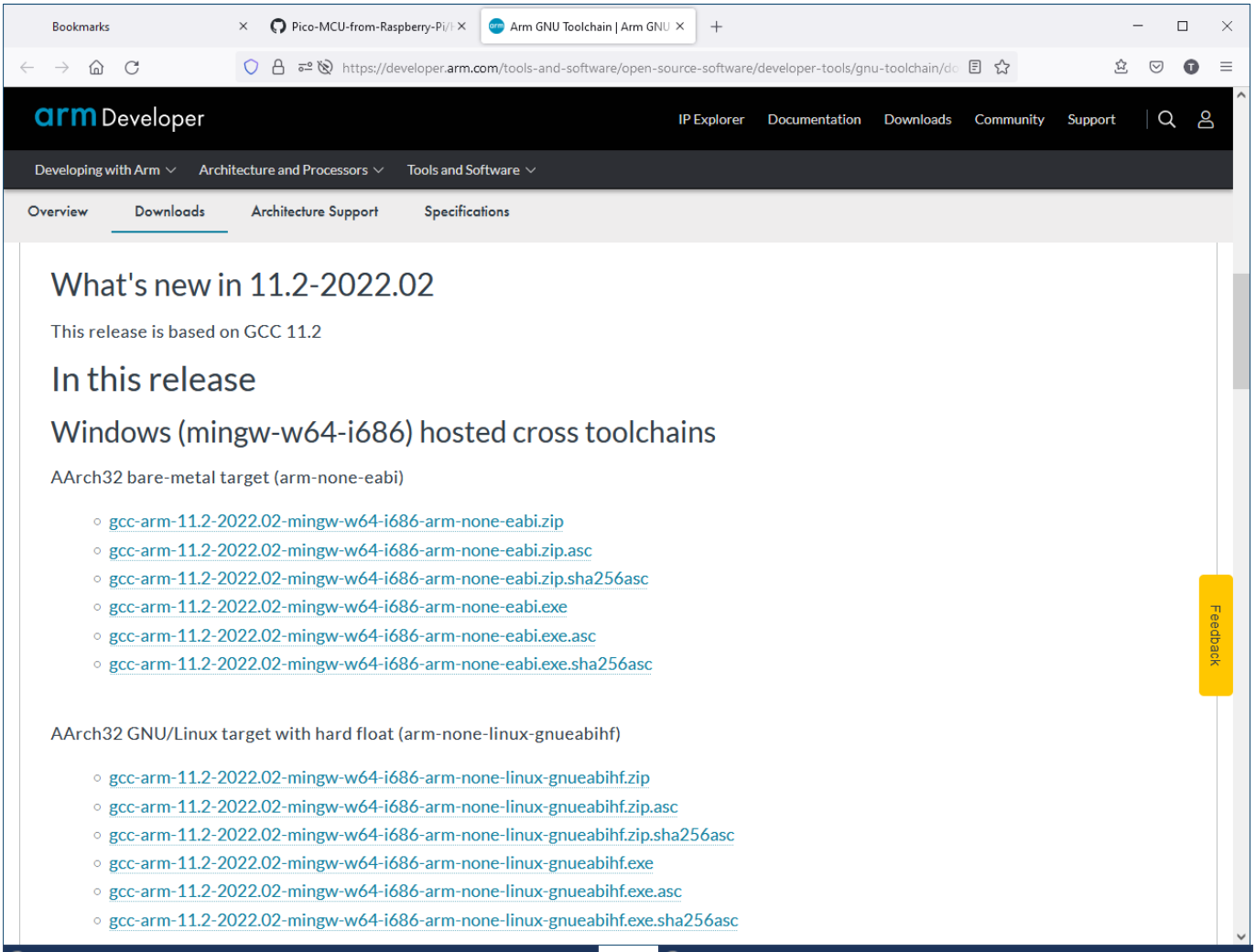
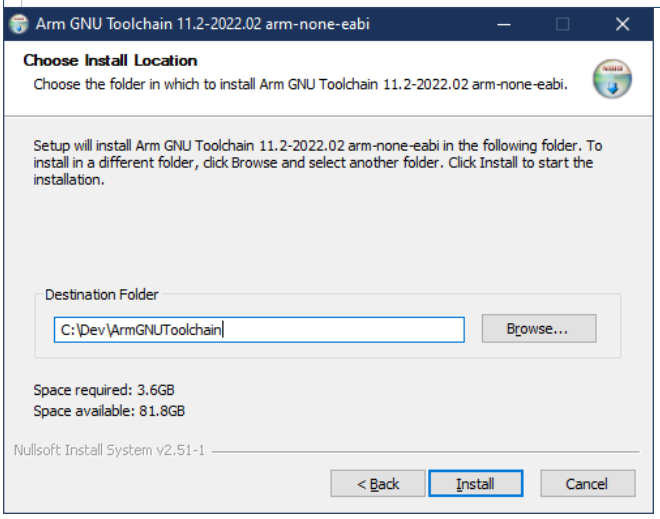
Install Pico SDK in Windows 10x64 June 2022

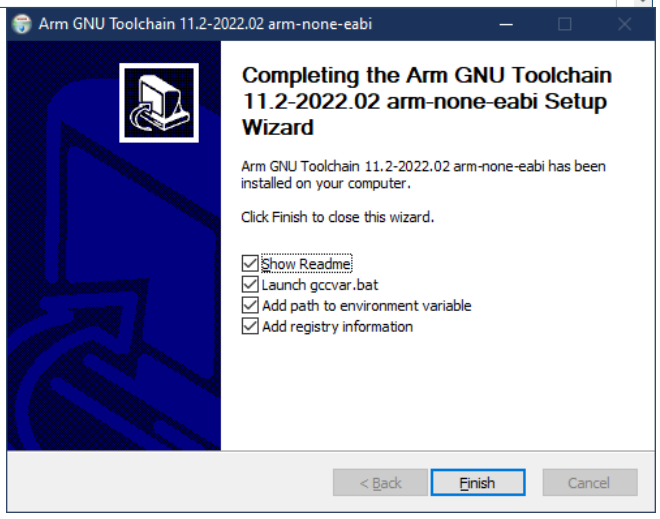
Largely based on RP2040 Development Setup on Windows https://len42.github.io/rp2040-dev-setup.html

1. Make two new folders (such as C:\Dev and C:\Pico).

2. Install gcc-arm-11.2-2022.02-mingw-w64-i686-arm-none-eabi.exe from: https://developer.arm.com/tools-and-software/open-source-software/developer-tools/gnu-toolchain/downloads to C:\Dev\ArmGNUToolchain - add path to environment variable during install.
https://developer.arm.com/-/media/Files/downloads/gnu/11.2-2022.02/binrel/gcc-arm-11.2-2022.02-mingw-w64-i686-arm-none-eabi.exe

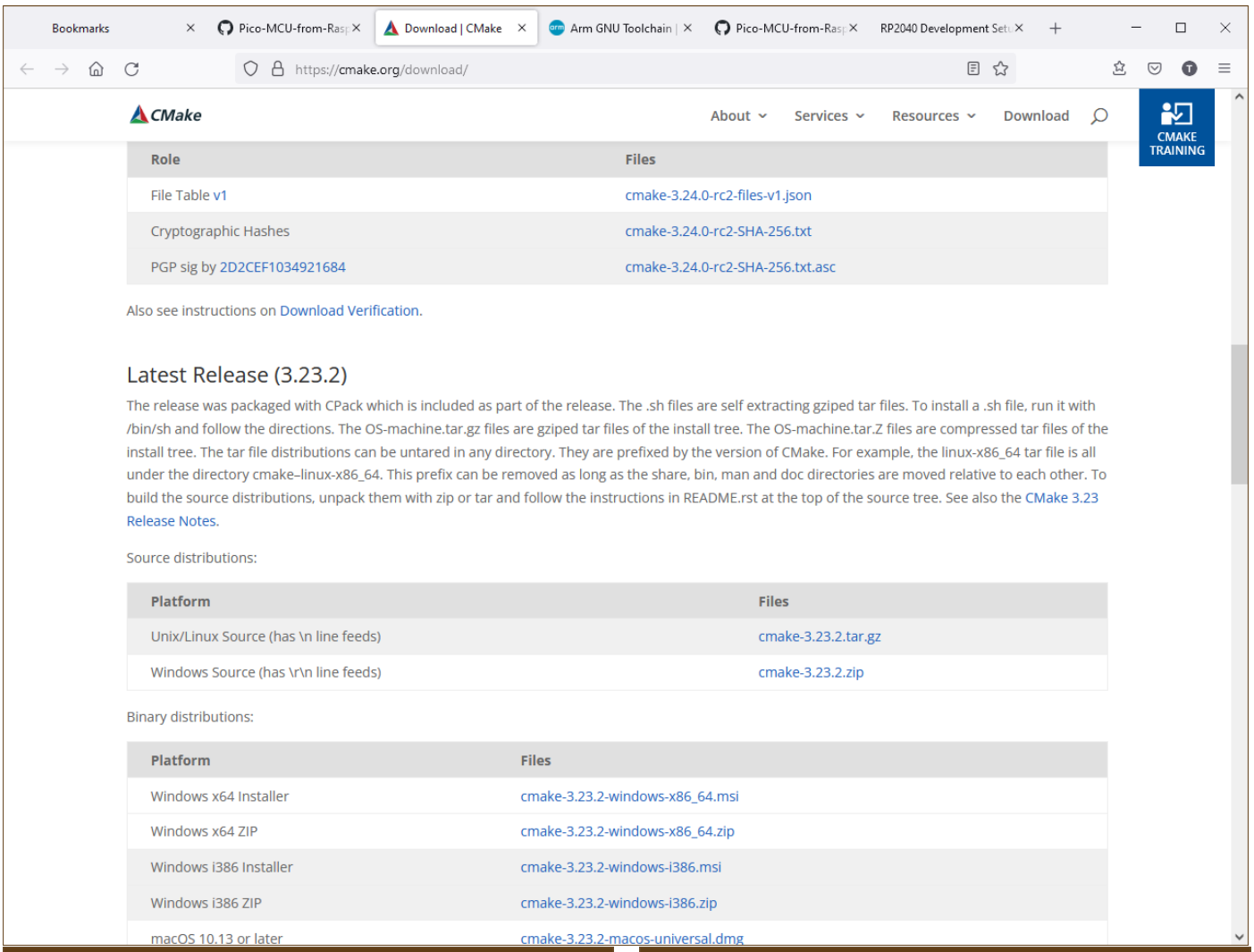


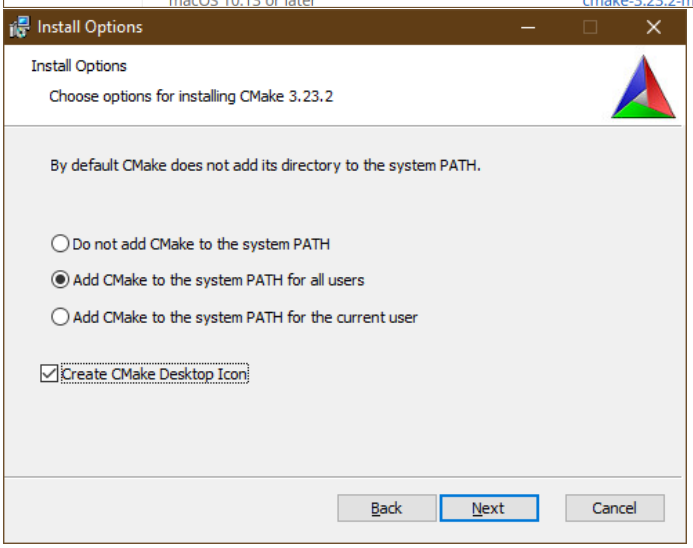


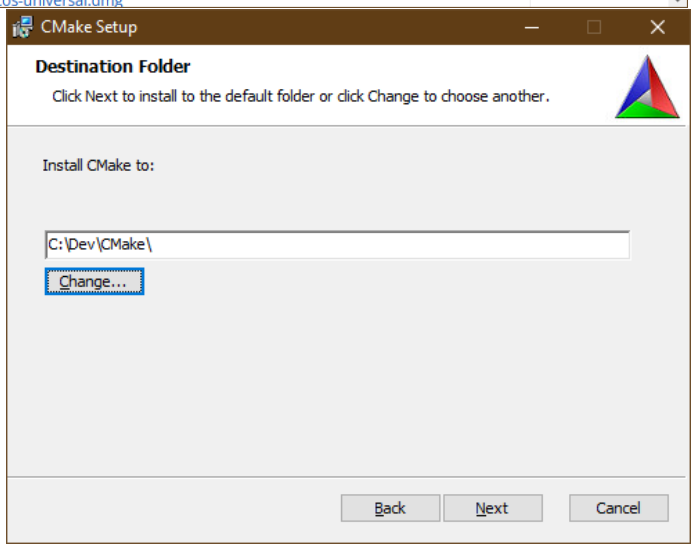


3. Install cmake-3.23.2-windows-x86_64.msi from https://cmake.org/download/ to C:\Dev\CMake\ - add Cmake to the system PATH for all users.

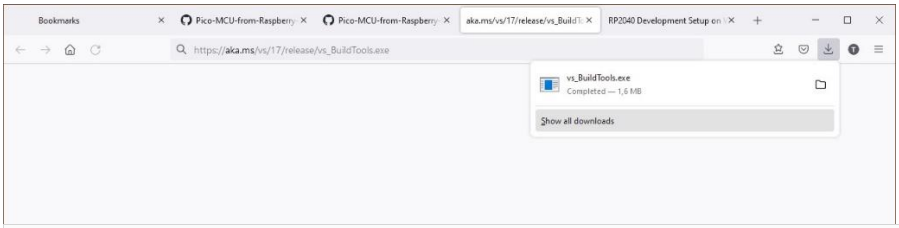
https://github.com/Kitware/CMake/releases/download/v3.23.2/cmake-3.23.2-windows-x86_64.msi

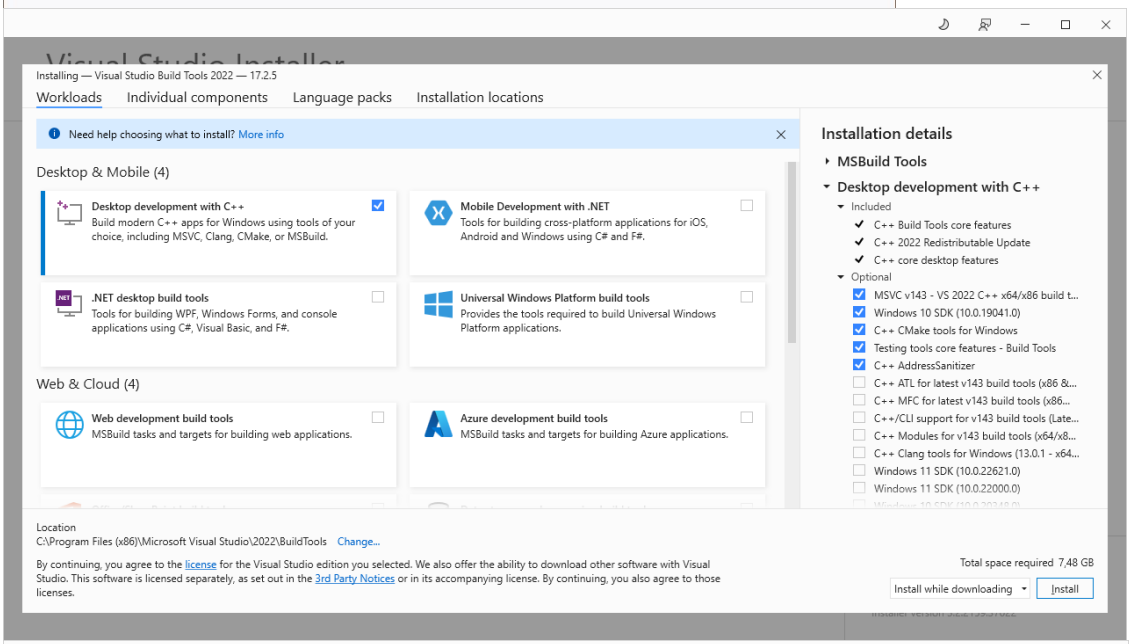


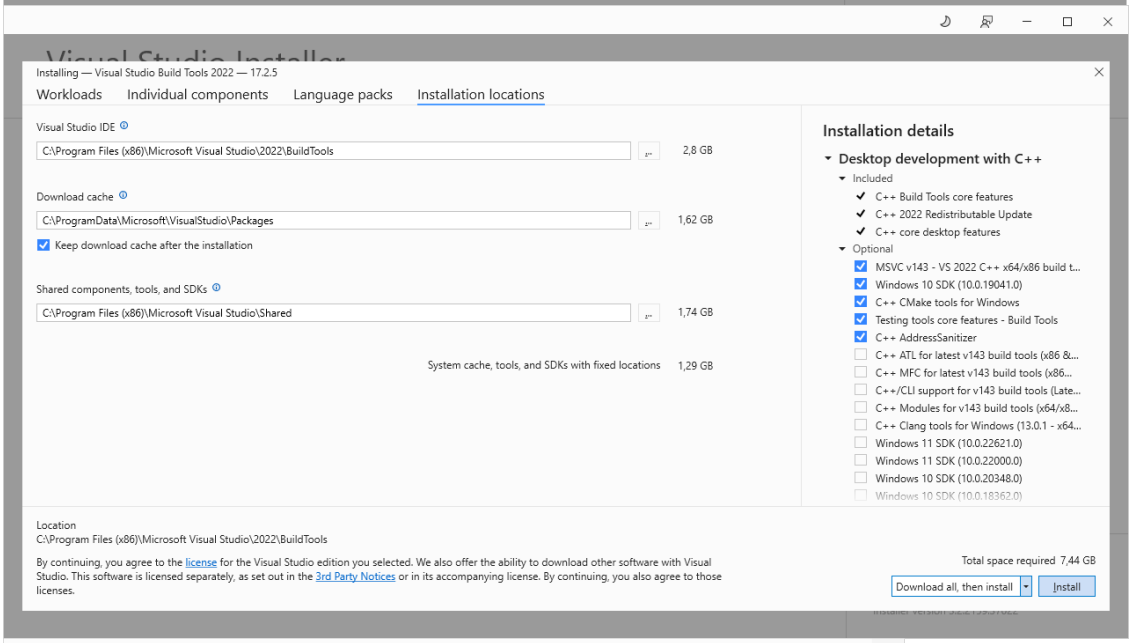


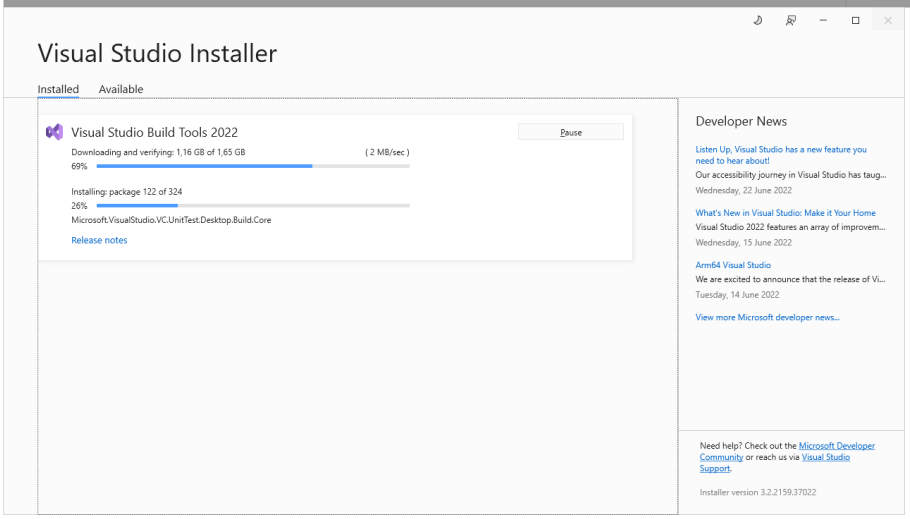


4. Install vs_BuildTools.exe from https://aka.ms/vs/17/release/vs_BuildTools.exe to the default folder - select C++ development tools. It was a 1.65 GB download.

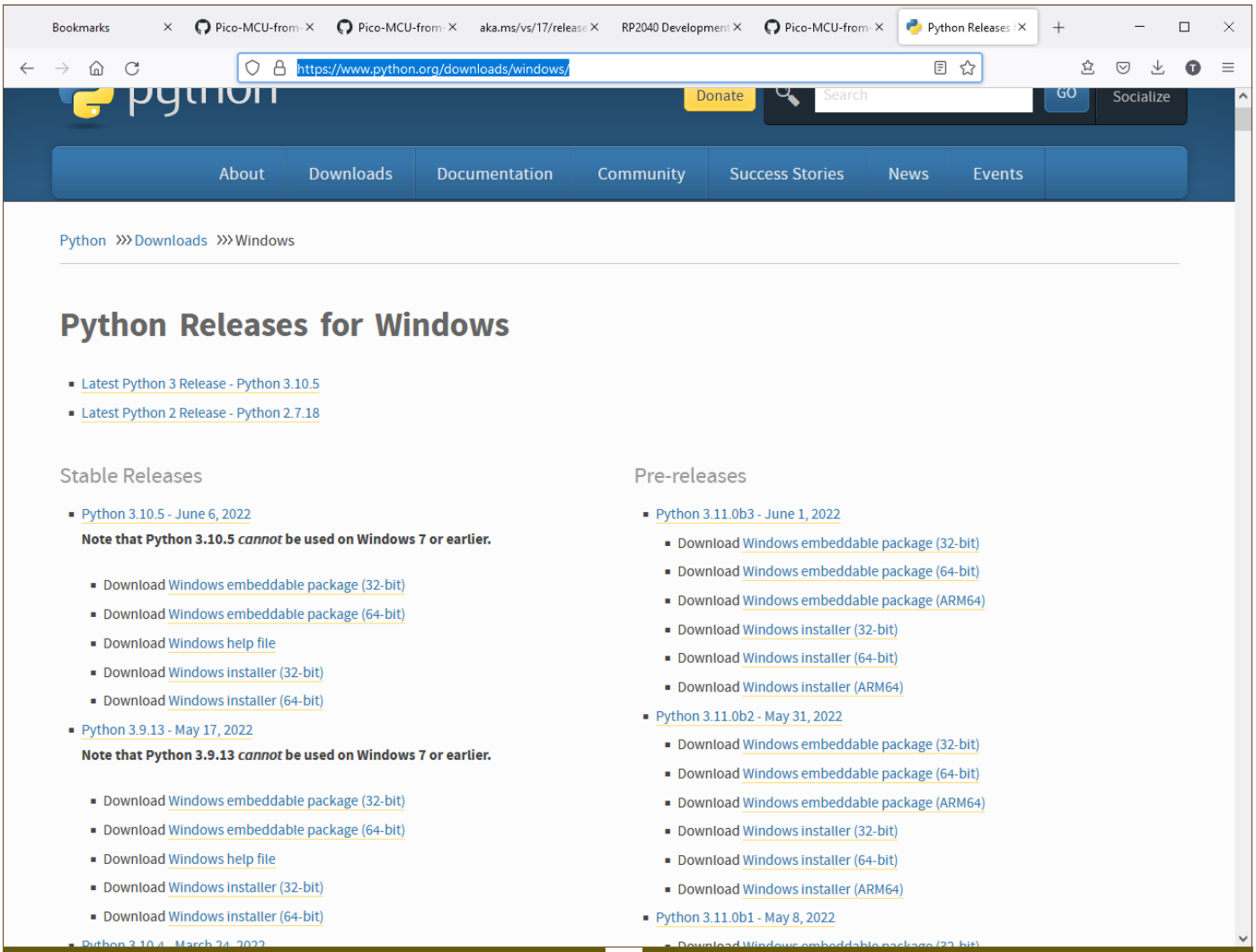

Bookmarks
Pico-MCU-from-Raspberry
Pico-MCU-from-Raspberry
aka.ms/vs/17/release/vs_BuildT
RP2040 Development Setup en
https://aka.ms/vs/17/release/vs_BuildTools.exe
vs_BuildTools.exe
Completed — 1,6 MB
Show all downloads

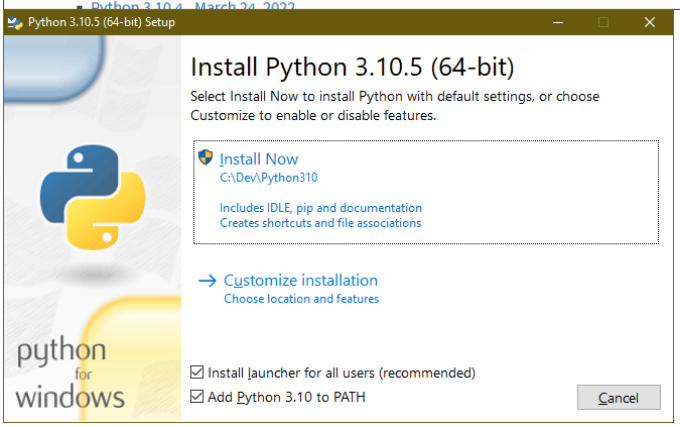

Installing — Visual Studio Build Tools 2022 — 17.2.5
Workloads
Individual components
Language packs
Installation locations
Need help choosing what to install? More info
Desktop & Mobile (4)
Desktop development with C++
Build modern C++ apps for Windows using tools of your choice, including MSVC, Clang, CMake, or MSBuild.
Mobile Development with .NET
Tools for building cross-platform applications for iOS, Android and Windows using C# and F#.
.NET desktop build tools
Tools for building WPF, Windows Forms, and console applications using C#, Visual Basic, and F#.
Universal Windows Platform build tools
Provides the tools required to build Universal Windows Platform applications.
Web & Cloud (4)
Web development build tools
MSBuild tasks and targets for building web applications.
Azure development build tools
MSBuild tasks and targets for building Azure applications.
Installation details
MSBuild Tools
Desktop development with C++
Included
C++ Build Tools core features
C++ 2022 Redistributable Update
C++ core desktop features
Optional
MSVC v143 - VS 2022 C++ x64/x86 build t...
Windows 10 SDK (10.0.19041.0)
C++ CMake tools for Windows
Testing tools core features - Build Tools
C++ AddressSanitizer
C++ ATL for latest v143 build tools (x86 &...
C++ MFC for latest v143 build tools (x86...
C++/CLI support for v143 build tools (Late...
C++ Modules for v143 build tools (x64/x8...
C++ Clang tools for Windows (13.0.1 - x64...
Windows 11 SDK (10.0.22621.0)
Windows 11 SDK (10.0.22000.0)
Location
C:\Program Files (x86)\Microsoft Visual Studio\2022\BuildTools
Change...
By continuing, you agree to the license for the Visual Studio edition you selected. We also offer the ability to download other software with Visual Studio. This software is licensed separately, as set out in the 3rd Party Notices or in its accompanying license. By continuing, you also agree to those licenses.
Total space required 7,48 GB
Install while downloading
Install

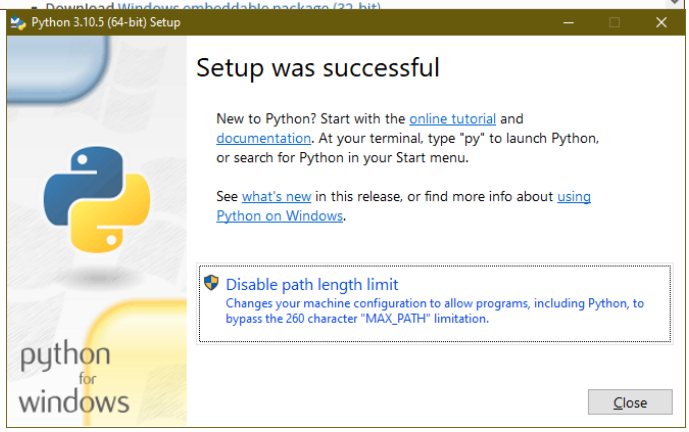

Installing — Visual Studio Build Tools 2022 — 17.2.5
Workloads
Individual components
Language packs
Installation locations
Visual Studio IDE
C:\Program Files (x86)\Microsoft Visual Studio\2022\BuildTools
2,8 GB
Download cache
C:\ProgramData\Microsoft\VisualStudio\Packages
1,62 GB
Keep download cache after the installation
Shared components, tools, and SDKs
C:\Program Files (x86)\Microsoft Visual Studio\Shared
1,74 GB
System cache, tools, and SDKs with fixed locations
1,29 GB
Installation details
Desktop development with C++
Included
C++ Build Tools core features
C++ 2022 Redistributable Update
C++ core desktop features
Optional
MSVC v143 - VS 2022 C++ x64/x86 build t...
Windows 10 SDK (10.0.19041.0)
C++ CMake tools for Windows
Testing tools core features - Build Tools
C++ AddressSanitizer
C++ ATL for latest v143 build tools (x86 &...
C++ MFC for latest v143 build tools (x86...
C++/CLI support for v143 build tools (Late...
C++ Modules for v143 build tools (x64/x8...
C++ Clang tools for Windows (13.0.1 - x64...
Windows 11 SDK (10.0.22621.0)
Windows 11 SDK (10.0.22000.0)
Windows 10 SDK (10.0.20348.0)
Windows 10 SDK (10.0.18362.0)
Location
C:\Program Files (x86)\Microsoft Visual Studio\2022\BuildTools
By continuing, you agree to the license for the Visual Studio edition you selected. We also offer the ability to download other software with Visual Studio. This software is licensed separately, as set out in the 3rd Party Notices or in its accompanying license. By continuing, you also agree to those licenses.
Total space required 7,44 GB
Download all, then install
Install


Visual Studio Installer
Installed
Available
Visual Studio Build Tools 2022
Pause
Downloading and verifying: 1,16 GB of 1,65 GB
(2 MB/sec)
69%
Installing: package 122 of 324
26%
Microsoft.VisualStudio.VC.UnitTest.Desktop.Build.Core
Release notes
Developer News
Listen Up, Visual Studio has a new feature you need to hear about!
Our accessibility journey in Visual Studio has taug...
Wednesday, 22 June 2022
What's New in Visual Studio: Make it Your Home
Visual Studio 2022 features an array of improvem...
Wednesday, 15 June 2022
Arm64 Visual Studio
We are excited to announce that the release of Vi...
Tuesday, 14 June 2022
View more Microsoft developer news...
Need help? Check out the Microsoft Developer Community or reach us via Visual Studio Support.
Installer version 3.2.2159.37022

5. Install python-3.10.5-amd64.exe from https://www.python.org/downloads/windows/ to C:\Dev\Python310 - select Add Python to PATH and also select to remove the max path length.
https://www.python.org/ftp/python/3.10.5/python-3.10.5-amd64.exe



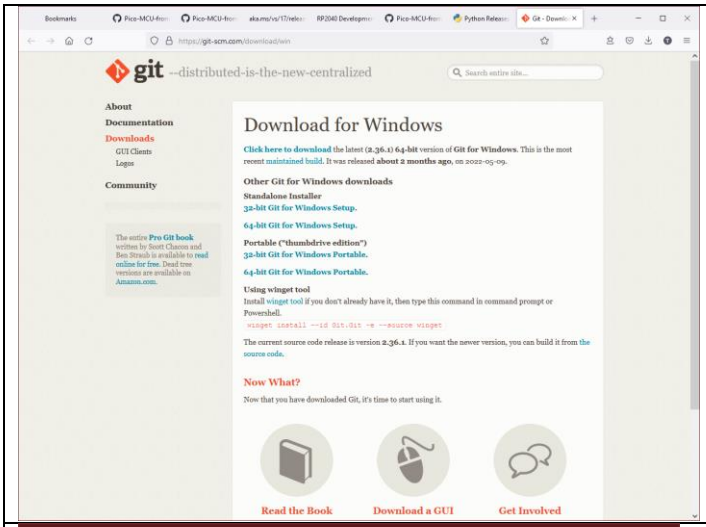


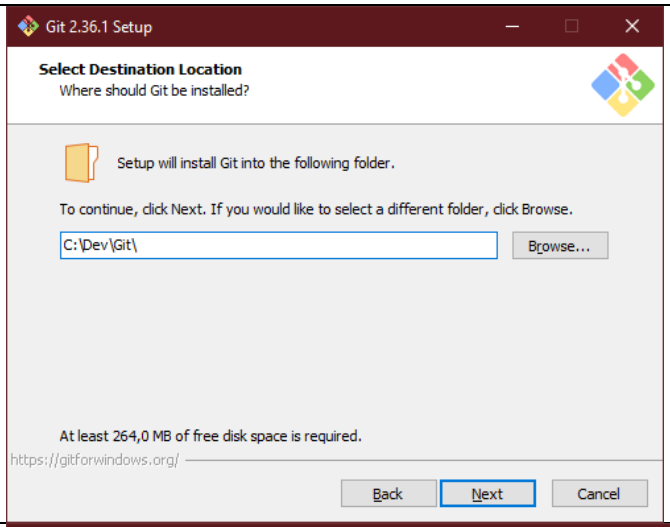


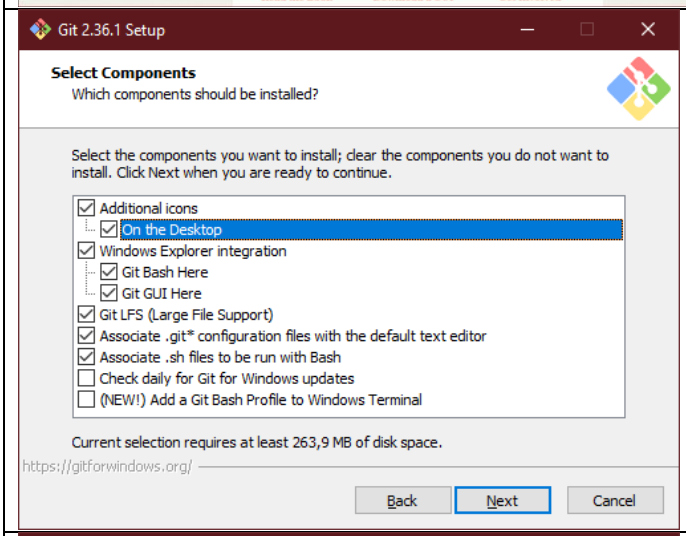
6. Install Git-2.36.1-64-bit.exe from https://git-scm.com/download/win to C:\Dev\Git - follow the instructions as below (from https://len42.github.io/rp2040-dev-setup.html).

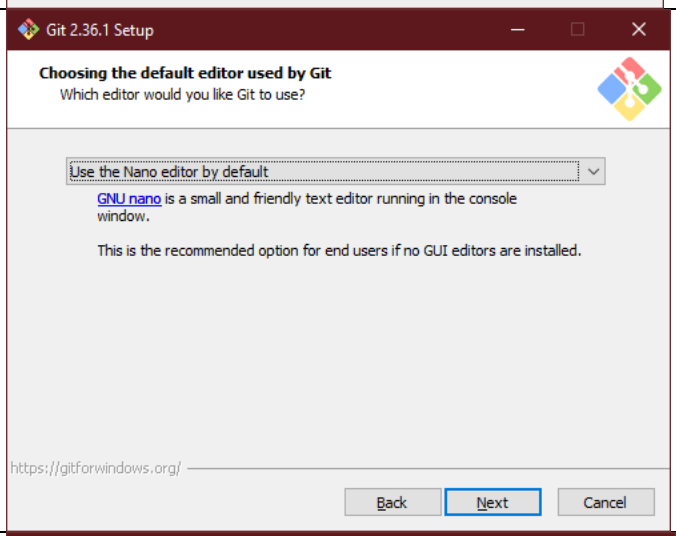
Destination Location: Default (or not)
Select Components: Default
Default editor: Select one you like.
Name of the initial branch: Let Git decide
PATH environment: Git from the command line and also from 3rd-party software
SSH executable: Use bundled OpenSSH
HTTPS transport backend: Use the OpenSSL library

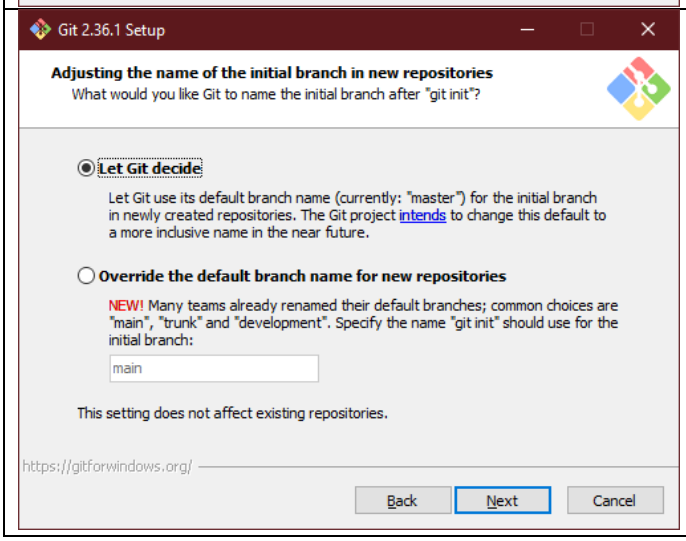
Line ending conversion: Checkout as-is, commit as-is
Terminal emulator for Git Bash: Select either option
Default behavior of “git pull”: Default (f-f or merge)
Credential helper: Default (Git Credential Manager Core)
Extra options: Default (Enable file system caching on, Enable symbolic links off)
Experimental options: Select “Enable experimental support for pseudo consoles”

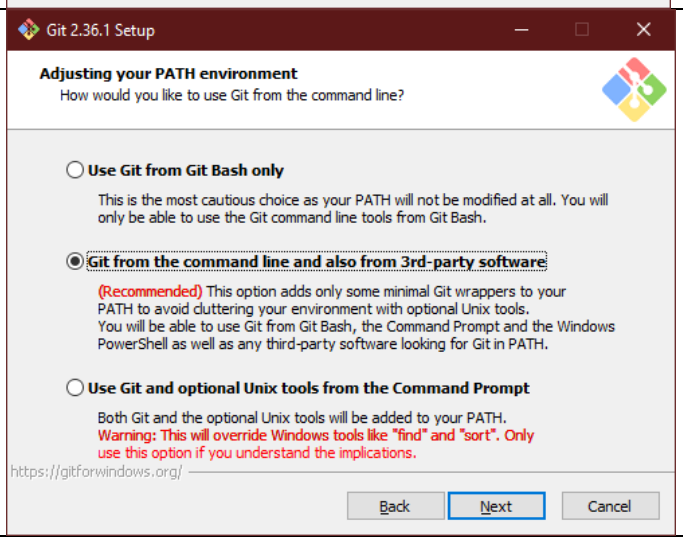












Git 2.36.1 Setup

Choosing the SSH executable
Which Secure Shell client program would you like Git to use?

- (●) **Use bundled OpenSSH**
  This uses ssh.exe that comes with Git.
- ( ) **Use external OpenSSH**
  NEW! This uses an external ssh.exe. Git will not install its own OpenSSH (and related) binaries but use them as found on the PATH.

https://gitforwindows.org/

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Git 2.36.1 Setup

Choosing HTTPS transport backend
Which SSL/TLS library would you like Git to use for HTTPS connections?

- (●) **Use the OpenSSL library**
  Server certificates will be validated using the ca-bundle.crt file.
- ( ) **Use the native Windows Secure Channel library**
  Server certificates will be validated using Windows Certificate Stores. This option also allows you to use your company's internal Root CA certificates distributed e.g. via Active Directory Domain Services.

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Git 2.36.1 Setup

Configuring the line ending conversions
How should Git treat line endings in text files?

- ( ) **Checkout Windows-style, commit Unix-style line endings**
  Git will convert LF to CRLF when checking out text files. When committing text files, CRLF will be converted to LF. For cross-platform projects, this is the recommended setting on Windows ("core.autocrlf" is set to "true").
- ( ) **Checkout as-is, commit Unix-style line endings**
  Git will not perform any conversion when checking out text files. When committing text files, CRLF will be converted to LF. For cross-platform projects, this is the recommended setting on Unix ("core.autocrlf" is set to "input").
- (●) **Checkout as-is, commit as-is**
  Git will not perform any conversions when checking out or committing text files. Choosing this option is not recommended for cross-platform projects ("core.autocrlf" is set to "false").

https://gitforwindows.org/

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Git 2.36.1 Setup

Configuring the terminal emulator to use with Git Bash
Which terminal emulator do you want to use with your Git Bash?

- ( ) **Use MinTTY (the default terminal of MSYS2)**
  Git Bash will use MinTTY as terminal emulator, which sports a resizable window, non-rectangular selections and a Unicode font. Windows console programs (such as interactive Python) must be launched via `winpty` to work in MinTTY.
- (●) **Use Windows' default console window**
  Git will use the default console window of Windows ("cmd.exe"), which works well with Win32 console programs such as interactive Python or node.js, but has a very limited default scroll-back, needs to be configured to use a Unicode font in order to display non-ASCII characters correctly, and prior to Windows 10 its window was not freely resizable and it only allowed rectangular text selections.

https://gitforwindows.org/

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Git 2.36.1 Setup

Choose the default behavior of `git pull`
What should `git pull` do by default?

- (●) **Default (fast-forward or merge)**
  This is the standard behavior of `git pull`: fast-forward the current branch to the fetched branch when possible, otherwise create a merge commit.
- ( ) **Rebase**
  Rebase the current branch onto the fetched branch. If there are no local commits to rebase, this is equivalent to a fast-forward.
- ( ) **Only ever fast-forward**
  Fast-forward to the fetched branch. Fail if that is not possible.

https://gitforwindows.org/

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Git 2.36.1 Setup

Choose a credential helper
Which credential helper should be configured?

- (●) **Git Credential Manager**
  Use the cross-platform Git Credential Manager.
  See more information about the future of Git Credential Manager here.
- ( ) **None**
  Do not use a credential helper.

https://gitforwindows.org/

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Git 2.36.1 Setup

Configuring extra options
Which features would you like to enable?

- [x] **Enable file system caching**
  File system data will be read in bulk and cached in memory for certain operations ("core.fscache" is set to "true"). This provides a significant performance boost.
- [ ] **Enable symbolic links**
  Enable symbolic links (requires the SeCreateSymbolicLink permission). Please note that existing repositories are unaffected by this setting.

https://gitforwindows.org/

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Git 2.36.1 Setup

Configuring experimental options
These features are developed actively. Would you like to try them?

- [x] **Enable experimental support for pseudo consoles.**
  (NEW!) This allows running native console programs like Node or Python in a Git Bash window without using winpty, but it still has known bugs.
- [ ] **Enable experimental built-in file system monitor**
  (NEW!) Automatically run a built-in file system watcher, to speed up common operations such as `git status`, `git add`, `git commit`, etc in worktrees containing many files.

https://gitforwindows.org/

Back | Install | Cancel

7. Use the windows admin cmd prompt to install the Pico SDK

cd c:\Pico
c:\Pico>git clone -b master https://github.com/raspberrypi/pico-sdk.git
c:\Pico>git clone -b master https://github.com/raspberrypi/pico-examples.git
c:\Pico>git clone -b master https://github.com/raspberrypi/pico-extras.git
c:\Pico>git clone -b master https://github.com/raspberrypi/pico-playground.git

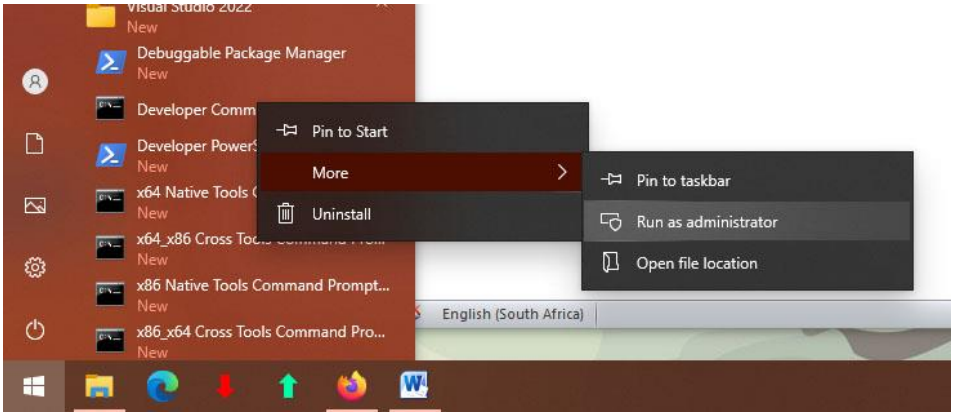
```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Windows\system32> cmd
Microsoft Windows [Version 10.0.19044.1766]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\system32>cd c:\Pico

c:\Pico>git clone -b master https://github.com/raspberrypi/pico-sdk.git
Cloning into 'pico-sdk'...
remote: Enumerating objects: 5225, done.
remote: Counting objects: 100% (284/284), done.
remote: Compressing objects: 100% (198/198), done.
remote: Total 5225 (delta 98), reused 175 (delta 50), pack-reused 4941
Receiving objects: 100% (5225/5225), 2.55 MiB | 899.00 KiB/s, done.
Resolving deltas: 100% (2605/2605), done.

c:\Pico>git clone -b master https://github.com/raspberrypi/pico-examples.git
Cloning into 'pico-examples'...
remote: Enumerating objects: 1990, done.
remote: Counting objects: 100% (787/787), done.
remote: Compressing objects: 100% (282/282), done.
remote: Total 1990 (delta 614), reused 505 (delta 505), pack-reused 1203
Receiving objects: 100% (1990/1990), 7.34 MiB | 782.00 KiB/s, done.
Resolving deltas: 100% (1079/1079), done.

c:\Pico>git clone -b master https://github.com/raspberrypi/pico-extras.git
Cloning into 'pico-extras'...
remote: Enumerating objects: 372, done.
remote: Counting objects: 100% (37/37), done.
remote: Compressing objects: 100% (16/16), done.
remote: Total 372 (delta 23), reused 22 (delta 21), pack-reused 335
Receiving objects: 100% (372/372), 160.05 KiB | 333.00 KiB/s, done.
Resolving deltas: 100% (160/160), done.

c:\Pico>git clone -b master https://github.com/raspberrypi/pico-playground.git
Cloning into 'pico-playground'...
remote: Enumerating objects: 297, done.
remote: Counting objects: 100% (78/78), done.
remote: Compressing objects: 100% (41/41), done.
remote: Total 297 (delta 49), reused 42 (delta 37), pack-reused 219
Receiving objects: 100% (297/297), 2.23 MiB | 943.00 KiB/s, done.
Resolving deltas: 100% (116/116), done.

c:\Pico>
```

c:\Pico>cd pico-extras
c:\Pico\pico-extras>git submodule update - -init
c:\Pico\pico-extras>cd ..
c:\Pico>cd pico-sdk
c:\Pico\pico-sdk>git submodule update - -init

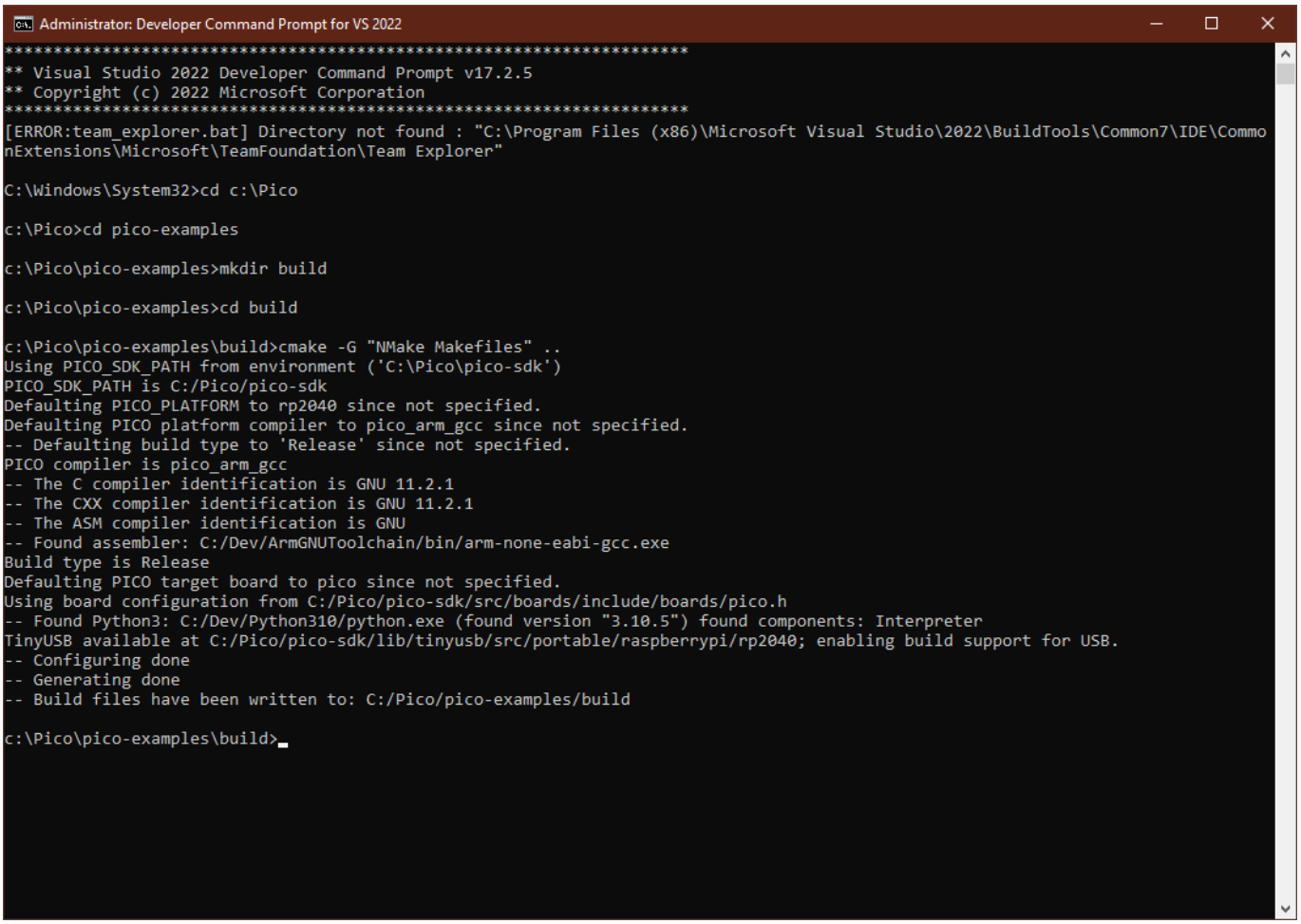
8. Then run a build of all the pico-examples:
c:\Pico\setx PICO_SDK_PATH "C:\Pico\pico-sdk"

```
c:\Pico>cd pico-extras

c:\Pico\pico-extras>git submodule update --init
Submodule 'lwip' (https://git.savannah.nongnu.org/git/lwip.git) registered for path 'lib/lwip'
Cloning into 'C:/Pico/pico-extras/lib/lwip'...
Submodule path 'lib/lwip': checked out 'c385f31076b27efb8ee37f00cb5568783a58f299'

c:\Pico\pico-extras>cd ..

c:\Pico>cd pico-sdk

c:\Pico\pico-sdk>git submodule update --init
Submodule 'tinyusb' (https://github.com/hathach/tinyusb.git) registered for path 'lib/tinyusb'
Cloning into 'C:/Pico/pico-sdk/lib/tinyusb'...
Submodule path 'lib/tinyusb': checked out '4bfab30c02279a0530e1a56f4a7c539f2d35a293'

c:\Pico\pico-sdk>setx PICO_SDK_PATH "C:\Pico\pico-sdk"

SUCCESS: Specified value was saved.

c:\Pico\pico-sdk>_
```

9. Close the cmd window and run the VS Developer Command Prompt as admin.




```
c:\Windows\System32>cd c:\Pico
c:\Pico>cd pico-examples\
c:\Pico\pico-examples>mkdir build
c:\Pico\pico-examples>cd build
c:\Pico\pico-examples\build>cmake -G "NMake Makefiles" ..
c:\Pico\pico-examples\build>nmake
```



```
Administrator: Developer Command Prompt for VS 2022 - nmake

c:\Pico\pico-examples>cd build

c:\Pico\pico-examples\build>cmake -G "NMake Makefiles" ..
Using PICO_SDK_PATH from environment ('C:\Pico\pico-sdk')
PICO_SDK_PATH is C:/Pico/pico-sdk
Defaulting PICO_PLATFORM to rp2040 since not specified.
Defaulting PICO platform compiler to pico_arm_gcc since not specified.
-- Defaulting build type to 'Release' since not specified.
PICO compiler is pico_arm_gcc
-- The C compiler identification is GNU 11.2.1
-- The CXX compiler identification is GNU 11.2.1
-- The ASM compiler identification is GNU
-- Found assembler: C:/Dev/ArmGNUToolchain/bin/arm-none-eabi-gcc.exe
Build type is Release
Defaulting PICO target board to pico since not specified.
Using board configuration from C:/Pico/pico-sdk/src/boards/include/boards/pico.h
-- Found Python3: C:/Dev/Python310/python.exe (found version "3.10.5") found components: Interpreter
TinyUSB available at C:/Pico/pico-sdk/lib/tinyusb/src/portable/raspberrypi/rp2040; enabling build support for USB.
-- Configuring done
-- Generating done
-- Build files have been written to: C:/Pico/pico-examples/build

c:\Pico\pico-examples\build>nmake

Microsoft (R) Program Maintenance Utility Version 14.32.31332.0
Copyright (C) Microsoft Corporation.  All rights reserved.

Scanning dependencies of target bs2_default
[  0%] Building ASM object pico-sdk/src/rp2_common/boot_stage2/CMakeFiles/bs2_default.dir/compile_time_choice.S.obj
[  0%] Linking ASM executable bs2_default.elf
[  0%] Built target bs2_default
[  0%] Generating bs2_default.bin
[  0%] Generating bs2_default_padded_checksummed.S
[  0%] Built target bs2_default_padded_checksummed_asm
[  0%] Creating directories for 'ELF2UF2Build'
[  0%] No download step for 'ELF2UF2Build'
[  0%] No update step for 'ELF2UF2Build'
[  0%] No patch step for 'ELF2UF2Build'
[  0%] Performing configure step for 'ELF2UF2Build'
-- The C compiler identification is MSVC 19.32.31332.0
-- The CXX compiler identification is MSVC 19.32.31332.0
-- Detecting C compiler ABI info
```

```
Administrator: Developer Command Prompt for VS 2022
[100%] Building C object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_printf/printf
.c.obj
[100%] Building ASM object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_bit_ops/bit
_ops_aeabi.S.obj
[100%] Building C object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_bootrom/bootr
om.c.obj
[100%] Building ASM object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_divider/div
ider.S.obj
[100%] Building ASM object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_double/doub
le_aeabi.S.obj
[100%] Building C object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_double/double
_init_rom.c.obj
[100%] Building C object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_double/double
_math.c.obj
[100%] Building ASM object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_double/doub
le_v1_rom_shim.S.obj
[100%] Building ASM object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_int64_ops/p
ico_int64_ops_aeabi.S.obj
[100%] Building ASM object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_float/float
_aeabi.S.obj
[100%] Building C object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_float/float_i
nit_rom.c.obj
[100%] Building C object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_float/float_m
ath.c.obj
[100%] Building ASM object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_float/float
_v1_rom_shim.S.obj
[100%] Building C object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_malloc/pico_m
alloc.c.obj
[100%] Building ASM object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_mem_ops/mem
_ops_aeabi.S.obj
[100%] Building ASM object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_standard_li
nk/crt0.S.obj
[100%] Building CXX object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_standard_li
nk/new_delete.cpp.obj
[100%] Building C object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_standard_link
/binary_info.c.obj
[100%] Building C object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_stdio/stdio.c
.obj
[100%] Building C object watchdog/hello_watchdog/CMakeFiles/hello_watchdog.dir/C_/Pico/pico-sdk/src/rp2_common/pico_stdio_uart/st
dio_uart.c.obj
[100%] Linking CXX executable hello_watchdog.elf
[100%] Built target hello_watchdog

c:\Pico\pico-examples\build>
```

You can find the uf2 files in the pico-examples\build\sub-folders.