CEC Continuing Education Center

DesignNews

C++ Primer for Embedded Systems

Day 2:

Tooling Up for Embedded C++ : VS Code

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Fred Eady

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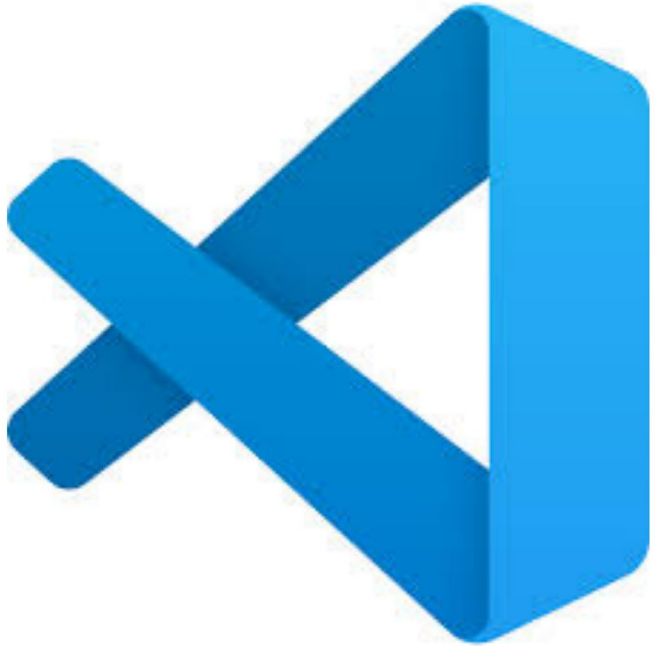
AGENDA

DigiKey

- Install Visual Studio Code
- Install the STM32 VS Code Extension
- Install the STM32 VS Code Prerequisites
- Create an STM32 C++ Project Using VS Code



Download and Install VS Code

Download Visual Studio Code

Free and built on open source. Integrated Git, debugging and extensions.

https://code.visualstudio.com/download#

Windows
Windows 10, 11

User Installer	x64 Arm64
System Installer	x64 Arm64
.zip	x64 Arm64
CLI	x64 Arm64

.deb
Debian, Ubuntu

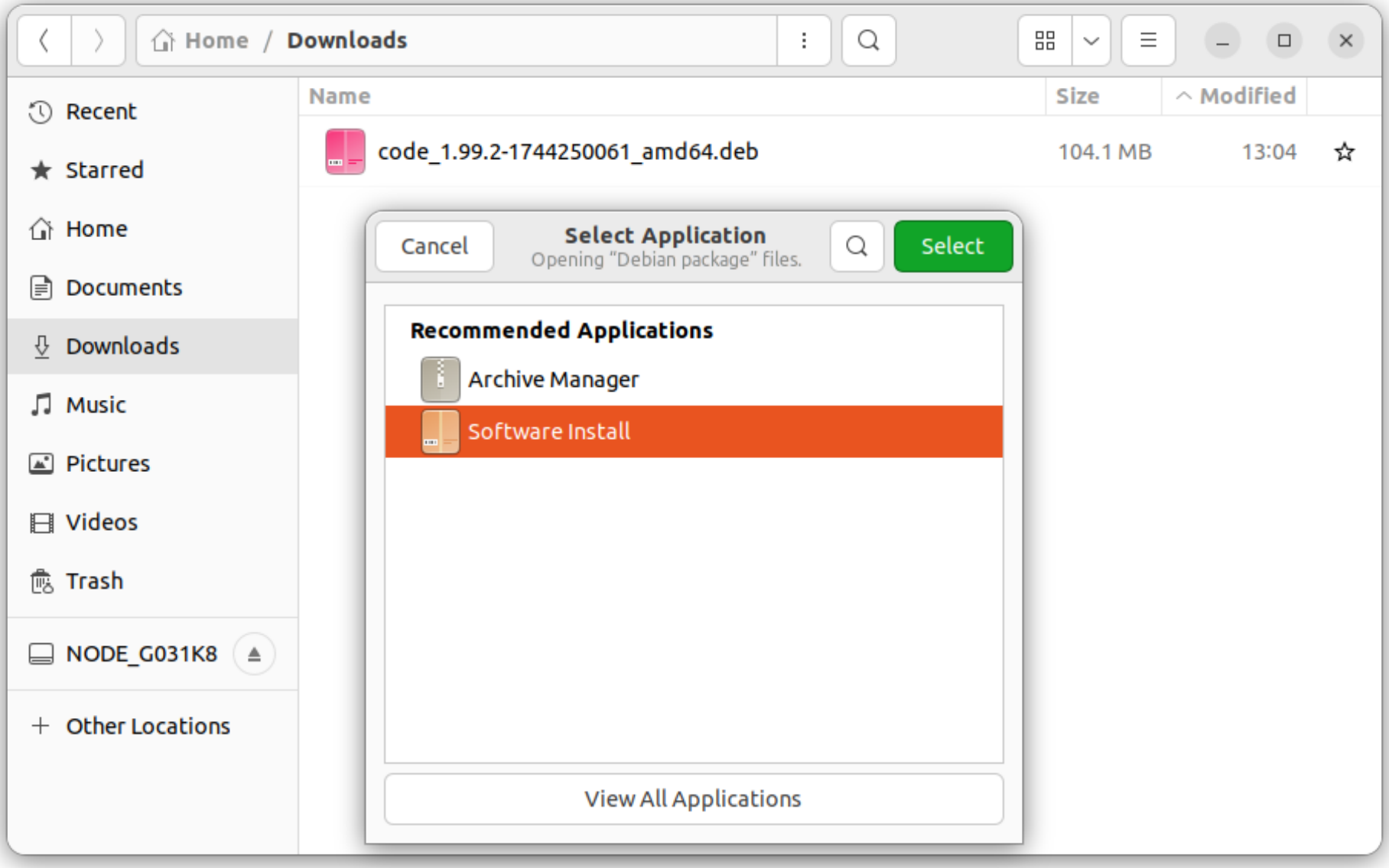
.rpm
Red Hat, Fedora, SUSE

.deb	x64 Arm32 Arm64
.rpm	x64 Arm32 Arm64
.tar.gz	x64 Arm32 Arm64
Snap	Snap Store
CLI	x64 Arm32 Arm64

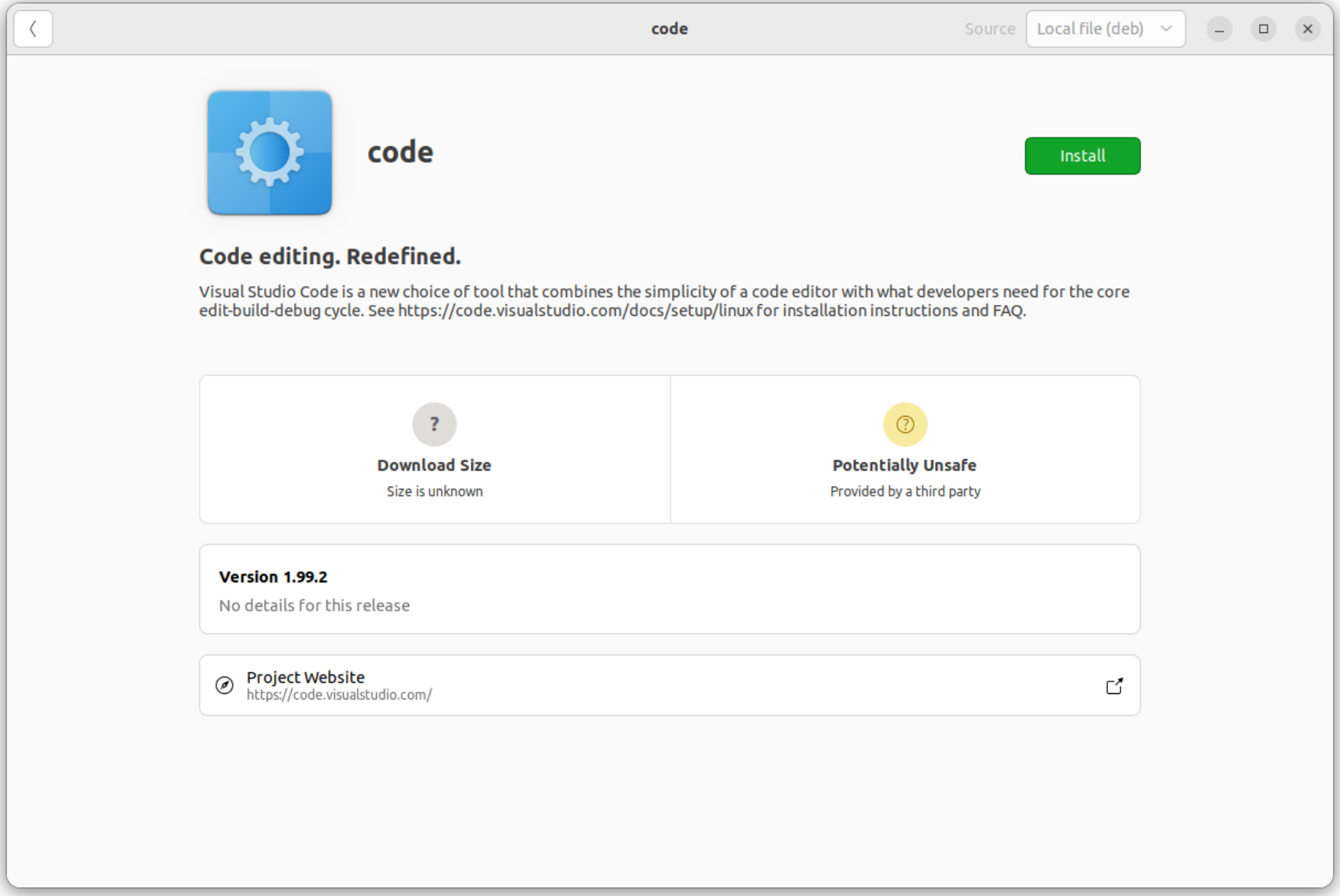
Mac
macOS 10.15+

.zip	Intel chip Apple silicon Universal
CLI	Intel chip Apple silicon

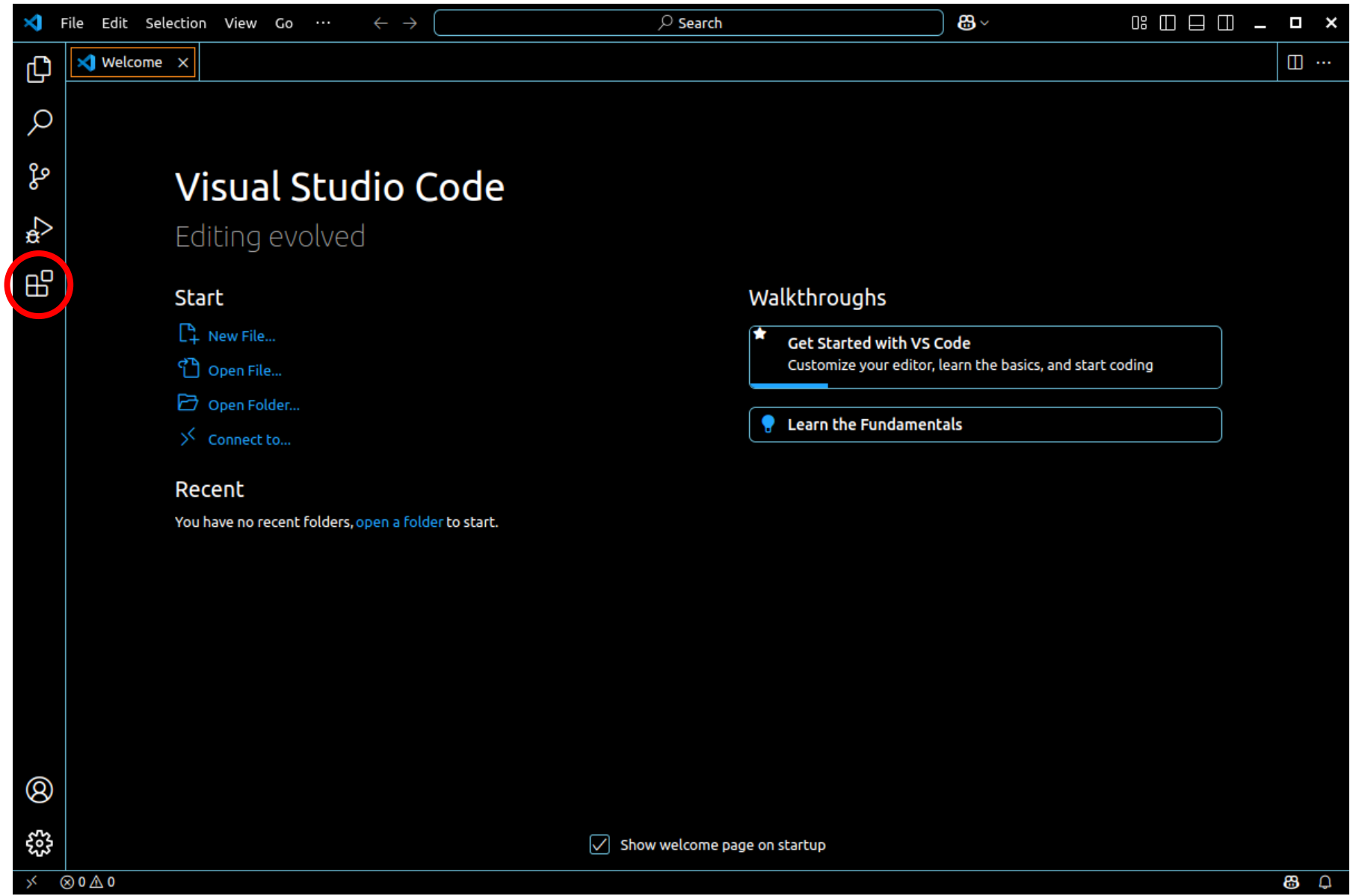
Download and Install VS Code



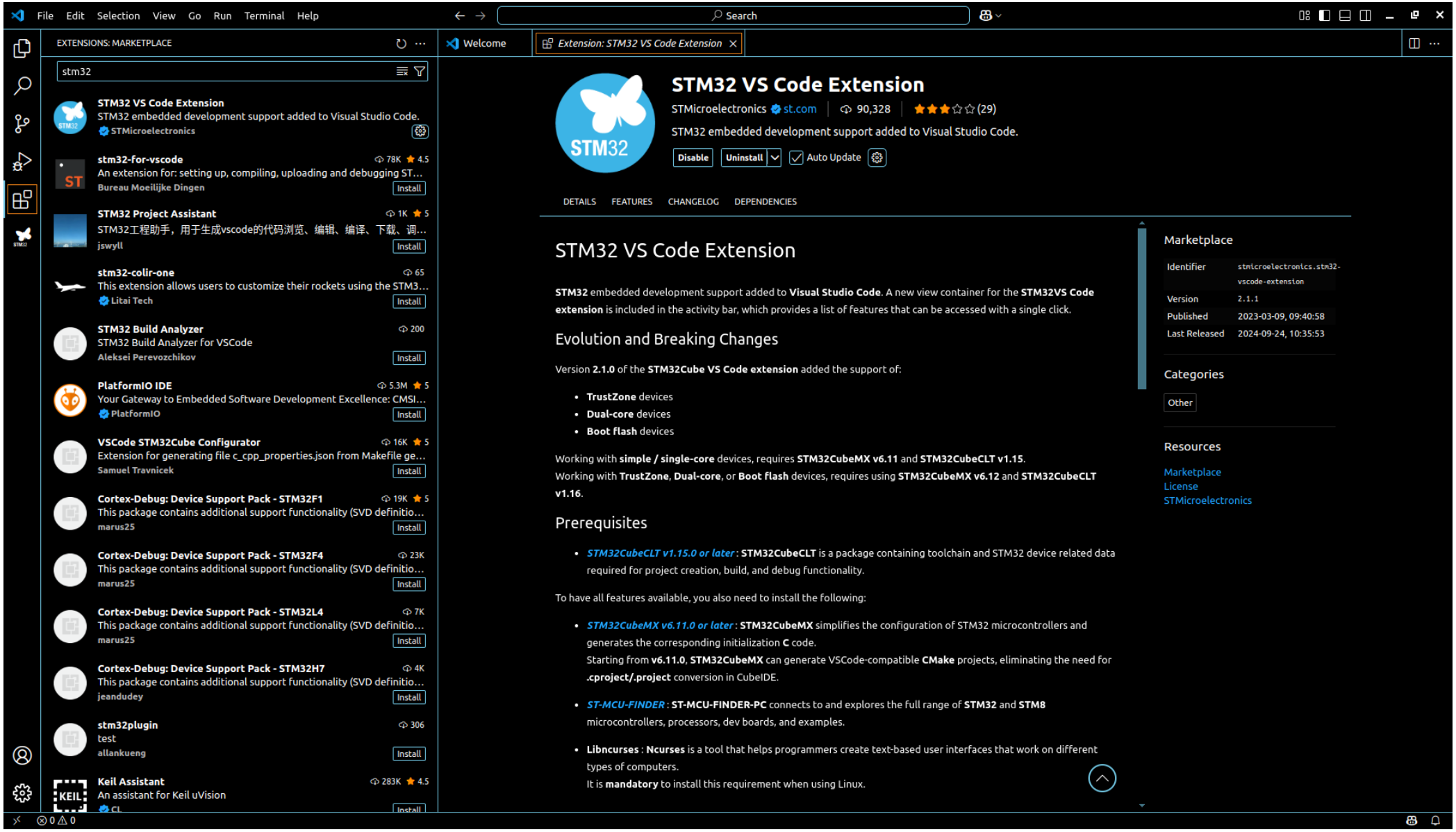
Download and Install VS Code



Install the STM32 VS Code Extension



Install the STM32 VS Code Extension



Install the STM32 VS Code Extension Prequisites

Prerequisites

- *STM32CubeCLT v1.15.0 or later* : **STM32CubeCLT** is a package containing toolchain and STM32 device related data required for project creation, build, and debug functionality.

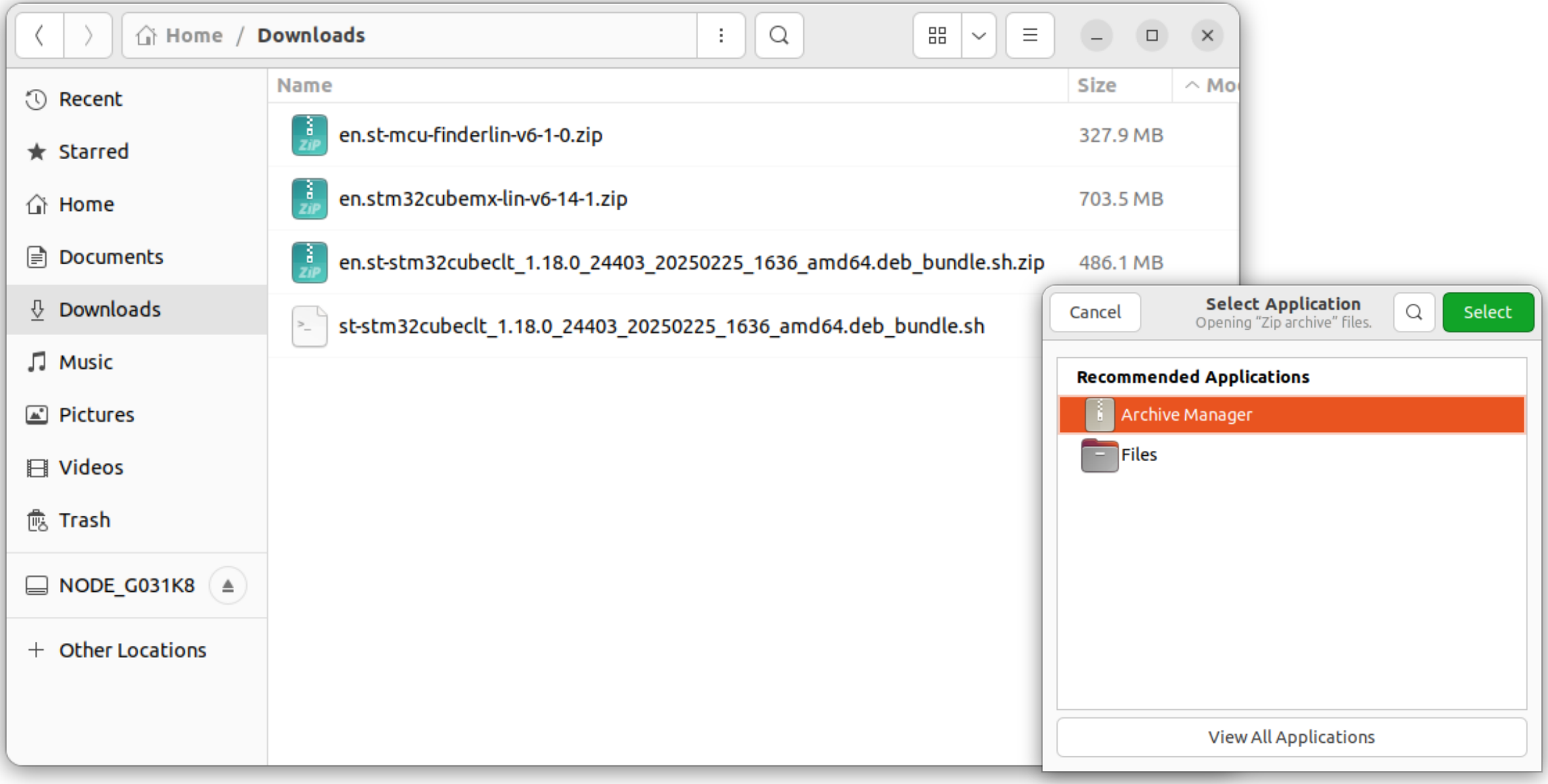
To have all features available, you also need to install the following:

- *STM32CubeMX v6.11.0 or later* : **STM32CubeMX** simplifies the configuration of STM32 microcontrollers and generates the corresponding initialization **C** code.
  Starting from **v6.11.0**, **STM32CubeMX** can generate VSCode-compatible **CMake** projects, eliminating the need for **.cproject/.project** conversion in CubeIDE.

- *ST-MCU-FINDER* : **ST-MCU-FINDER-PC** connects to and explores the full range of **STM32** and **STM8** microcontrollers, processors, dev boards, and examples.

- **Libncurses** : **Ncurses** is a tool that helps programmers create text-based user interfaces that work on different types of computers.
  It is **mandatory** to install this requirement when using Linux.

Download the STM32 VS Code Prequisites

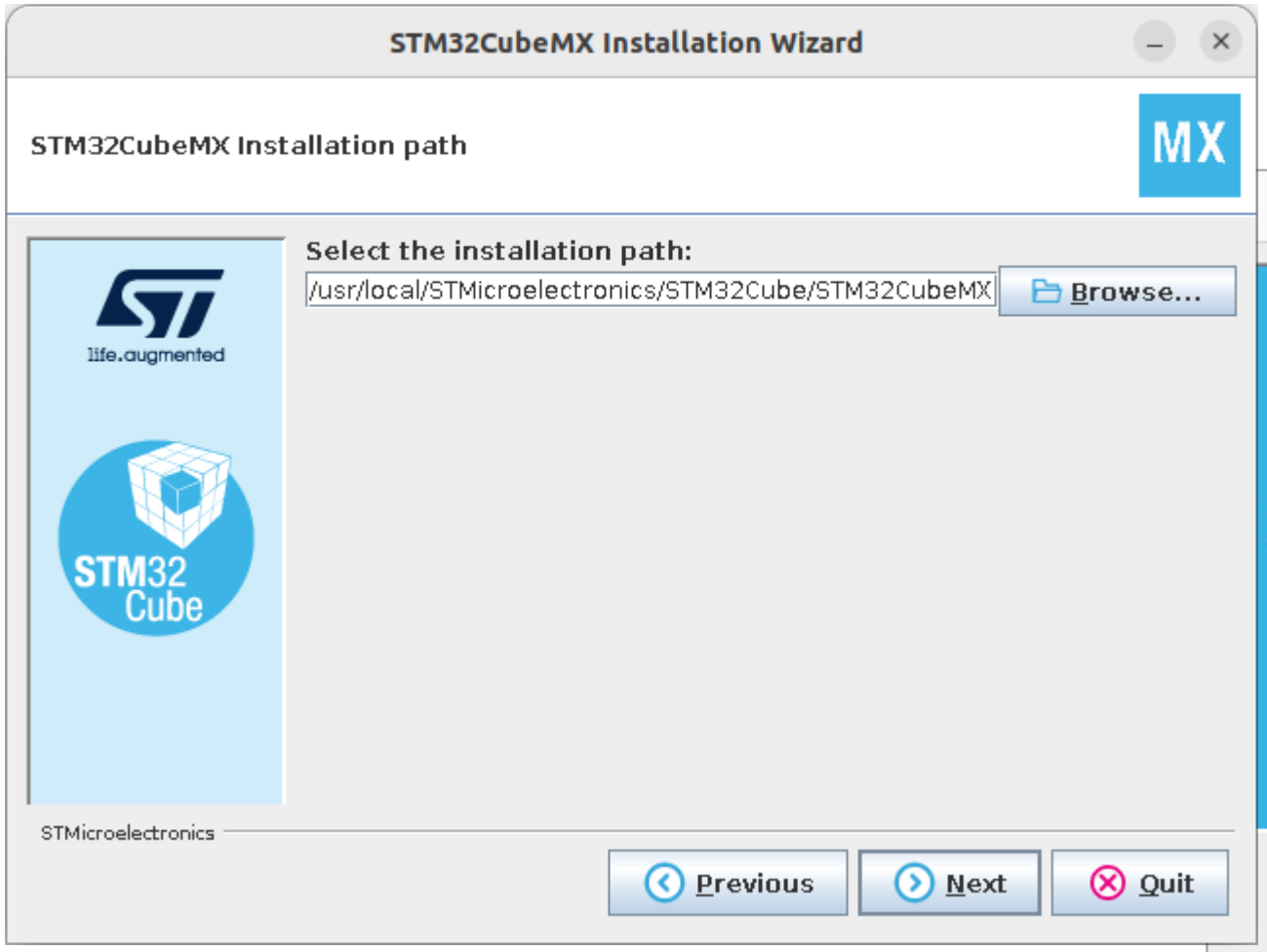


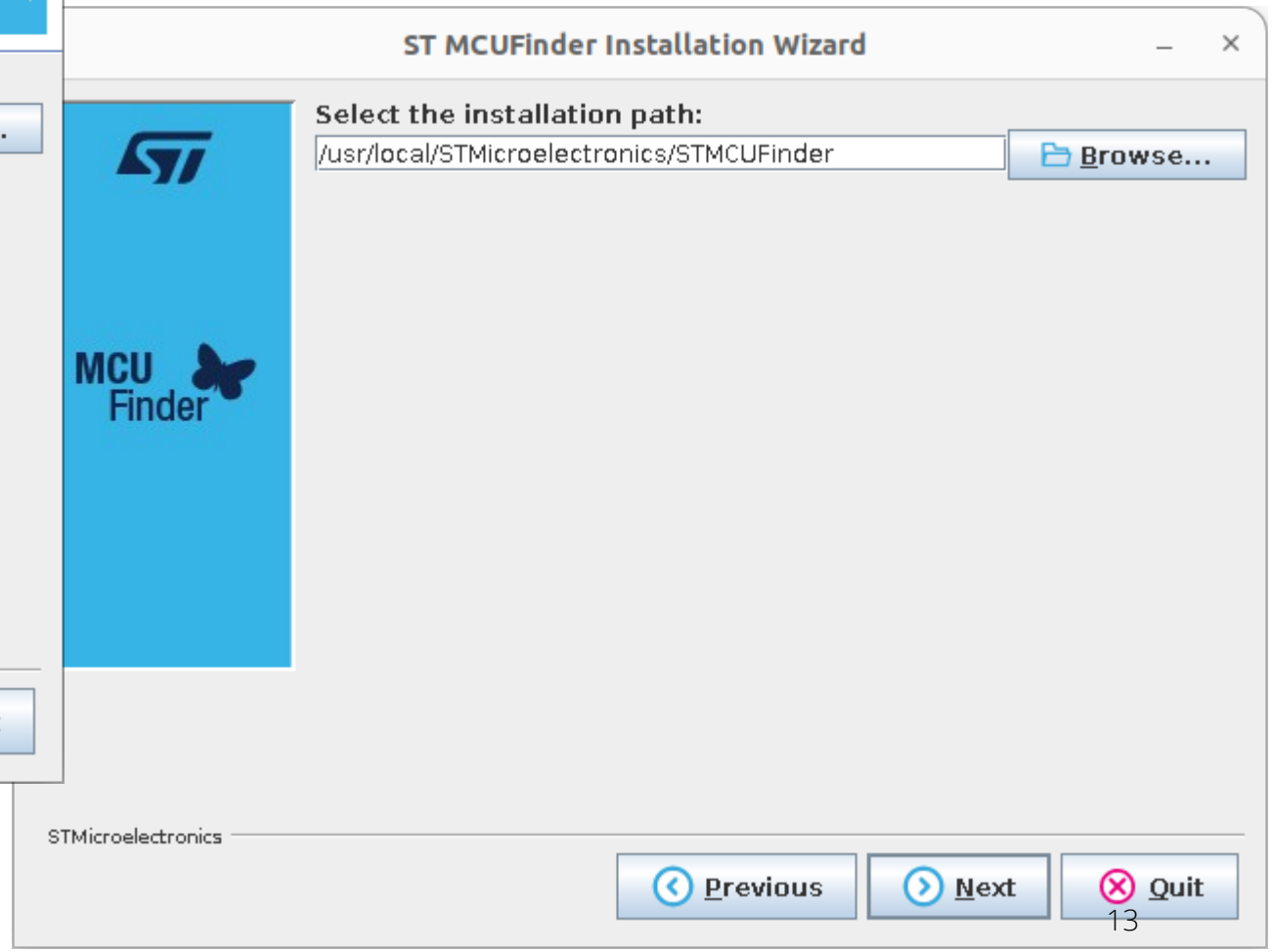
Install the Prequisites – STM32CubeCLT

```
fred@shop-ubuntu-1770: ~/Downloads
fred@shop-ubuntu-1770:~$ cd Downloads/
fred@shop-ubuntu-1770:~/Downloads$ ls -l
total 1956564
-rw-rw-r-- 1 fred fred 703471499 Apr 16 13:45 en.stm32cubemx-lin-v6-14-1.zip
-rw-rw-r-- 1 fred fred 327926737 Apr 16 13:46 en.st-mcu-finderlin-v6-1-0.zip
-rw-rw-r-- 1 fred fred 486054626 Apr 16 13:42 en.st-stm32cubeclt_1.18.0_24403_20250225_1636_amd64.deb_bundle.sh.zip
-rw-rw-r-- 1 fred fred 486054368 Feb 26 12:38 st-stm32cubeclt_1.18.0_24403_20250225_1636_amd64.deb_bundle.sh
fred@shop-ubuntu-1770:~/Downloads$ chmod +x st-stm32cubeclt_1.18.0_24403_20250225_1636_amd64.deb_bundle.sh
fred@shop-ubuntu-1770:~/Downloads$ ls -l
total 1956564
-rw-rw-r-- 1 fred fred 703471499 Apr 16 13:45 en.stm32cubemx-lin-v6-14-1.zip
-rw-rw-r-- 1 fred fred 327926737 Apr 16 13:46 en.st-mcu-finderlin-v6-1-0.zip
-rw-rw-r-- 1 fred fred 486054626 Apr 16 13:42 en.st-stm32cubeclt_1.18.0_24403_20250225_1636_amd64.deb_bundle.sh.zip
-rwxrwxr-x 1 fred fred 486054368 Feb 26 12:38 st-stm32cubeclt_1.18.0_24403_20250225_1636_amd64.deb_bundle.sh
fred@shop-ubuntu-1770:~/Downloads$
```

STM32CubeCLT (Command Line Tools)

Install the Prequisites – STM32CubeMX/STMCUFinder





Install the Prequisites – STM32CubeMX/STMCUFinder

@ext:STMicroelectronics.stm32-vscode-extension

User

- Extensions (3)
  - STM32 VS Code E... (3)
    - STM32CubeMX (1)
    - STMCUFinder (1)
    - STM32CubeCLT (1)

STM32 VSCode Extension › Project Creator: Executable Path

Absolute path to the STM32CubeMX executable

/usr/local/STMicroelectronics/STM32Cube/STM32CubeMX/STM32...

STM32 VSCode Extension › Product Finder: Executable Path

Absolute path to the STMCUFinder executable

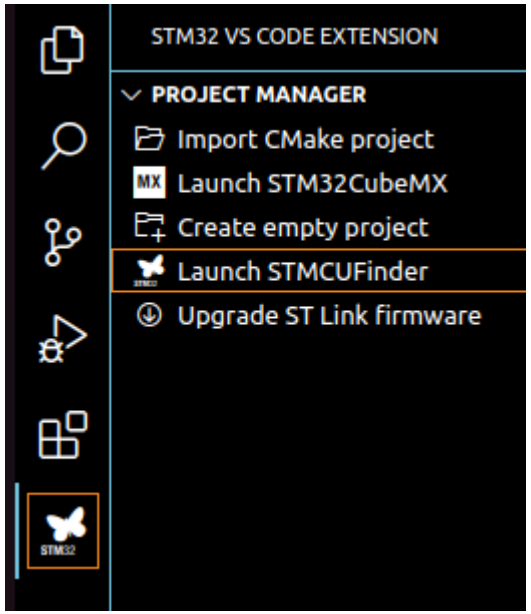
/usr/local/STMicroelectronics/STMCUFinder/STMCUFinder

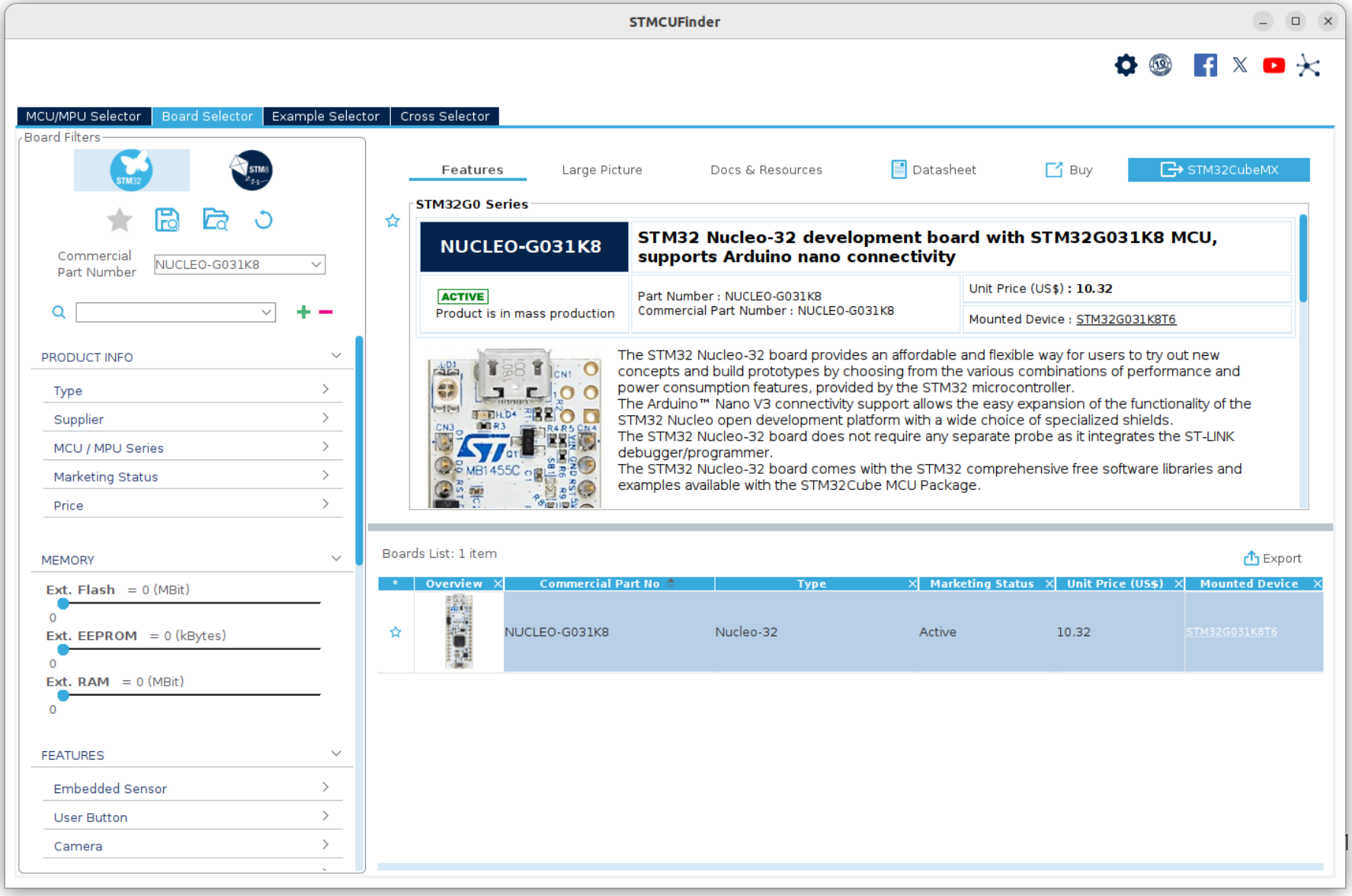
STM32 VSCode Extension › Cube CLT: Path

Absolute path to the STM32CubeCLT folder

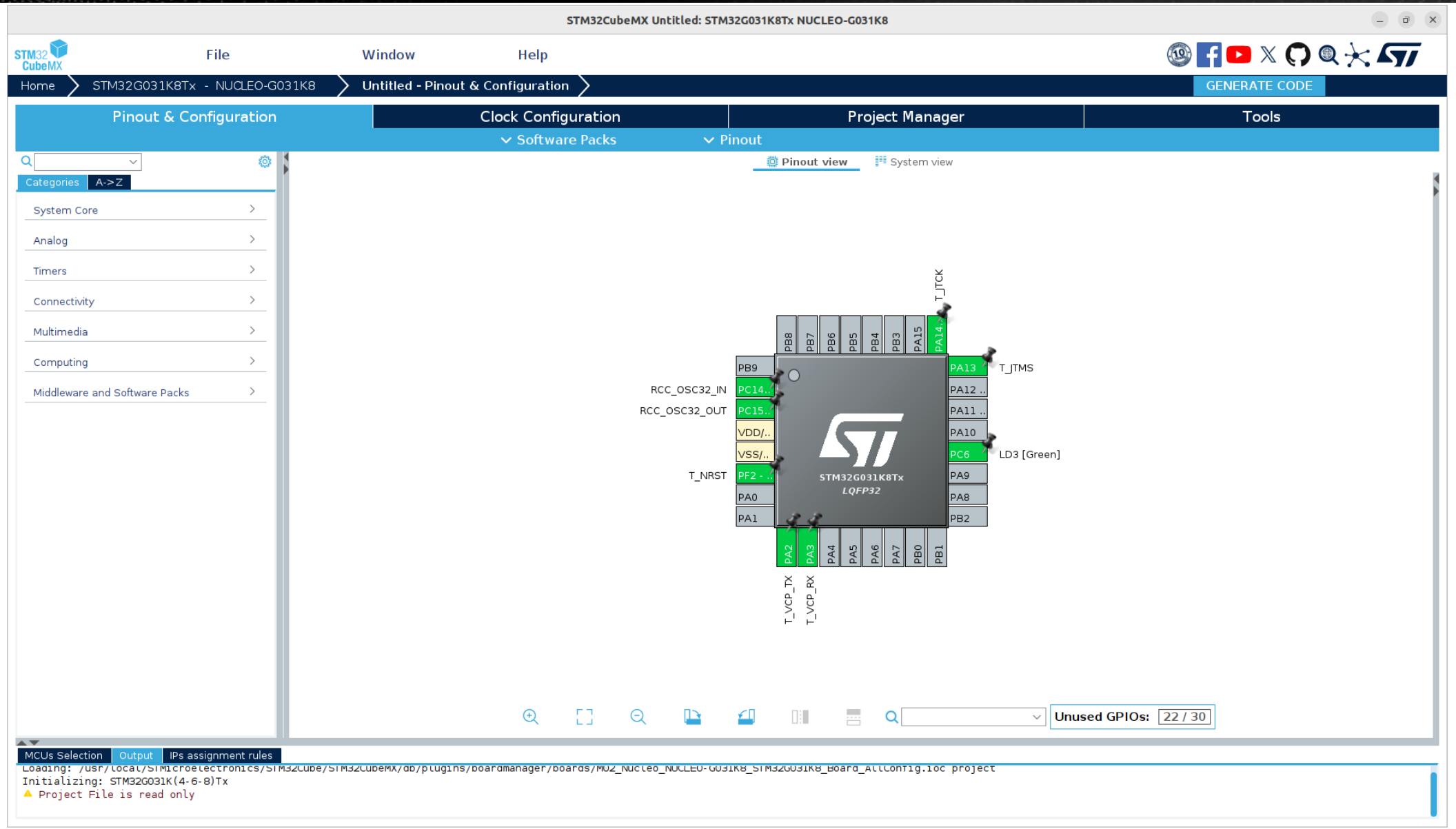
/opt/st/stm32cubeclt_1.18.0

Launch STMCUFinder





Launch STM32CubeMX



Configure the C++ Project

STM32 CubeMX File Window Help

Home > STM32G031K8Tx - NUCLEO-G031K8 > Untitled - Project Manager

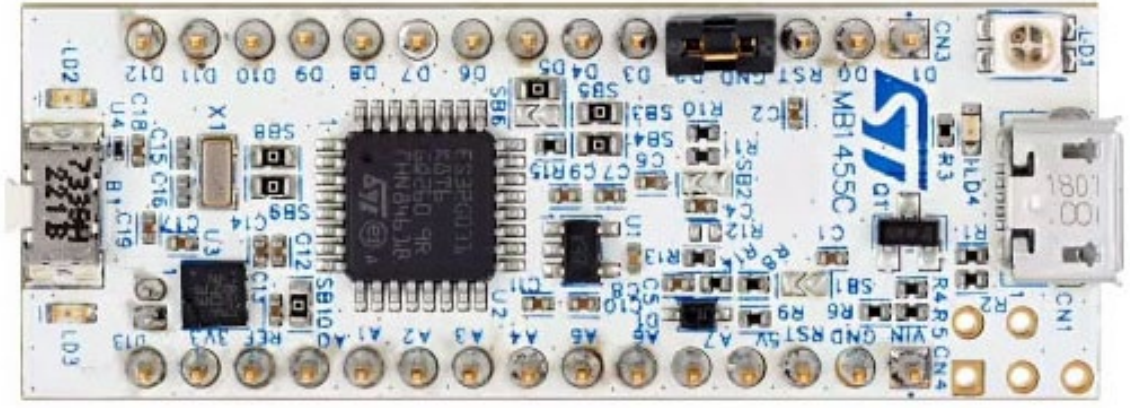
Pinout & Configuration | Clock Configuration | Project Manager

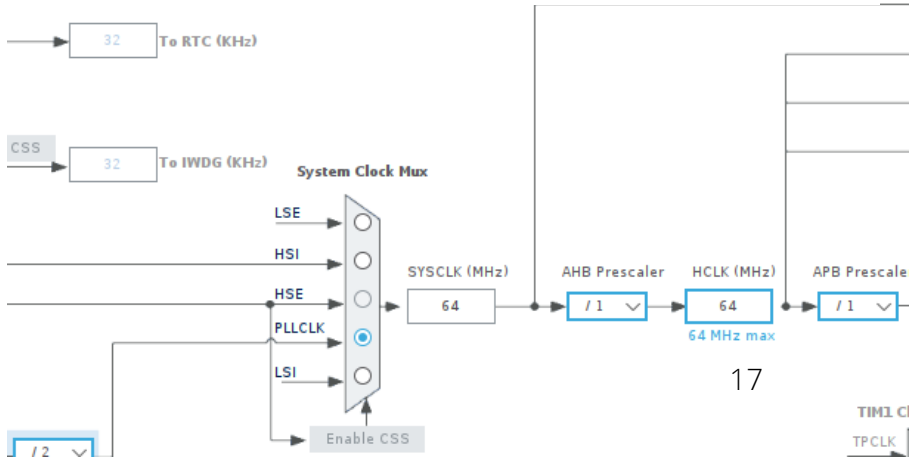
Project

Code Generator

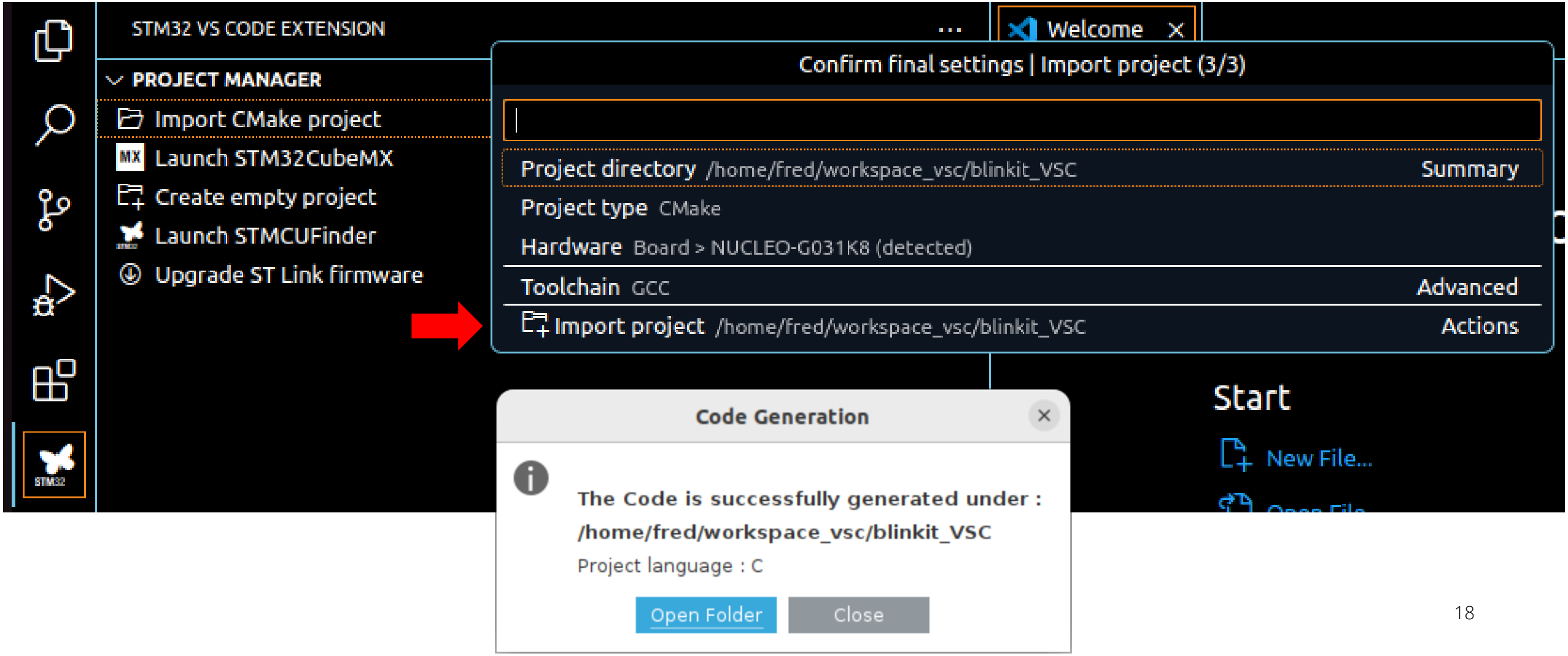
Project Settings

Project Name	blinkit_VSC
Project Location	/home/fred/workspace_vsc Browse
Application Structure	Advanced ☐ Do not generate the main()
Toolchain Folder Location	/home/fred/workspace_vsc/blinkit_VSC/
Toolchain / IDE	CMake ☐ Generate Under Root

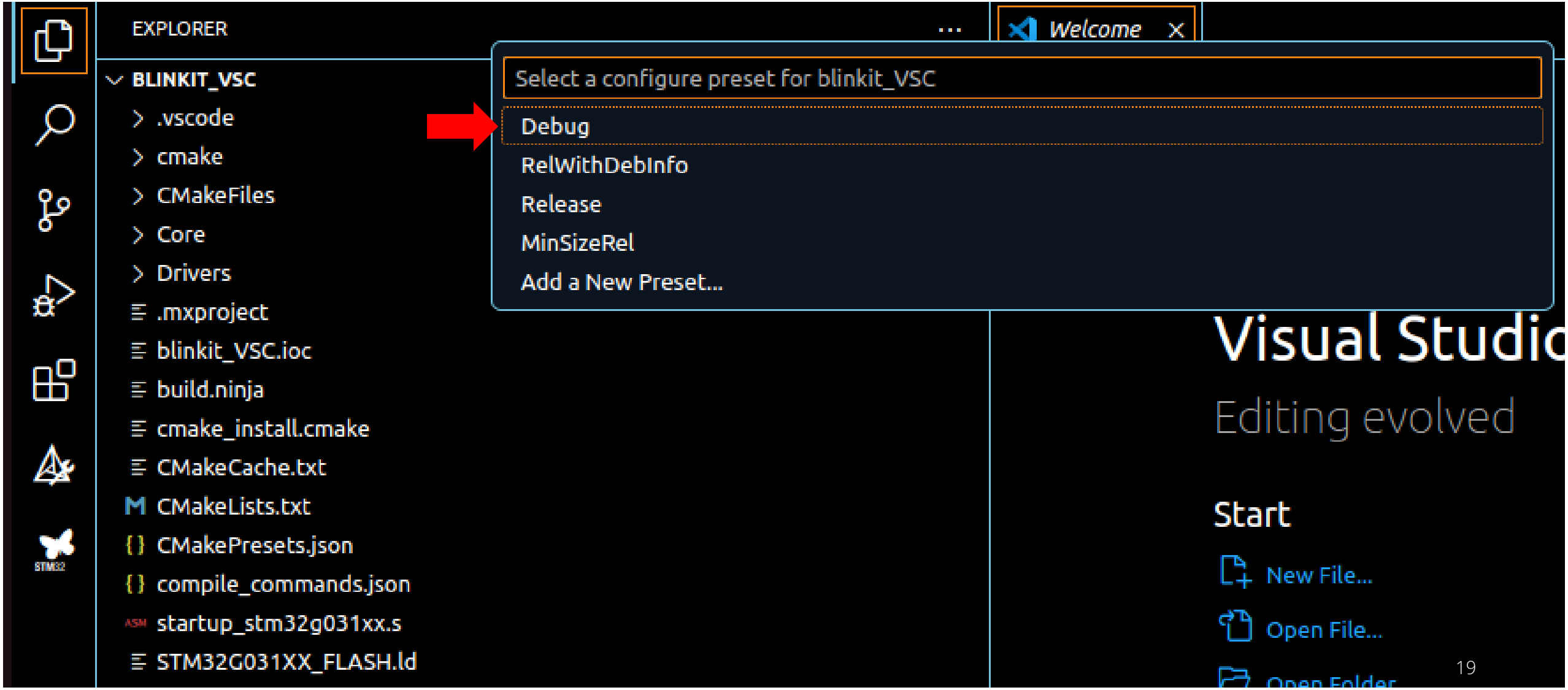




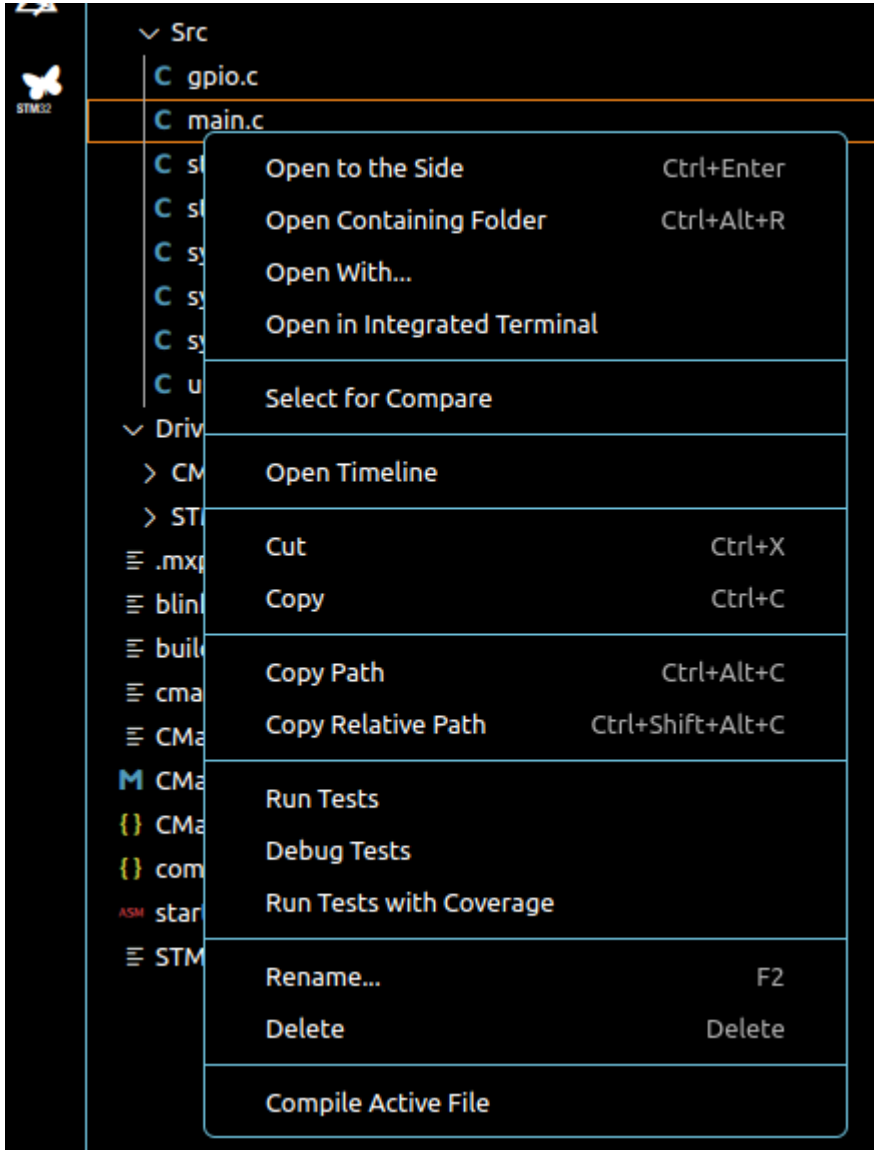
Import the C++ Project

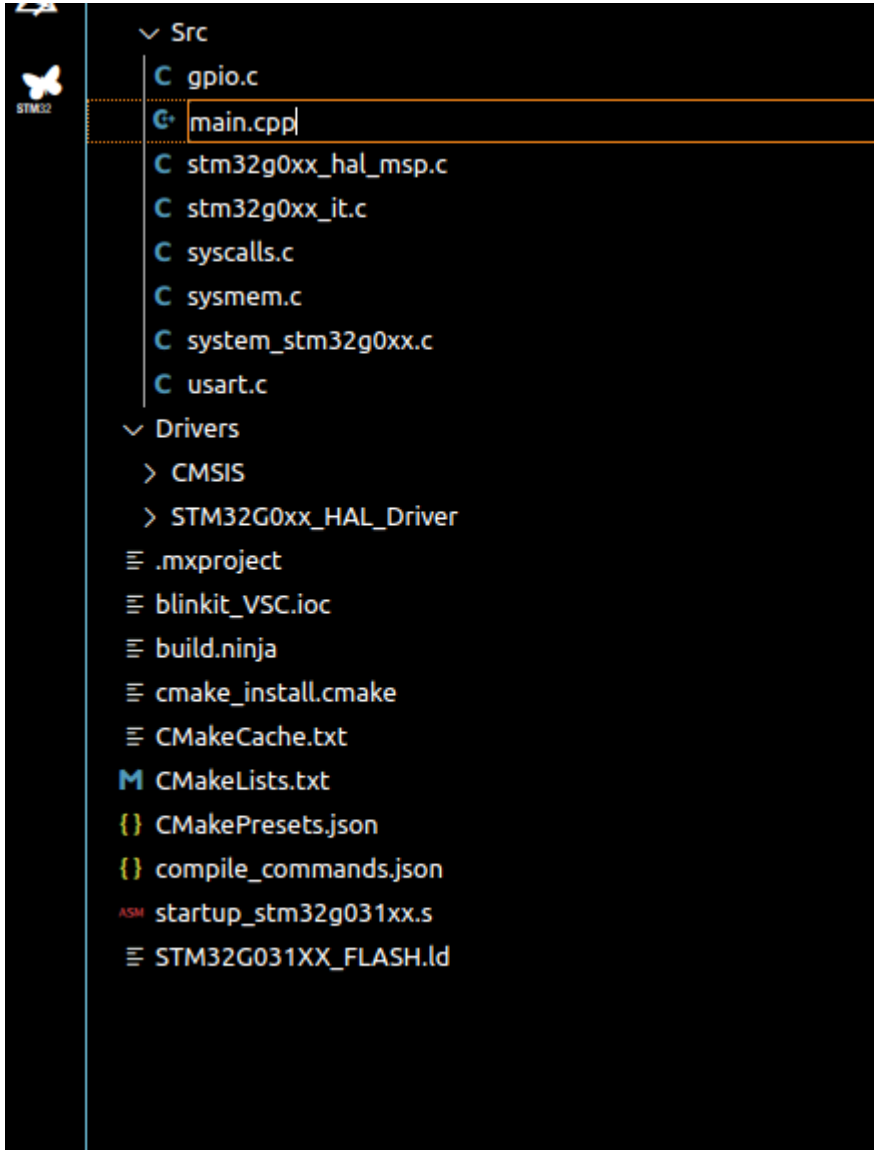


Configure the C++ Project For Debugging

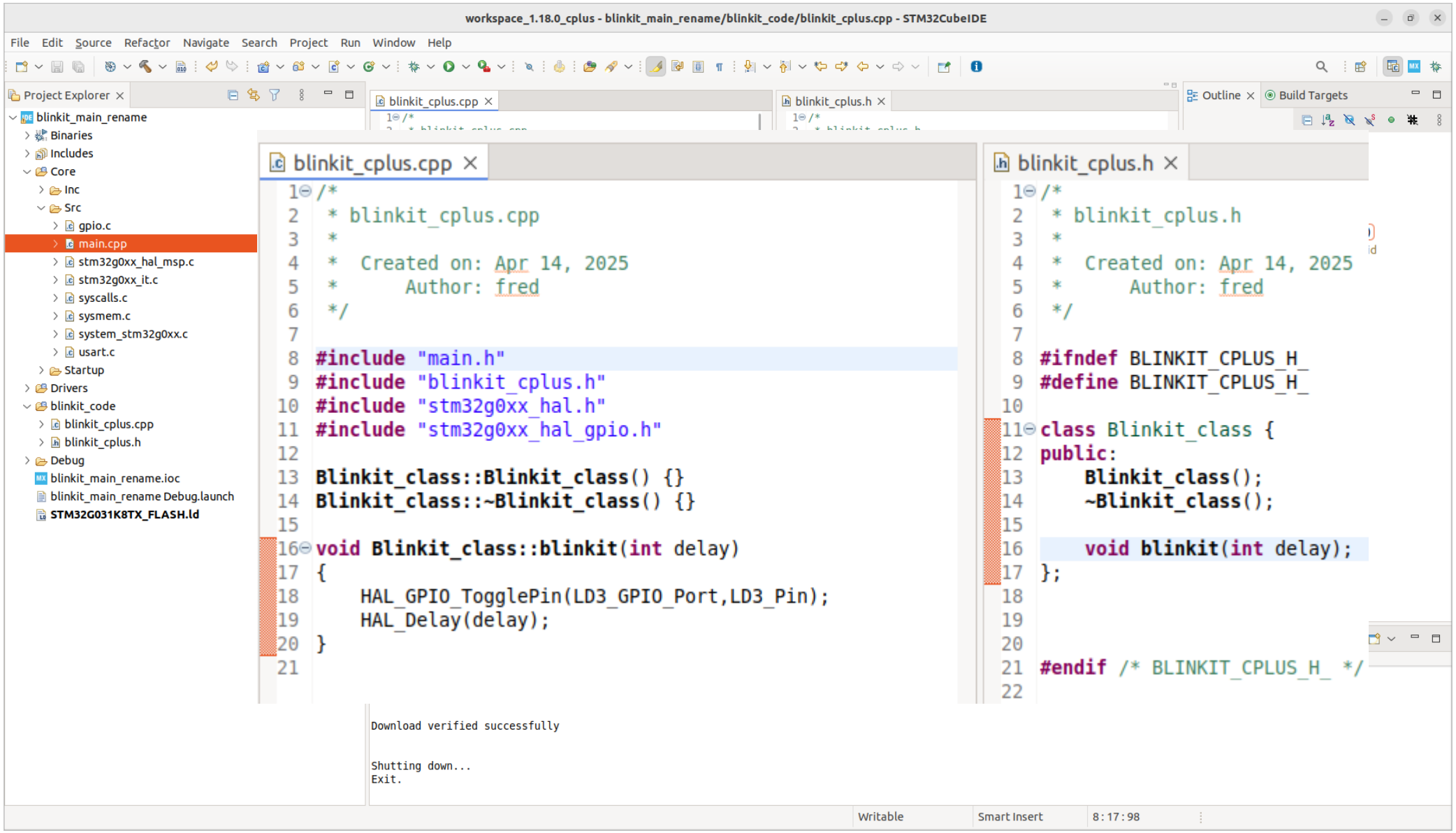


Configure the C++ Project – Create main.cpp

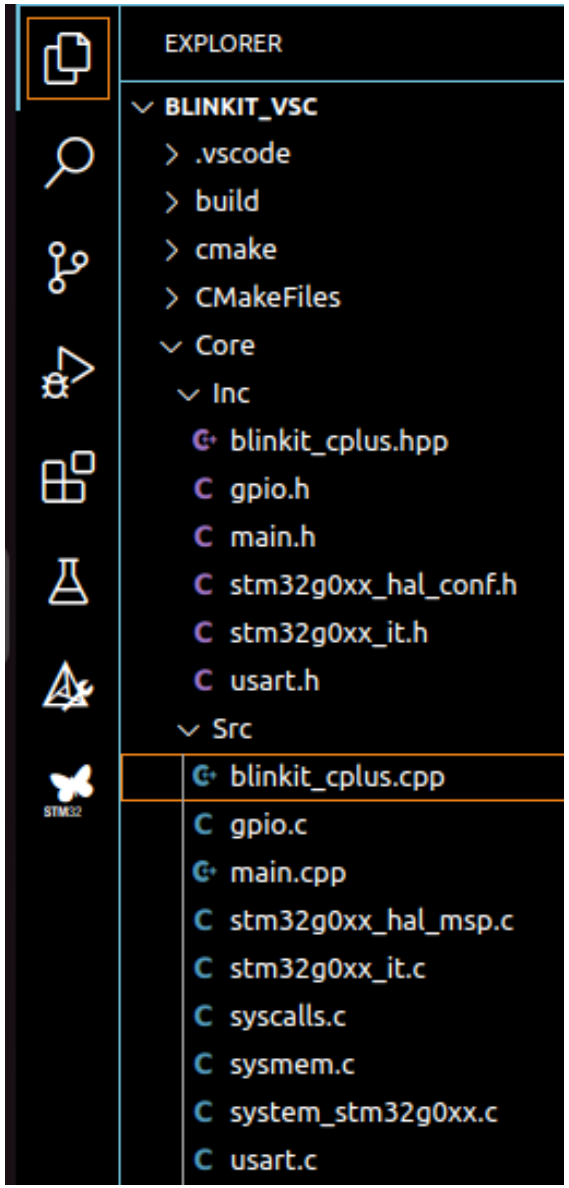


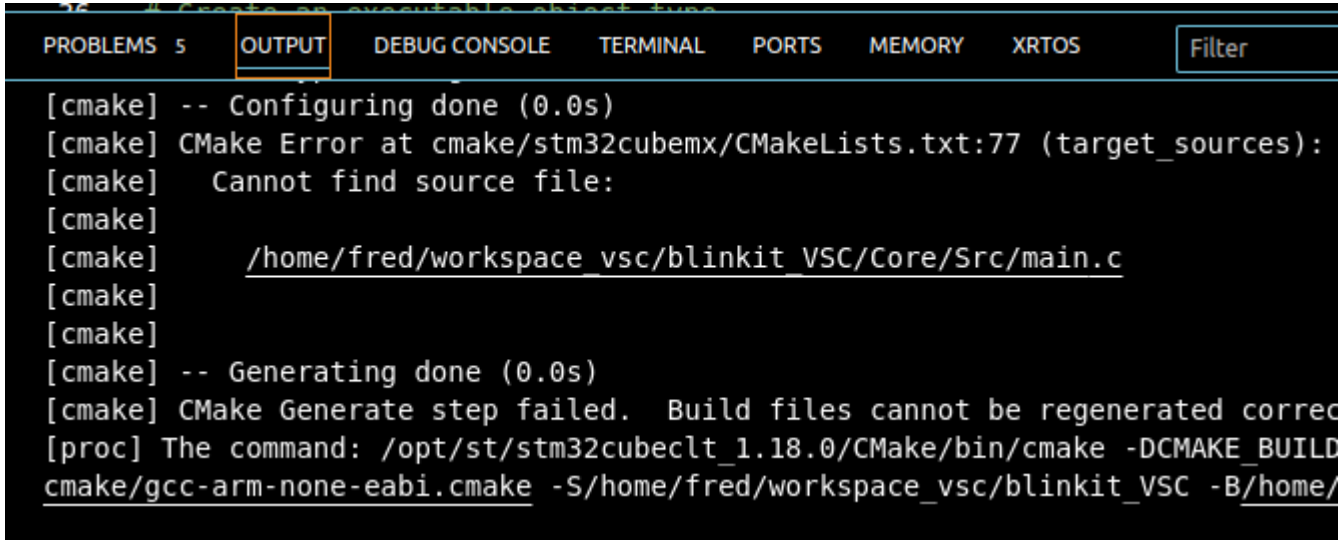


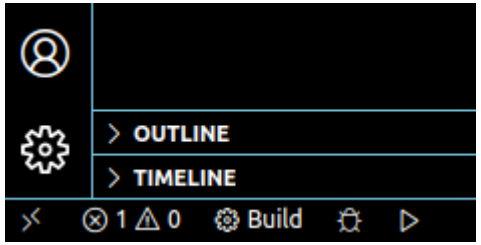
Add Files to the C++ Project

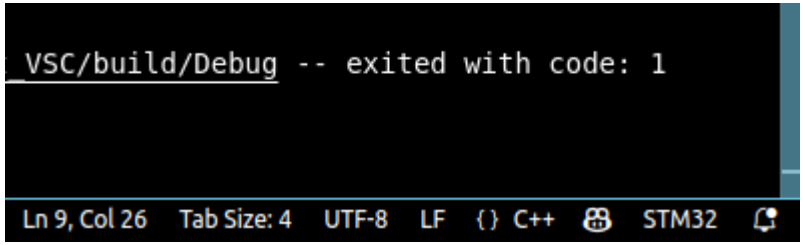


C++ Project Initial Build









Add Required Files to cmake/stm32cubemx/CMakeLists.txt

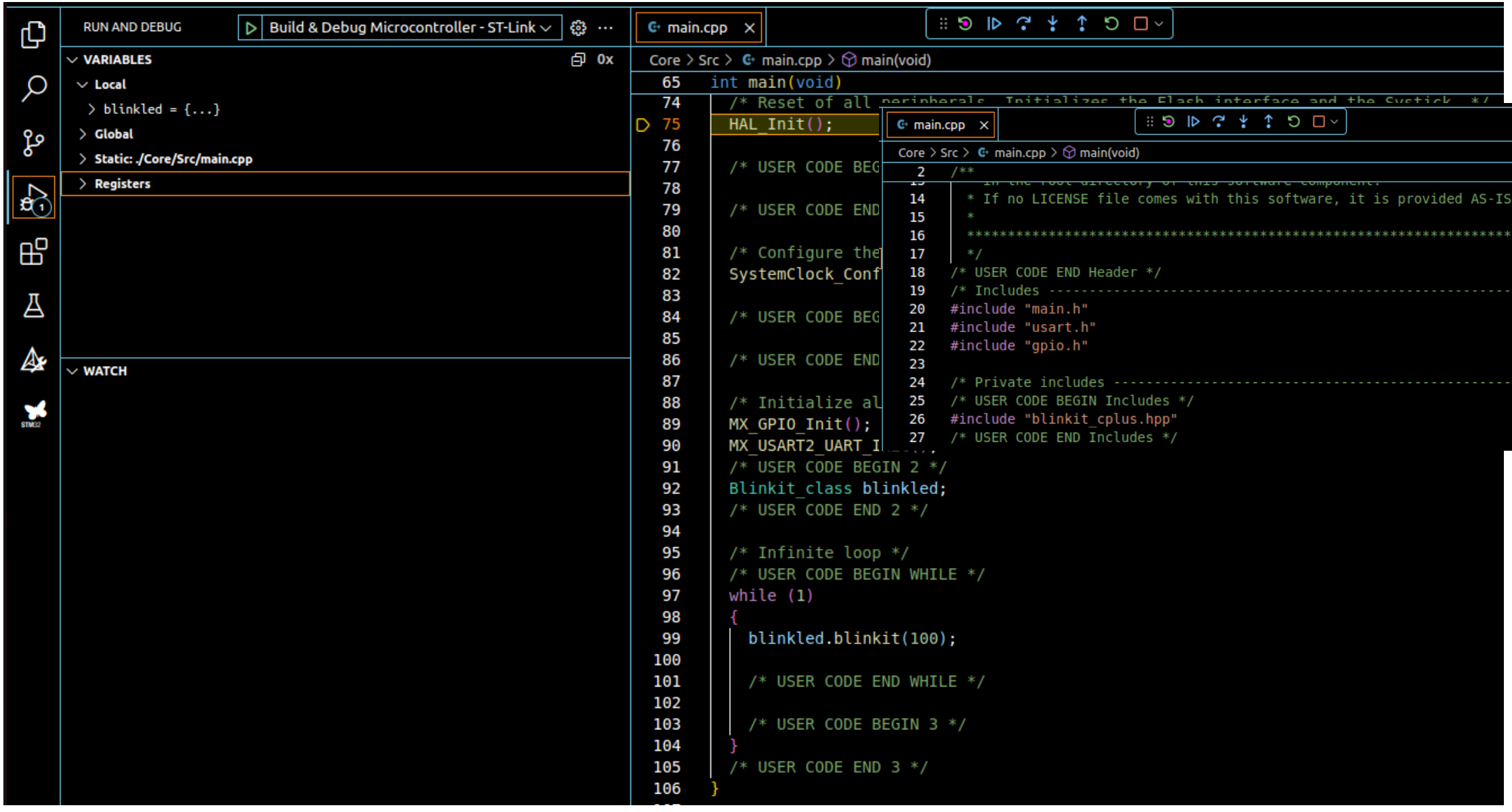
cplusplus_vs_code/CMakeLists.txt

```
PROBLEMS 5   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS   MEMORY   XRTOS   Filter
[cmake] -- Configuring done (0.0s)
[cmake] CMake Error at cmake/stm32cubemx/CMakeLists.txt:77 (target_sources):
[cmake]   Cannot find source file:
77   # Add STM32CubeMX generated application sources to the project
78   target_sources(${CMAKE_PROJECT_NAME} PRIVATE ${MX_Application_Src})
[cmake]
[cmake] -- Generating done (0.0s)
```

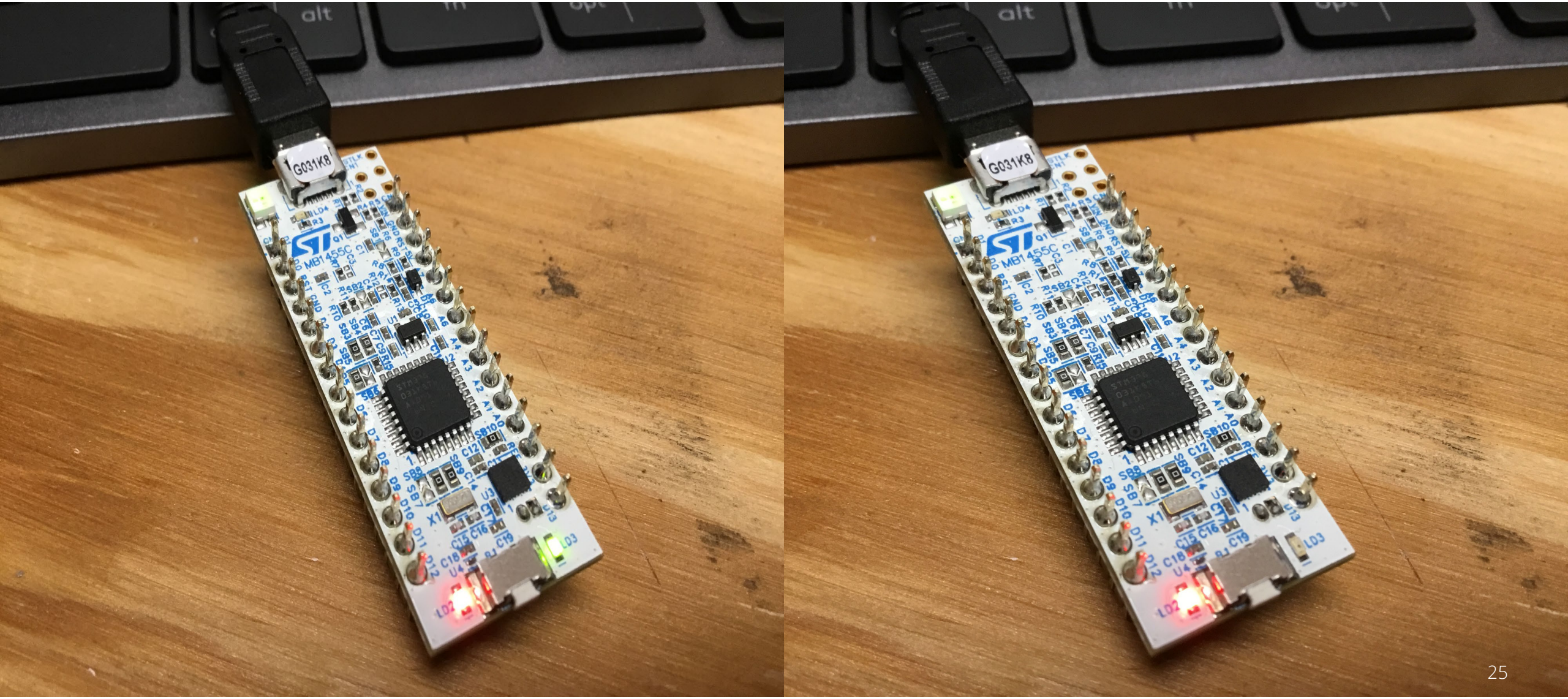
```
11  # STM32CubeMX generated include paths
12  set(MX_Include_Dirs
13      ${CMAKE_SOURCE_DIR}/Core/Inc
14      ${CMAKE_SOURCE_DIR}/Drivers/STM32G0xx_HAL_Driver/Inc
15      ${CMAKE_SOURCE_DIR}/Drivers/STM32G0xx_HAL_Driver/Inc/Legacy
16      ${CMAKE_SOURCE_DIR}/Drivers/CMSIS/Device/ST/STM32G0xx/Include
17      ${CMAKE_SOURCE_DIR}/Drivers/CMSIS/Include
18  )
19
20  # STM32CubeMX generated application sources
21  set(MX_Application_Src
22      ${CMAKE_SOURCE_DIR}/Core/Src/main.c
23      ${CMAKE_SOURCE_DIR}/Core/Src/gpio.c
24      ${CMAKE_SOURCE_DIR}/Core/Src/usart.c
25      ${CMAKE_SOURCE_DIR}/Core/Src/stm32g0xx_it.c
26      ${CMAKE_SOURCE_DIR}/Core/Src/stm32g0xx_hal_msp.c
27      ${CMAKE_SOURCE_DIR}/Core/Src/sysmem.c
28      ${CMAKE_SOURCE_DIR}/Core/Src/syscalls.c
29      ${CMAKE_SOURCE_DIR}/startup_stm32g031xx.s
30  )
```

```
11  # STM32CubeMX generated include paths
12  set(MX_Include_Dirs
13      ${CMAKE_SOURCE_DIR}/Core/Inc
14      ${CMAKE_SOURCE_DIR}/Drivers/STM32G0xx_HAL_Driver/Inc
15      ${CMAKE_SOURCE_DIR}/Drivers/STM32G0xx_HAL_Driver/Inc/Legacy
16      ${CMAKE_SOURCE_DIR}/Drivers/CMSIS/Device/ST/STM32G0xx/Include
17      ${CMAKE_SOURCE_DIR}/Drivers/CMSIS/Include
18  )
19
20  # STM32CubeMX generated application sources
21  set(MX_Application_Src
22      ${CMAKE_SOURCE_DIR}/Core/Src/main.cpp
23      ${CMAKE_SOURCE_DIR}/Core/Src/blinkit_cplus.cpp
24      ${CMAKE_SOURCE_DIR}/Core/Src/gpio.c
25      ${CMAKE_SOURCE_DIR}/Core/Src/usart.c
26      ${CMAKE_SOURCE_DIR}/Core/Src/stm32g0xx_it.c
27      ${CMAKE_SOURCE_DIR}/Core/Src/stm32g0xx_hal_msp.c
28      ${CMAKE_SOURCE_DIR}/Core/Src/sysmem.c
29      ${CMAKE_SOURCE_DIR}/Core/Src/syscalls.c
30      ${CMAKE_SOURCE_DIR}/startup_stm32g031xx.s
```

Debug the C++ Project



Debug the C++ Project



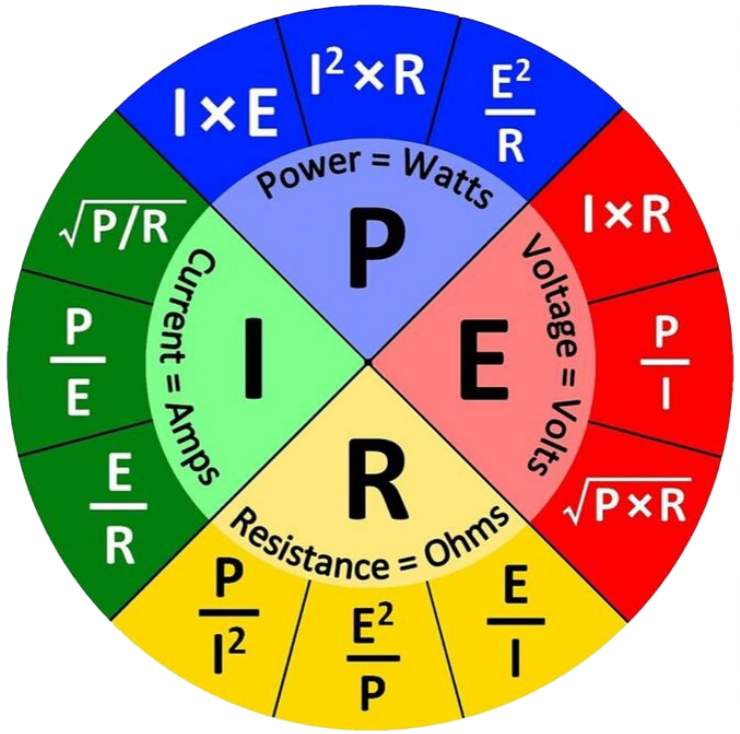
Next Time…

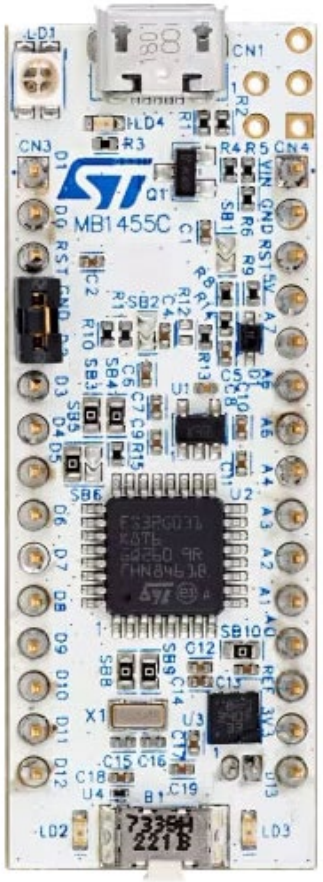
MORE TO COME..

Thank you for attending!!!

Please consider the resources below:

- **Today's Download Package**





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