Liangniu SDK cross-compilation environment description

- Liangniu SDK supports **CMake** + **ARM GCC** compilation;
- with SEGGER JLink, it can be burned and the GDB debugging server can be
- started; using the Visual Studio Code editor to load the **Cortex-Debug** plug-in for online debugging;

Some tools are limited to 64-bit versions, so this article uses Windows 10 x64 and Ubuntu 20.04 x64 for instructions.

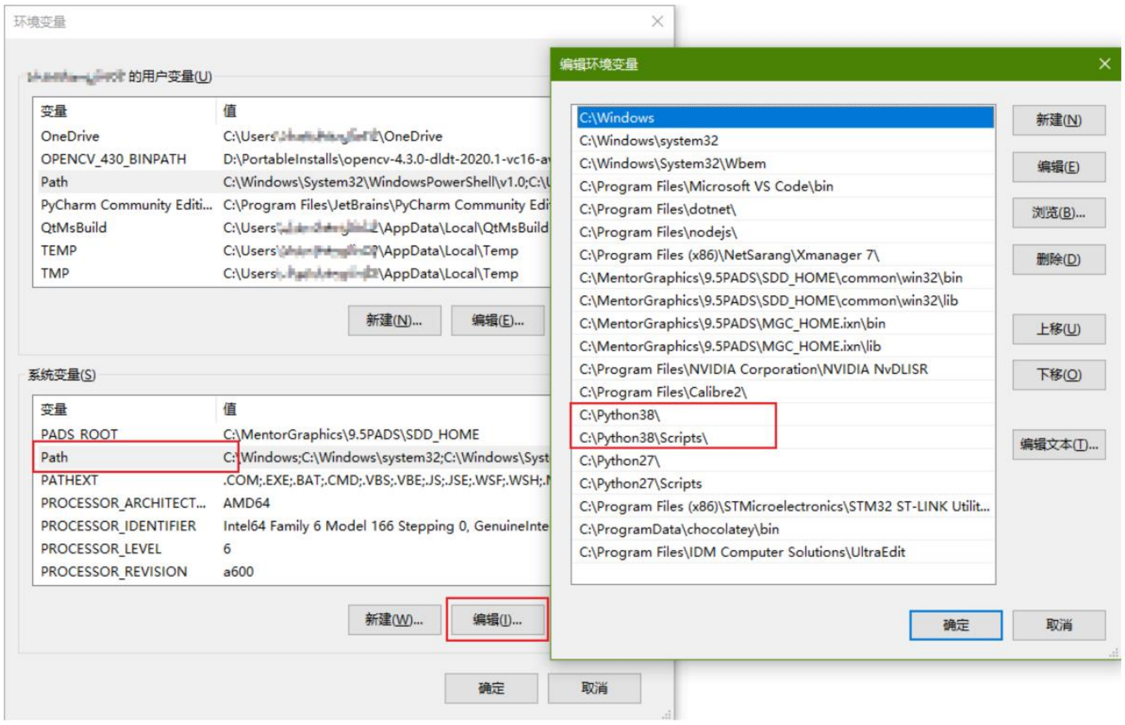
Software List

software	Introduction
Python	Use Python scripts in the build, and the SDK path cannot contain Chinese characters.
ARM GCC Compiler Suite	Use ARM's official **GNU Arm Embedded Toolchain: 10-2020-q4-major** version.
CMake	Generate the corresponding Makefile file or build.ninja file according to the selected generator.
Ninja (recommended)	A build tool similar to Make that processes **build.ninja** files generated by CMake, much faster than **Make .**
Make (Linux version)	Read the Makefile generated by CMake and call the compiler suite to generate targets.
GNU MCU Eclipse Windows Build Tools (Windows version)	It is the Windows version of GNU Make, which calls the GCC compilation suite to perform the actual compilation action and generate an executable image file.
SEGGER JLink	It can burn firmware and start GDB debugging server. **(Note that** it is recommended to install **V752d** and below)
Visual Studio Code Editor	Optional, but required for debugging with gdb.

Software Installation (Windows 10 x64 Example)

Python

1. Installation: Double-click the installation package to install it in the default mode. 2. Check: Enter python --version in the newly opened command line to check whether the installation is complete. 3. **PATH** environment variable: If step 2 is not successful, open the environment variable editor and edit the user or **Add the corresponding** Python installation path to the system's environment variable PATH. The example is as follows:


环境变量

[redacted] 的用户变量(U)

变量	值
OneDrive	C:\Users\[redacted]\OneDrive
OPENCV_430_BINPATH	D:\PortableInstalls\opencv-4.3.0-dldt-2020.1-vc16-a
Path	C:\Windows\System32\WindowsPowerShell\v1.0;C:\
PyCharm Community Editi...	C:\Program Files\JetBrains\PyCharm Community Edi
QtMsBuild	C:\Users\[redacted]\AppData\Local\QtMsBuild
TEMP	C:\Users\[redacted]\AppData\Local\Temp
TMP	C:\Users\[redacted]\AppData\Local\Temp

系统变量(S)

变量	值
PADS_ROOT	C:\MentorGraphics\9.5PADS\SDD_HOME
Path	C:\Windows;C:\Windows\system32;C:\Windows\Syst
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.
PROCESSOR_ARCHITECT...	AMD64
PROCESSOR_IDENTIFIER	Intel64 Family 6 Model 166 Stepping 0, GenuineInte
PROCESSOR_LEVEL	6
PROCESSOR_REVISION	a600

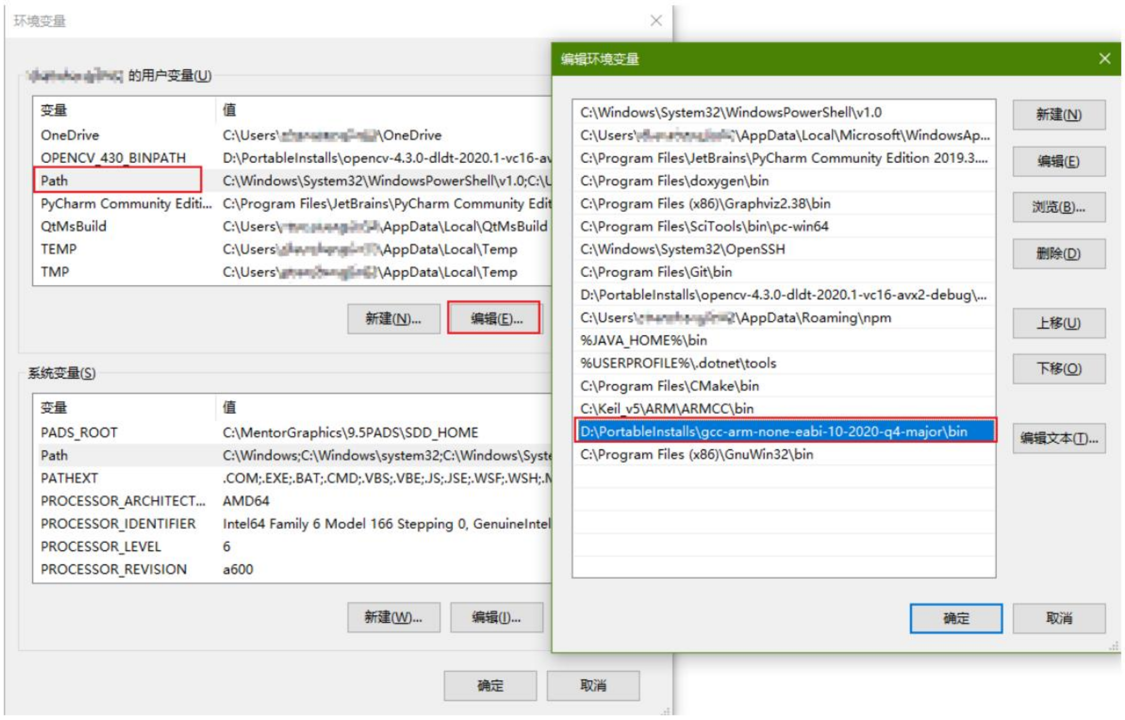
编辑环境变量

```
C:\Windows
C:\Windows\system32
C:\Windows\System32\Wbem
C:\Program Files\Microsoft VS Code\bin
C:\Program Files\dotnet\
C:\Program Files\nodejs\
C:\Program Files (x86)\NetSarang\Xmanager 7\
C:\MentorGraphics\9.5PADS\SDD_HOME\common\win32\bin
C:\MentorGraphics\9.5PADS\SDD_HOME\common\win32\lib
C:\MentorGraphics\9.5PADS\MGC_HOME.ixn\bin
C:\MentorGraphics\9.5PADS\MGC_HOME.ixn\lib
C:\Program Files\NVIDIA Corporation\NVIDIA NvDLISR
C:\Program Files\Calibre2\
C:\Python38\
C:\Python38\Scripts\
C:\Python27\
C:\Python27\Scripts
C:\Program Files (x86)\STMicroelectronics\STM32 ST-LINK Utilit...
C:\ProgramData\chocolatey\bin
C:\Program Files\IDM Computer Solutions\UltraEdit
```

ARM GCC Compiler Suite

1. Unzip: **gcc-arm-none-eabi-10-2020-q4-major-win32.zip** is a green version, no installation is required, just unzip it to a directory, for example, unzip it to the D:\PortableInstalls directory;

2. **PATH** environment variable: The example is as follows


环境变量

[redacted] 的用户变量(U)

变量	值
OneDrive	C:\Users\[redacted]\OneDrive
OPENCV_430_BINPATH	D:\PortableInstalls\opencv-4.3.0-dldt-2020.1-vc16-a
Path	C:\Windows\System32\WindowsPowerShell\v1.0;C:\
PyCharm Community Editi...	C:\Program Files\JetBrains\PyCharm Community Edi
QtMsBuild	C:\Users\[redacted]\AppData\Local\QtMsBuild
TEMP	C:\Users\[redacted]\AppData\Local\Temp
TMP	C:\Users\[redacted]\AppData\Local\Temp

系统变量(S)

变量	值
PADS_ROOT	C:\MentorGraphics\9.5PADS\SDD_HOME
Path	C:\Windows;C:\Windows\system32;C:\Windows\Syst
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.
PROCESSOR_ARCHITECT...	AMD64
PROCESSOR_IDENTIFIER	Intel64 Family 6 Model 166 Stepping 0, GenuineIntel
PROCESSOR_LEVEL	6
PROCESSOR_REVISION	a600

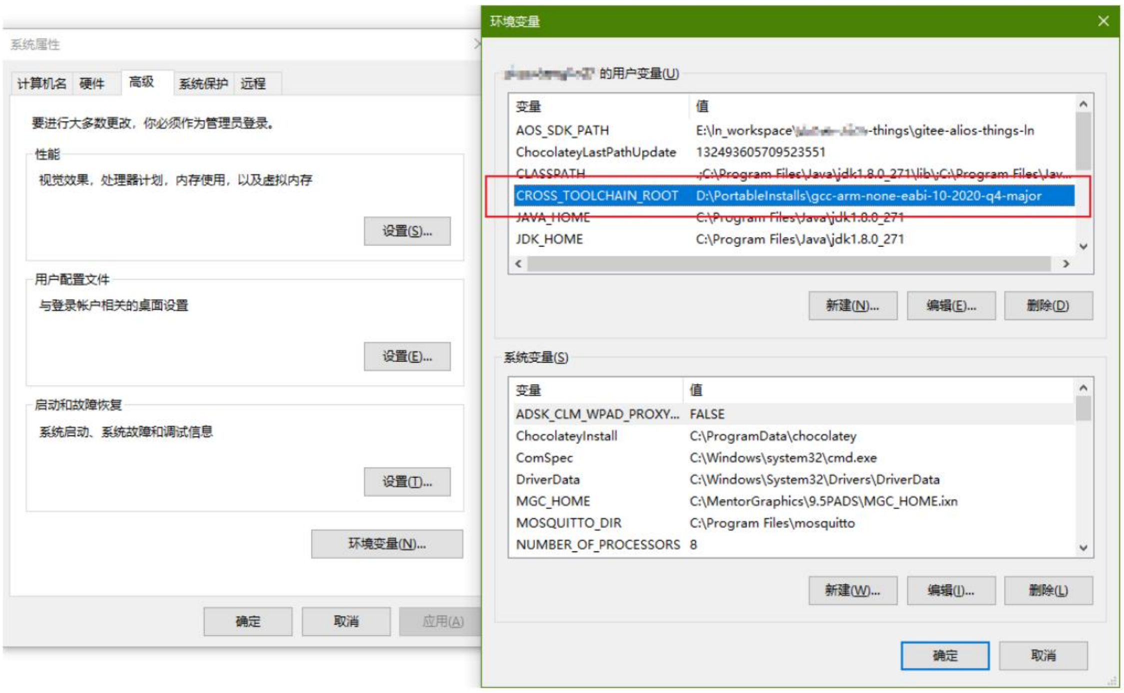
编辑环境变量

```
C:\Windows\System32\WindowsPowerShell\v1.0
C:\Users\[redacted]\AppData\Local\Microsoft\WindowsAp...
C:\Program Files\JetBrains\PyCharm Community Edition 2019.3....
C:\Program Files\doxygen\bin
C:\Program Files (x86)\Graphviz2.38\bin
C:\Program Files\SciTools\bin\pc-win64
C:\Windows\System32\OpenSSH
C:\Program Files\Git\bin
D:\PortableInstalls\opencv-4.3.0-dldt-2020.1-vc16-avx2-debug\...
C:\Users\[redacted]\AppData\Roaming\npm
%JAVA_HOME%\bin
%USERPROFILE%\.dotnet\tools
C:\Program Files\CMake\bin
C:\Keil_v5\ARM\ARMCC\bin
D:\PortableInstalls\gcc-arm-none-eabi-10-2020-q4-major\bin
C:\Program Files (x86)\GnuWin32\bin
```

3. Check: Enter arm-none-eabi-gcc --version in the newly opened command line to confirm the version information.

breath;

4. Add another environment variable **CROSS_TOOLCHAIN_ROOT, its value is D:\PortableInstalls\gcc-arm-none-eabi-10-2020-q4-major, as shown below:**



系统属性

计算机名 硬件 高级 系统保护 远程

要进行大多数更改，你必须作为管理员登录。

性能

视觉效果，处理器计划，内存使用，以及虚拟内存

设置(S)...

用户配置文件

与登录帐户相关的桌面设置

设置(E)...

启动和故障恢复

系统启动、系统故障和调试信息

设置(T)...

环境变量(N)...

确定 取消 应用(A)

环境变量

[redacted] 的用户变量(U)

变量	值
AOS_SDK_PATH	E:\ln_workspace\[redacted]-things\gitee-alios-things-ln
ChocolateyLastPathUpdate	132493605709523551
CLASSPATH	.;C:\Program Files\Java\jdk1.8.0_271\lib\;C:\Program Files\Jav...
CROSS_TOOLCHAIN_ROOT	D:\PortableInstalls\gcc-arm-none-eabi-10-2020-q4-major
JAVA_HOME	C:\Program Files\Java\jdk1.8.0_271
JDK_HOME	C:\Program Files\Java\jdk1.8.0_271

新建(N)... 编辑(E)... 删除(D)

系统变量(S)

变量	值
ADSK_CLM_WPAD_PROXY...	FALSE
ChocolateyInstall	C:\ProgramData\chocolatey
ComSpec	C:\Windows\system32\cmd.exe
DriverData	C:\Windows\System32\Drivers\DriverData
MGC_HOME	C:\MentorGraphics\9.5PADS\MGC_HOME.ixn
MOSQUITTO_DIR	C:\Program Files\mosquitto
NUMBER_OF_PROCESSORS	8

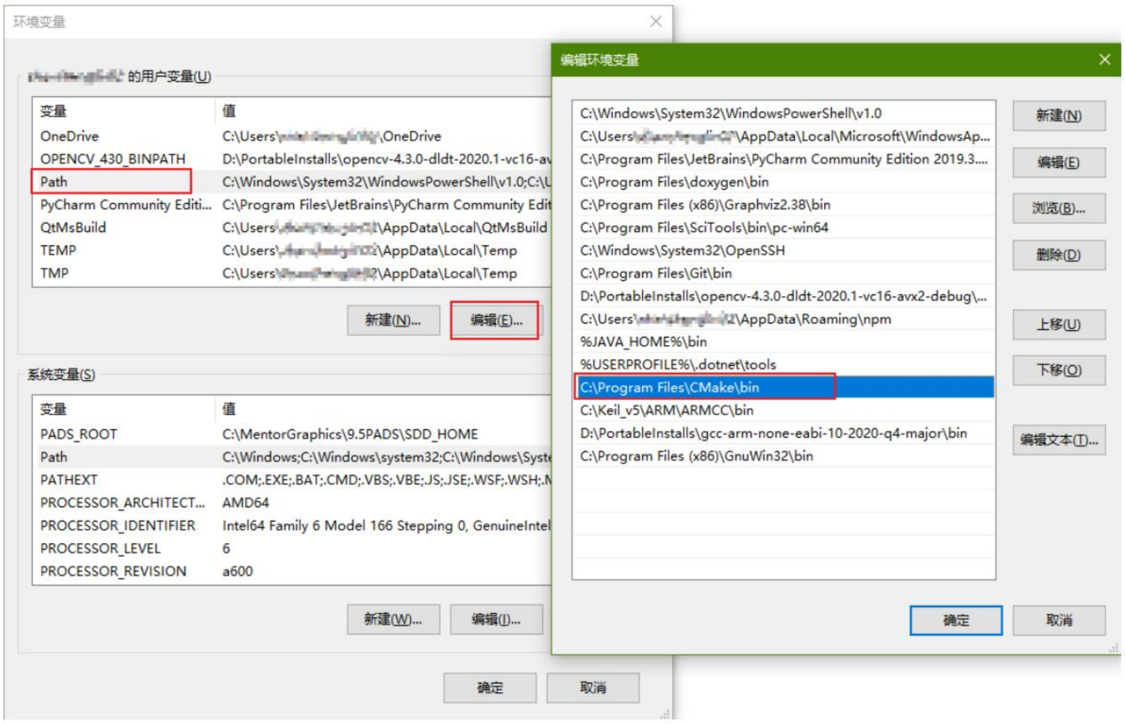
新建(W)... 编辑(I)... 删除(L)

确定 取消

CMake

1. Installation: Double-click the installation package to install it in the default

mode; 2. **PATH** environment variable: The example is as follows



环境变量

[redacted] 的用户变量(U)

变量	值
OneDrive	C:\Users\[redacted]\OneDrive
OPENCV_430_BINPATH	D:\PortableInstalls\opencv-4.3.0-dldt-2020.1-vc16-av
Path	C:\Windows\System32\WindowsPowerShell\v1.0;C:\U
PyCharm Community Editi...	C:\Program Files\JetBrains\PyCharm Community Edit
QtMsBuild	C:\Users\[redacted]\AppData\Local\QtMsBuild
TEMP	C:\Users\[redacted]\AppData\Local\Temp
TMP	C:\Users\[redacted]\AppData\Local\Temp

新建(N)... 编辑(E)...

系统变量(S)

变量	值
PADS_ROOT	C:\MentorGraphics\9.5PADS\SDD_HOME
Path	C:\Windows;C:\Windows\system32;C:\Windows\Syste
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.M
PROCESSOR_ARCHITECT...	AMD64
PROCESSOR_IDENTIFIER	Intel64 Family 6 Model 166 Stepping 0, GenuineIntel
PROCESSOR_LEVEL	6
PROCESSOR_REVISION	a600

新建(W)... 编辑(I)...

确定 取消

编辑环境变量

```
C:\Windows\System32\WindowsPowerShell\v1.0
C:\Users\[redacted]\AppData\Local\Microsoft\WindowsAp...
C:\Program Files\JetBrains\PyCharm Community Edition 2019.3....
C:\Program Files\doxygen\bin
C:\Program Files (x86)\Graphviz2.38\bin
C:\Program Files\SciTools\bin\pc-win64
C:\Windows\System32\OpenSSH
C:\Program Files\Git\bin
D:\PortableInstalls\opencv-4.3.0-dldt-2020.1-vc16-avx2-debug\...
C:\Users\[redacted]\AppData\Roaming\npm
%JAVA_HOME%\bin
%USERPROFILE%\.dotnet\tools
C:\Program Files\CMake\bin
C:\Keil_v5\ARM\ARMCC\bin
D:\PortableInstalls\gcc-arm-none-eabi-10-2020-q4-major\bin
C:\Program Files (x86)\GnuWin32\bin
```

新建(N) 编辑(E) 浏览(B)... 删除(D) 上移(U) 下移(O) 编辑文本(T)...

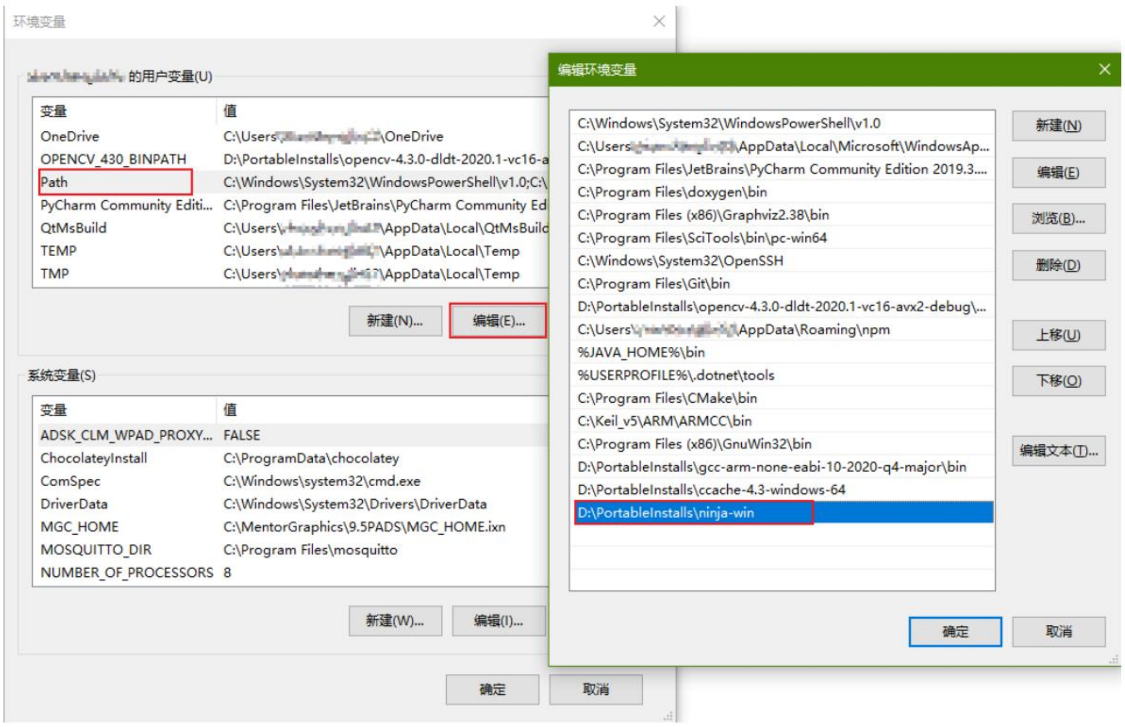
确定 取消

3. Check: Enter `cmake --version` in the newly opened command line to confirm the version information;

Ninja

1. Installation: Green version, just unzip it to a directory;

2. **PATH** environment variable: The example is as follows:



变量	值
OneDrive	C:\Users\[redacted]\OneDrive
OPENCV_430_BINPATH	D:\PortableInstalls\opencv-4.3.0-dldt-2020.1-vc16-a
Path	C:\Windows\System32\WindowsPowerShell\v1.0;C:\
PyCharm Community Editi...	C:\Program Files\JetBrains\PyCharm Community Ed
QtMsBuild	C:\Users\[redacted]\AppData\Local\QtMsBuild
TEMP	C:\Users\[redacted]\AppData\Local\Temp
TMP	C:\Users\[redacted]\AppData\Local\Temp

变量	值
ADSK_CLM_WPAD_PROXY...	FALSE
ChocolateyInstall	C:\ProgramData\chocolatey
ComSpec	C:\Windows\system32\cmd.exe
DriverData	C:\Windows\System32\Drivers\DriverData
MGC_HOME	C:\MentorGraphics\9.5PADS\MGC_HOME.ixn
MOSQUITTO_DIR	C:\Program Files\mosquitto
NUMBER_OF_PROCESSORS	8

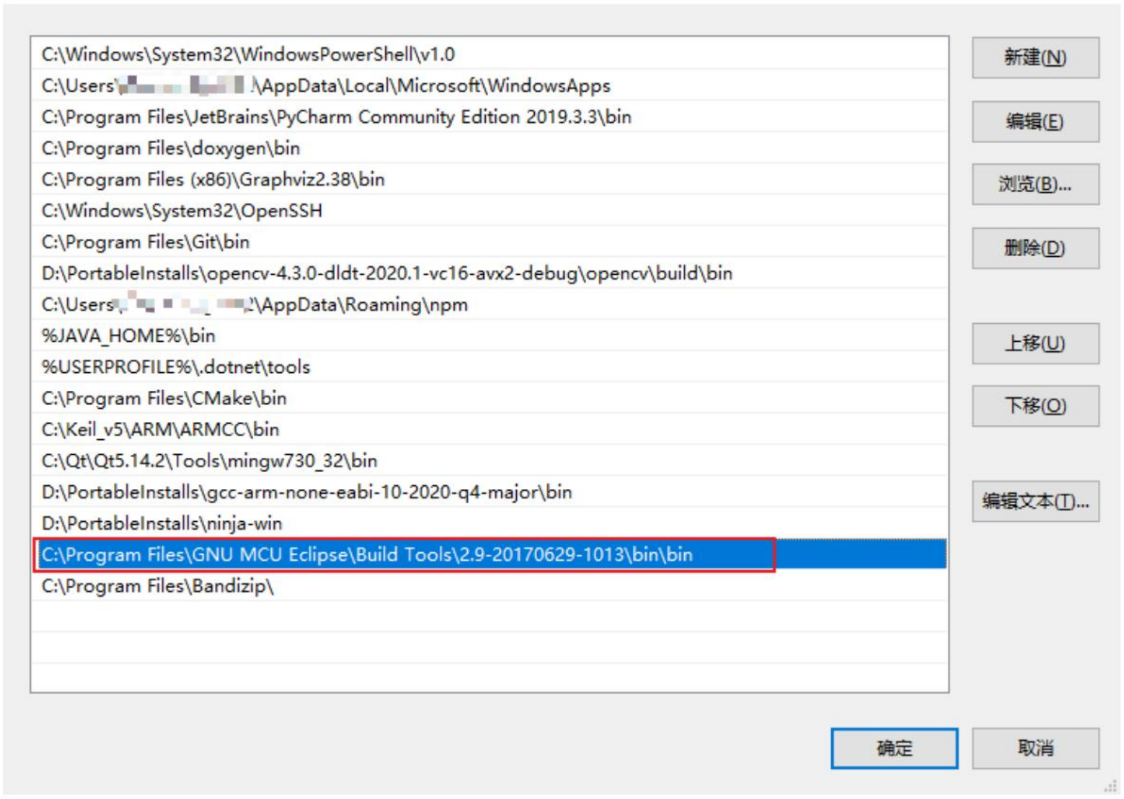
```
C:\Windows\System32\WindowsPowerShell\v1.0
C:\Users\[redacted]\AppData\Local\Microsoft\WindowsAp...
C:\Program Files\JetBrains\PyCharm Community Edition 2019.3....
C:\Program Files\doxygen\bin
C:\Program Files (x86)\Graphviz2.38\bin
C:\Program Files\SciTools\bin\pc-win64
C:\Windows\System32\OpenSSH
C:\Program Files\Git\bin
D:\PortableInstalls\opencv-4.3.0-dldt-2020.1-vc16-avx2-debug\...
C:\Users\[redacted]\AppData\Roaming\npm
%JAVA_HOME%\bin
%USERPROFILE%\.dotnet\tools
C:\Program Files\CMake\bin
C:\Keil_v5\ARM\ARMCC\bin
C:\Program Files (x86)\GnuWin32\bin
D:\PortableInstalls\gcc-arm-none-eabi-10-2020-q4-major\bin
D:\PortableInstalls\ccache-4.3-windows-64
D:\PortableInstalls\ninja-win
```

3. Check: Enter ninja --version in the newly opened command line to confirm the version information;

GNU MCU Eclipse Windows Build Tools

1. Installation: Double-click to

install; 2. **PATH** environment variable: as follows:



```
C:\Windows\System32\WindowsPowerShell\v1.0
C:\Users\[redacted]\AppData\Local\Microsoft\WindowsApps
C:\Program Files\JetBrains\PyCharm Community Edition 2019.3.3\bin
C:\Program Files\doxygen\bin
C:\Program Files (x86)\Graphviz2.38\bin
C:\Windows\System32\OpenSSH
C:\Program Files\Git\bin
D:\PortableInstalls\opencv-4.3.0-dldt-2020.1-vc16-avx2-debug\opencv\build\bin
C:\Users\[redacted]\AppData\Roaming\npm
%JAVA_HOME%\bin
%USERPROFILE%\.dotnet\tools
C:\Program Files\CMake\bin
C:\Keil_v5\ARM\ARMCC\bin
C:\Qt\Qt5.14.2\Tools\mingw730_32\bin
D:\PortableInstalls\gcc-arm-none-eabi-10-2020-q4-major\bin
D:\PortableInstalls\ninja-win
C:\Program Files\GNU MCU Eclipse\Build Tools\2.9-20170629-1013\bin\bin
C:\Program Files\Bandizip\
```

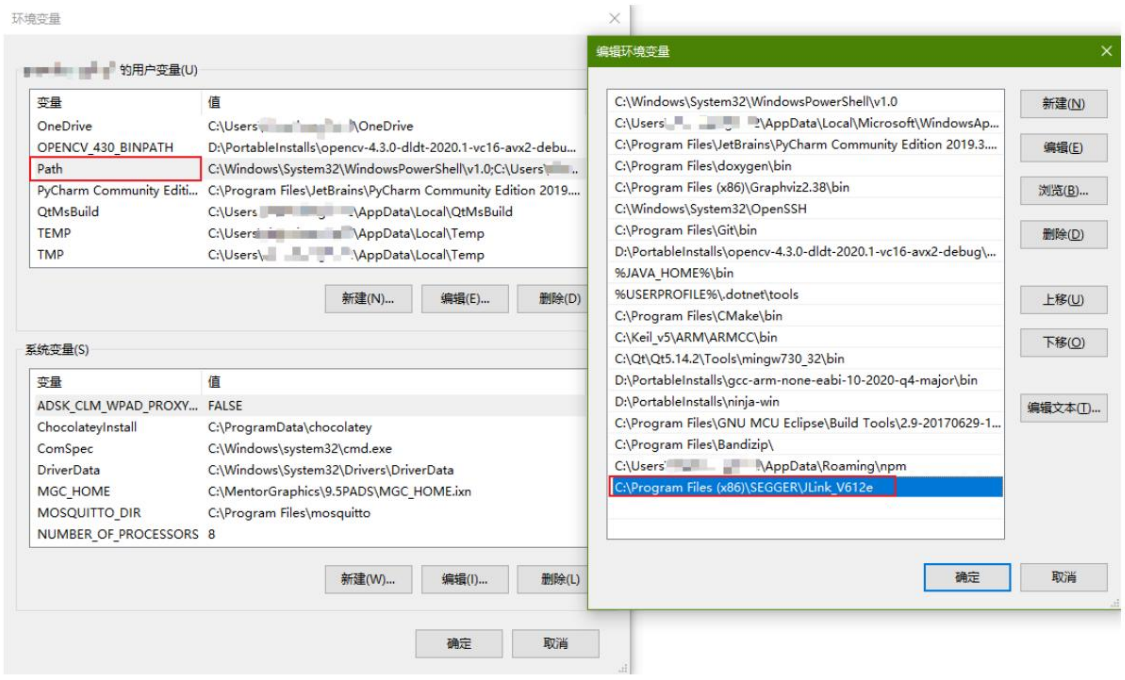
3. Check: Enter make --version in the newly opened command line to confirm the version information;

Machine Translated by Google

SEGGER JLink Tools

1. Installation: Double-click to install, install with default options;

2. **PATH** environment variable: as follows:



[redacted] 的用户变量(U)

变量	值
OneDrive	C:\Users\[redacted]\OneDrive
OPENCV_430_BINPATH	D:\PortableInstalls\opencv-4.3.0-dldt-2020.1-vc16-avx2-debu...
Path	C:\Windows\System32\WindowsPowerShell\v1.0;C:\Users\[redacted]..
PyCharm Community Editi...	C:\Program Files\JetBrains\PyCharm Community Edition 2019....
QtMsBuild	C:\Users\[redacted]\AppData\Local\QtMsBuild
TEMP	C:\Users\[redacted]\AppData\Local\Temp
TMP	C:\Users\[redacted]\AppData\Local\Temp

系统变量(S)

变量	值
ADSK_CLM_WPAD_PROXY...	FALSE
ChocolateyInstall	C:\ProgramData\chocolatey
ComSpec	C:\Windows\system32\cmd.exe
DriverData	C:\Windows\System32\Drivers\DriverData
MGC_HOME	C:\MentorGraphics\9.5PADS\MGC_HOME.ixn
MOSQUITTO_DIR	C:\Program Files\mosquitto
NUMBER_OF_PROCESSORS	8

```
C:\Windows\System32\WindowsPowerShell\v1.0
C:\Users\[redacted]\AppData\Local\Microsoft\WindowsAp...
C:\Program Files\JetBrains\PyCharm Community Edition 2019.3....
C:\Program Files\doxygen\bin
C:\Program Files (x86)\Graphviz2.38\bin
C:\Windows\System32\OpenSSH
C:\Program Files\Git\bin
D:\PortableInstalls\opencv-4.3.0-dldt-2020.1-vc16-avx2-debug\...
%JAVA_HOME%\bin
%USERPROFILE%\.dotnet\tools
C:\Program Files\CMake\bin
C:\Keil_v5\ARM\ARMCC\bin
C:\Qt\Qt5.14.2\Tools\mingw730_32\bin
D:\PortableInstalls\gcc-arm-none-eabi-10-2020-q4-major\bin
D:\PortableInstalls\ninja-win
C:\Program Files\GNU MCU Eclipse\Build Tools\2.9-20170629-1...
C:\Program Files\Bandizip\
C:\Users\[redacted]\AppData\Roaming\npm
C:\Program Files (x86)\SEGGER\JLink_V612e
```

3. Check: Enter JFlash.exe -? in the newly `opened command line` . If a window pops up, that's it.

Visual Studio Code Editor

Visual Studio Code editor is a lightweight and powerful source code editor that can achieve IDE-like effects with various plug-ins.

It is recommended to install the following plug-ins to edit source code and debug embedded programs:

1. **C/C++ IntelliSense**
2. **CMake**
3. **CMake Tools**
4. **Cortex-Debug** Its configuration file refers to cortex-debug

Software Installation (Ubuntu 20.04 x64 Example)

Install necessary software using package manager

> sudo apt-get install python3 cmake ninja-build make

Download other necessary software from the official website (Ubuntu version)

ARM GCC Compiler Suite

Select gcc-arm-none-eabi-10-2020-q4-major-x86_64-linux.tar.bz2 from the download page

Unzip it to a directory and then export the environment variables at the end of the ~/.bashrc file `CROSS_TOOLCHAIN_ROOT ÿ`

```
# GCC ARM NONE EABI
export CROSS_TOOLCHAIN_ROOT=$HOME/PortableInstalls/gcc-arm-none-eabi-10-2020-q4-major
```

Open a new command line or enter source ~/.bashrc in the current command line to reload the environment variables.

SEGGER JLink Tools

Select v7.52d 64-bit DEB Installer from the download page

Enter the command to install

> sudo dpkg -i JLink_Linux_V752d_x86_64.deb

Visual Studio Code Editor

Select .deb 64bit from the download page

Enter the command to install

> sudo dpkg -i code_1.59.1-1629375198_amd64.deb

Open vscode and install the following plugins:

1. **C/C++ IntelliSense**
2. **CMake**
3. **CMake Tools** 4.

Cortex-Debug For its configuration file, refer to cortex-debug