

Lesson 0

Setup Environment

Lecturer: Harvard Tseng

Keil MDK Version 5 Development Kit



Step1. Install IDE

- Download from [Keil](#).

MDK Editions

MDK is available in various editions. [Compare Editions >](#)

MDK-Lite

Product evaluation, small projects, and education. Code size restricted to 32 Kbyte.

[Learn more >](#)

 [Download & Install](#)

MDK-Cortex-M

For ARM Cortex-M based microcontroller projects.

[Learn more >](#)

 [Request a Quote](#)

MDK-Plus

For Cortex-M, ARM7, ARM9.
Includes middleware (IPv4 Networking, USB Device, File System, Graphics).

[Learn more >](#)

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MDK-Professional

For Cortex-M, Cortex-A, ARM7, ARM9. Includes middleware (IPv4/IPv6 Networking, USB Host & Device, File System, Graphics, mbed components).

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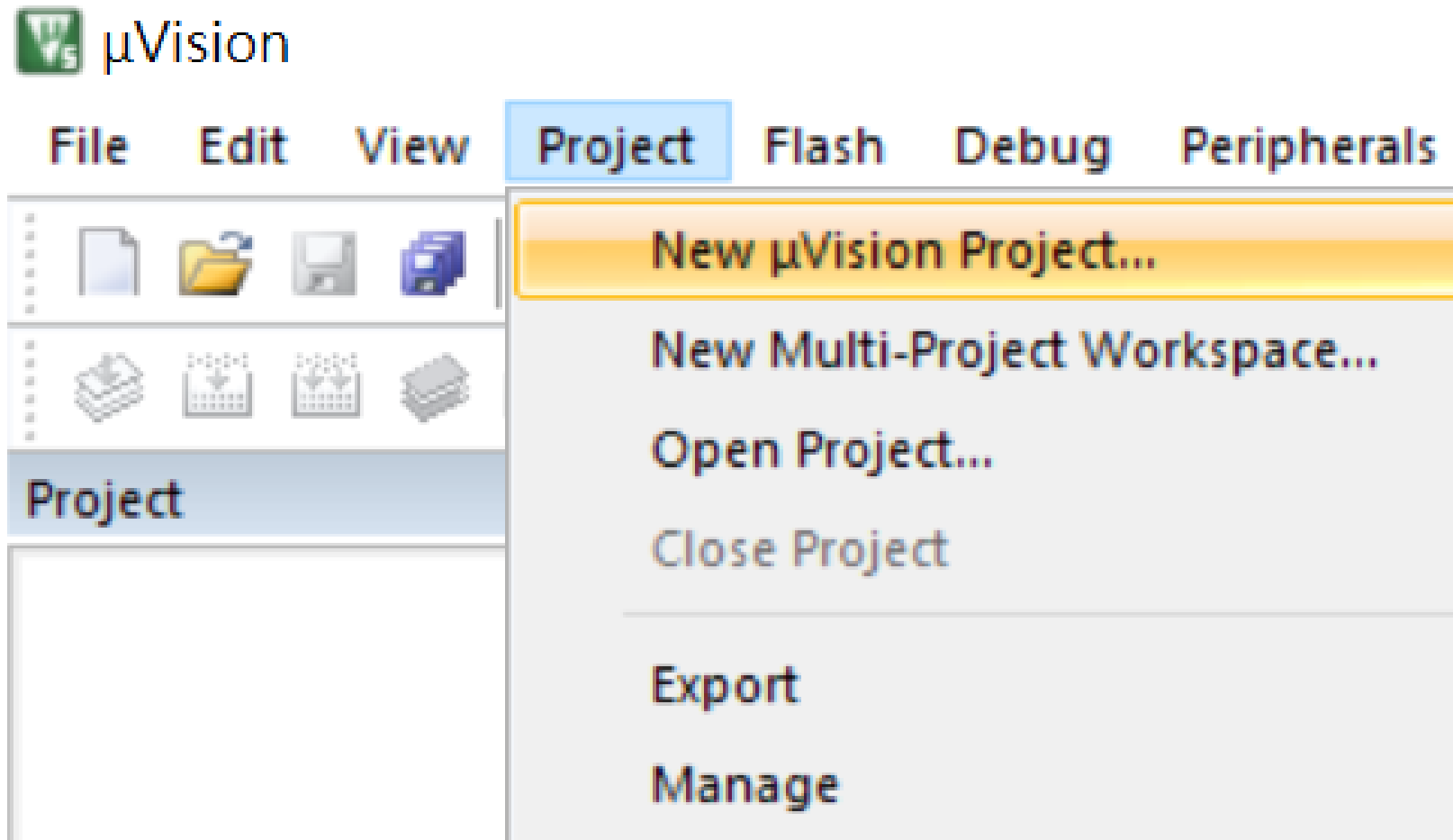
 [Request a Quote](#)

Step2. Install Software Packs

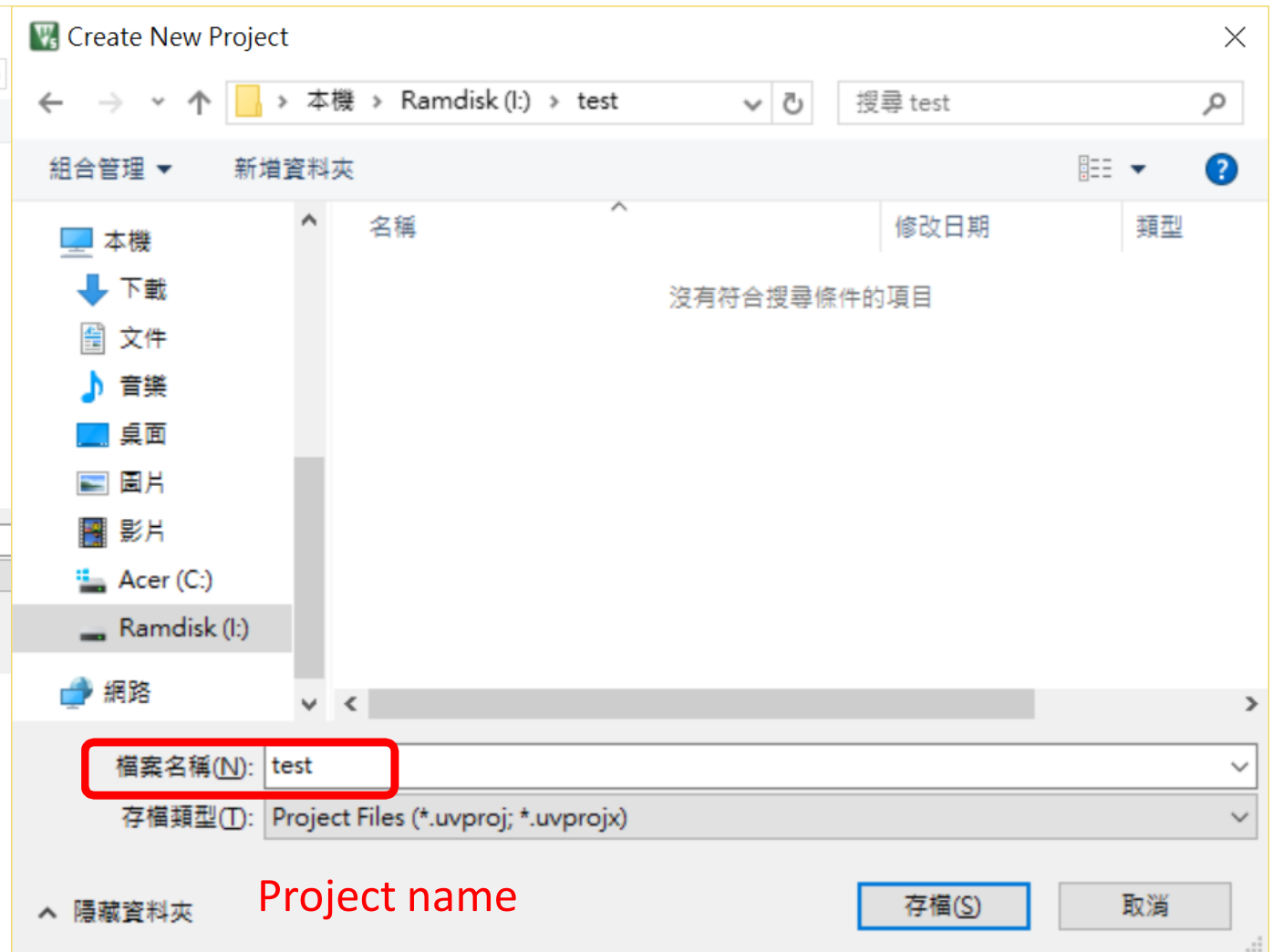
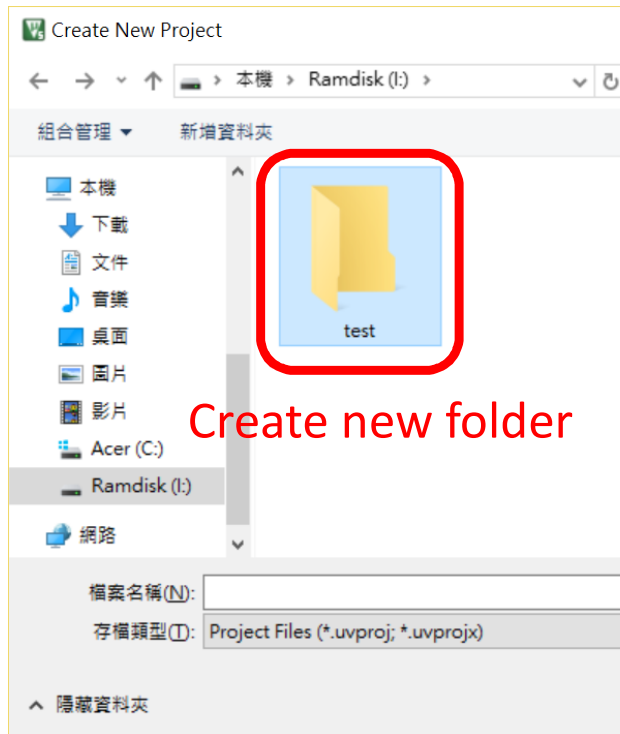
- Download from [Keil](#).

➤ STMicroelectronics Nucleo Boards Support and Examples	BSP	1.6.0	⬇
➤ STMicroelectronics STM32F0 Series Device Support and Examples	BSP	DFP	1.5.0 ⬇
➤ STMicroelectronics STM32F1 Series Device Support, Drivers and Examples	BSP	DFP	2.1.0 ⬇
➤ STMicroelectronics STM32F2 Series Device Support, Drivers and Examples	BSP	DFP	2.6.0 ⬇
➤ STMicroelectronics STM32F3 Series Device Support and Examples	BSP	DFP	1.3.0 ⬇
➤ STMicroelectronics STM32F4 Series Device Support, Drivers and Examples	BSP	DFP	2.9.0 ⬇
➤ STMicroelectronics STM32F7 Series Device Support, Drivers and Examples	BSP	DFP	2.7.0 ⬇
➤ STMicroelectronics STM32L0 Series Device Support and Examples	BSP	DFP	1.6.0 ⬇
➤ STMicroelectronics STM32L1 Series Device Support and Examples	DFP	1.0.2	⬇
➤ STMicroelectronics STM32L4 Series Device Support, Drivers and Examples	BSP	DFP	1.2.0 ⬇

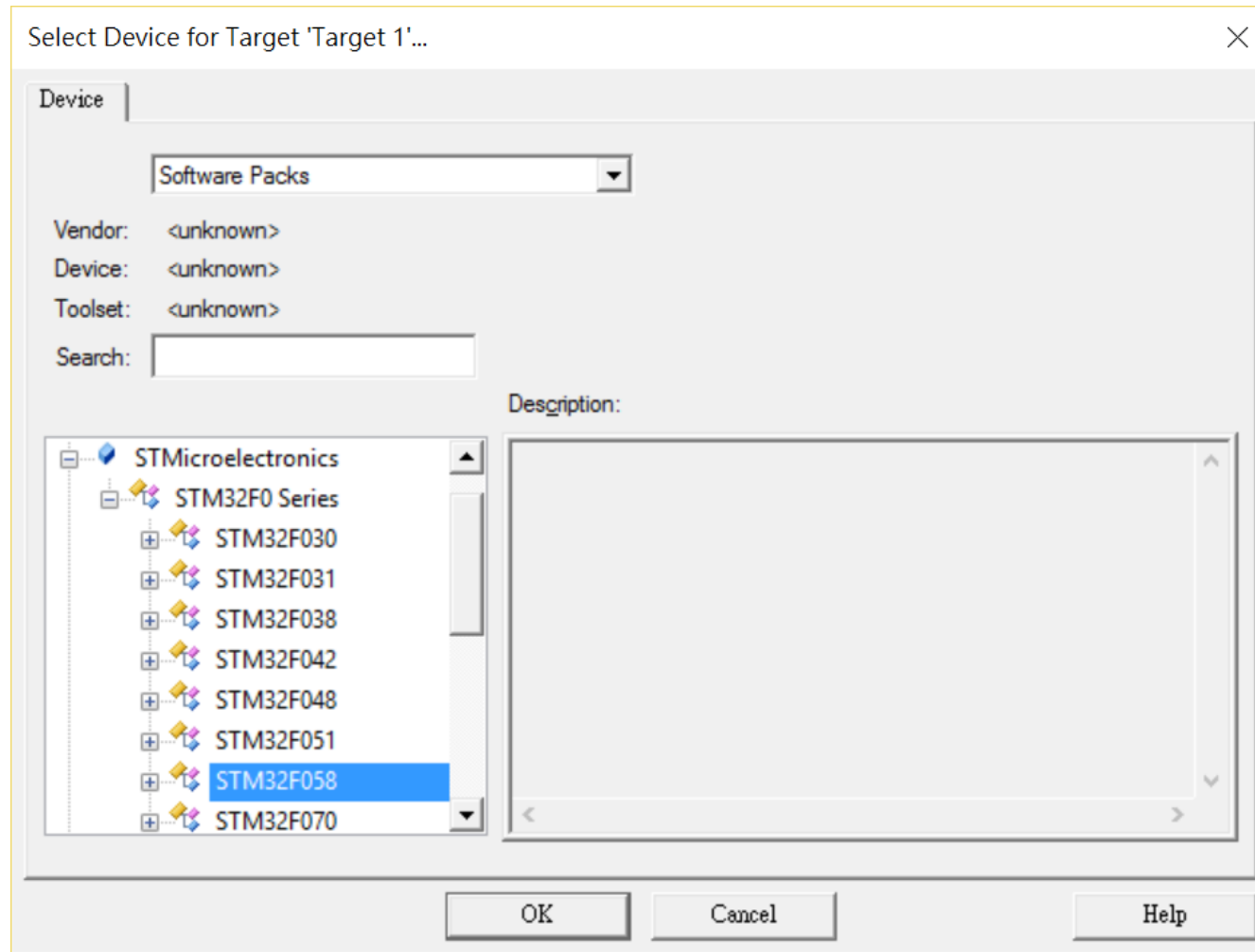
Step3. Create a New Project



Step3. Create a New Project



Step4. Select Device



Step5. Add Software Component

Manage Run-Time Environment

Software Component

- [-] CMSIS
 - [+] CORE
 - [+] DSP
 - [+] RTOS (API)
- [+] CMSIS Driver
- [+] Compiler
- [-] Device
 - [+] Startup
- [+] File System
- [+] Graphics
- [+] Network
- [+] USB

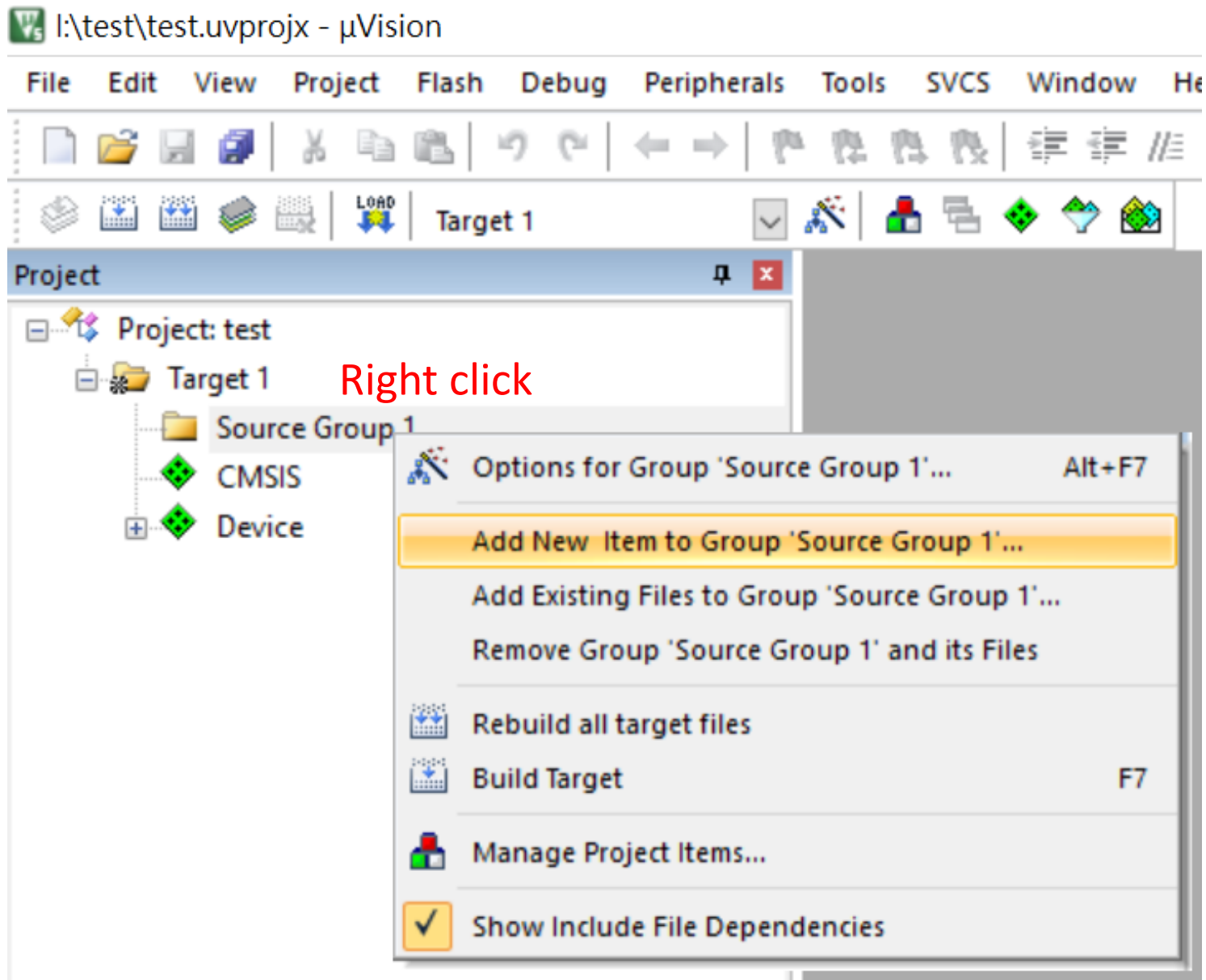
Sel.	Variant	Version	Description
<input type="checkbox"/>			Cortex Microcontroller Software Interface Components
<input checked="" type="checkbox"/>		4.3.0	CMSIS-CORE for Cortex-M, SC000, and SC300
<input type="checkbox"/>		1.4.6	CMSIS-DSP Library for Cortex-M, SC000, and SC300
<input type="checkbox"/>		1.0	CMSIS-RTOS API for Cortex-M, SC000, and SC300
<input type="checkbox"/>			Unified Device Drivers compliant to CMSIS-Driver Specifications
<input type="checkbox"/>			ARM Compiler Software Extensions
<input type="checkbox"/>			Startup, System Setup
<input checked="" type="checkbox"/>		2.2.3	System Startup for STMicroelectronics STM32F058xx Devices
<input type="checkbox"/>	MDK-Pro	6.7.0	File Access on various storage devices
<input type="checkbox"/>	MDK-Pro	5.32.2	User Interface on graphical LCD displays
<input type="checkbox"/>	MDK-Pro	7.1.0	IPv4/IPv6 Networking using Ethernet or Serial protocols
<input type="checkbox"/>	MDK-Pro	6.7.0	USB Communication with various device classes

Select these two

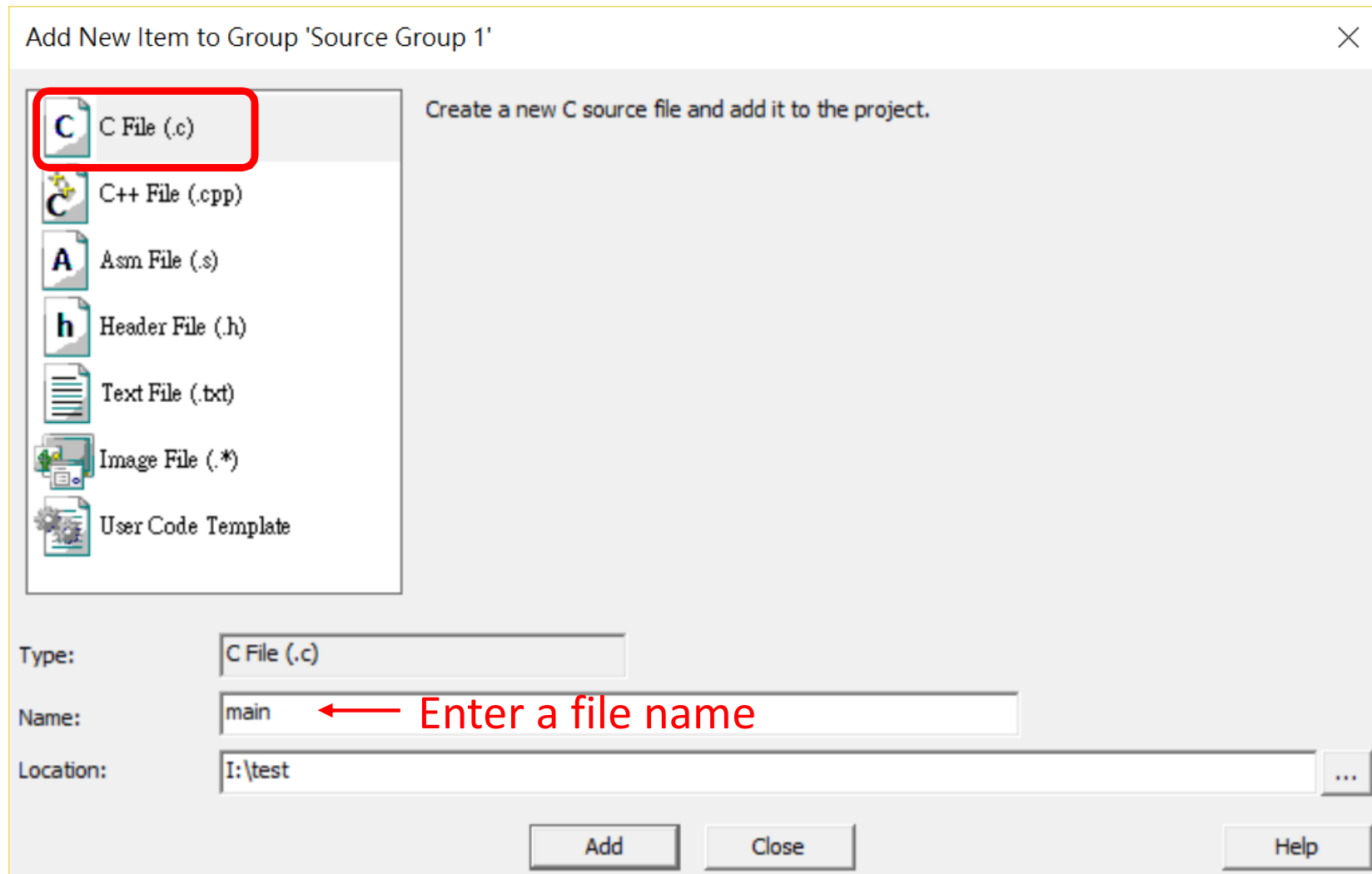
core_cmx.h

startup_<device>.s
system_<device>.c

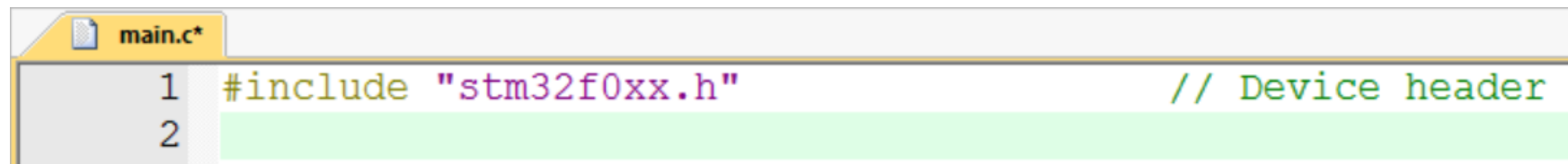
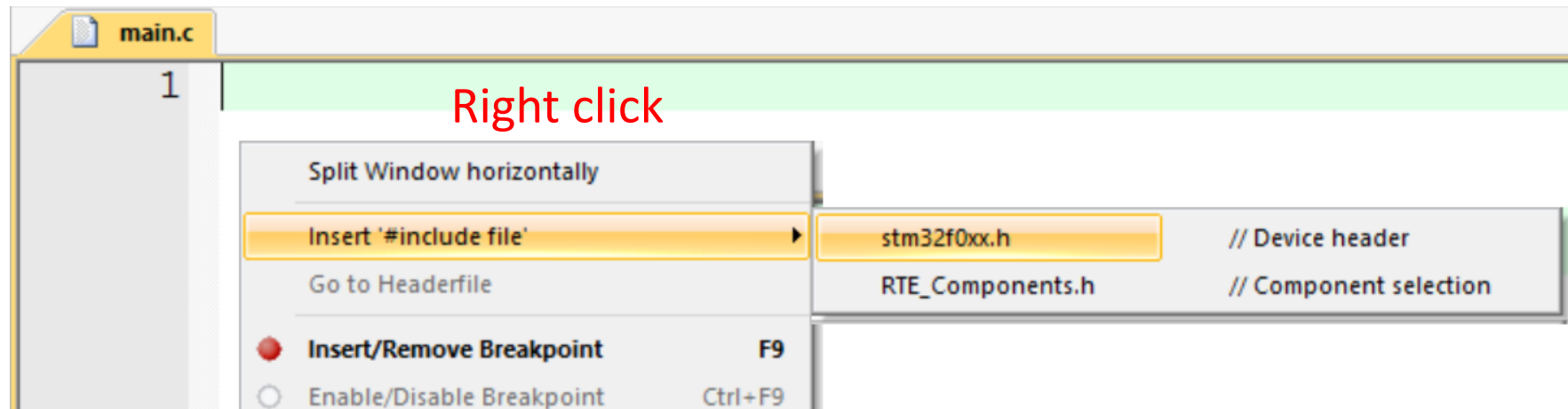
Step6. Add main.c



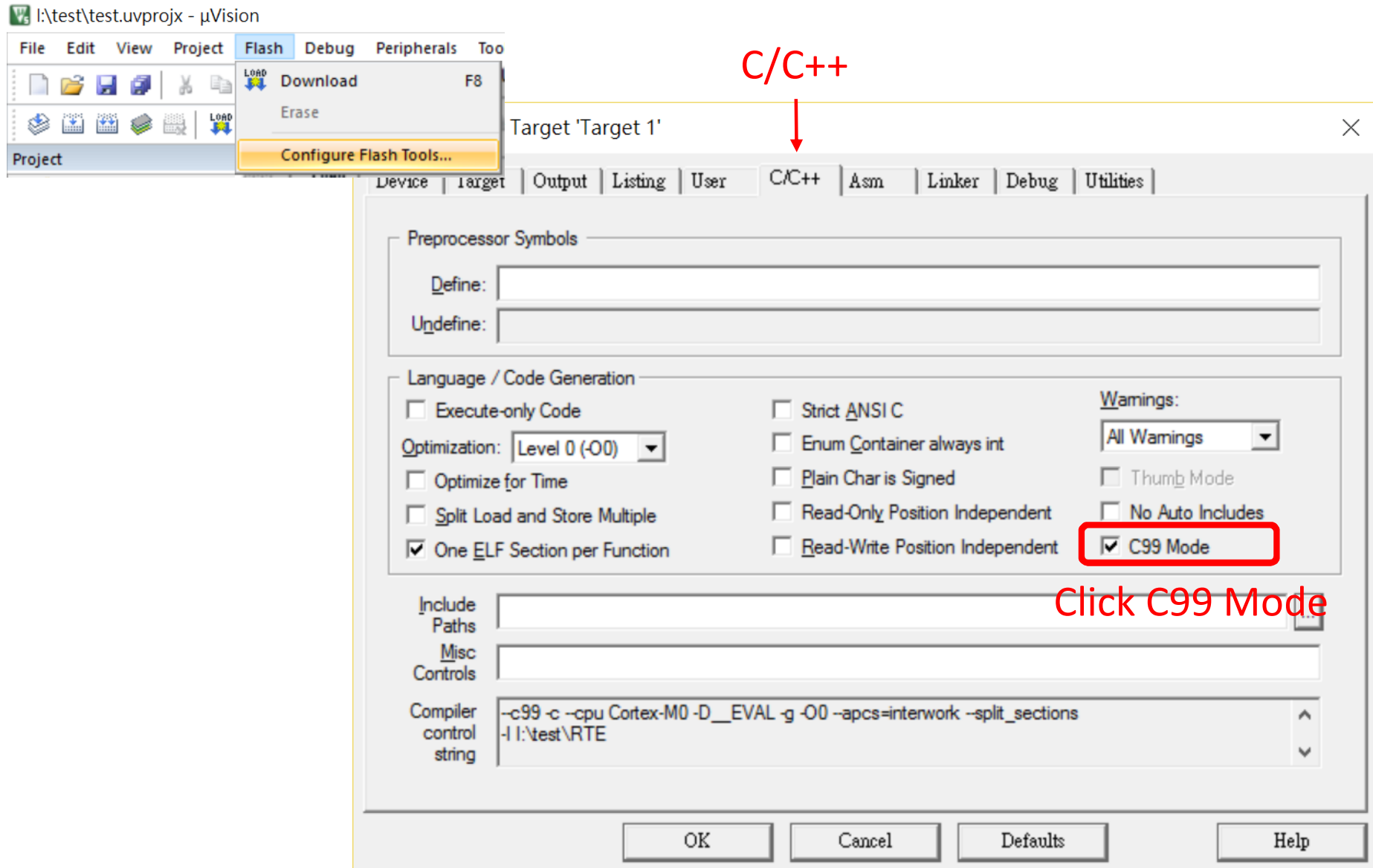
Step6. Add main.c



Step7. Include Device Header



Step8. Configure Flash



Step8. Configure Flash

Debug

2. Press Setting

1. Select debugger

3. Choose "Erase Full Chip"

The image shows two screenshots from an IDE, likely Visual Studio, illustrating the steps to configure a target device for flashing.

Screenshot 1: Options for Target 'Target 1'

The 'Debug' tab is selected. The 'Use:' dropdown is set to 'ST-Link Debugger'. The 'Settings' button is highlighted. The 'Load Application at Startup' checkbox is checked. The 'Run to main()' checkbox is checked. The 'Initialization File' field is empty. The 'Restore Debug Session Settings' section has checkboxes for 'Breakpoints', 'Toolbox', 'Watch Windows & Performance Analyzer', 'Memory Display', and 'System Viewer', all of which are checked. The 'CPU DLL' is 'SARMCM3.DLL' with parameter '-REMAP'. The 'Dialog DLL' is 'DARMCM1.DLL' with parameter 'pCM0'. The 'Driver DLL' is 'SARMCM3.DLL' with parameter '-REMAP'. The 'Dialog DLL' is 'TARMCM1.DLL' with parameter 'pCM0'. The 'Manage Component Viewer Description Files ...' button is visible. The 'OK', 'Cancel', and 'Defaults' buttons are at the bottom.

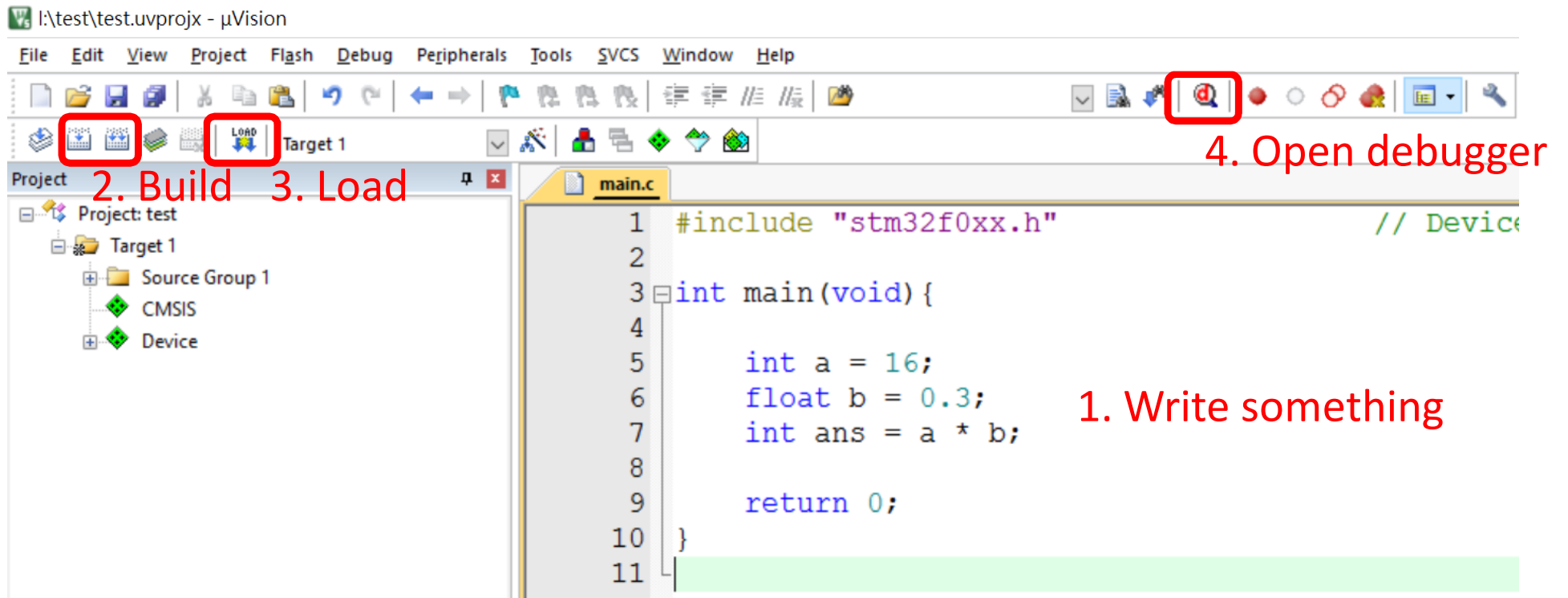
Screenshot 2: Cortex-M Target Driver Setup

The 'Flash Download' tab is selected. The 'Download Function' section has three radio buttons: 'Erase Full Chip' (selected), 'Erase Sectors', and 'Do not Erase'. The 'Program' checkbox is checked. The 'Verify' checkbox is checked. The 'Reset and Run' checkbox is unchecked. The 'RAM for Algorithm' section has 'Start' set to '0x20000000' and 'Size' set to '0x1000'. The 'Programming Algorithm' table is shown below:

Description	Device Size	Device Type	Address Range
STM32F0xx 64k8 Flash	64k	On-chip Flash	08000000H - 0800FFFFH

The 'Start' and 'Size' fields are empty. The 'Add' and 'Remove' buttons are at the bottom. The '確定' (OK), '取消' (Cancel), and '套用(A)' (Apply) buttons are at the bottom right.

Step9. Test



Install Debugger USB Driver

- If your board debugger doesn't work, download from [ST](#).

Home › Embedded Software › Development Tool Software › **STSW-LINK009**

STSW-LINK009 ACTIVE

ST-Link, ST-Link/V2, ST-Link/V2-1 USB driver signed for XP, Windows7, Windows8

 Download Databrief

QUICK VIEW

DESIGN

GET SOFTWARE



Content

- Introduction
- Hardware
- Software
- Exercise

Exercise

Do it back home.

Basic C Operator

```
main.c
1  #include "stm32f0xx.h"
2
3  int a = 3, b = 6, ans;
4  int main(void) {
5      while(1) {
6          ans = a + b;
7          ans = a - b;
8          ans = a * b;
9          ans = a / b;
10         ans = a % b;
11         ans = a | b;
12         ans = a & b;
13         ans = a ^ b;
14         ans = ~ans;
15     }
16     return 0;
17 }
18
```

Use Debugger

- Review answer step by step.
- Monitor the variable you want.
- Set break points.