



KEIL μ Vision getting started

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KEIL μ Vision 5



MDK-Arm

Version 5.29 (November 2019)

Development environment for Cortex and Arm devices.

- The Development environment for Cortex and Arm devices (aka MDK) includes the μ Vision Tools.
- The μ Vision IDE combines in a single environment:
 - project management,
 - run-time environment,
 - build facilities,
 - source code editing,
 - and program debugging.
- The μ Vision Debugger provides a single environment in which you may test, verify, and optimize your application code. The debugger includes traditional features like simple and complex breakpoints, watch windows, and execution control and provides full visibility to device peripherals.
- <https://www.keil.com/download/product/>

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The screenshot displays the 'armKEIL' website's 'Download Products' page. The page features a navigation bar with links to 'Products', 'Download', 'Events', 'Support', and 'Videos'. A search bar is also present. The main content area is titled 'Download Products' and includes a sub-header 'Select a product from the list below to download the latest version.' Below this, there are four product tiles, each with a download icon and a description:

- MDK-Arm** (Version 5.29 (November 2019)): Development environment for Cortex and Arm devices. An orange arrow points to this tile.
- C51** (Version 9.60a (May 2019)): Development tools for all 8051 devices.
- C251** (Version 5.60 (May 2018)): Development tools for all 80251 devices.
- C166** (Version 7.57 (May 2018)): Development tools for C166, XC166, & XC2000 MCUs.

Below the product tiles, a note states: 'Keil products use a [License Management](#) system - without a current license the product runs as a Lite/Evaluation edition with a few [Limitations](#).'

The 'Maintenance Status and Previous Versions' section includes a form to enter a valid Product Serial Number (PSN) or License Code (LIC) to get access to all product versions available to you, or to check the status of your support and maintenance agreement. The form has a 'Submit' button.

The browser's taskbar at the bottom shows several open files: MDK529.EXE (Operazione annullata), license (6).dat, lab_06.zip, and ITC_2019_Slides.zip. A 'Mostra tutto' button is also visible.

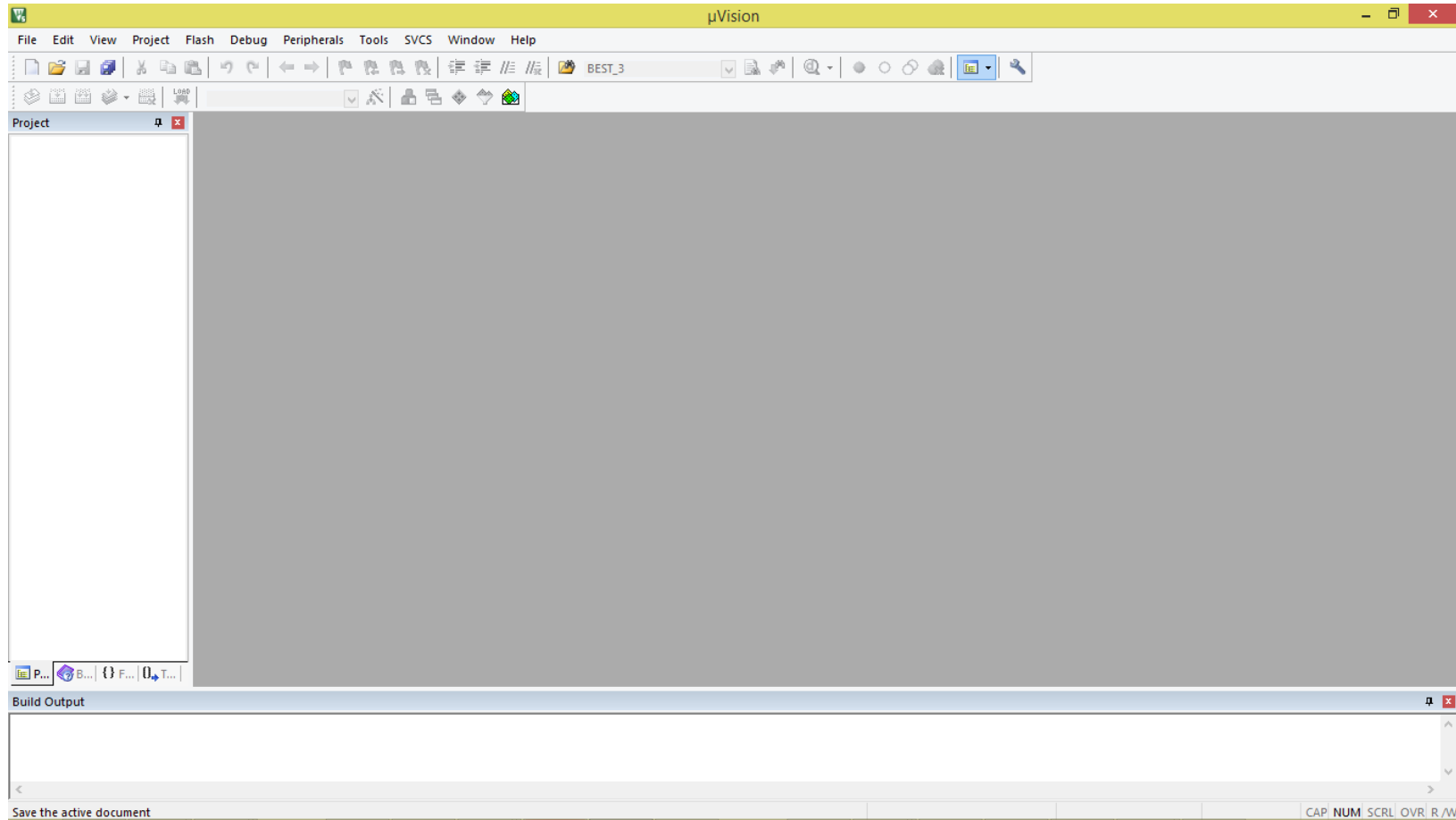
KEIL μ Vision 5 – installation and template

- <https://www.keil.com/download/product/>
- Along the download phase you will be required to enter your affiliation and email address; this is an important information, make sure you enter your institutional account
- <name.surname>@studenti.polito.it
- Affiliation: Politecnico di Torino

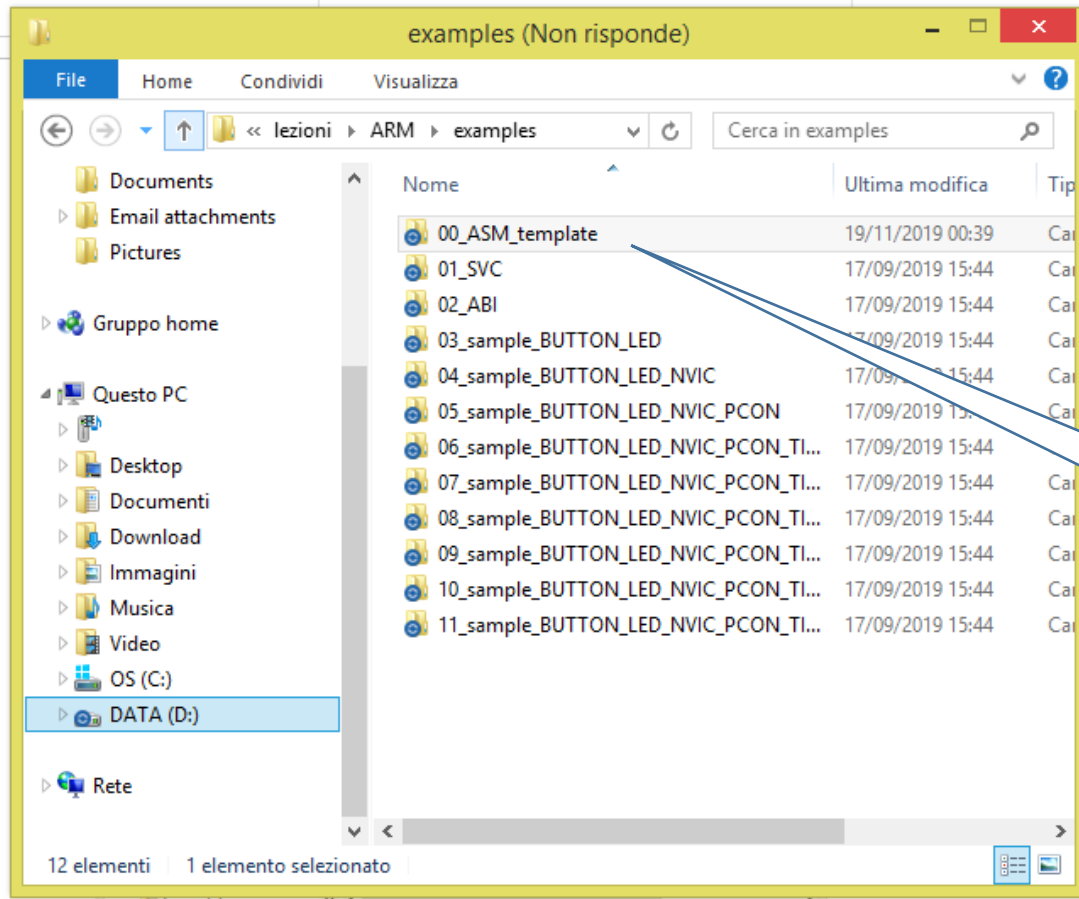
Installation completed



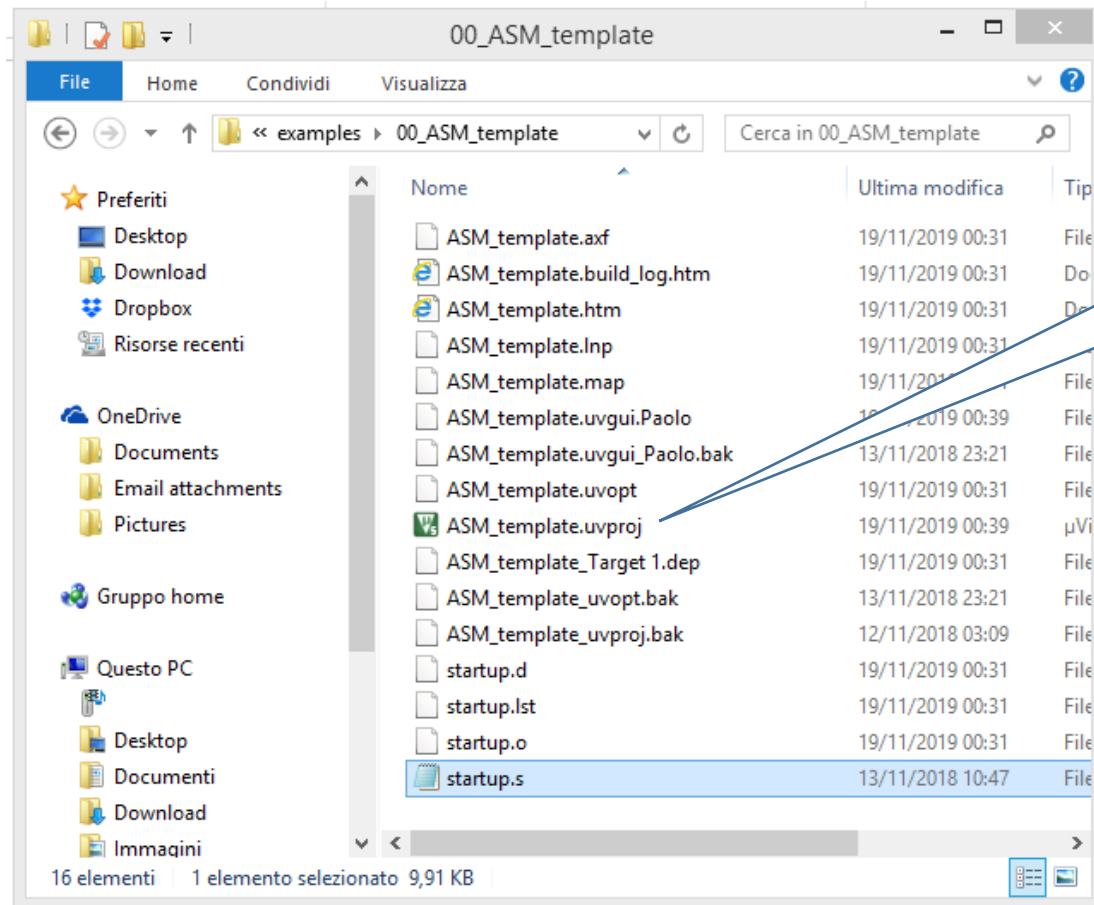
KEIL uVision5



Open the 00_ASM_template project



Open the 00_ASM_template project

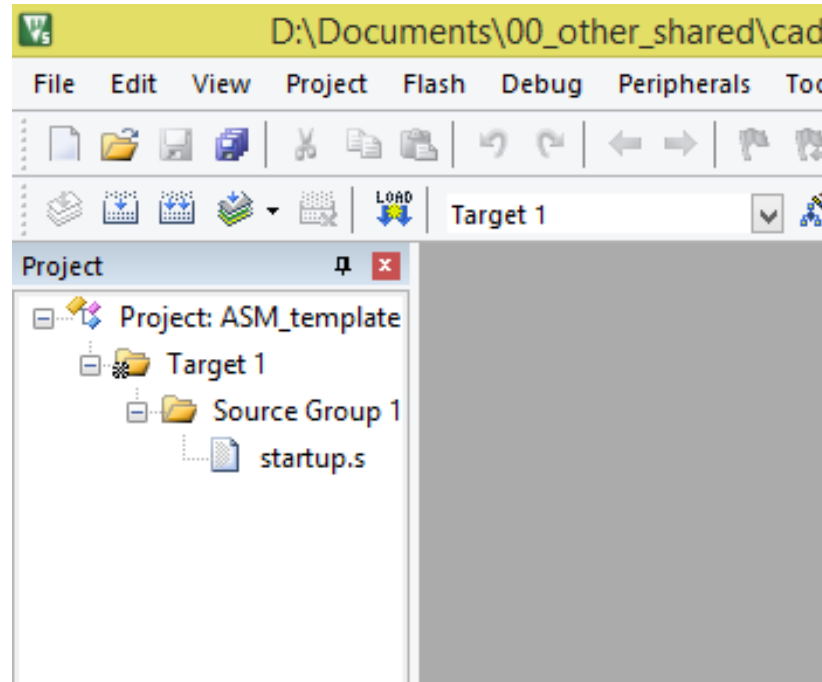


Open the
ASM_template.uvproj file

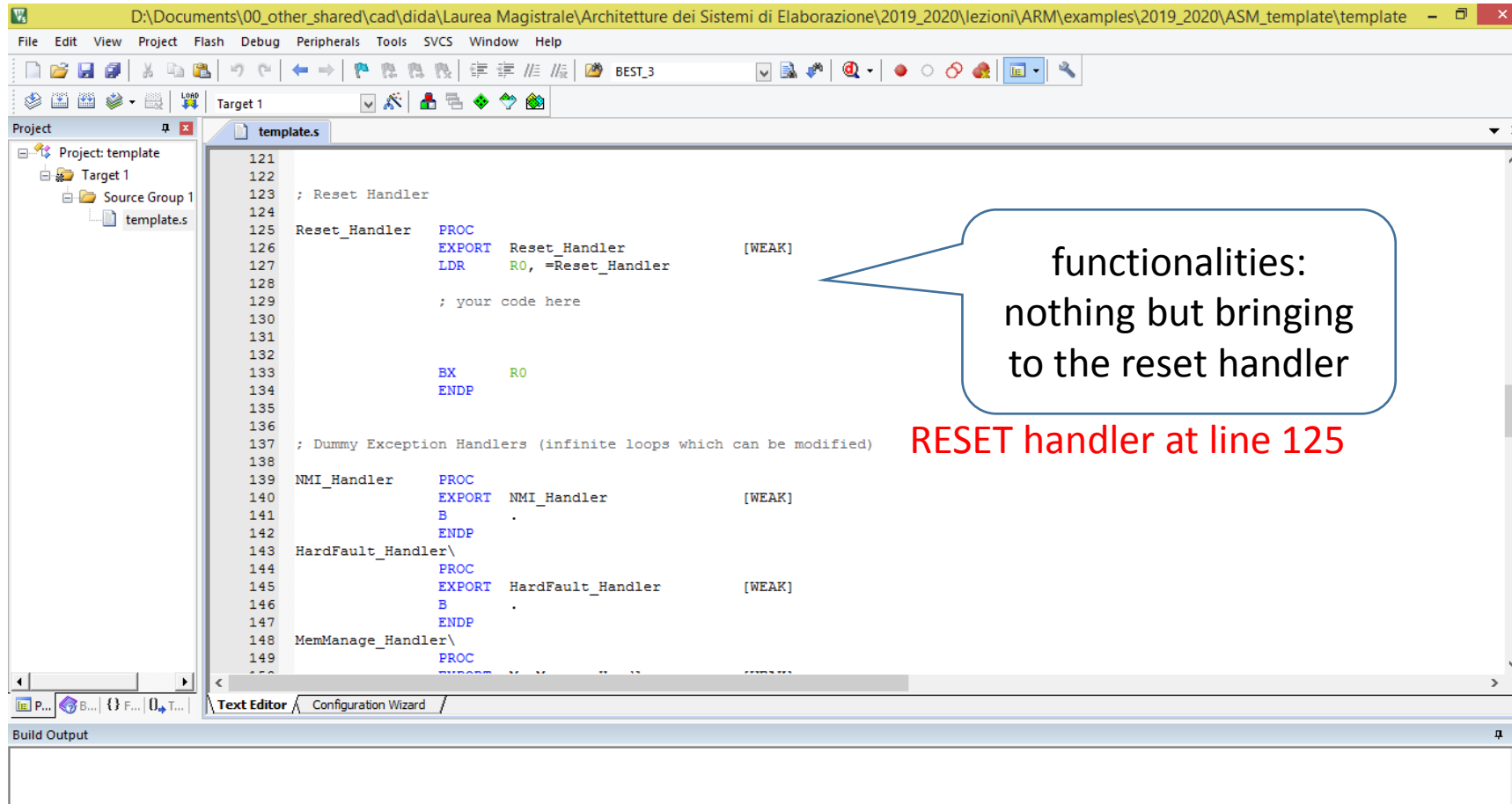
Legacy pack

- Most probably you will not have the correct LPC device environment installed at default
- Dialogs will appear and guide you to the proper website to download installation

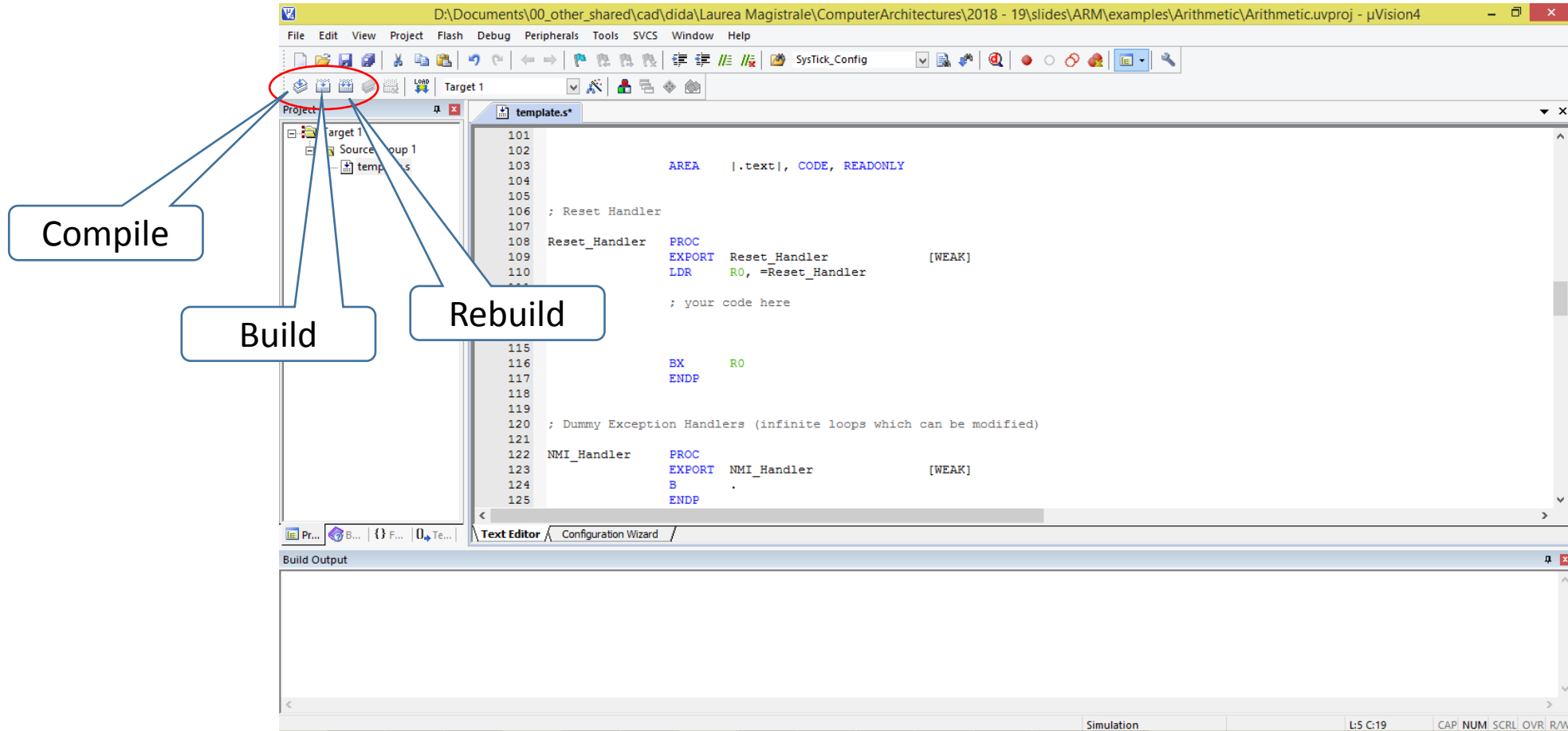
Congratulations, your first project is created



startup.s

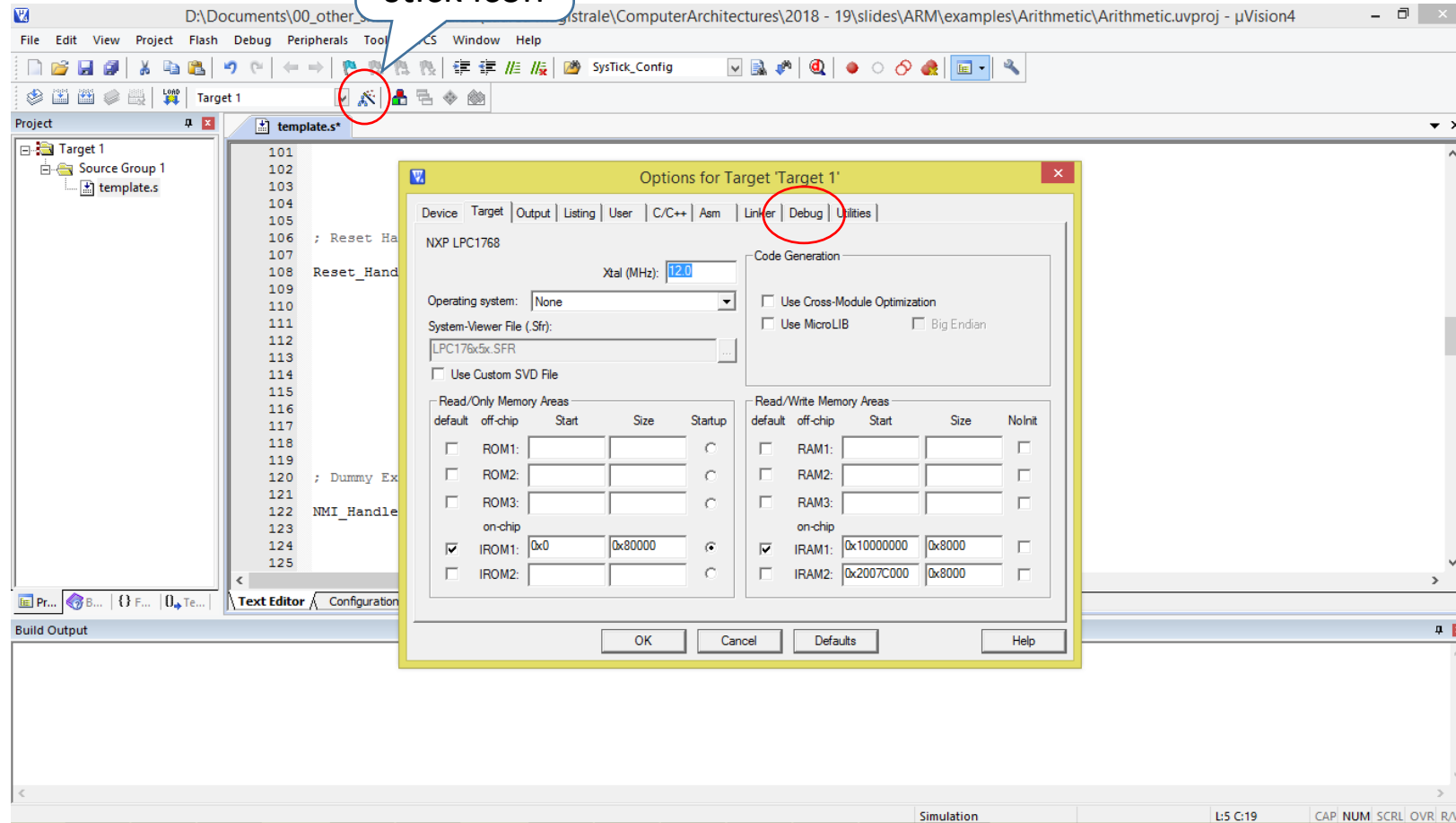


Build your code

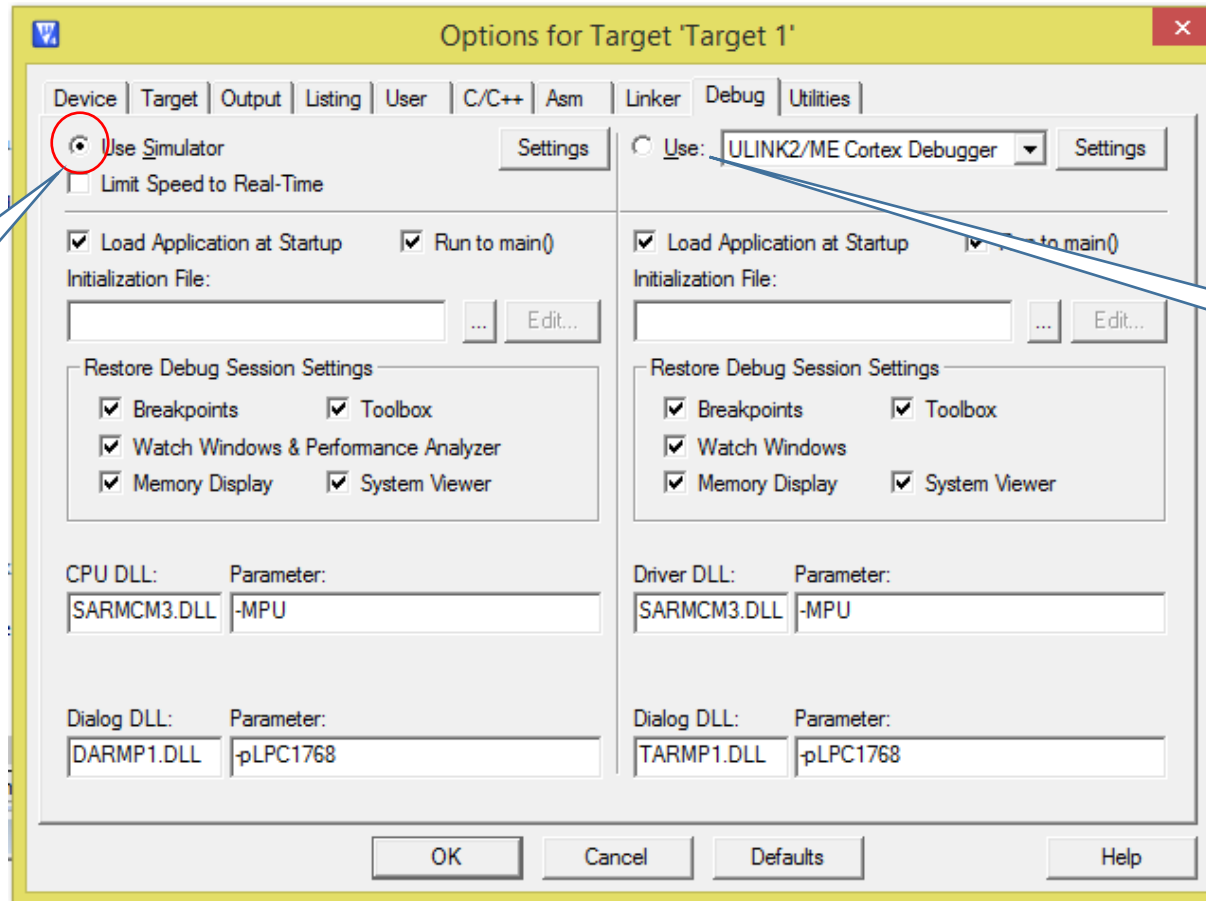


Debug setup

Magical
stick icon



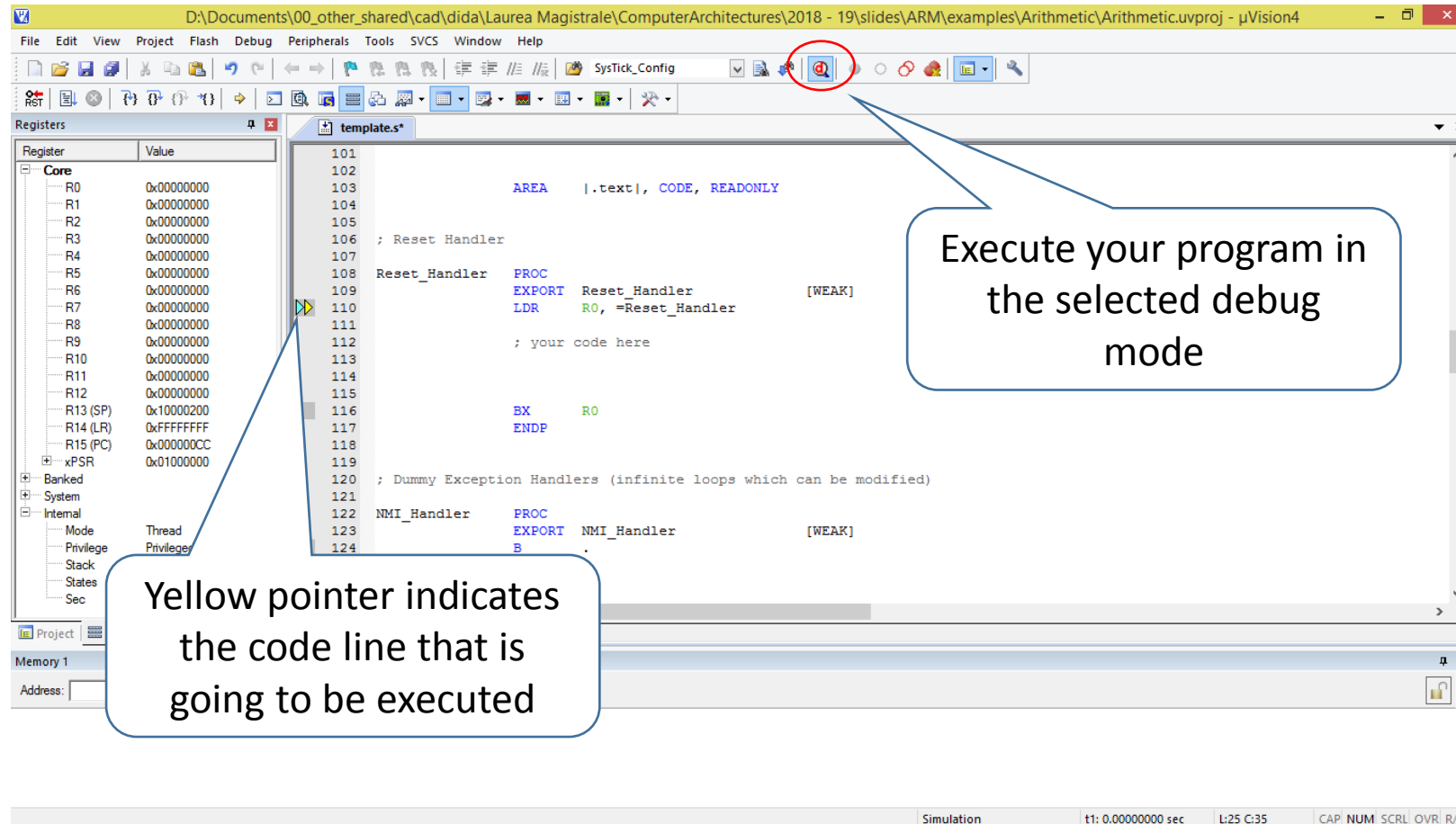
Select type of debug



Software debug
(emulated
functionalities)

Hardware debug
(with board)

Debug: (1) setup breakpoint (2) run debug



Debug execution

The screenshot displays the µVision4 IDE interface with several annotations explaining debugging features:

- RESET: it resets the device**: Points to the 'RESET' button in the top toolbar.
- STEP INTO (F11) STEP OVER (F10)**: Points to the 'Step Into' and 'Step Over' buttons in the top toolbar.
- Breakpoint (set by double click on the gray area close to code line)**: Points to a red dot breakpoint set on line 116 of the code editor.
- RUN TO CURSOR: execution stops only at a breakpoint**: Points to the 'Run to Cursor' button in the top toolbar.
- Execution time**: Points to the 't1: 0.00000000 sec' value in the bottom status bar.

The code editor shows the following assembly code:

```
101  
102  
103  
104  
105  
106 ; Reset_Handler  
107  
108 Reset_Handler PROC  
109 EXPORT Reset_Handler [WEAK]  
110 LDR R0, =Reset_Handler  
111  
112 ; your code here  
113  
114  
115  
116 BX R0  
117 ENDP  
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Peripherals modules

Open the needed peripheral windows

The screenshot displays the TI-RTOS IDE interface. The **Peripherals** window is open, showing a tree view of system components. The **Clocking & Power Control** module is selected, and its sub-components are listed: Clock Source Selection, Clock Dividers, Phase Locked Loop 0, Phase Locked Loop 1, and Power Control. The **Clock Generation Schematic** window is also open, showing a block diagram of the clock system. The schematic includes a **System clock select (CLKSRCSEL)** block that receives inputs from a 4.000 MHz source and a 32.768 kHz source. It outputs to a **Main PLL (PL550M)** and a **USB PLL (PL160M)**. The **Main PLL** outputs to a **CPU Clock Divider** and a **Peripheral Clock Divider**. The **USB PLL** outputs to a **USB Clock Divider**. The **CPU Clock Divider** outputs to the **Peripheral Clock Divider**. The **Peripheral Clock Divider** outputs to various peripheral clocks: PCLK/1 (12.000 MHz), PCLK/2 (6.000 MHz), PCLK/4 (3.000 MHz), PCLK/8 (1.500 MHz), and wd_clk. The **USB Clock Divider** outputs to USBCLK (12.000 MHz) and USBCLKDIV (12.000 MHz). The **Peripheral Clock Divider** also outputs PLLCLK (12.000 MHz) and CCLK (12.000 MHz). The **System clock select** block also outputs to a **Watchdog clock select (WDCLKSEL)** block, which outputs to the **watchdog pclk**.

Registers window (Core):

Register	Value
R0	0x0000C
R1	0x0000C
R2	0x0000C
R3	0x0000C
R4	0x0000C
R5	0x0000C
R6	0x0000C
R7	0x0000C
R8	0x0000C
R9	0x0000C
R10	0x0000C
R11	0x0000C
R12	0x0000C
R13 (SP)	0x1000C
R14 (LR)	0xFFFFF
R15 (PC)	0x0000C
xPSR	0x0100C

Command window:

```
Load "D:\Documents\00_other_shared\cad\did\Laurea Mag
```