

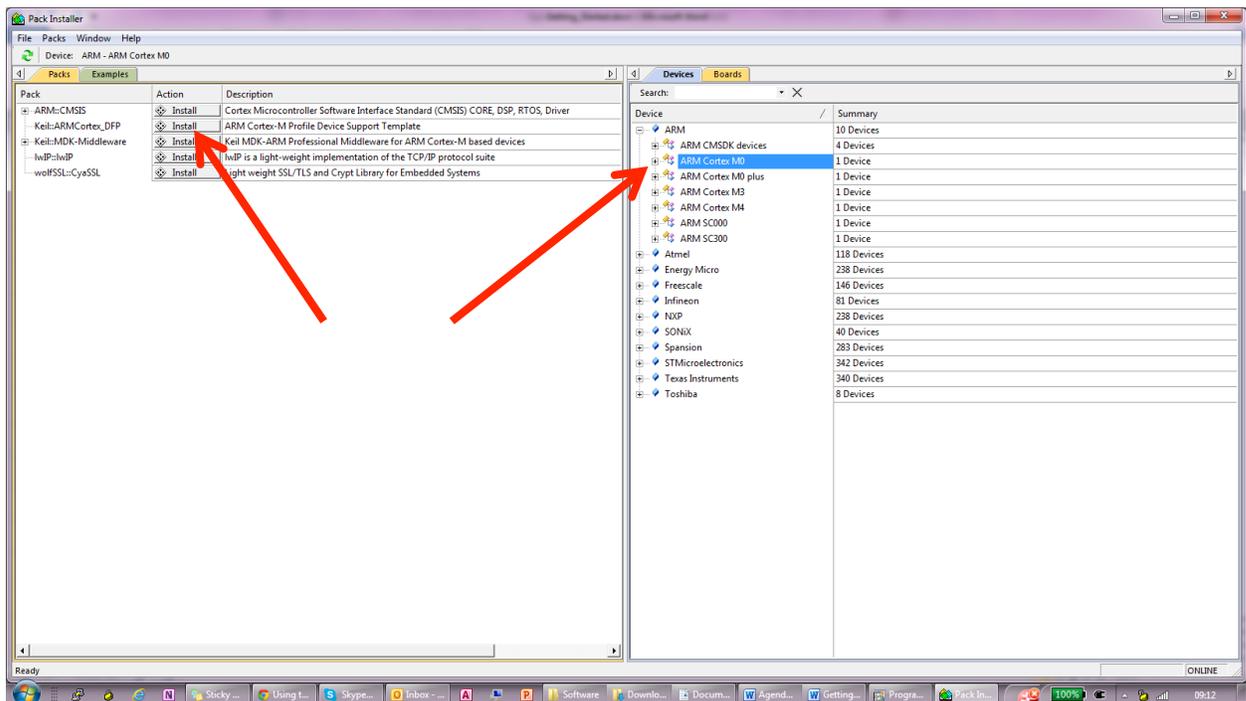
Cortex M0 Assembly Programming

SUMMARY

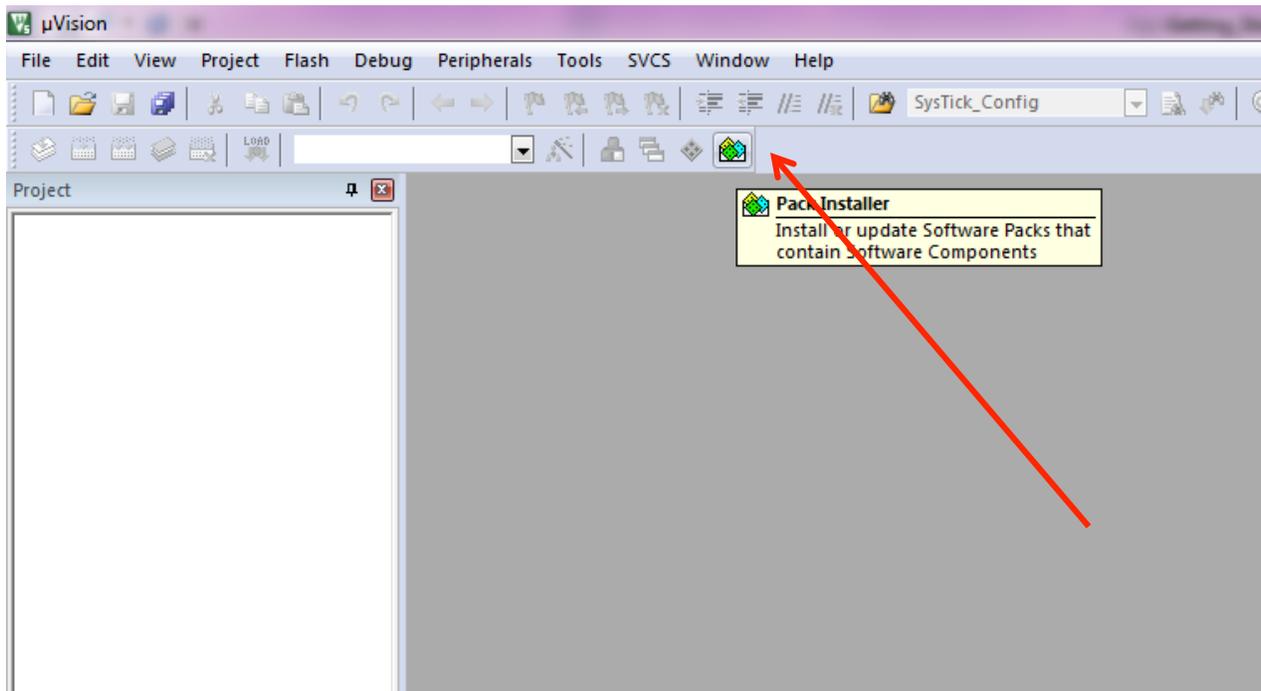
1. Consider you have a simple Cortex M0 based Micro-controller with the following memory map
 - a. Internal SRAM – 1 KB – Starting Address 0x0000 0000
 - b. A LED Peripheral – One word – Address 0x5000 0000
2. We will write assembly program to toggle the LEDs and simulate the program
3. We will analyze the resulting binary file and the disassembly file
4. In the Next Section we will see how to design AHB-Lite Compliant LED Peripheral

INSTALL KEIL MDK

1. Install KEIL MDK. You can download the software suite from <http://www.keil.com/arm/mdk.asp>
2. Install ARM Cortex M Profile Device Pack: **KEIL ARMCORTEX:DFP** as shown below,



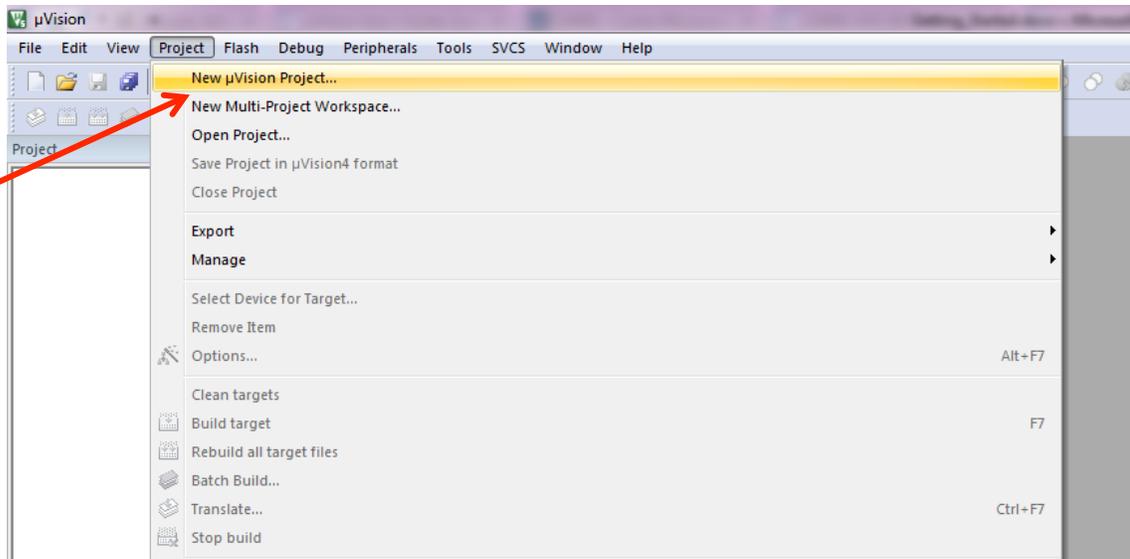
3. If you have already installed KEIL MDK-ARM without any packs, you can install the same by clicking pack installer as shown below,



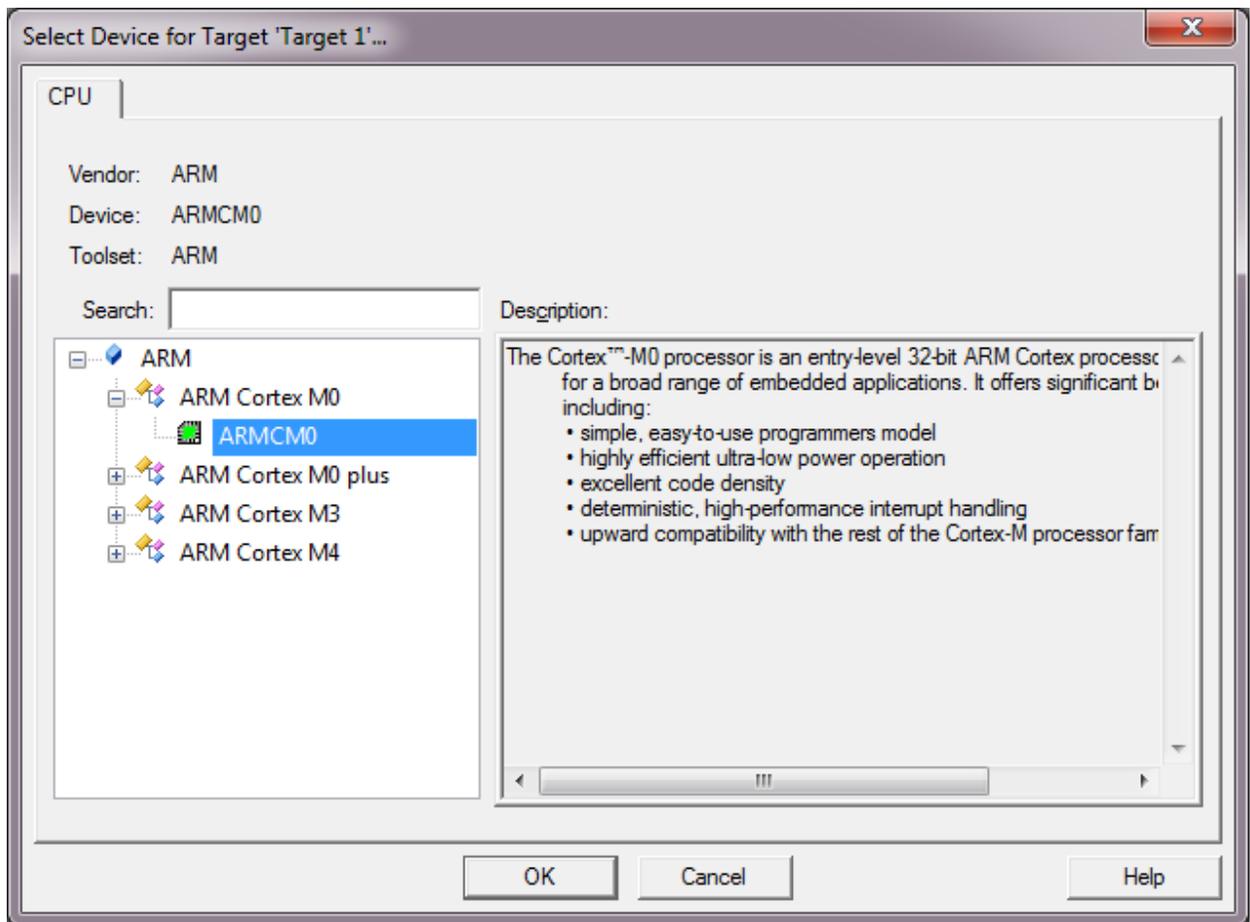
4. Install the license key provided. Steps to install are given in KEIL MDK License Installation Guide.

CREATE A NEW PROJECT

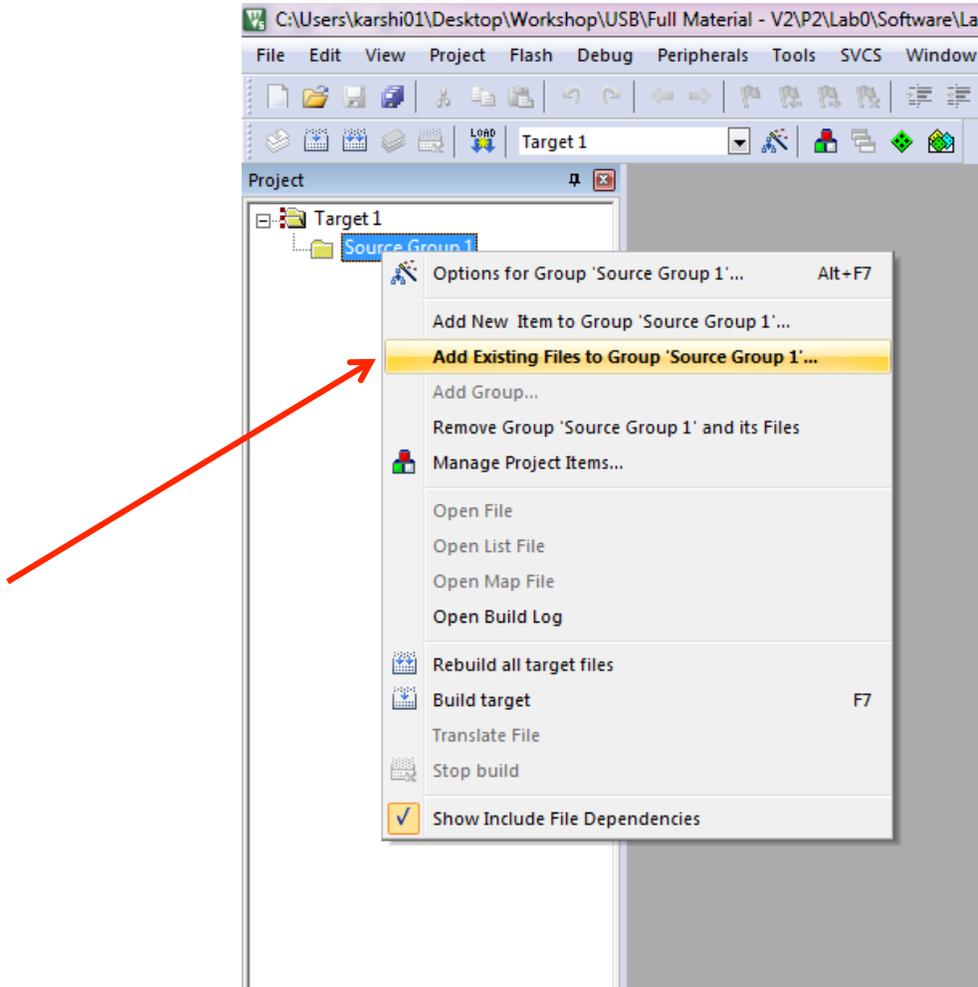
1. Create a new project



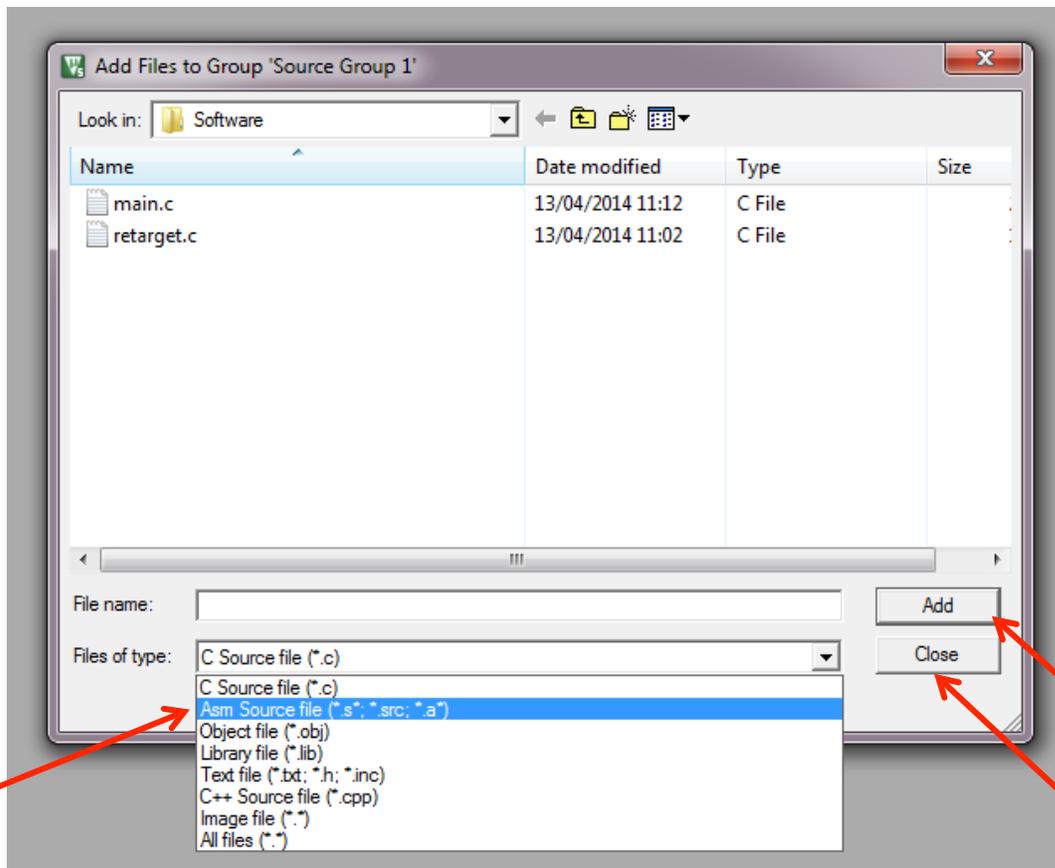
2. Give the project name as "lab"
3. In select Device Target, choose ARM → Cortex M0



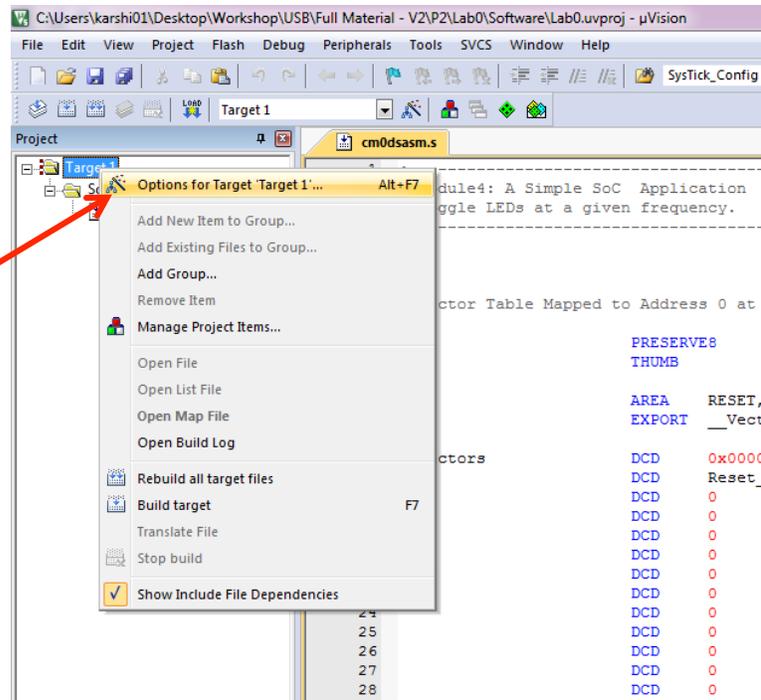
4. Skip the next step “Manage Run Tim environment” by clicking cancel.
5. Add file cm0dsasm.s into the project,



6. Choose “ARM Source Files” in the drop down “File Types” and then select cm0dsasm.s



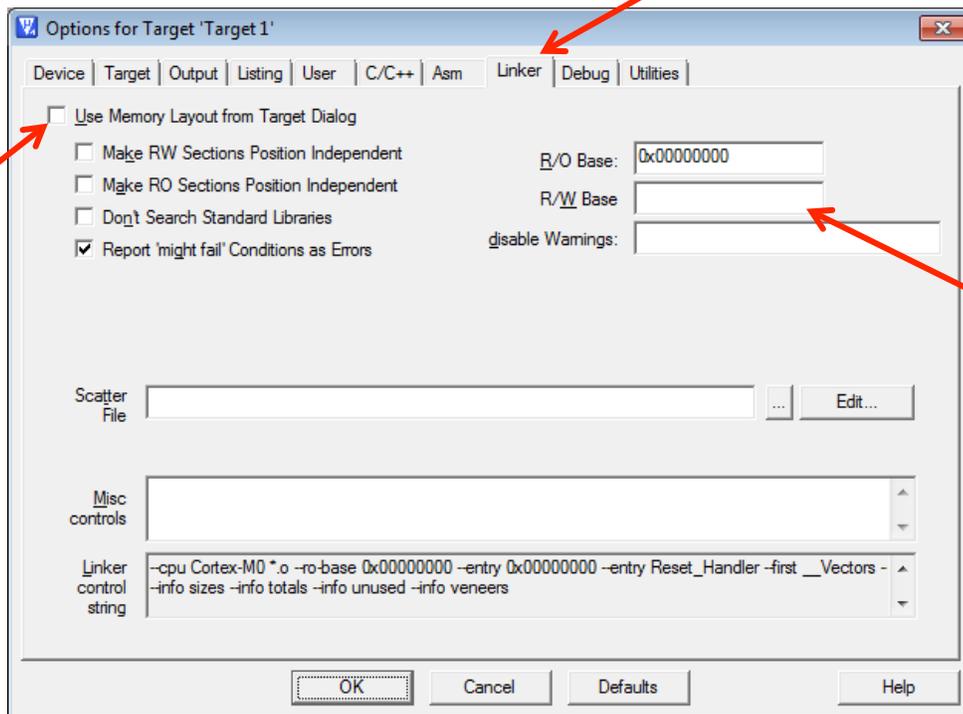
7. Once you select the file, click "Add" and then click "Close"
8. The will be added into "Source Group1" under "Target1"
9. Right click on Target1 in project navigator and click "Options for Target1"



10. This opens up the configuration window for your project

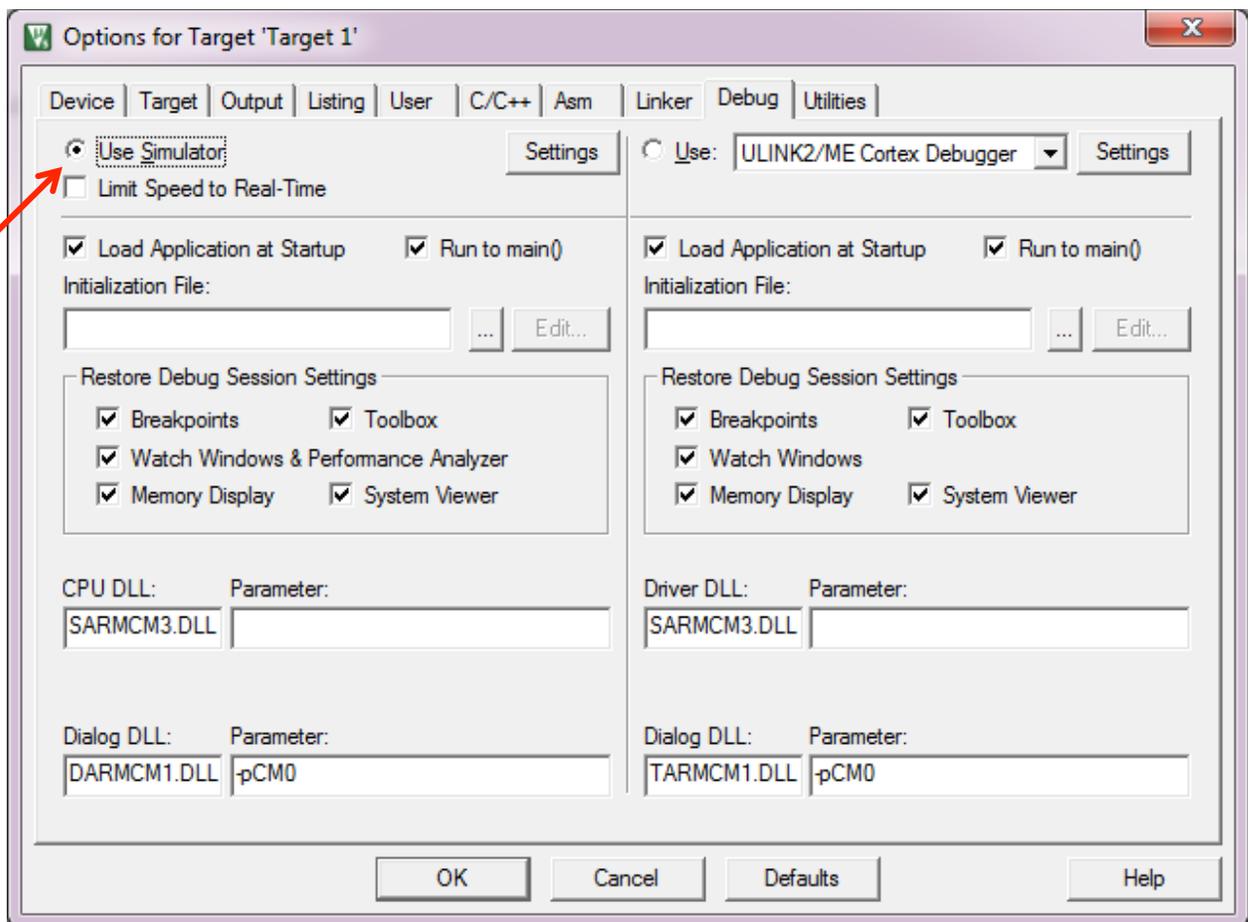
CHANGING THE CONFIGURATION OPTIONS

1. Go to the linker tab and delete the R/W Base entry.



Configuration in Linker Tab

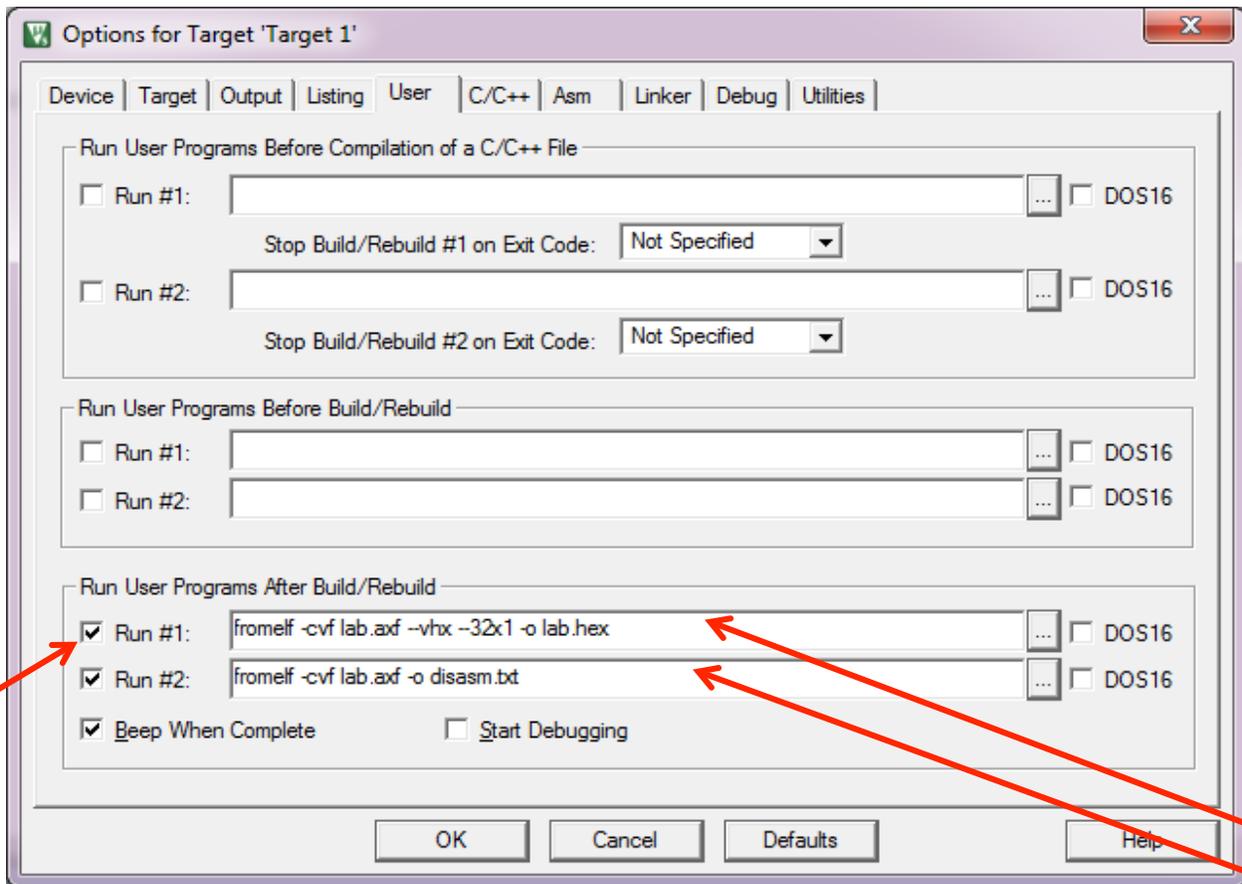
2. Go to the debug tab and change the choice to “USE SIMULATOR”



3. Go to USER tab and place these fromelf commands in “RUN THESE COMMANDS AFTER BUILD” section.
 - a. `fromelf -cvf Objects/lab.axf --vhx -32x1 -o lab.hex`
 - b. `fromelf -cvf Objects/lab.axf -o disasm.txt`

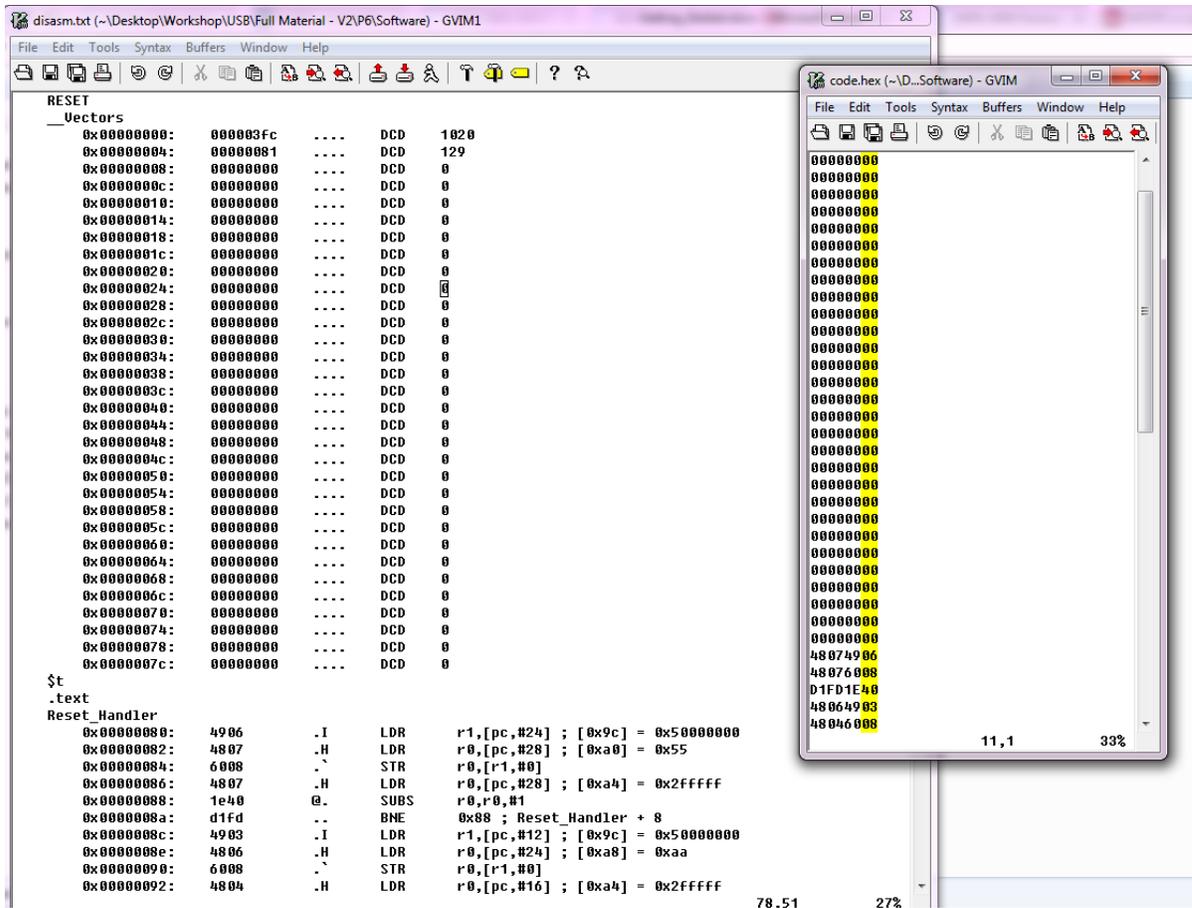
More information about fromelf utility can be found here:

http://www.keil.com/support/man/docs/armutil/armutil_caccdhia.htm



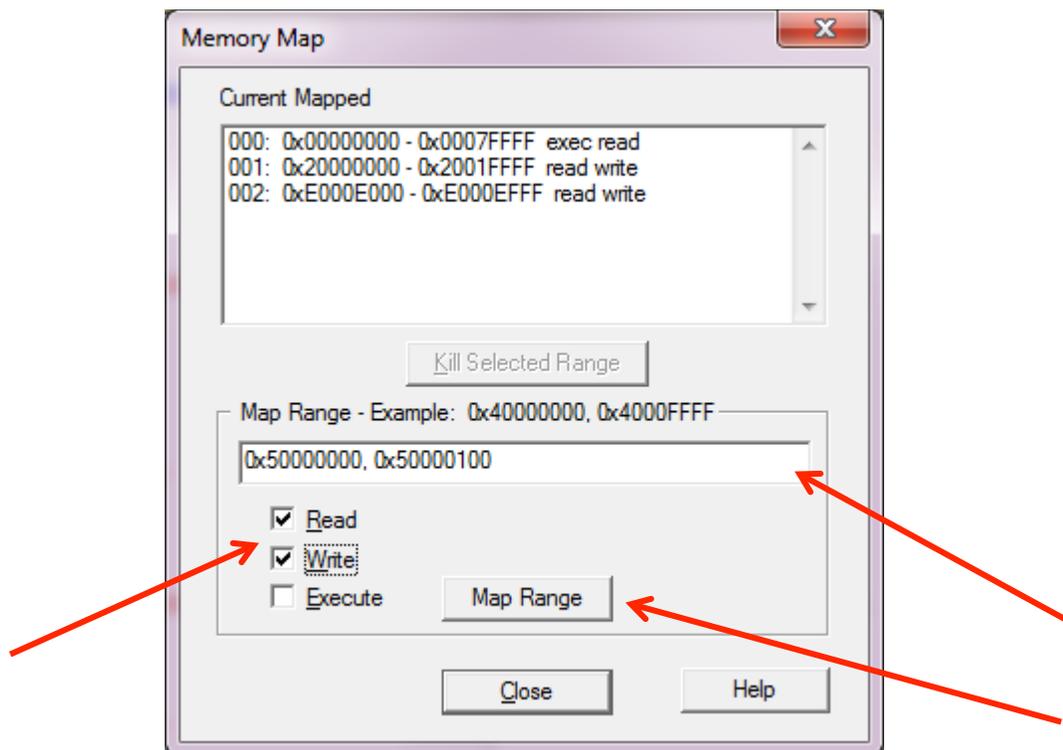
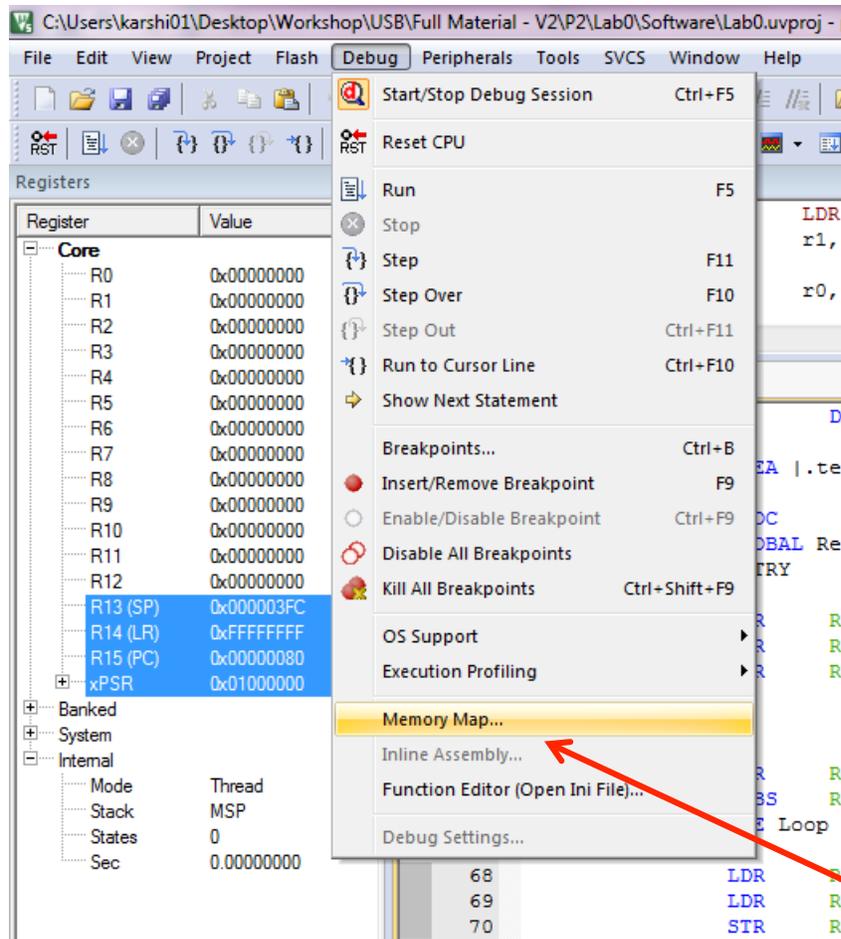
BUILD THE PROJECT

1. Build Target (Project → Build Target)
2. Analyze disasm.txt and lab.hex file generated in your project directory and compare with the source file cm0dsasm.s

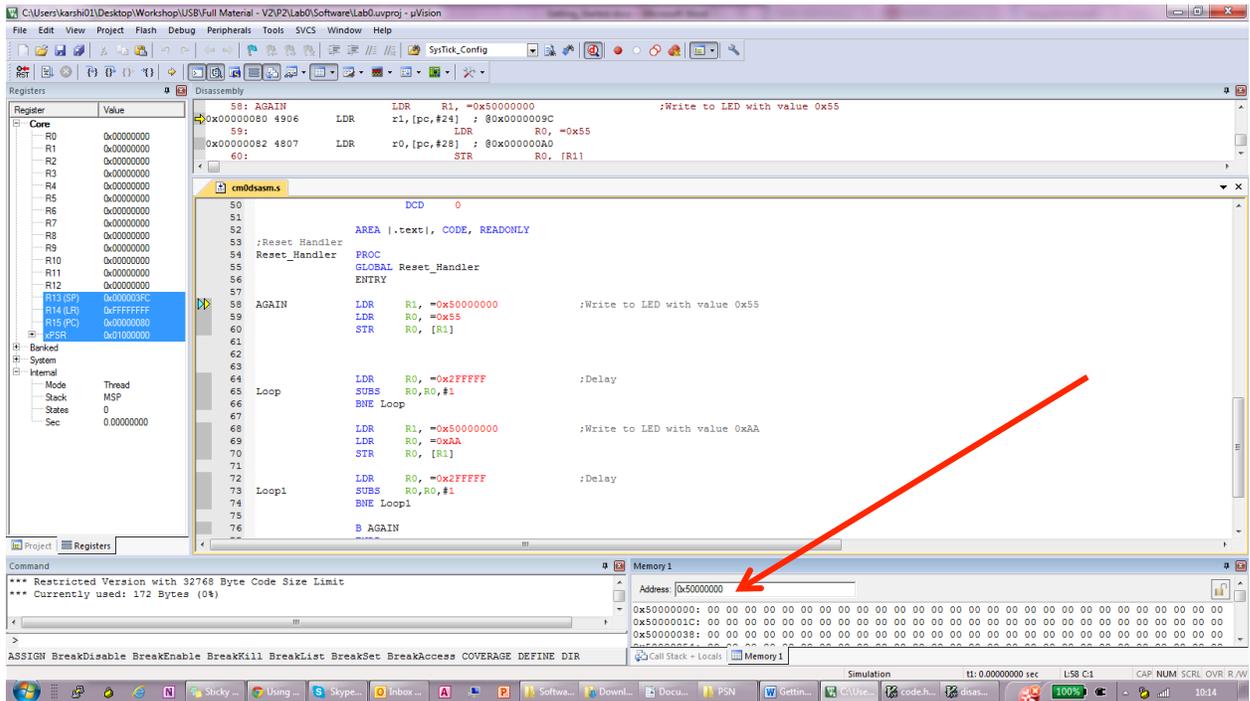


USING THE SIMULATOR

1. After you have compiled go to Debug → Start/Stop Debug Session
2. Ignore the warning message
3. Note that PC is already pointing to the Reset_Handler (This matches the entry point flag set during compilation)
4. Goto Debug → Memory Map and add the LED peripheral Memory information. Note the region should be Read and Write.



5. View the contents of at 0x5000_0000 in Memory1 Window.



6. Execute the image using Single Step and watch the memory contents change
7. Close the simulation using Debug → Close simulation