Getting Started with Keil µVision

WEL Team, IIT Bombay

2020

Development Tools

- **Editor**
  - Entry of code into files
- **Assembler or Compiler**
  - Generate machine code from source code
- **Downloader**
  - Put machine code in the chip
- **Execution check**
  - Using Debugger to verify operation of program (on Hardware or Simulator)

Single Point Solution?

Keil µVision IDE

- **Keil µVision**

  An easy-to-use **IDE** (Integrated Development Environment)
  - Project management,
  - Source code editing,
  - Code building facilities,
  - Run-time environment,
  - Program debugging

Since 1982

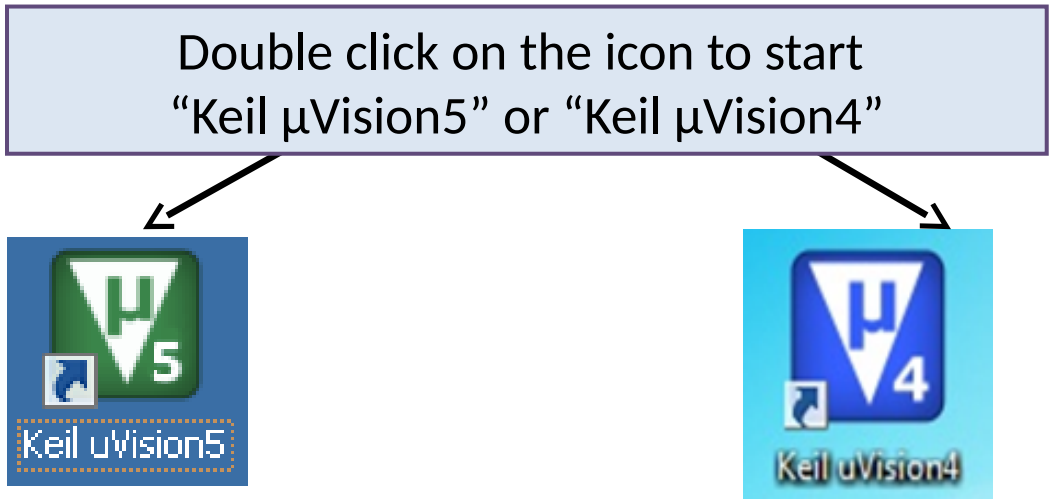
Acquisition by

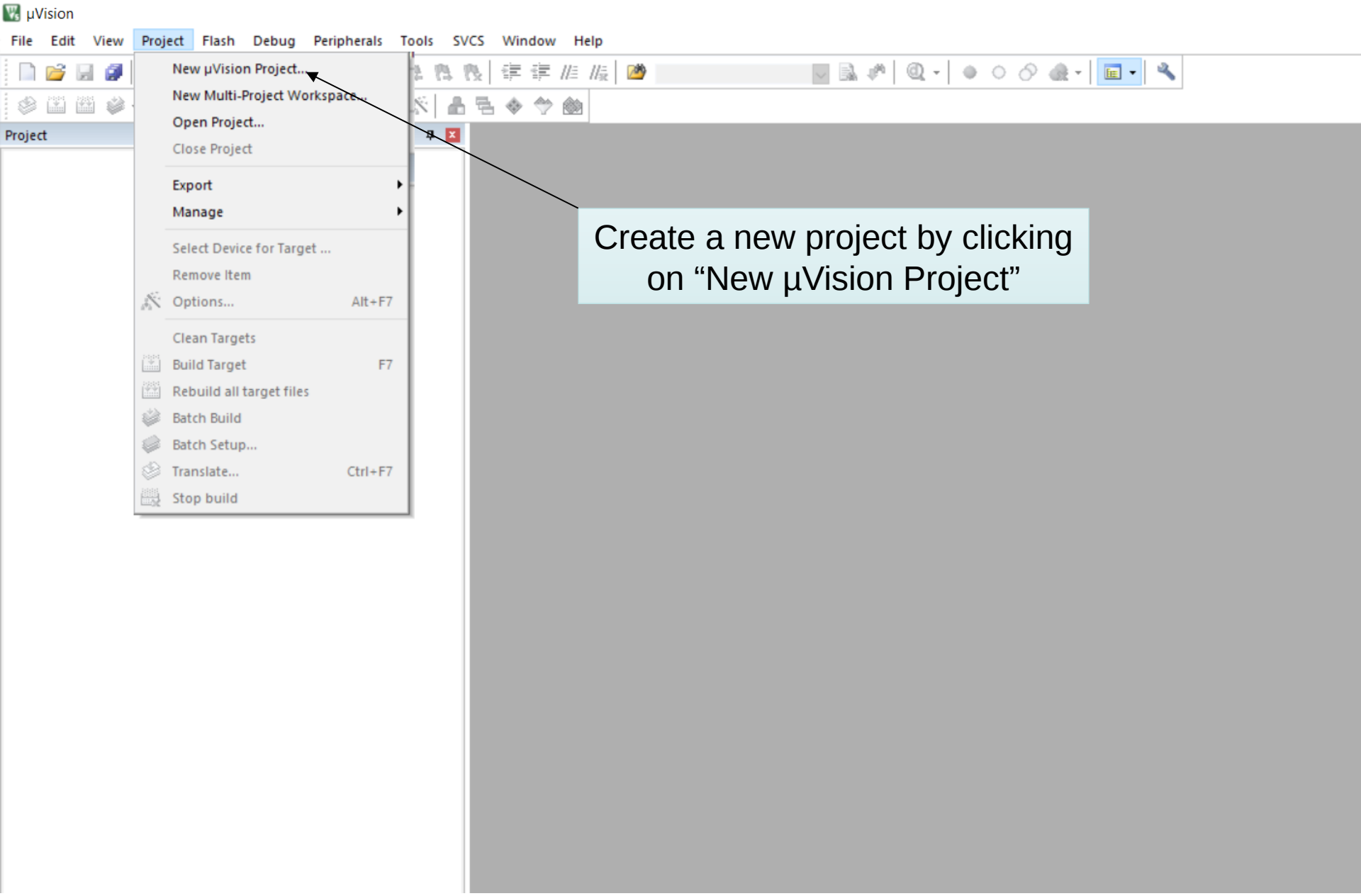
Around 2005

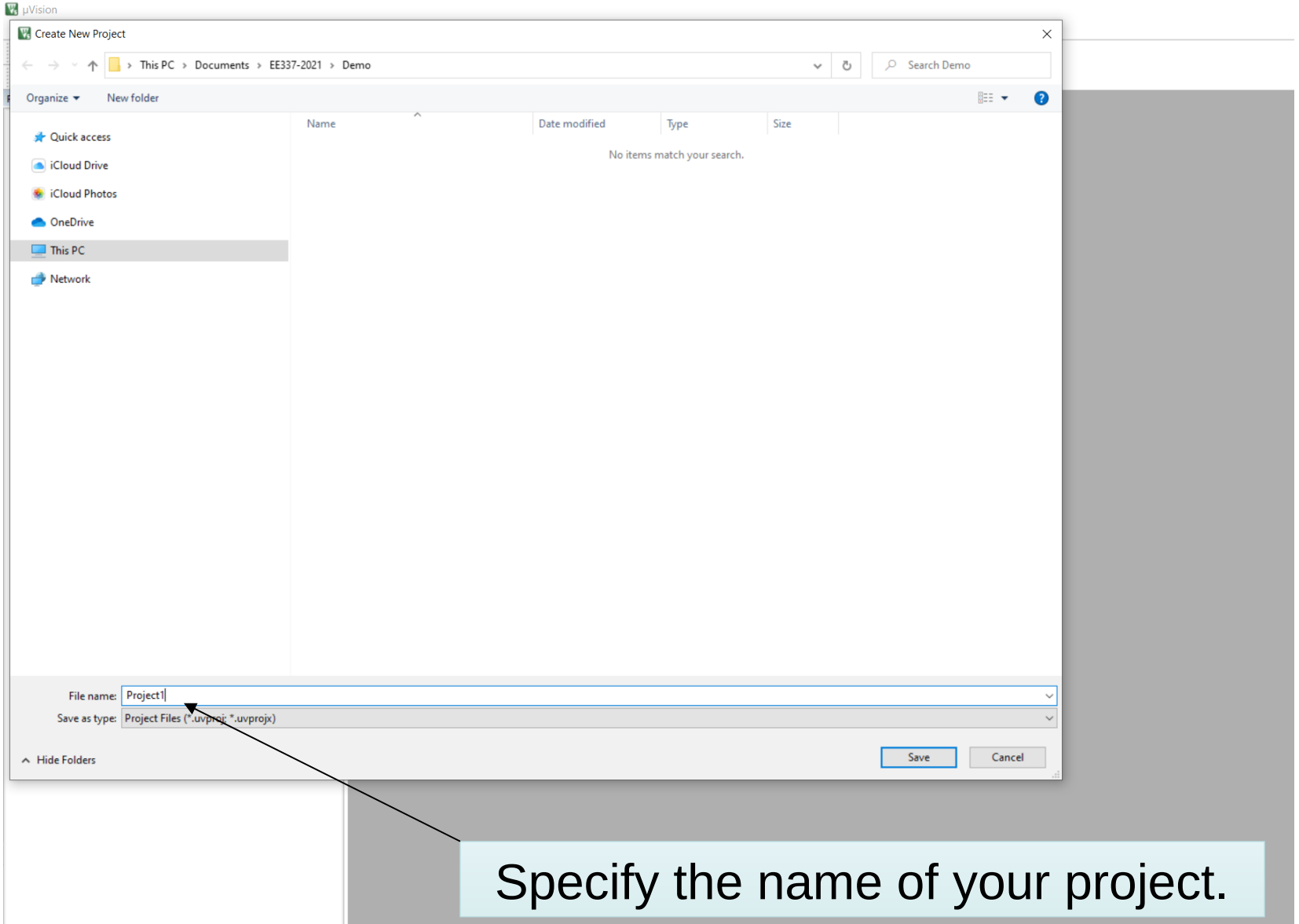
Now providing

Keil µVision IDE

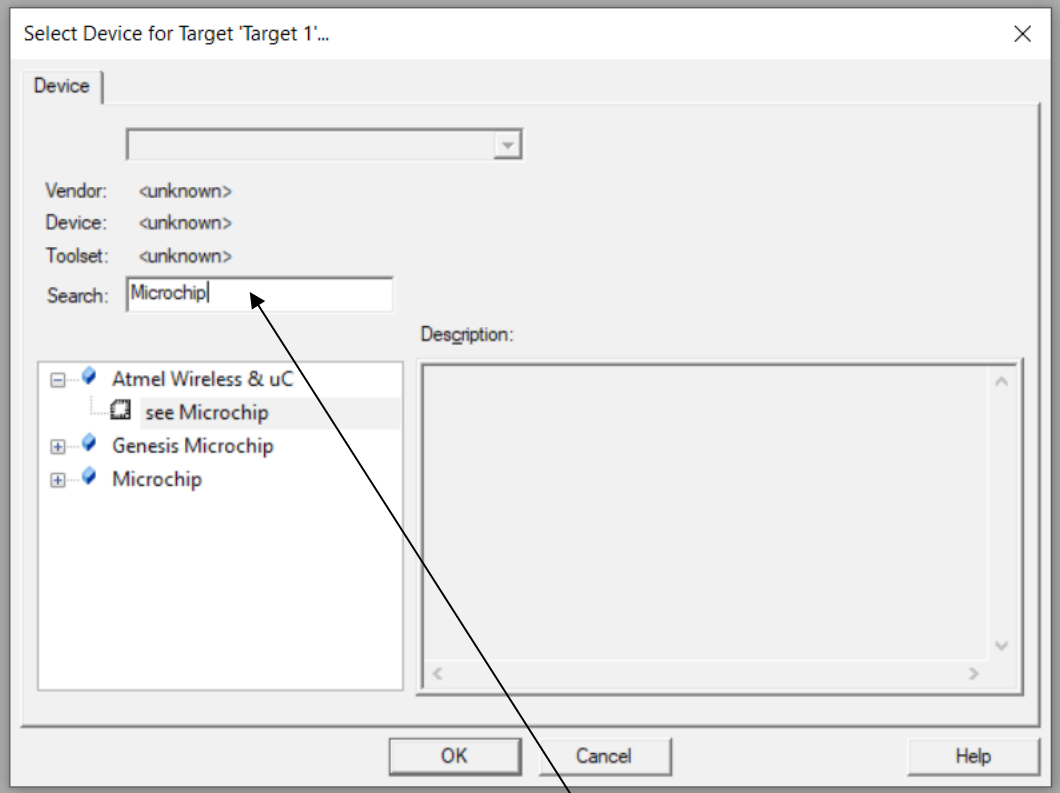
- **Project**
  - A collection of files related to a particular programming task.
- **Build**
  - The process in which **only the files modified since last build** are assembled/compiled for the chosen microcontroller device
- **Rebuild**
  - The process in which **all files** **are assembled/compiled** irrespective of their modification state.




µVision
File
Edit
View
Project
Flash
Debug
Peripherals
Tools
SVCS
Window
Help
New µVision Project...
New Multi-Project Workspace...
Open Project...
Close Project
Export
Manage
Select Device for Target ...
Remove Item
Options... Alt+F7
Clean Targets
Build Target F7
Rebuild all target files
Batch Build
Batch Setup...
Translate... Ctrl+F7
Stop build
Project
Create a new project by clicking on “New µVision Project”

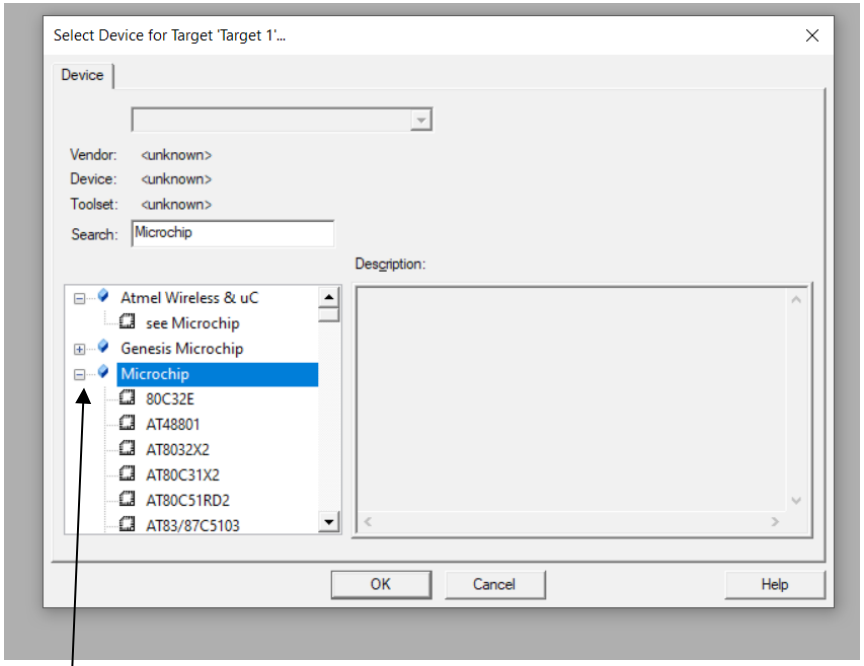


Specify the name of your project.

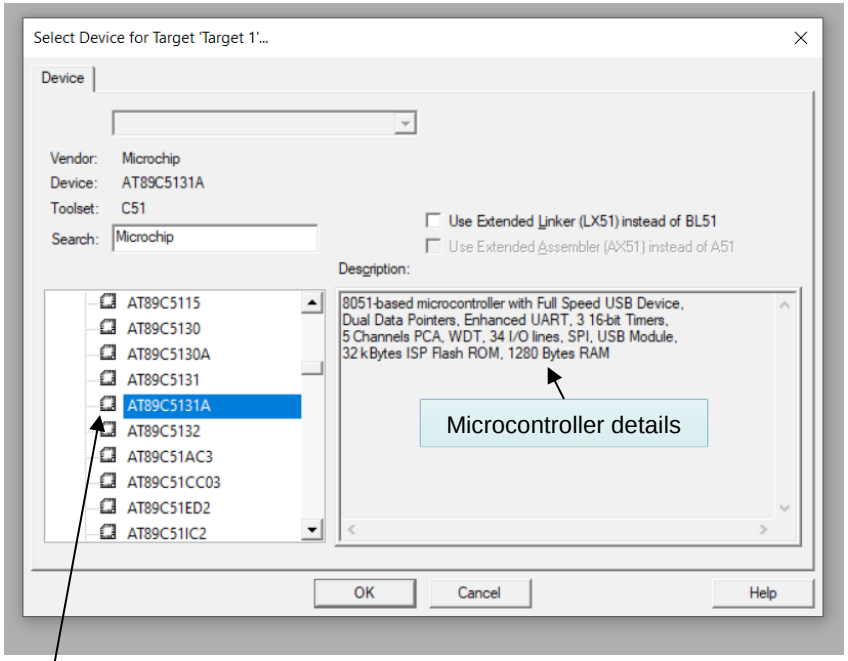


In the “Select Device for Target” dialog, type Microchip

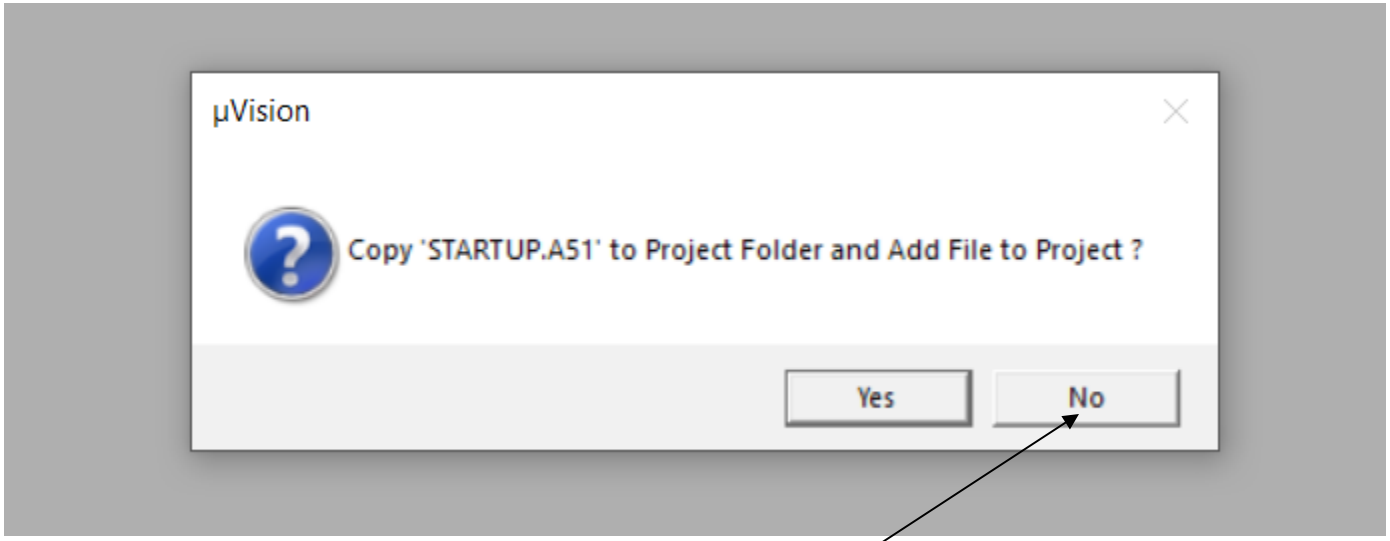
The Pt-51 board uses an Atmel microcontroller (AT89C5131A). Atmel was acquired by Microchip Technology Inc in 2016.



Expand the list of Microchip devices

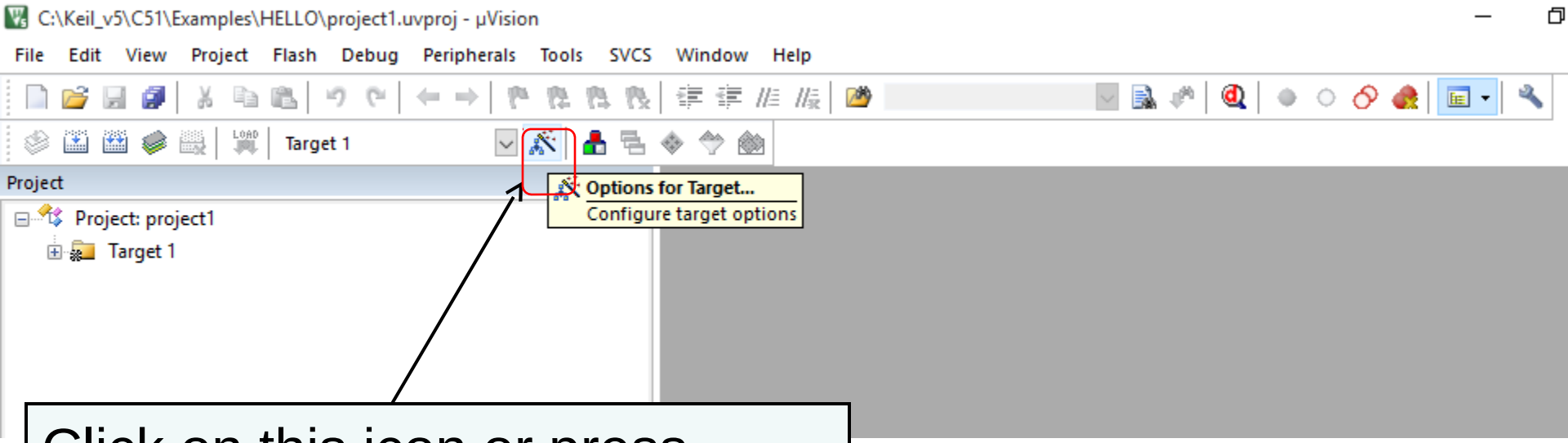


Choose AT89C5131A from the list



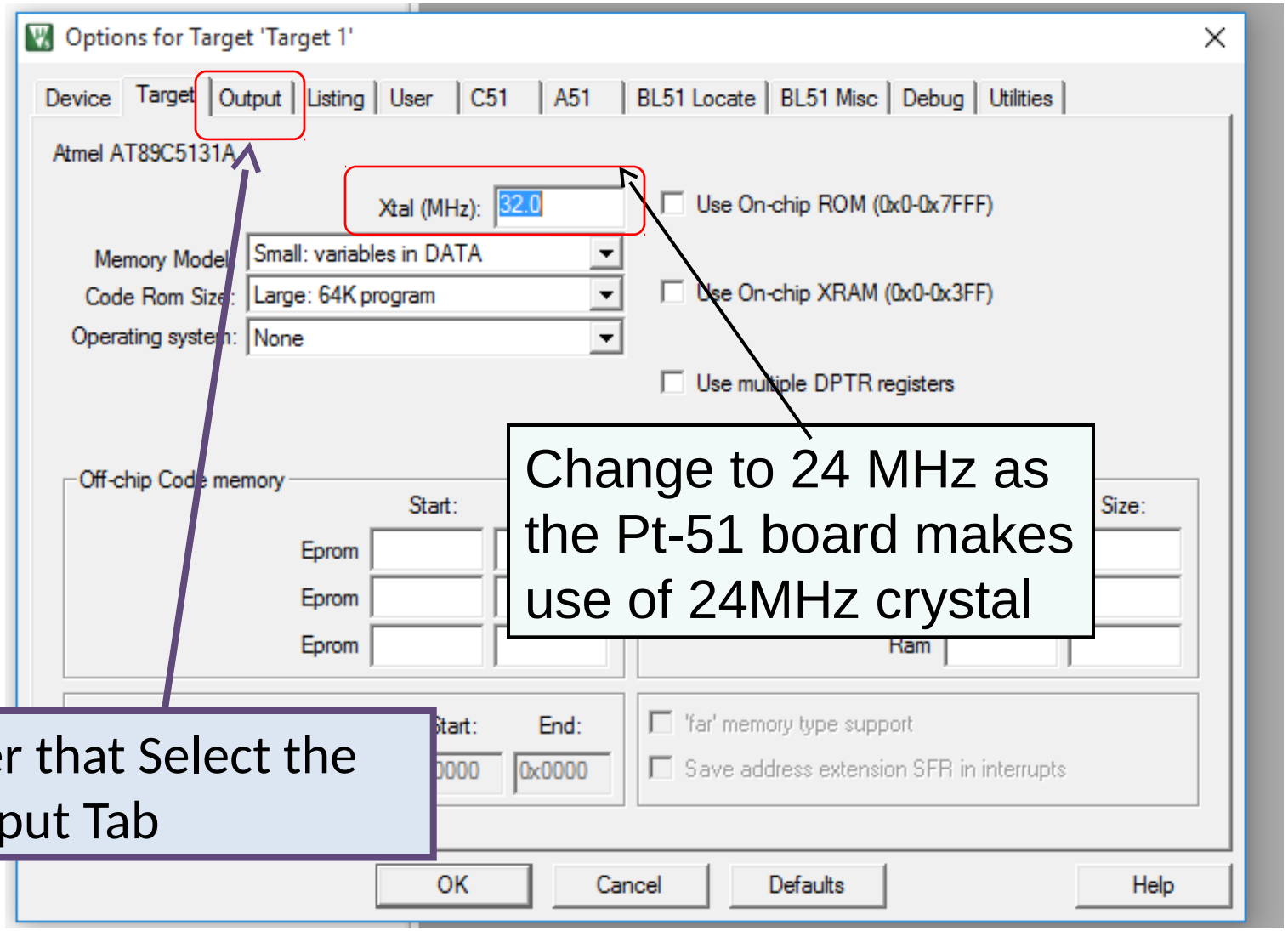
- In the dialog which pops up, choose “No” if you are going to write programs in assembly language.
- STARTUP.A51 is a file required for writing programs in C.

Configuring the Project target options

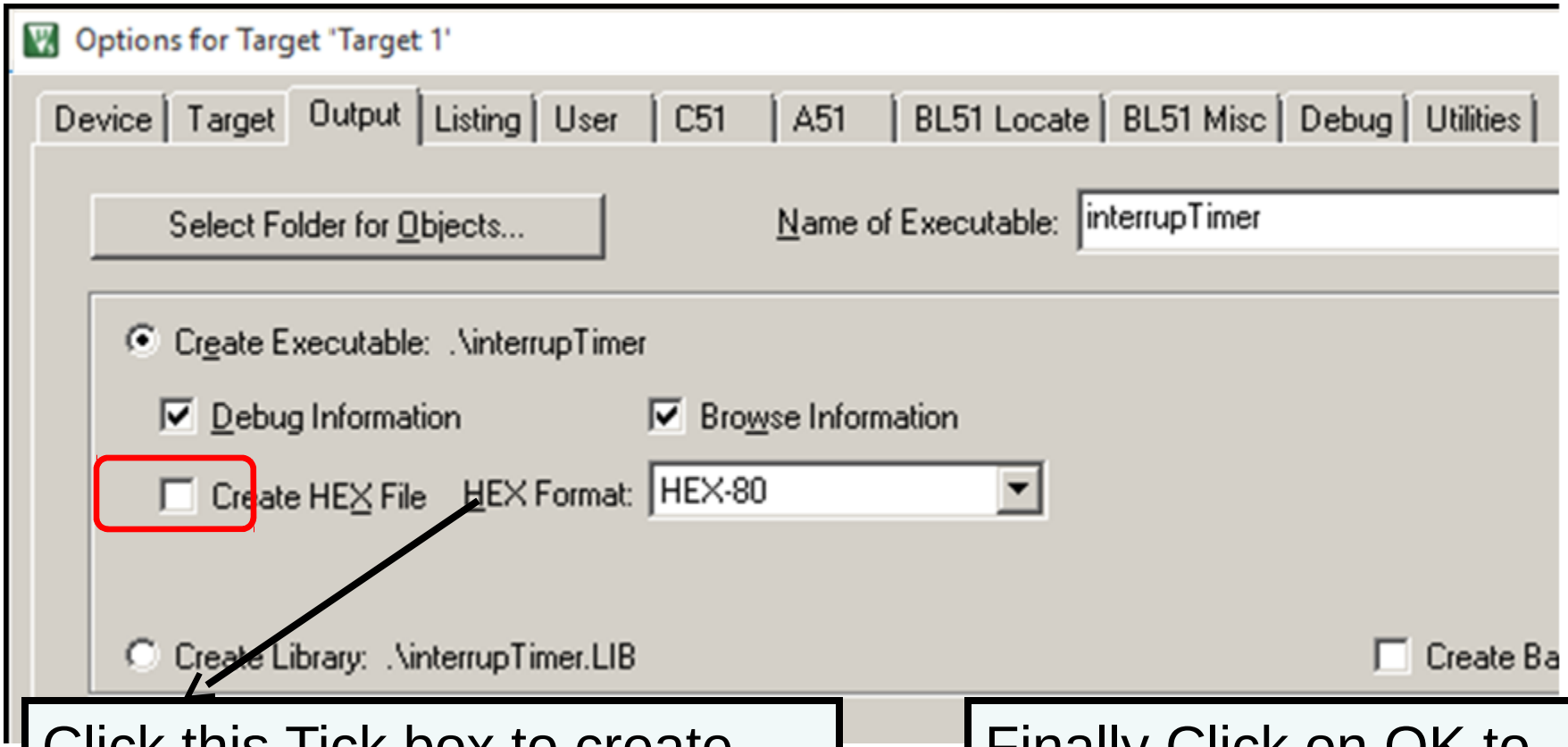


Click on this icon or press “Alt+F7” to configure the target options

Configuring the Crystal frequency

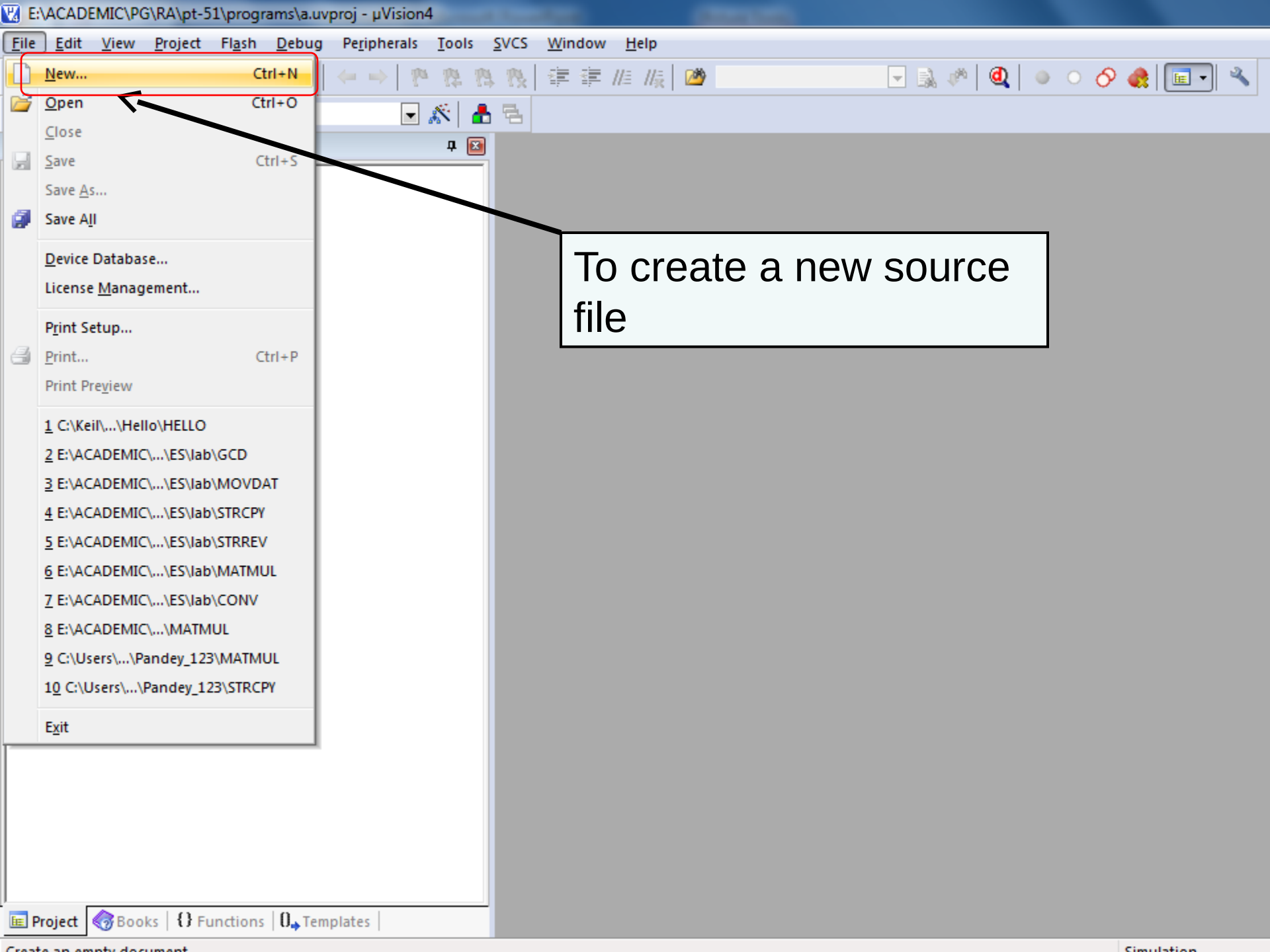


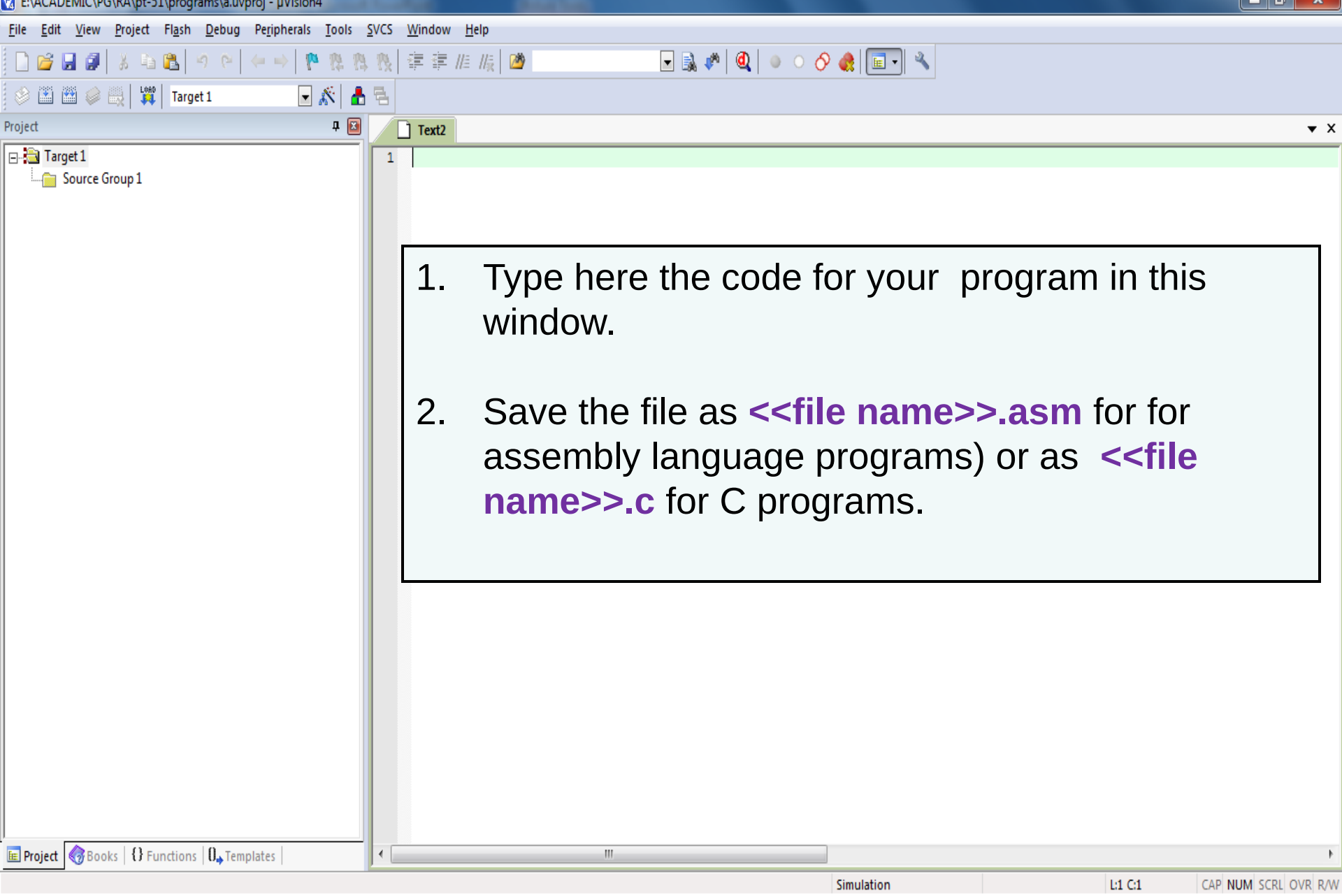
Creating HEX file

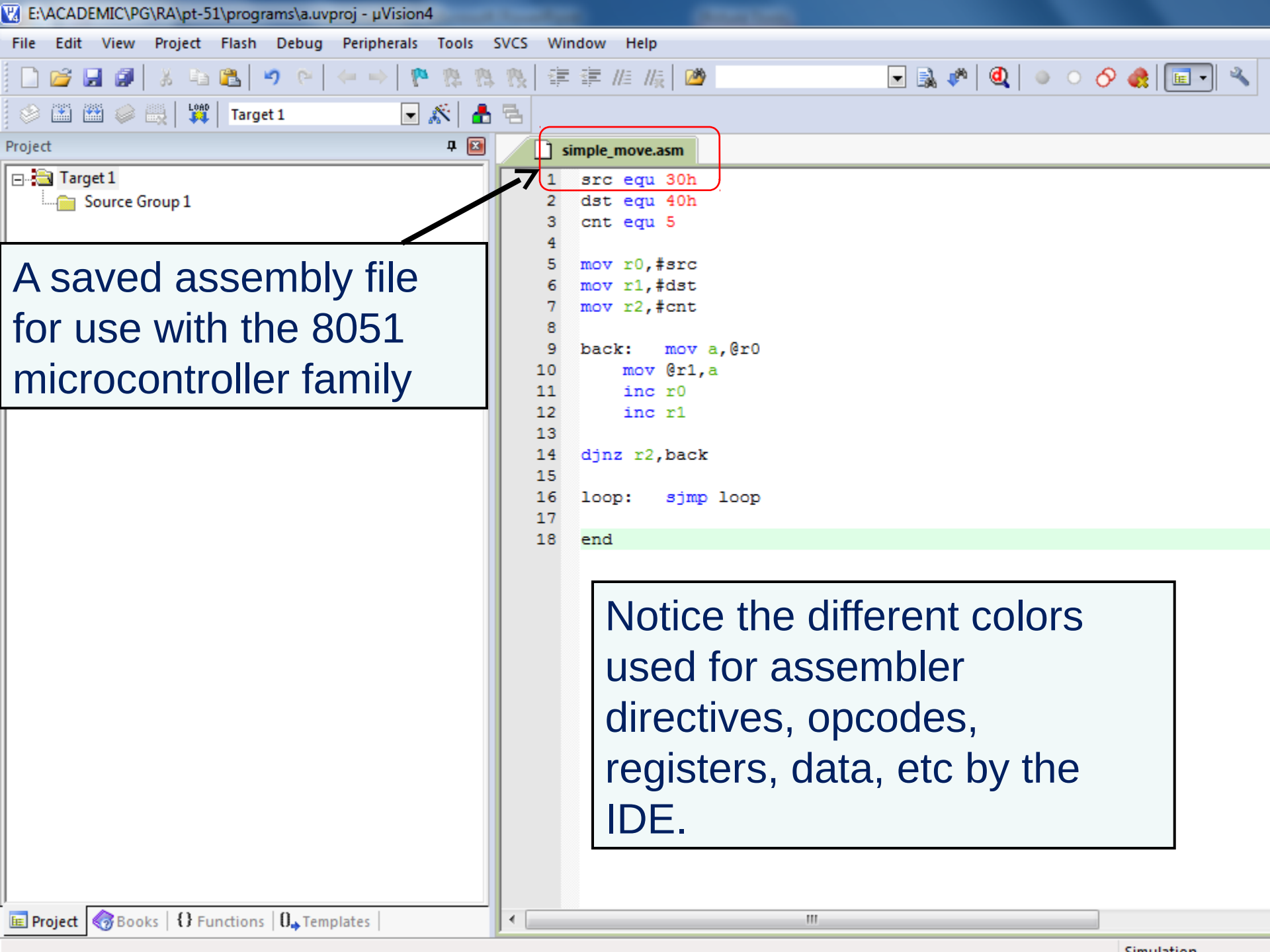


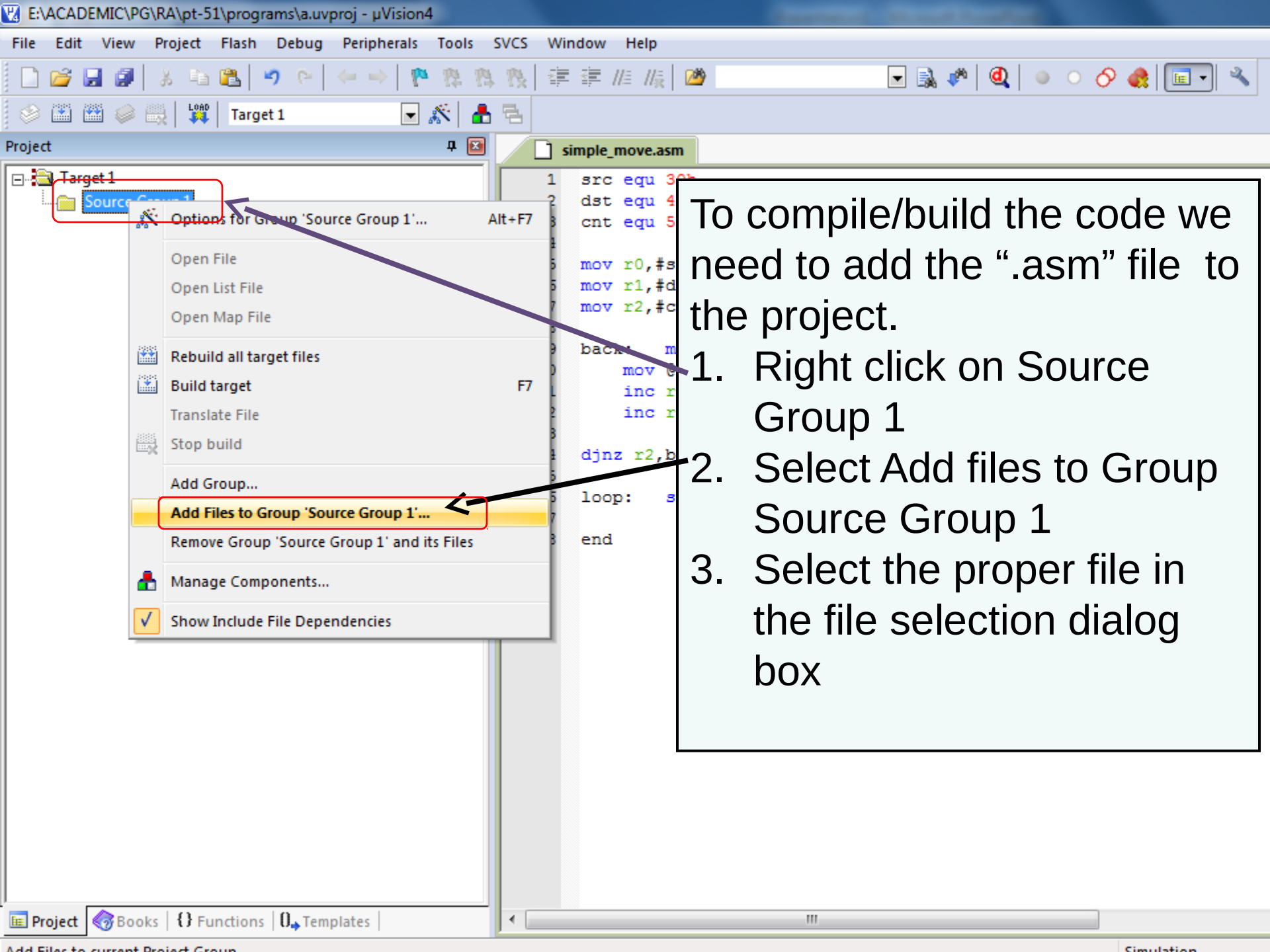
Click this Tick box to create Hex file

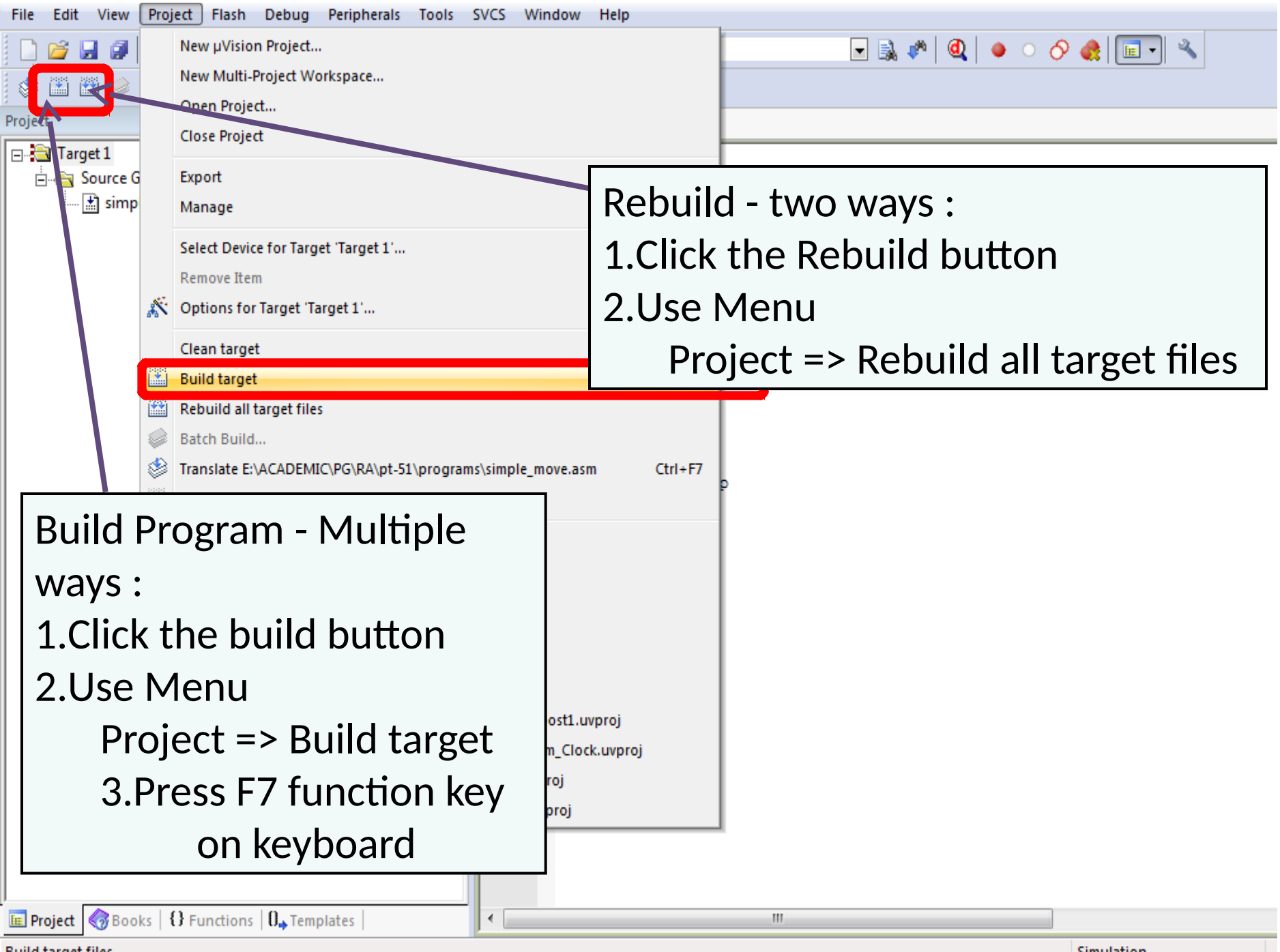
Finally Click on OK to save these Options chosen for this project


E:\ACADEMIC\PG\RA\pt-51\programs\a.uvproj - µVision4
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
New... Ctrl+N
Open Ctrl+O
Close
Save Ctrl+S
Save As...
Save All
Device Database...
License Management...
Print Setup...
Print... Ctrl+P
Print Preview
1 C:\Keil\...\Hello\HELLO
2 E:\ACADEMIC\...\ES\lab\GCD
3 E:\ACADEMIC\...\ES\lab\MOVDAT
4 E:\ACADEMIC\...\ES\lab\STRCPY
5 E:\ACADEMIC\...\ES\lab\STRREV
6 E:\ACADEMIC\...\ES\lab\MATMUL
7 E:\ACADEMIC\...\ES\lab\CONV
8 E:\ACADEMIC\...\MATMUL
9 C:\Users\...\Pandey_123\MATMUL
10 C:\Users\...\Pandey_123\STRCPY
Exit
To create a new source file
Project
Books
Functions
Templates


E:\ACADEMIC\PG\RA\pt-51\programs\a.uvproj - µVision4
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
Target 1
Project
Target 1
Source Group 1
Project Books Functions Templates
Text2
1
1. Type here the code for your program in this window.
2. Save the file as <<file name>>.asm for for assembly language programs) or as <<file name>>.c for C programs.
Simulation
L:1 C:1
CAP NUM SCRL OVR R/W


E:\ACADEMIC\PG\RA\pt-51\programs\a.uvproj - µVision4
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
Target 1
Project
Target 1
Source Group 1
simple_move.asm
1 src equ 30h
2 dst equ 40h
3 cnt equ 5
4
5 mov r0,#src
6 mov r1,#dst
7 mov r2,#cnt
8
9 back: mov a,@r0
10 mov @r1,a
11 inc r0
12 inc r1
13
14 djnz r2,back
15
16 loop: sjmp loop
17
18 end
A saved assembly file for use with the 8051 microcontroller family
Notice the different colors used for assembler directives, opcodes, registers, data, etc by the IDE.
Project
Books
Functions
Templates


E:\ACADEMIC\PG\RA\pt-51\programs\a.uvproj - µVision4
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
Target 1
Project
Target 1
Source Group 1
Options for Group 'Source Group 1'... Alt+F7
Open File
Open List File
Open Map File
Rebuild all target files
Build target F7
Translate File
Stop build
Add Group...
Add Files to Group 'Source Group 1'...
Remove Group 'Source Group 1' and its Files
Manage Components...
Show Include File Dependencies
simple_move.asm
src equ 30h
dst equ 4
cnt equ 5
mov r0,#s
mov r1,#d
mov r2,#c
djnz r2,b
loop: s
end
Project Books Functions Templates
To compile/build the code we need to add the ".asm" file to the project.
1. Right click on Source Group 1
2. Select Add files to Group Source Group 1
3. Select the proper file in the file selection dialog box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New µVision Project...
New Multi-Project Workspace...
Open Project...
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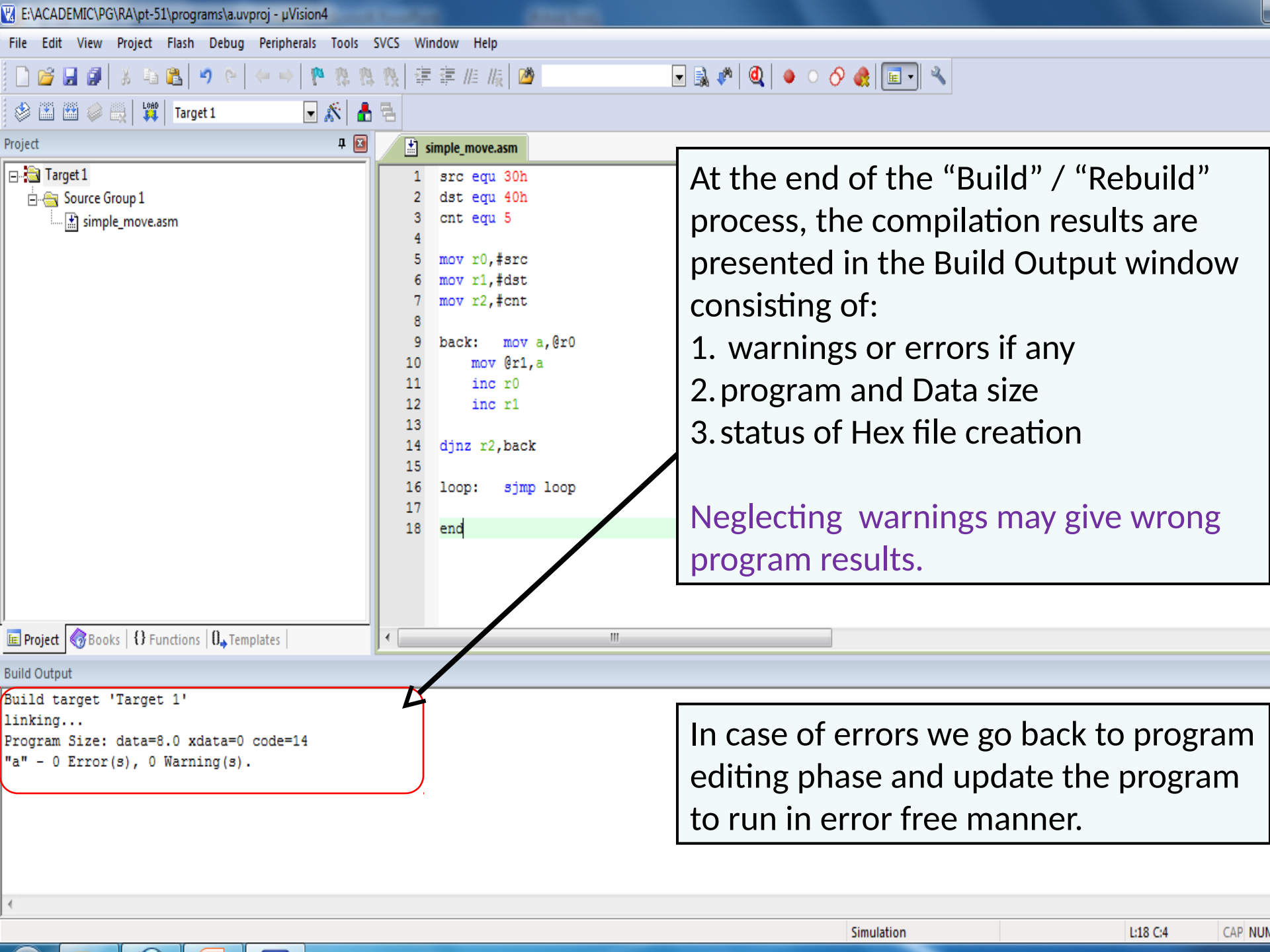
Select Device for Target 'Target 1'...
Remove Item
Options for Target 'Target 1'...
Clean target
Build target
Rebuild all target files
Batch Build...
Translate E:\ACADEMIC\PG\RA\pt-51\programs\simple_move.asm Ctrl+F7
Target 1
Source G
simp
Project
Books
Functions
Templates
Rebuild - two ways :
1.Click the Rebuild button
2.Use Menu
Project => Rebuild all target files
Build Program - Multiple ways :
1.Click the build button
2.Use Menu
Project => Build target
3.Press F7 function key on keyboard



At the end of the “Build” / “Rebuild” process, the compilation results are presented in the Build Output window consisting of:

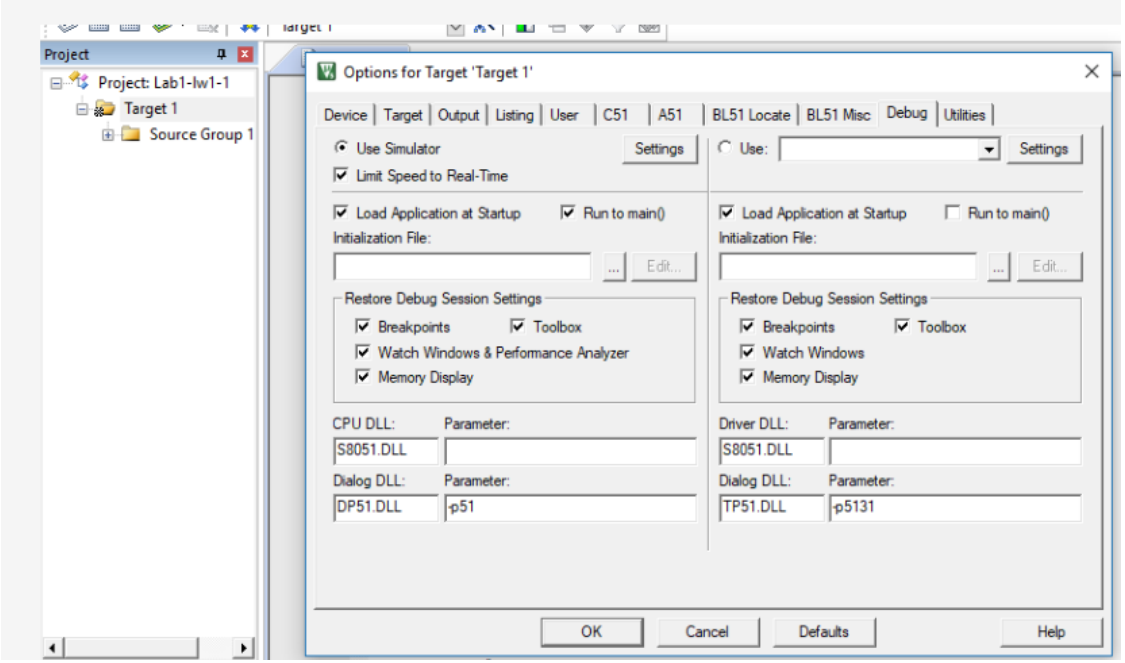
1. warnings or errors if any
2. program and Data size
3. status of Hex file creation

Neglecting warnings may give wrong program results.

In case of errors we go back to program editing phase and update the program to run in error free manner.

Solving Keil Crash Issue

- If Keil µVision keeps crashing on pressing the `Start\stop debug session`, then follow these steps.
  - Right click on the target folder (at the left pane).
  - Select `Options for Target `<TargetName>``.
  - Select the `Debug` pane.
  - Change the `Parameter` field to the right of `Dialog DLL` with name `DP51.DLL` to `-p51`.
  - Tick the `Limit Speed to Real-Time` checkbox.



Questions ?

Thank you

WEL, IIT Bombay

2020

Presentation Version Information:

Date	Comments
Jan 2020	Modifications to title. Changed some screenshots to remove Atmel references. Deleted flowchart slide. Changed uVision to µVision.
2016	Initial version by Suryakant Toraskar, smtoraskar.iitbombay@gmail.com