# *Week 10 Lab*

## *CC2511*

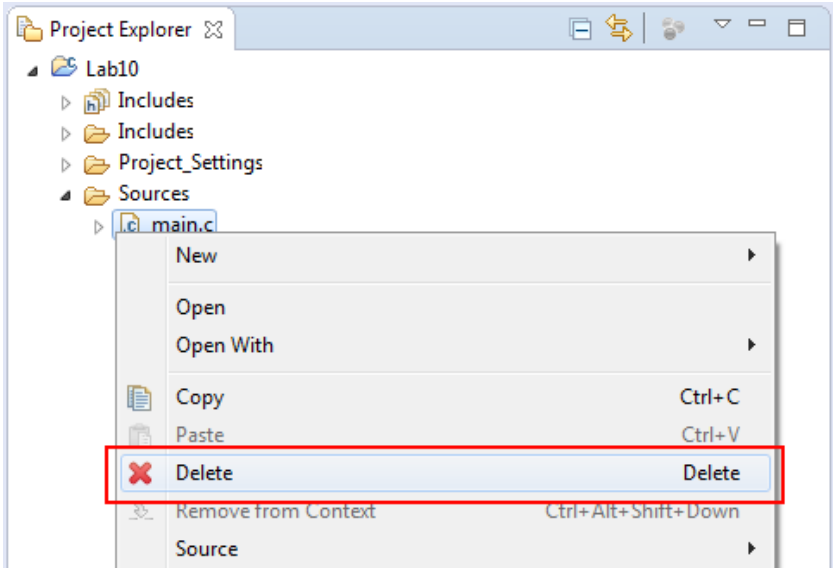
### *Task Description*

**Your task is to write an assembly language program to blink at least one of the LEDs.** This is similar to your first C program back in Week 3, except that now you're doing it in hand-written assembly.

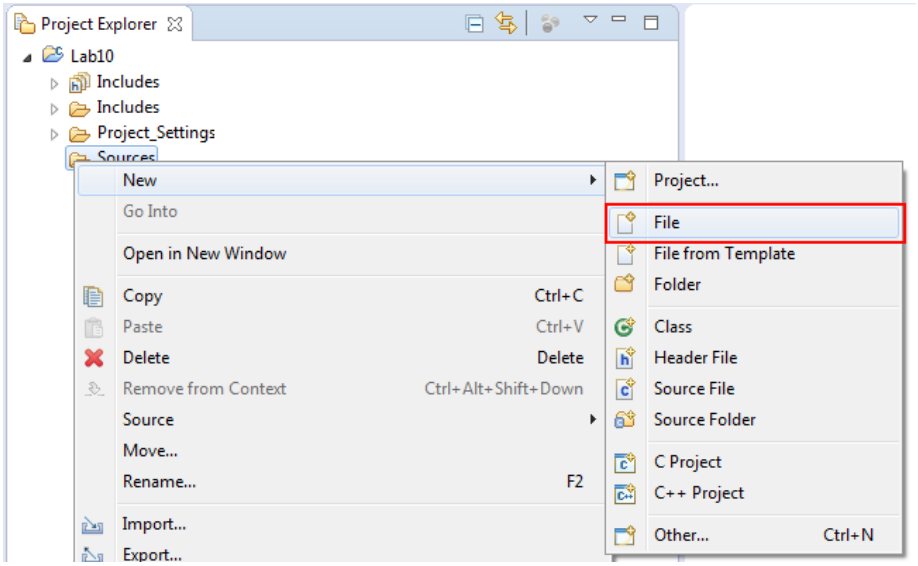
The purpose of this task is to learn the fundamentals of ARM assembly, to prepare for a more advanced task next week.

### *Suggested steps*

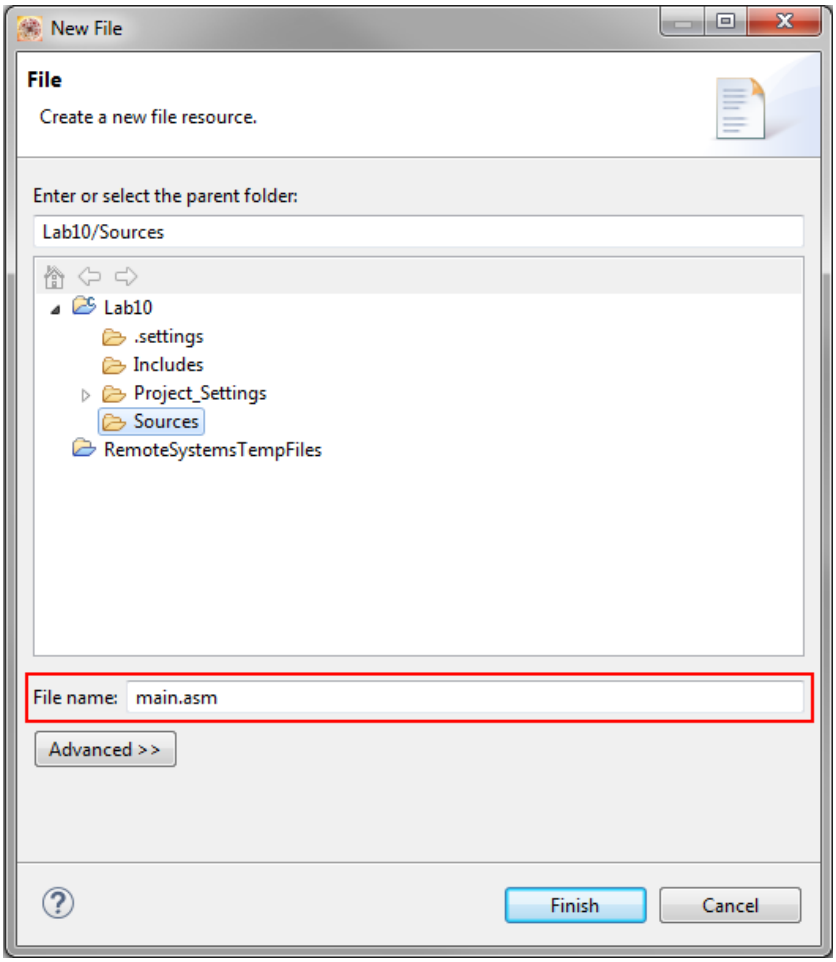
1. Create a new Kinetis project **without Processor Expert** support.
2. **Delete the main.c** file by right clicking on it in the Source view.



3. Right click on **Sources** and choose **New -> File**.




4. Name the file as **main.asm**



5. Copy and paste the starter code from LearnJCU.

### *Hints*

- You can write to peripheral registers by:
  1. Loading the address into a general purpose register,
  2. Loading the value into another general purpose register, and
  3. Using the `str` instruction.
- You must first configure the relevant pins for GPIO. Refer back to your Week 3 lab to determine which registers you need to set. Note that you will need to look up addresses of these registers in the reference manual!
- You must clock the port control module by writing `0x3e00` into `SIM_SCGC5`. You will have to look up the address of this register in the reference manual.
- You can delay by creating a loop that counts down from a large number. This is probably what you did in Week 3; now you must implement this in assembly code. Use conditional branch instructions to achieve this loop.
- Assembly language code must be well commented, or else it becomes difficult to read.
- The ARM instruction set is documented online:

  `http://infocenter.arm.com/help/index.jsp?topic=/com.arm.doc.dui0553a/CIHJJEIH.html`

### *Assessment*

To complete this lab task, you must demonstrate to your prac tutor:

- A working board that blinks at least one LED.
- Handwritten assembly code implementing this task that is well commented.