LAB 1: Get started and pulse generation

Goal

1. Get familiar with development environment (Code Composer Studio for MSP430)

2. Understand the register manipulation, including value assignment, addition, subtraction and bitwise logic.

3. Learn to manipulate IO port of the microcontroller, including the port direction configuration, port value assignment and port interrupt handling.

Introduction

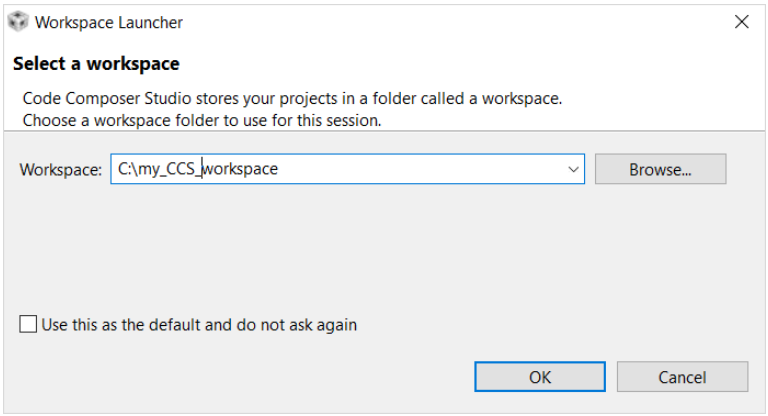
This is the first lab of the course. This lab is separated into mainly two parts. In the first part, the lab focuses on studying the development environment – Code Composer Studio. The lab shows a step-by-step introduction based on one simple task. There are several tasks in this part. The second part of the lab is to use one of the IO pins in the MSP430 board to generate a pulse signal. The pulse frequency is depend on the number of times of the push button is clicked. (More detailed description is given in the second part).

Before the lab, one should hand in the lab preparation which contains the preliminary answer of the questions listed at the end of this lab PM. The lab preparation should be handed in before the lab and the review will be given during the lab individually. For the lab, normally it is 2 people in one group.

Part 1 Get Started!

1. Open Code Composer Studio 7.00 (CCSv7)

Find the program named “Code Composer Studio 7.00” (or manybe some version that earlier or later). When CCSv7 is opened, you should first select a workspace in the following window.

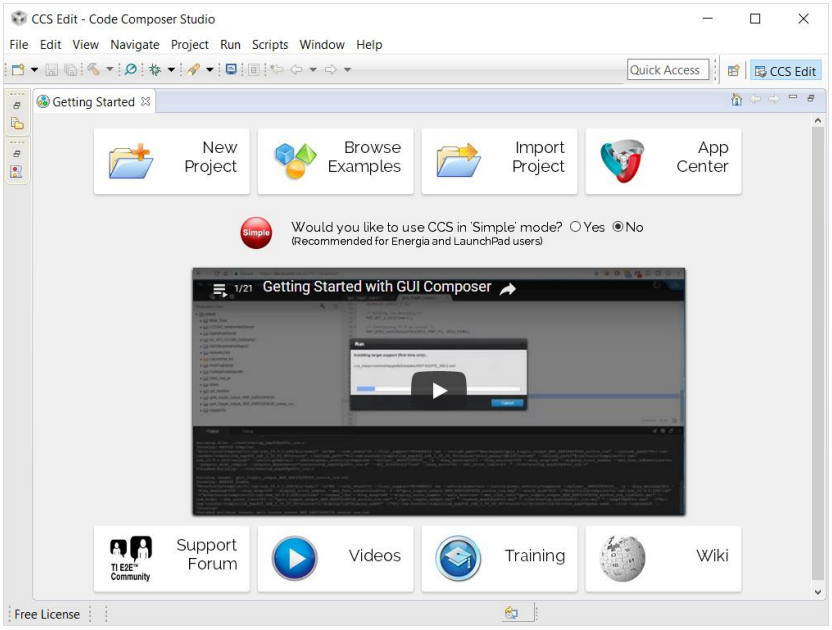


2. Setting the Workspace Directory

The Workspace directory you select will save your projects with the project files, configuration files, source files and compiler output files you may want to have access in the future.

Do **NOT** check the “Use this as the default and do not ask again” box.

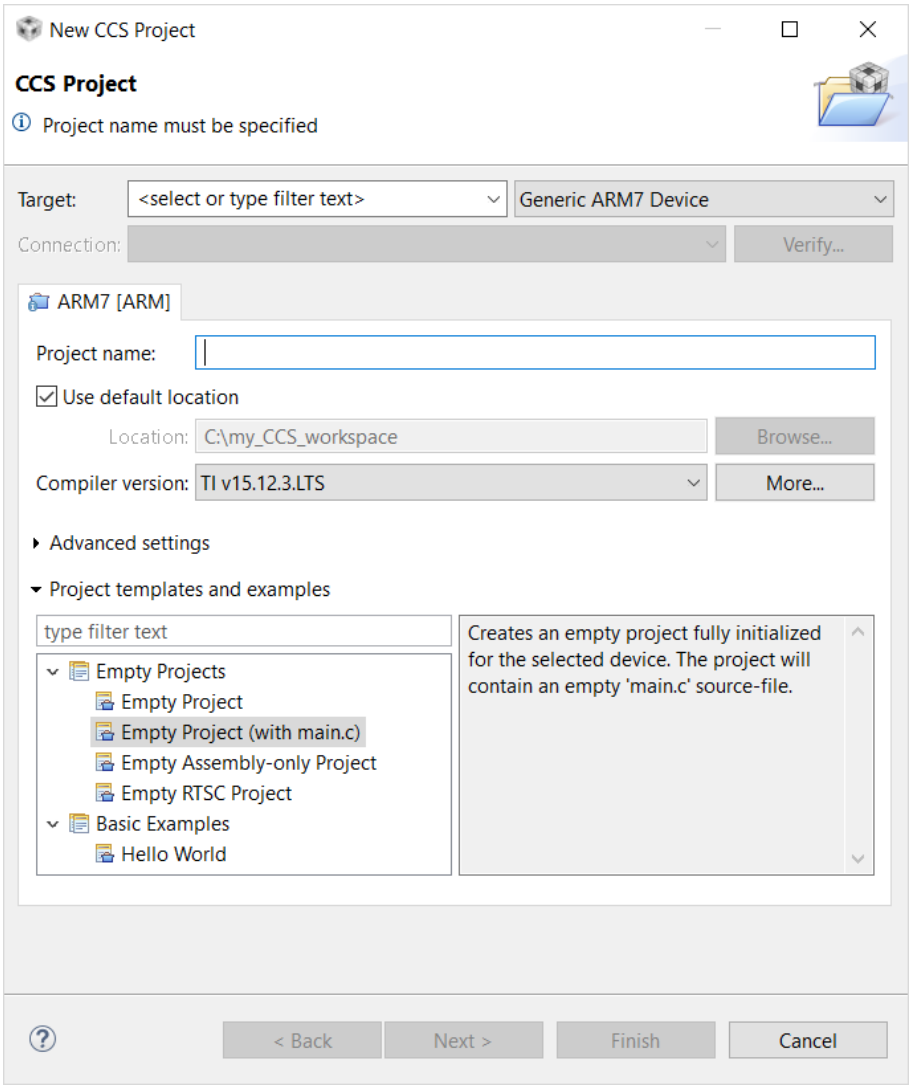
After clicking “OK”, the following window is shown.



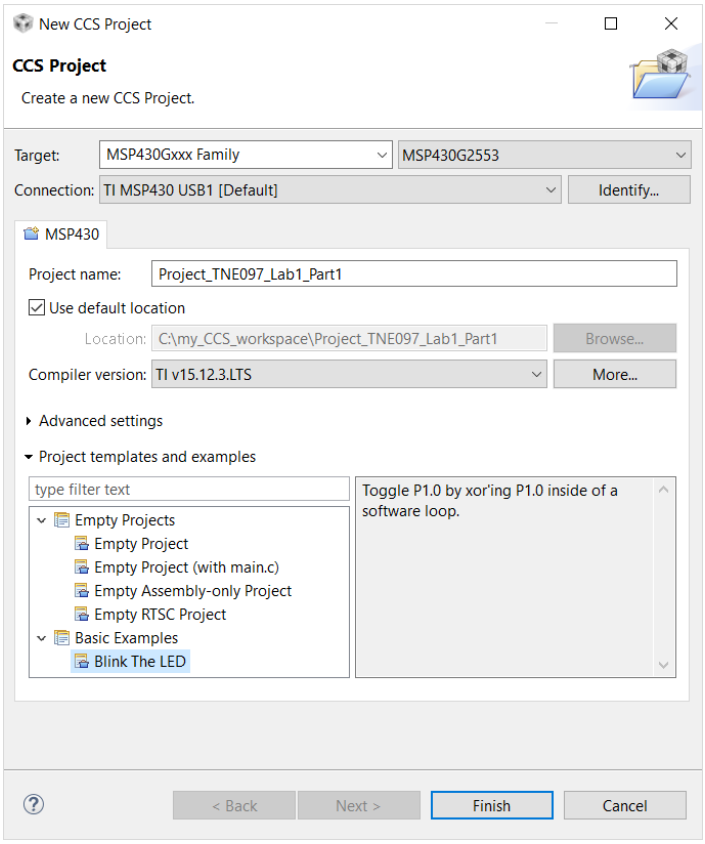
In this page, you can find pretty much useful information about CCS.

3. Create a new project

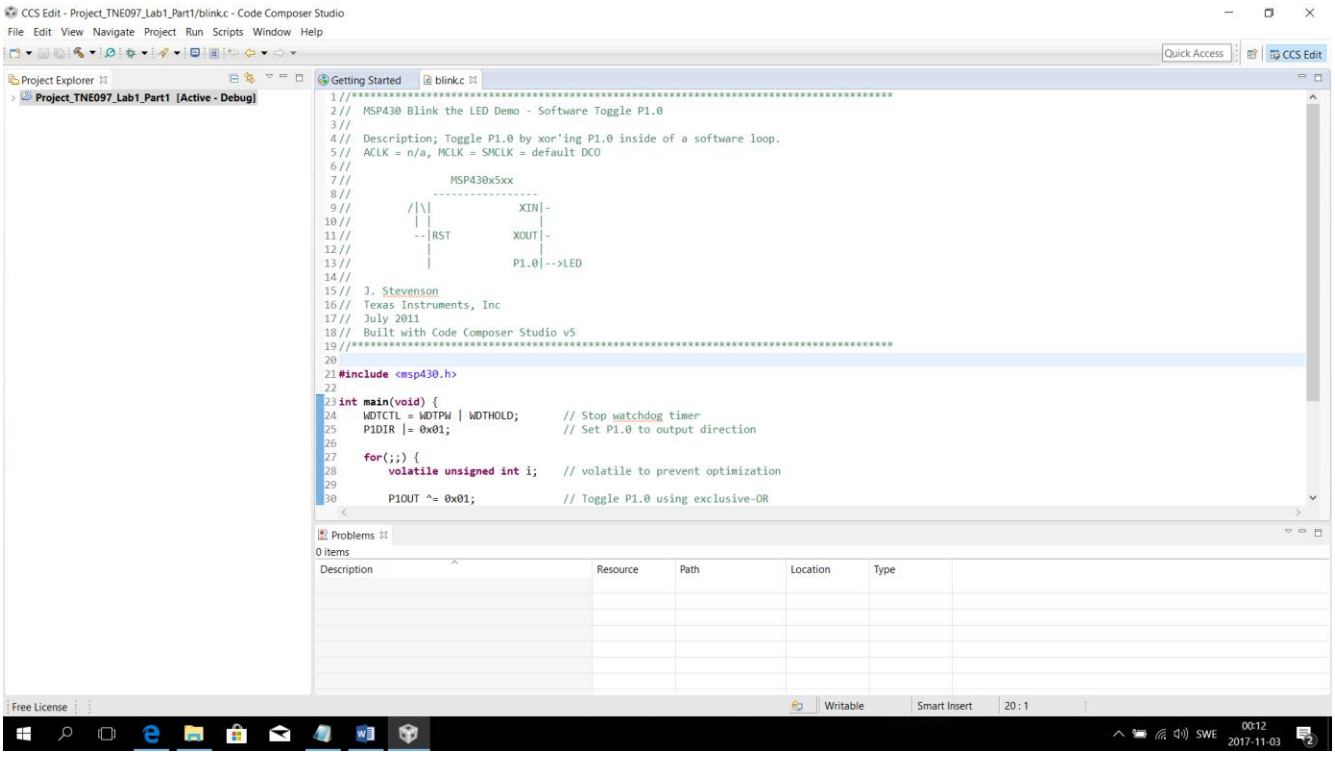
Click “New Project” icon, the following window is shown.



In the “Target” box, select filter text “MSP430Gxxx Family” from a pulldown list and then select “MSP430G2553” from the pulldown list of microcontrollers of the MSP430Gxxx family. Type your project name in the “Project name” box. In the “Project templates and examples” box, expand “Empty Projects” and “Basic Examples”. You can either select “Blink The LED” or “Empty Project (with main.c)”. The description of each selected item is shown in the neighboring box. You can select “Blink The LED” to test the LaunchPad as follows.



After clicking “Finish”, CCS Edit Perspectives is shown.



Now you can also create a new project by clicking “Project -> New CCS Project…” in the menu.

4. Connect LaunchPad to PC

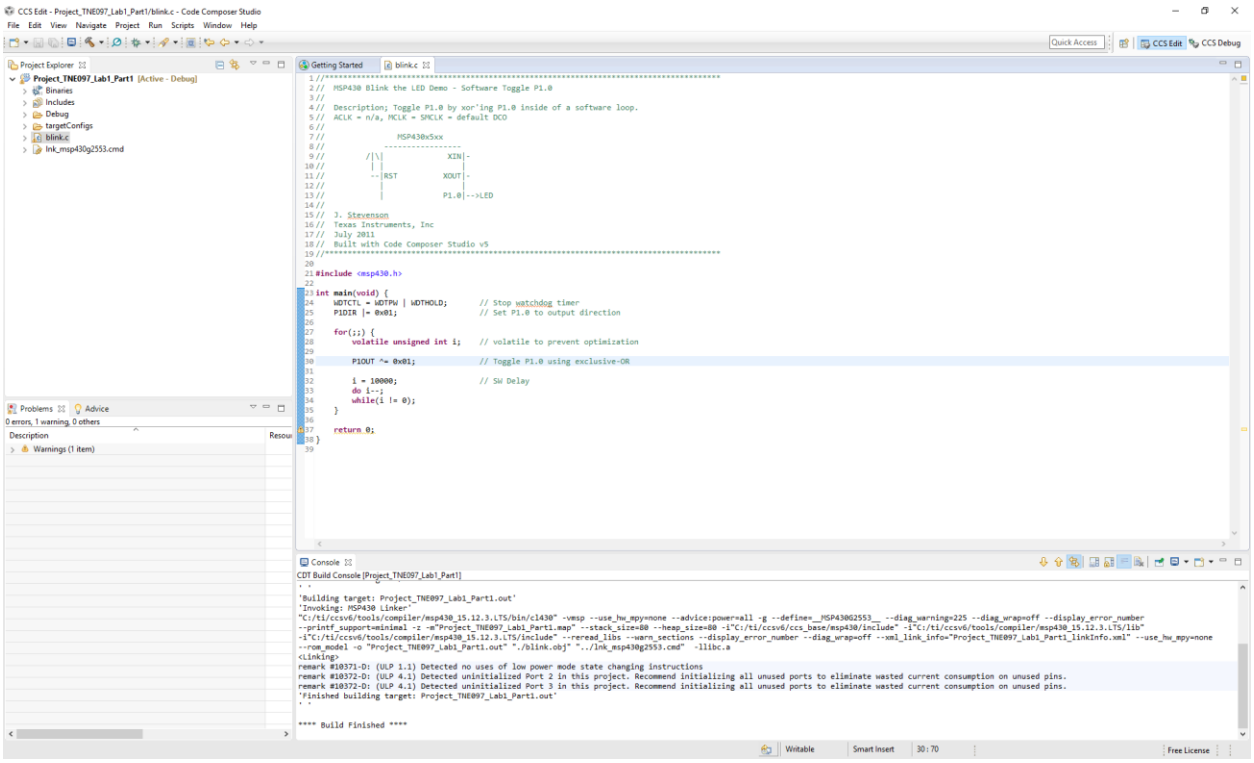
Since CCSv6 and CCSv7 do NOT have any simulator for MSP430, we should connect the LaunchPad to the PC to debug programs. Texas Instruments is moving away from providing simulators and instead is focusing on providing low cost development boards. We are going to download our software image into MSP430 development board and do debugging in the board.

Use a USB cable to connect the LaunchPad and the PC. The green LED (LED0) should be ON.

5. Compile and Link the programs

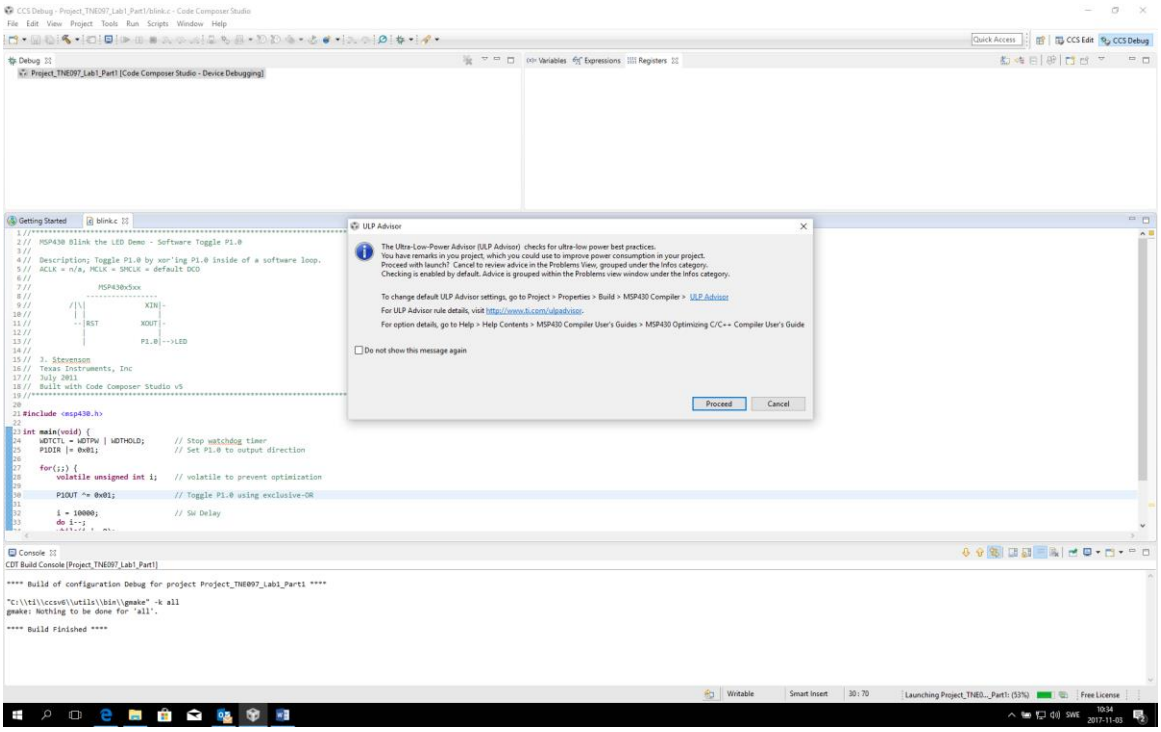
In the “Project Explorer” pane, click on “>” beside “Project_TNE097_Lab1_Part1” to view the files of the project. Double click on “blink.c” to view the program.

Click “Project-> Build All” in the menu to compile and link.



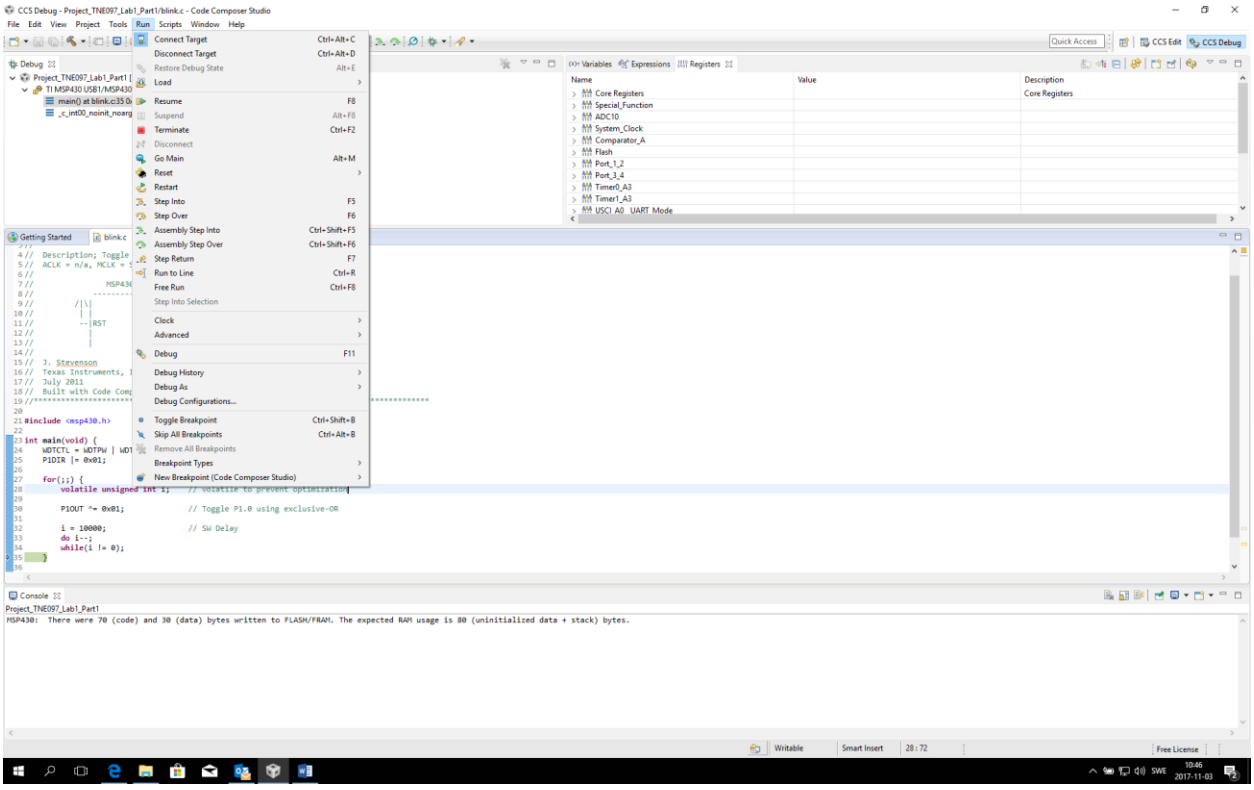
6. Debug the program

Click “Run -> Debug” in the menu. Now CCS Debug Perspectives is shown.



A pop-up window “ULP Advisor” might be shown. Click “Proceed” to continue.

Click “Run” in the menu for CCS Debug Perspectives. Choose a command to debug the program. You can also click a command symbol on the menu bar.



If you choose “Resume”, the red LED (LED1) will blink.

You can view Variables, Expressions and Registers in the “watch” pane.

If you change the code in the program, you should click “Run -> Suspend” and terminate the debugging by clicking “Run -> Terminate”. In CCS Edit Perspectives, save the modified program and click “Run -> Debug”. This will compile, link and start CCS Debug Perspectives.