INSTALLING THE BUILD TOOLS

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JANUARY 22, 2018

1 *Installing the Compiler*

In this class, you'll be working with the PIC24FJ128GB206. As you will learn, it's a very capable 16-bit microcontroller. To compile firmware for the microcontroller, you need (at a minimum) to install the C compiler for the hardware. The compiler for this family of PICs is a variant of the GNU C compiler (`gcc`) from Microchip (the maker of the PIC) called `XC16`. Let's get started:

1. Download the correct installer for your operating system from Microchip's compilers page. The download links are in the left column toward the bottom of the page.
2. Run the installer executable on your platform. By default on **Windows**, the compiler will be installed in

   ```
   C:\Program Files (x86)\Microchip\xc16\v1.33
   ```

   On **OSX**, the default path is:

   ```
   /Applications/microchip/xc16/v1.33/bin
   ```

   On Ubuntu Linux, the default path is:

   ```
   /opt/microchip/xc16/v1.33/bin
   ```

3. Accept all the defaults in the installer, and leave the license key field blank to install the free version.

2 *Additional build tools*

The compiler is the bare minimum you need to get started, but any project that consists of more than one file typically makes use of some kind of build system. Build systems are essentially scripting languages that let you automate compiling, linking (more on this later), and even executing other scripts to do stuff like make directories or create/delete files.

We strongly recommend that you use a build system called **SCons**. **SCons** is a build automation tool in which the configuration files are all just Python scripts. It's lightweight, fast, aggregates all configuration in a single file, and is easy to understand.

2.1 *Installing SCons*

Windows

Before downloading SCons, you need to make sure that the locations of the Python executable and included scripts are on your path.

1. Click on the "Start" menu and right-click "Computer"
2. Select "Properties"
3. In the left column click "Advanced System Settings"
4. In the resulting window, click the "Environment Variables" button in the lower right-hand corner
5. Under "System variables" double-click the entry for the "Path" variable
6. If it's not already there, add the following string to the end of the "Variable value" field

   ```
   ;C:\Python27\;C:\Python27\Scripts
   ```

7. Now, if you open an `cmd` window and type `python` you should see a message, the first line of which should look something like this:

   ```
   Python 2.7.9 (default, Dec 10 2014, 12:24:55)
   ```

To INSTALL SCONS:

1. Download the installer
2. Locate and double-click the executable
3. Accept all default settings in the installer
4. After clicking "Finish," open a `cmd` window
5. Type the following (without the $)

   ```
   $ scons --help
   ```

   and you should be greeted with the help file for SCons.

OS X

1. `$ brew install scons`

Ubuntu Linux

1. `$ sudo apt-get install scons`

2.2 *MPLABX*

MPLABX is an integrated development environment (IDE) for PIC microcontrollers. It provides a graphical user interface (GUI) for organizing your files and configuring your builds. Microchip has recently released a web-based version of MPLABX called MPLABX-press. You are welcome to use either, but the teaching team has more experience and familiarity with supporting SCons.

1. Download the correct installer for your operating system
2. Run the executable or mount the dmg file to install the IDE.