

B. Installing Necessary Software

B.1. For Microsoft Windows

Windows 10:

Microsoft has released a set of tools for Windows 10 that allows you to install a complete development environment, including the tools used in this book, fairly easily. The first thing you'll need to install is called "Windows Subsystem for Linux" (WSL). You'll find up-to-date instructions for installing it here:

<https://docs.microsoft.com/en-us/windows/wsl/install>

At some point during the installation you might be asked which Linux distribution to use. Pick the latest available version of "Ubuntu".

After you install WSL, there are a few more things you'll need to do:

1. Update and install software in the Ubuntu App:

Start the app and type the following commands in the app's window:

```
sudo apt update
sudo apt -y upgrade
sudo apt -y install g++ nano gnuplot-x11
sudo apt -y reinstall gnome-icon-theme
```

The first command will ask for the user name and password you entered while setting up WSL. If any of the commands asks you about restarting services, answer "yes".

This will install the specific software (*g++*, *nano*, and *gnuplot*) used in this book.

2. Next, type the following commands:

```
wget http://tinyurl.com/practical-c/wsl-fix.sh
sh wsl-fix.sh
source .bashrc
```

3. In order to use this version of *gnuplot* you'll need to install one more piece of Windows software, called an "X server". This allows the tools in the development environment (installed in the steps above) to display graphics on your screen. To install it, download and install VcXsrv from here:

<https://sourceforge.net/projects/vcxsrv/>

4. After you've installed VcXsrv, click the Start button, and type "xlaunch" and press the Enter key. A window like Figure B.1 should appear. Keep clicking "Next" until you get to the dialog box shown in Figure B.2. Put a check mark in all of the boxes in this section.

Then continue clicking "Next" until you get to the dialog box shown in Figure B.3.

Click "Save Configuration" and save the configuration as "config.xlaunch" on your desktop.

Now hold down the "Windows" key and type R, press "Enter", then type:

```
shell:startup
```

and press the Enter key. This will open up your startup folder. Drag the "config.xlaunch" icon from your desktop into this folder.

5. Now restart your computer. You should be able to get a command window by clicking "Ubuntu" in the Start Menu. All the work in this book can be done in this window.

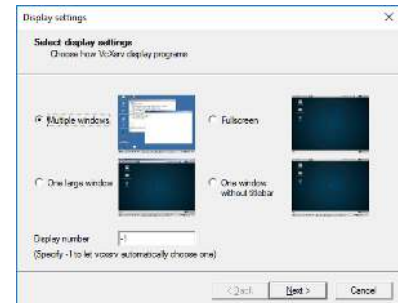


Figure B.1: Running xlaunch.

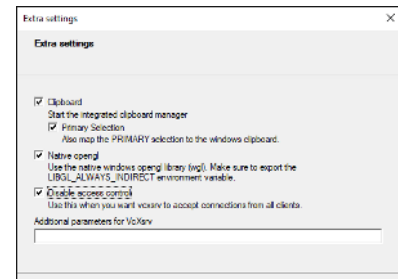


Figure B.2: "Extra Settings" screen.

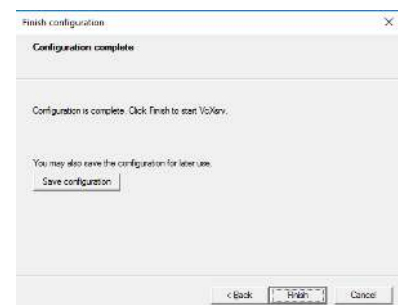


Figure B.3: Saving xlaunch configuration.

B.2. For Linux

On Debian, Ubuntu, Mint and similar distributions, type:

```
sudo apt update
sudo apt -y upgrade
sudo apt -y install g++ nano gnuplot
```

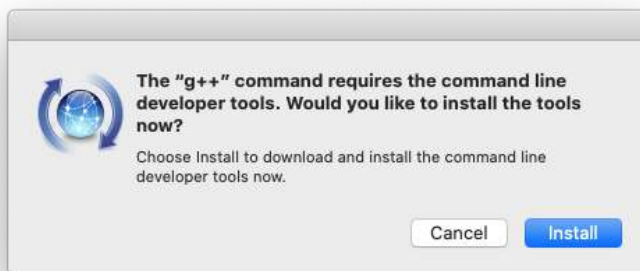
On Fedora, CentOS, Red Hat and similar distributions, type:

```
sudo yum install gcc-c++ nano gnuplot
```

B.3. For Apple MacOS

For Mac users, Apple includes many of the tools you'll need, but they might need to be "activated". You'll also need *gnuplot* and *Xquartz*, upon which *gnuplot* depends.

1. To get a command window, click any blank spot on your desktop background, then go to the "Go" menu at the top of the screen and select Utilities->Terminal.
2. Inside the terminal window, type `g++`. The first time you do this you'll see a message like the one below.



Click "Install" to install the command line developer tools. Now you should be able to use the `g++` command as we do in this book.

3. In order to use *gnuplot* under OS X, you'll also need to install two more things. The first is *XQuartz*, which you can get here:
<http://xquartz.macosforge.org/landing/>
4. **IMPORTANT:** After you've installed *XQuartz*, you must log out of your computer and log back in to complete the installation. (If you

don't do this, *gnuplot* may not install or work correctly.)

5. The last thing to install is *gnuplot* itself, which you can get here:

https://csml-wiki.northwestern.edu/index.php/Binary_versions_of_Gnuplot_for_OS_X

Download the current version of *gnuplot* from the site above.

6. **IMPORTANT:** After you've downloaded the file, hold down the Ctrl key while clicking on it. If you don't hold down the Ctrl key, the computer might refuse to run the installer. Then proceed to install the package as usual.

You should now be able to use the *g++*, *nano*, and *gnuplot* in your terminal window.