

APPENDIX A

Installing and Testing the IDE

Preparing the Computer

1. Go to www.arduino.cc and download latest version of the Arduino IDE which is the [arduino 1.5.6-r2-windows.exe](#) file. The download may take several minutes, as the file size is 66 MB. See figure A.1. Your instructor may provide a copy of the file on a CD or USB drive. Save the file in the location [c:\Arduino](#). You may need to create this folder before downloading the file. Your computer may request that you allow the program to make changes as shown in figure A.1. If so, answer Yes.

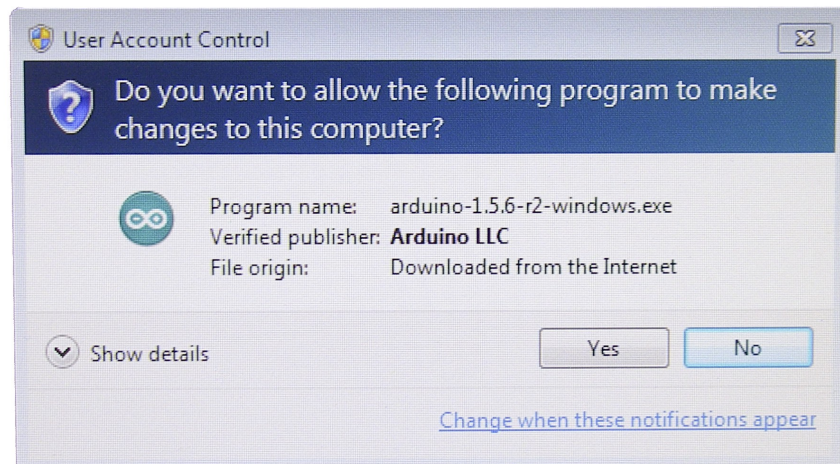


Figure A.1

2. Go to the [c:\Arduino](#) installation directory and run [1.5.6-r2-windows.exe](#) file, as shown in figure A.2. You will be prompted to agree to the liscence agreement. Click [I Agree](#).

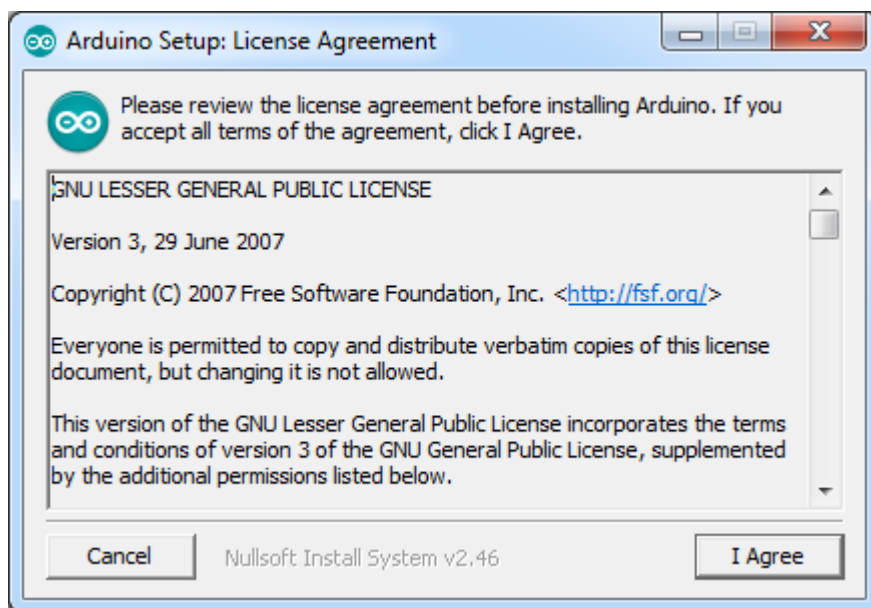


Figure A.2

3. It is recommended that you use the default installation options, as shown in figure A.3. Click Next.

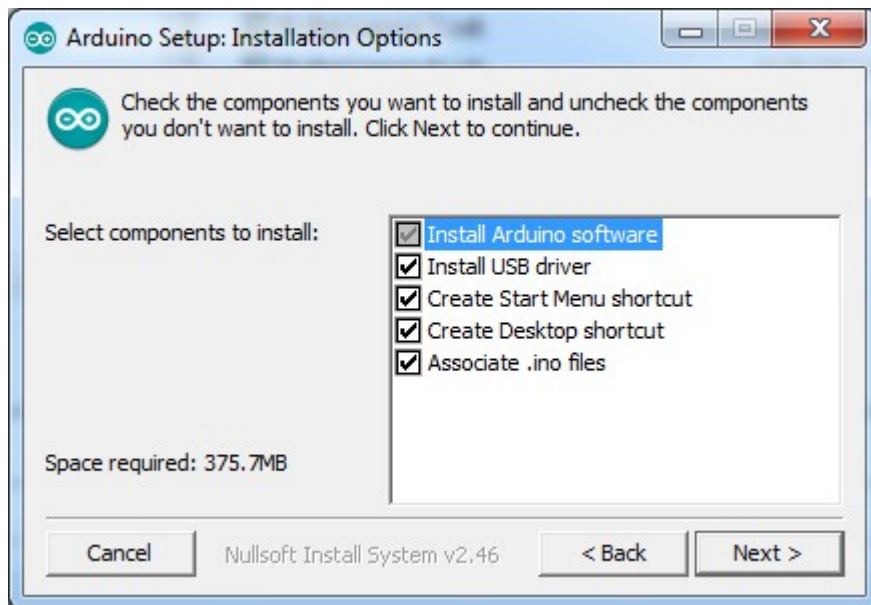


Figure A.3

4. Select your destination folder and click Install, as shown in figure A.4.

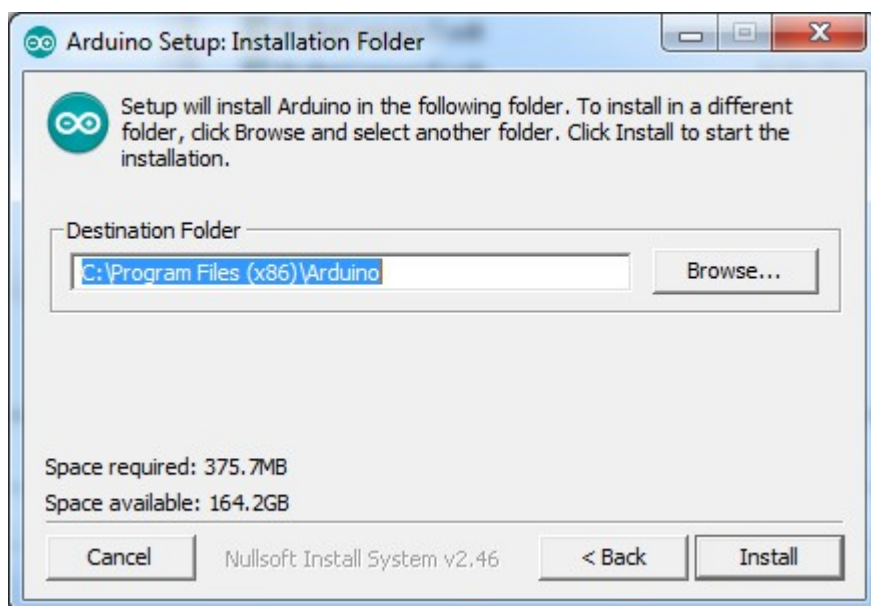


Figure A.4

5. After installation is complete, you should see the Arduino Setup: Completed dialog box, as shown in figure A.5.

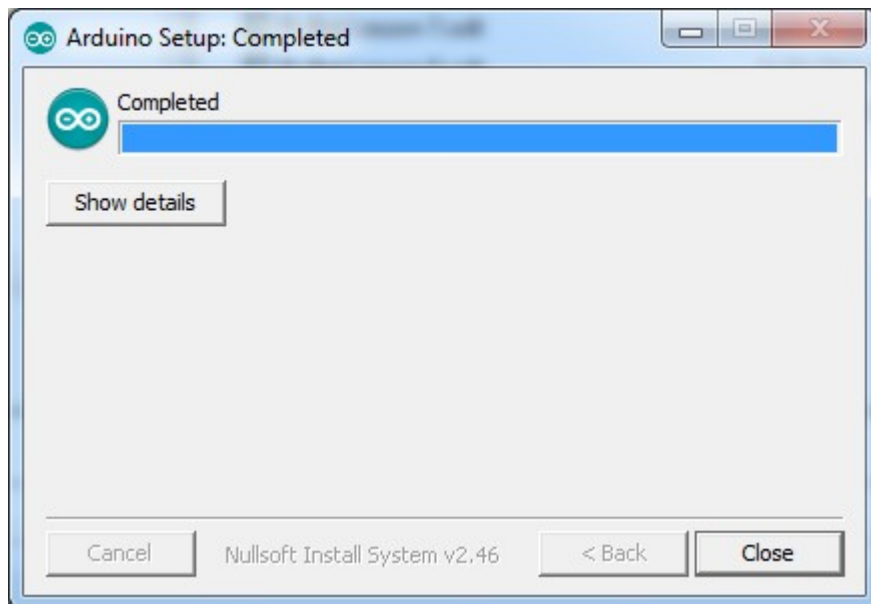


Figure A.5

6. Use the Arduino command in the Start menu, or click on the icon on the desktop to open the program, as shown in figure A.6.

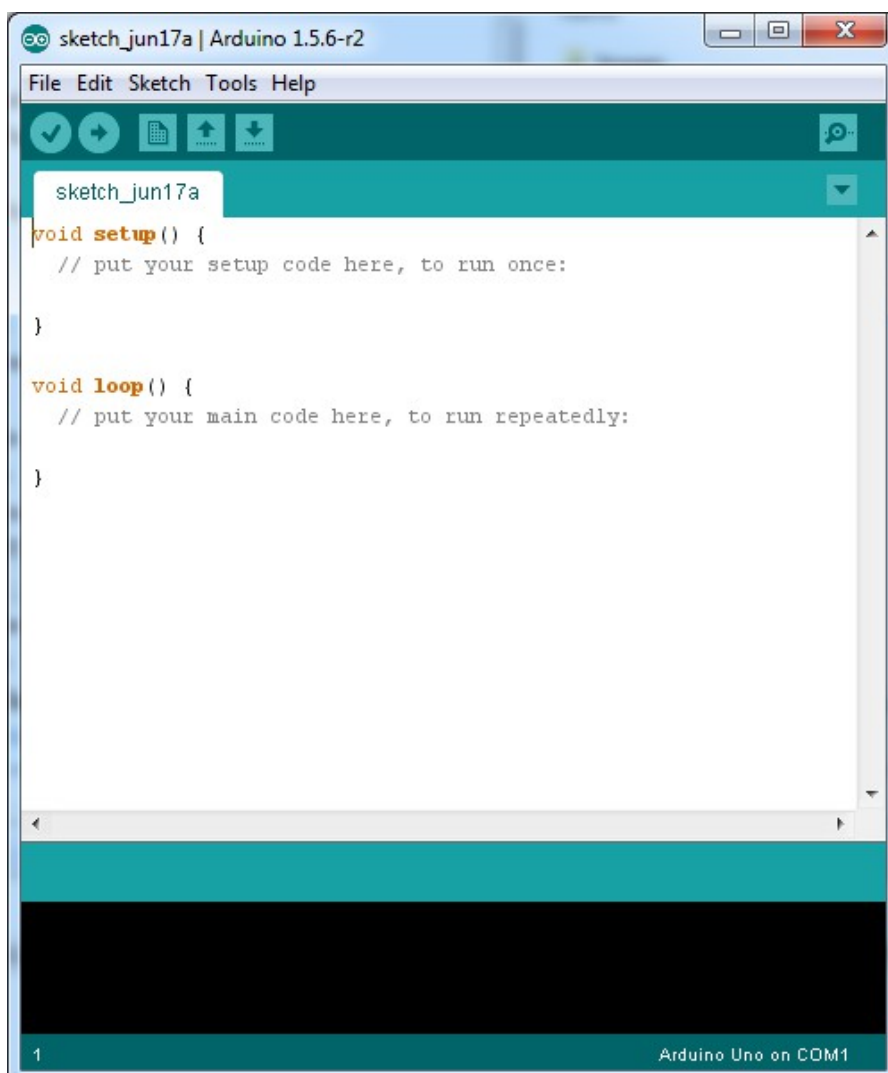


Figure A.6

Connecting the Arduino to the Computer

1. Close down the IDE.
2. Plug the STEM Board microprocessor into an available USB port using the supplied USB cable.
3. The first time you plug the STEM Board into your computer, Windows should automatically detect the newly attached device and attempt to find a driver for it. If Windows finds and updates the driver, skip to the next section: Testing the IDE. In the likely event that Windows cannot find the appropriate driver, follow the following steps.
4. Go to the Start Menu and select Devices and Printers, as shown in figure A.7.

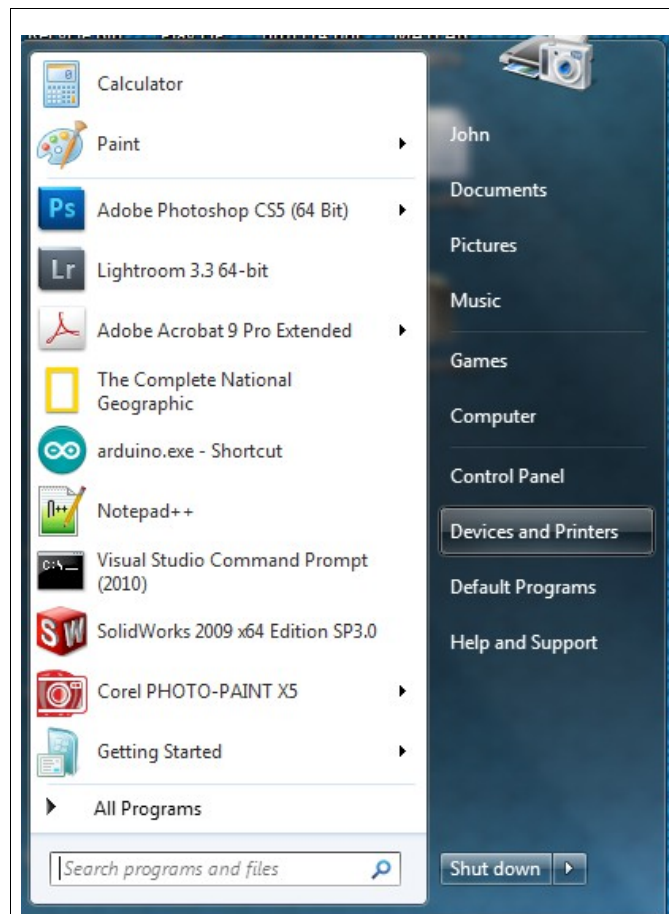


Figure A.7

5. Scroll down and double click on the Arduino UNO icon, as shown in figure A.8.

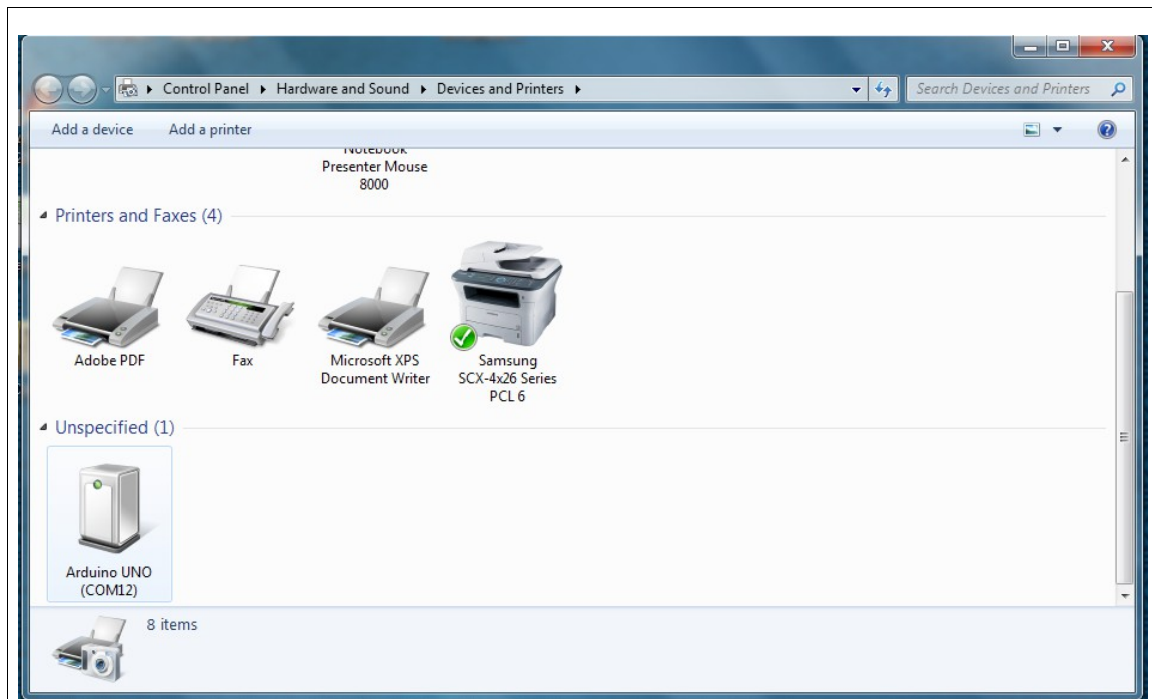


Figure A.8

6. In the Arduino UNO dialog box, select the Properties tab, as shown in figure A.9.

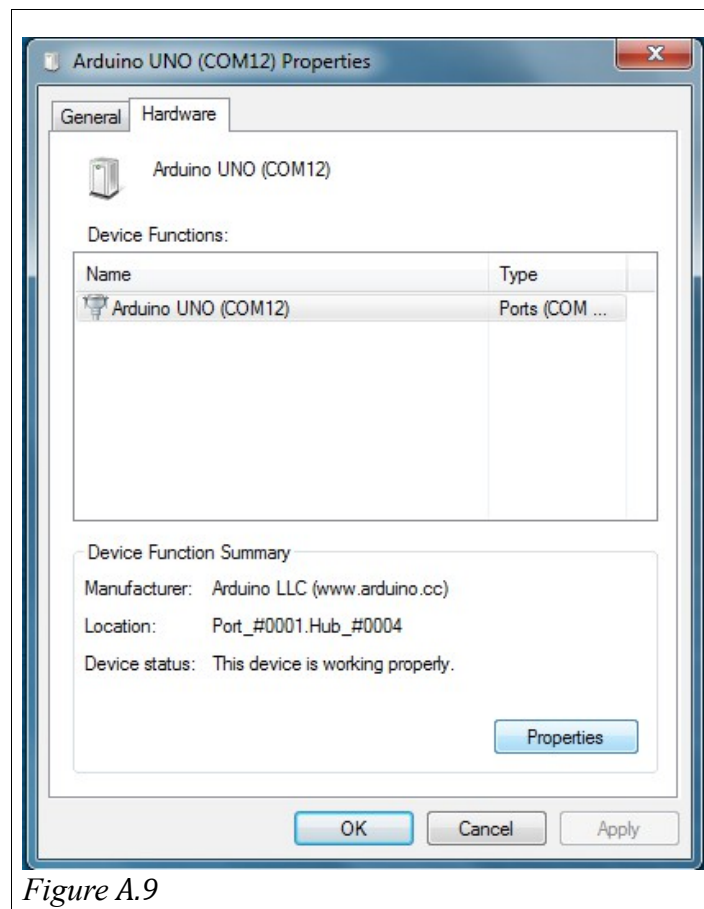
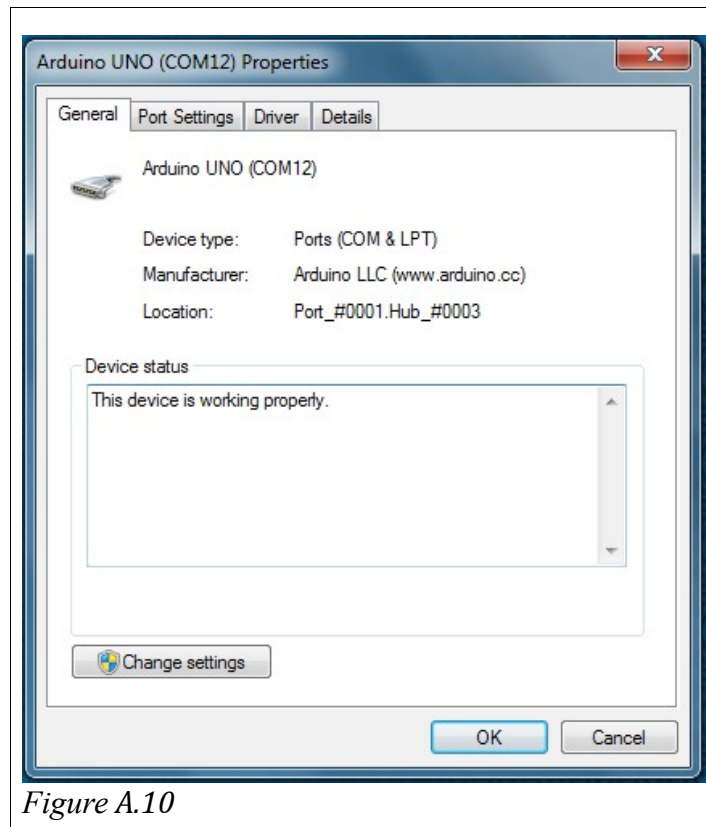
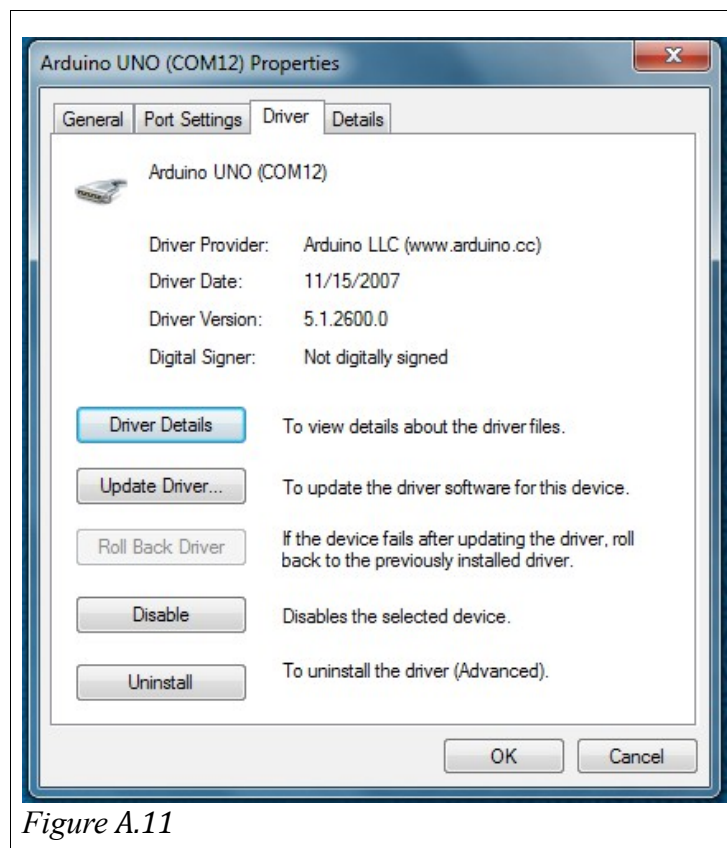


Figure A.9

7. Next, select the Change settings button, as shown in figure A.10.



8. Next select the Update Driver... button to update the driver software, as shown in figure A.11.



9. Windows will prompt you, whether you would like Windows to automatically search for driver software or browse your computer. Choose the second option: Browse my computer for driver software, as shown in figure A.12.

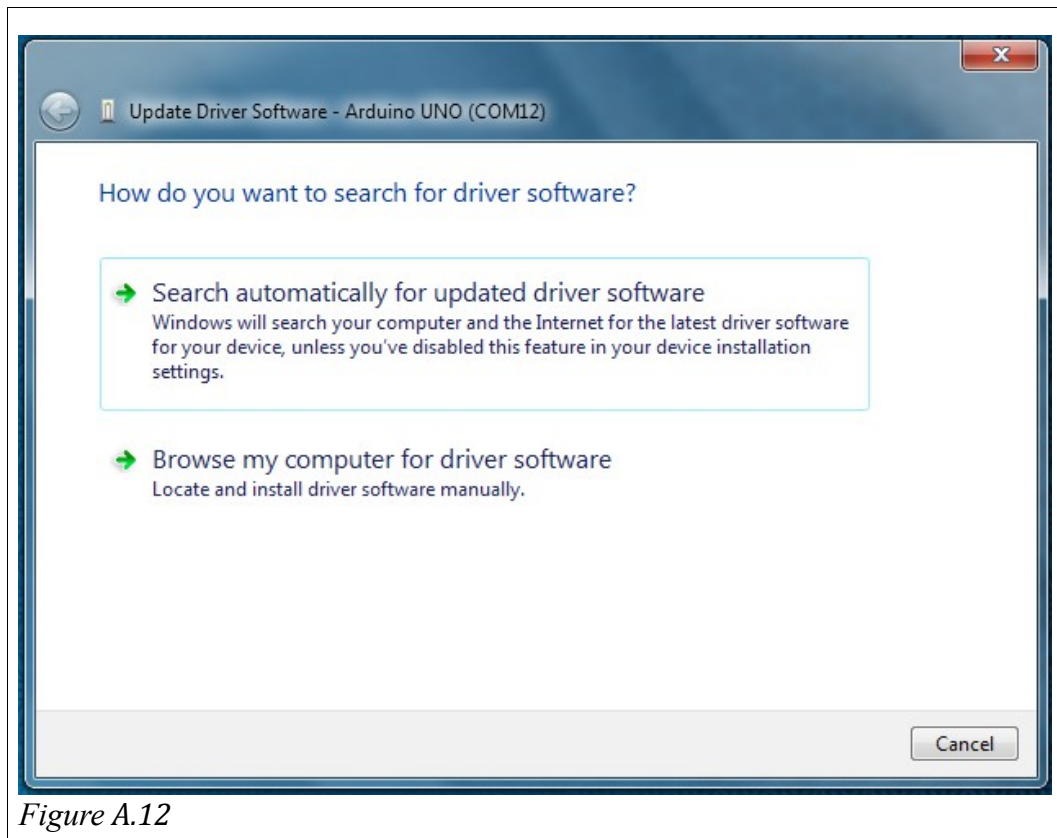


Figure A.12

10. Use the Browse button and select the location the C:\Arduino\arduino-0022\drivers, as shown in figure A.13. Click Next and Windows should install the correct driver.
11. A Windows message should popup indicating that the device is ready for use.

You are now ready to begin Lesson 3: Introduction to C Programming.

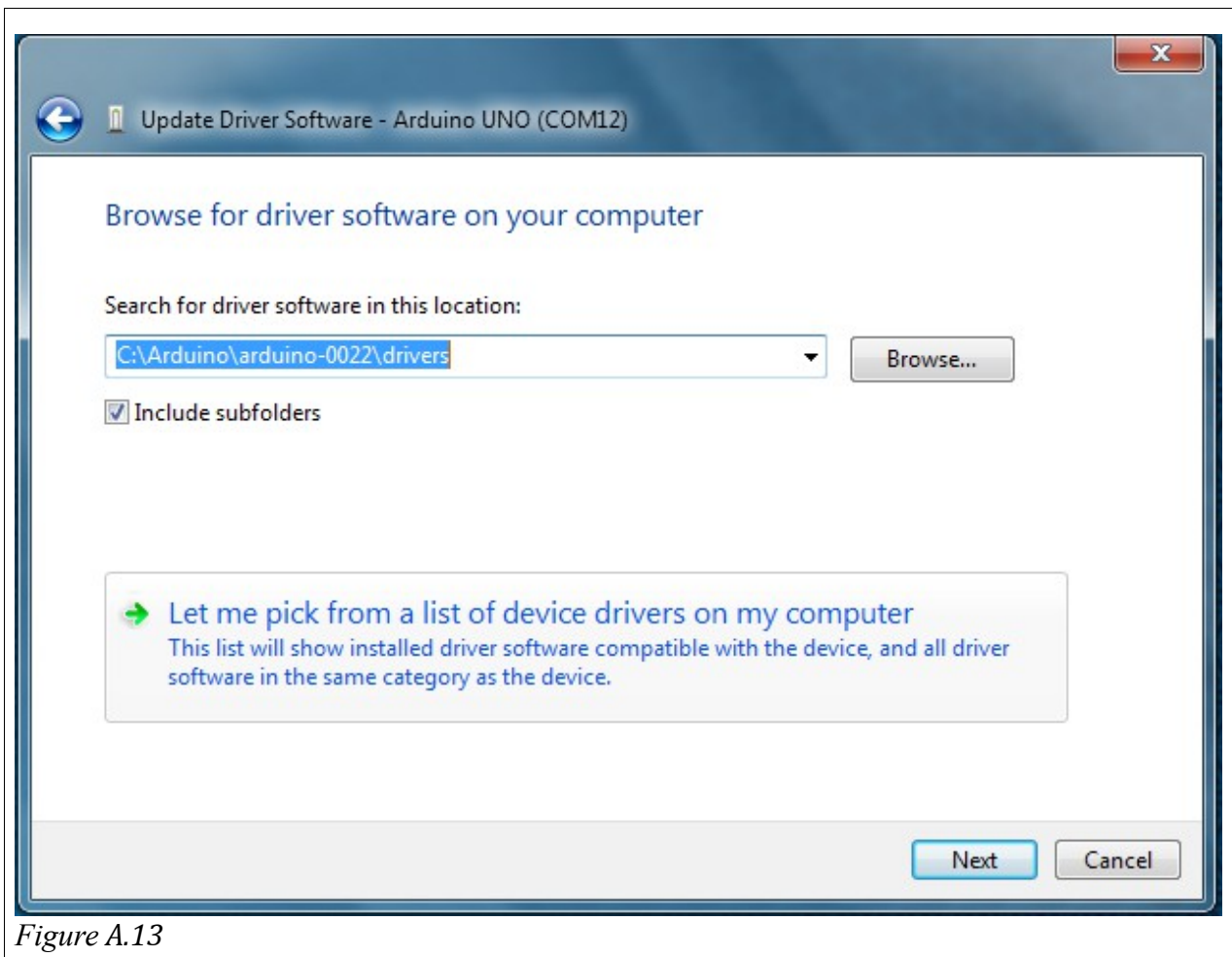


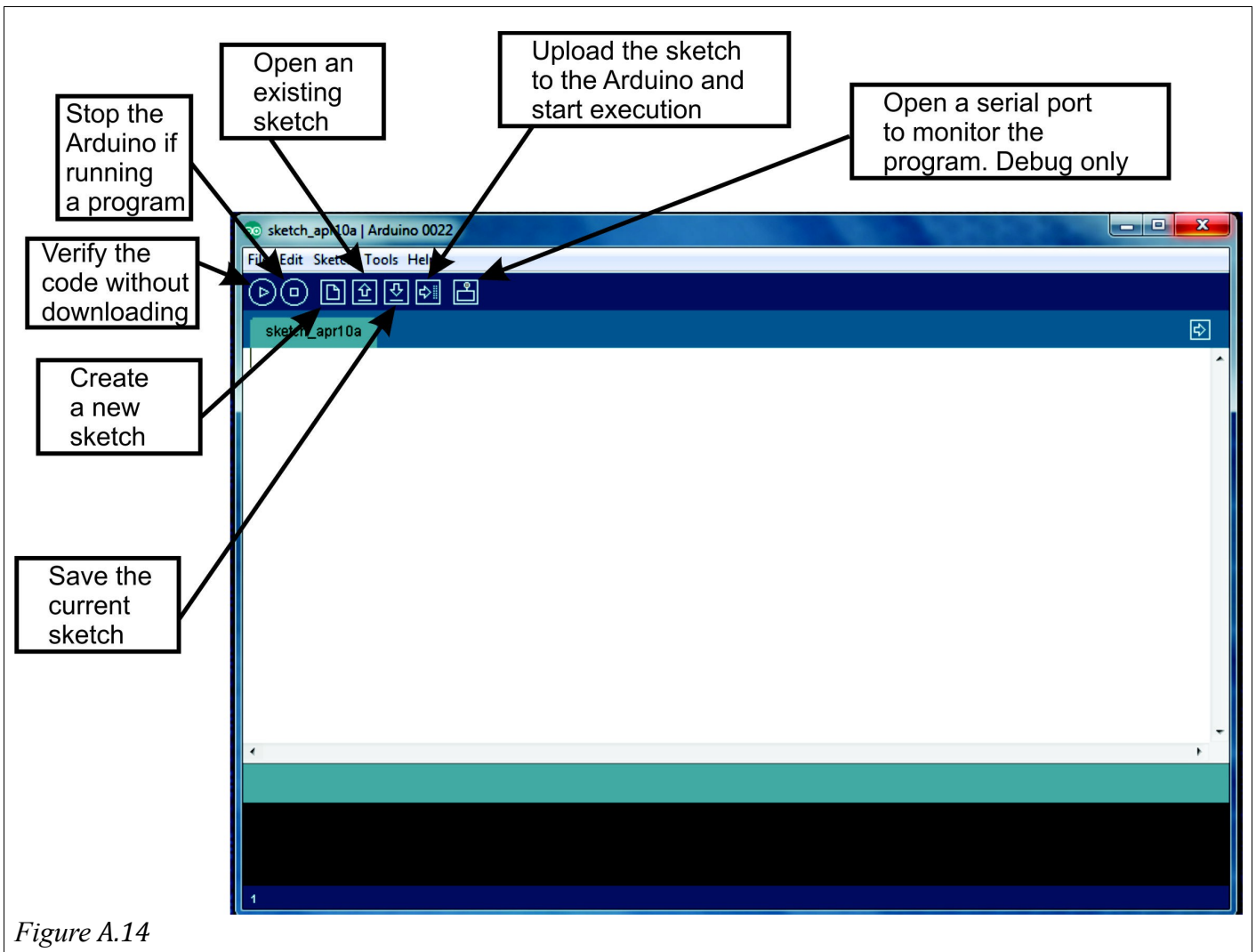
Figure A.13

12. We are now ready to test the system.

Testing the IDE

1. Open up the IDE. It should look similar to the IDE shown in figure A.14.

Note: The boxed comments in figure A.14 have been added to help understand the IDE.



2. Most (but not all) of your interfacing with the IDE can be accomplished using the seven action buttons directly below the menus. A brief description of each button is useful;
- Button 1, ► (right pointing triangle), is used to VERIFY your code, which in Arduino language is known as a sketch. Use this button to compile (convert) your code (the sketch) to Arduino language, but not upload your code to the Arduino microprocessor. This is very useful when you want to determine if the code you wrote is valid, but you are not ready to execute it and do not want to waste time uploading.
 - Button 2, the STOP button, is used to stop the execution of the program. This is useful for when you need to stop a runaway program. Note, however, there will be times that the STOP button will not stop your code, and you will need to unplug the Arduino microprocessor from the USB and/or shut down the IDE. Make sure that you save often as not to lose any of your hard work.
 - Button 3, the NEW button, is use to create a new sketch. The new sketch is created in the same IDE by default. However, if you hold the SHIFT key down while selecting the NEW button, the new sketch is created in a new IDE.

- Button 4, the OPEN button, is used to open an existing sketch. The existing sketch opens in the same IDE by default. However, if you hold the SHIFT key down while selecting the OPEN button, the existing sketch is opened in a new IDE.
- Button 5, the SAVE button, is used to save the current sketch. Use it often! Don't lose your work!
- Button 6, the UPLOAD button, is used to compile (generate the Arduino machine code) the current sketch and, if no errors result, upload it to the Arduino microprocessor. If any compiling errors do occur, they will be shown in the output window at the bottom of the IDE.
- Button 7, the MONITOR button, is used to monitor your program by sending data from the Arduino microprocessor back to your PC and display it in a monitor window.

Note: While the monitor tool is very valuable for debugging, it is extremely time-consuming for the Arduino microprocessor. When it is not needed for debugging, remove or comment out any of the monitor output. This is especially necessary when performing the control algorithms.

3. Now that we have an understanding of the action buttons, let's begin!
4. Make sure that the IDE is set up for the Arduino UNO. Using Tools → Board, select the Arduino UNO, as shown in figure A.15.

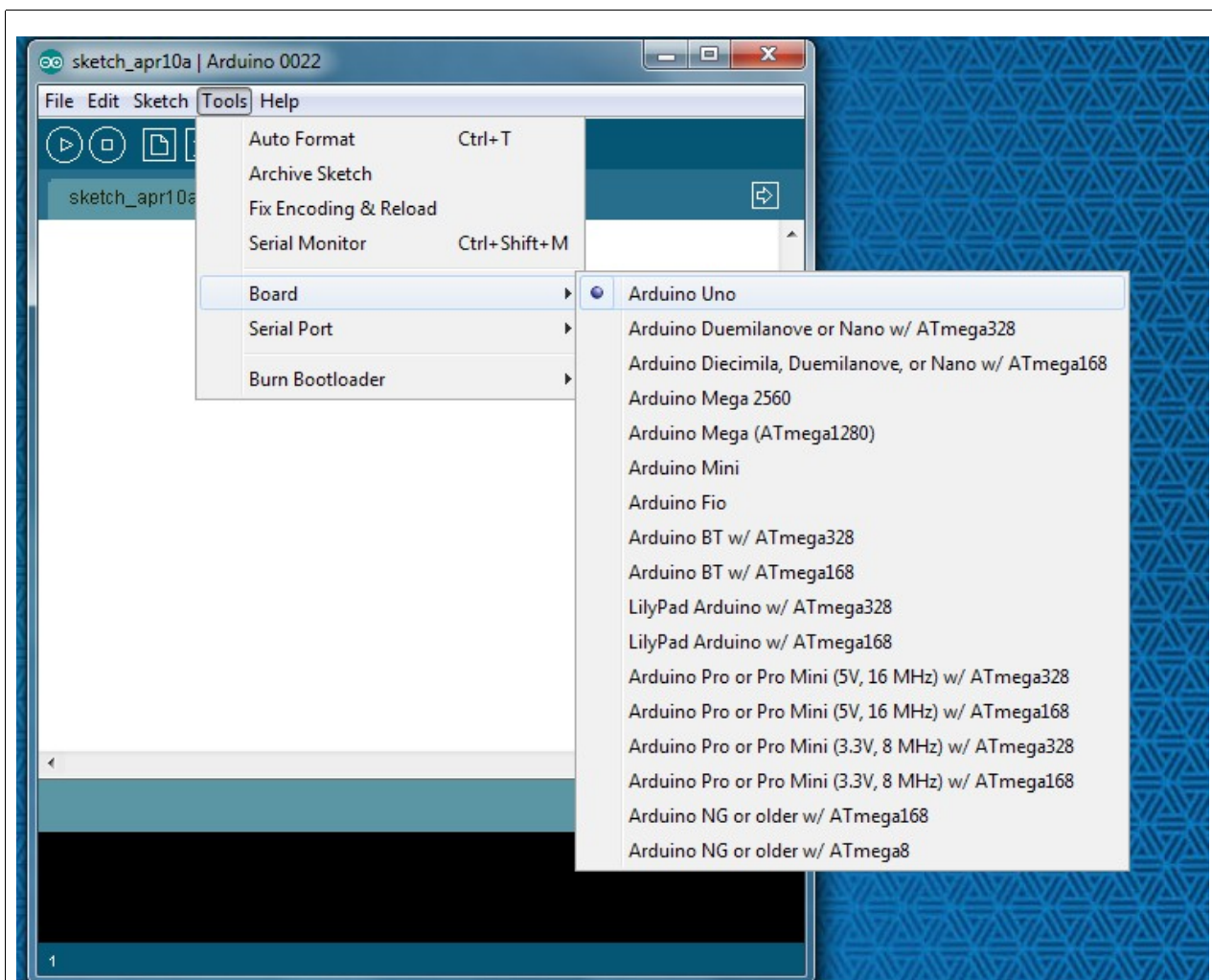


Figure A.15

5. Next, check that the STEM Board microprocessor is connected to a USB port. Do this by clicking Tools → Serial Port, as shown in figure A.16. A serial port must be selected. It will probably not be port 12, as shown in figure A.16. If you have multiple ports and the IDE cannot communicate with the STEM Board, try changing the ports.

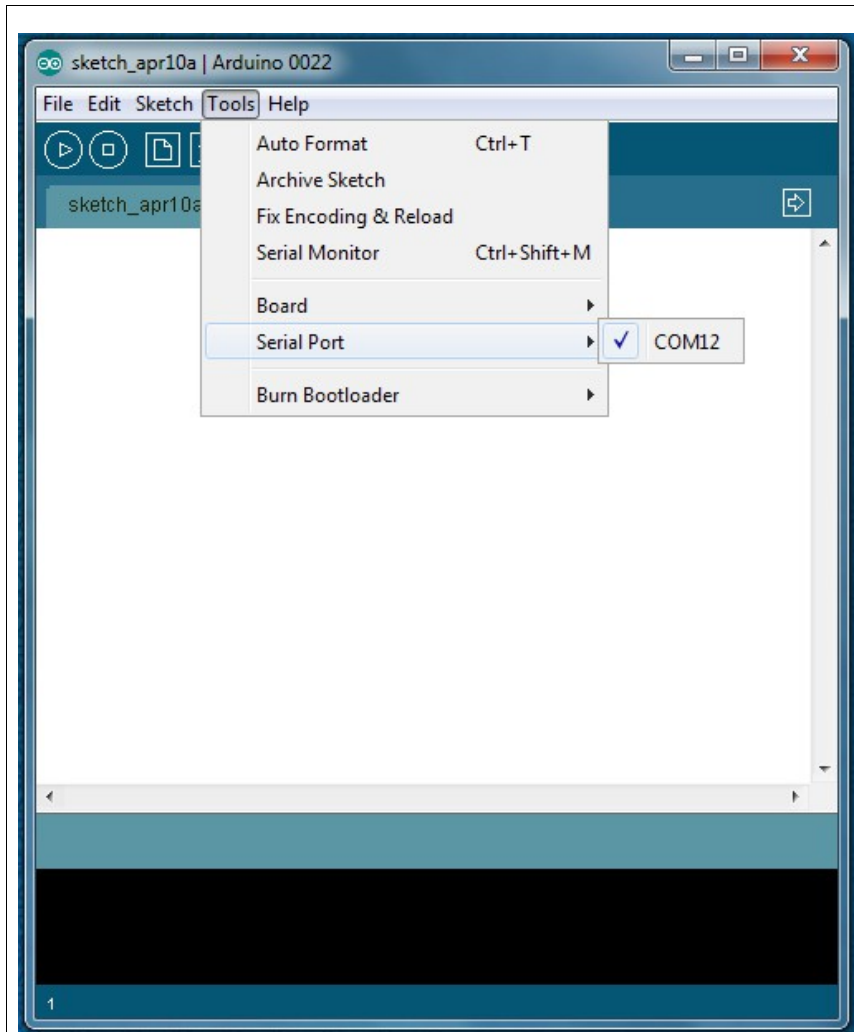


Figure A.16

6. We are now ready to write our first program.
7. Cut and paste (or type, if you like) the following code into the IDE. See figure A.17.

```
void setup()
{
  // Your setup code here, to run once:
  Serial.begin(9600);
}

void loop()
{
  // Your main code here, to run repeatedly:
  Serial.println("Hello World");
  delay(1000);
}
```

Figure A.17

8. SAVE it. You may wish to create a working directory to save your programs. DO NOT save your programs into the c:\Arduino directory.
9. Click the VERIFY button. Did it compile without errors?

Note: This step is not really needed in this case, but it helps to understand the functionality of the IDE buttons.

10. If so, click the UPLOAD button.
11. Open a monitor window by clicking the MONITOR button
12. Does it continuously print Hello World? If so...

Congratulations! You have successfully run your first Arduino program.