

# APPENDIX B

## Installing OpenGL and Running Code

(by Chansophea Chuon)

**W**e explain here how to install OpenGL and run the book programs, and create and execute your own, on Windows, Mac OS and Ubuntu Linux platforms.

### B.1 Microsoft Windows XP and Higher

Download and install Microsoft Visual C++ 2010 Express edition from <http://www.microsoft.com/express/>. After Visual C++ has been successfully installed, do the following.

- Install GLUT:
  1. Download and unzip the file `glut-3.7.6-bin.zip` from <http://www.xmission.com/~nate/glut.html>.
    - (a) Copy `glut32.dll` to `C:\Windows\System32`.
    - (b) Copy `glut32.lib` to `C:\Program Files\Microsoft Visual Studio 10.0\VC\lib`
    - (c) Copy `glut.h` to `C:\Program Files\Microsoft Visual Studio 10.0\VC\include\GL`. Note that you may have to create the GL directory.
- Install GLEW (if your graphics card supports at least OpenGL 1.5):

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**Appendix B**  
INSTALLING OpenGL  
AND RUNNING CODE

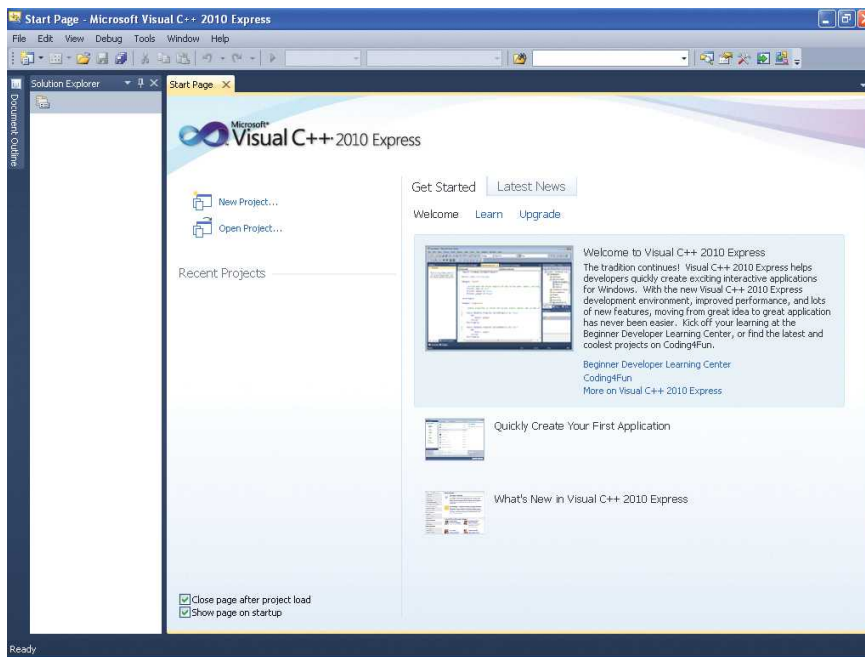
1. Download `glxt.h` from <http://www.opengl.org/registry/api/glxt.h> to `C:\Program Files\Microsoft Visual Studio 10.0\VC\include\GL`.
2. Download and unzip the file `glew-1.5.4-win32.zip` from <http://glew.sourceforge.net/>.
  - (a) Copy `glew32.dll` from the `bin` directory to `C:\Windows\System32`.
  - (b) Copy `glew32.lib` and `glew32s.lib` from the `lib` directory to `C:\Program Files\Microsoft Visual Studio 10.0\VC\lib`
  - (c) Copy `glew.h`, `glxew.h` and `wglew.h` from the `include\GL` directory to `C:\Program Files\Microsoft Visual Studio 10.0\VC\include\GL`.

Now you are ready to run the book programs and write and run your own. Follow the steps in the next pages.

- Open Visual C++ 2010 from the Start Menu to bring up the welcome screen. See Figure B.1.

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**Section B.1**  
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**Figure B.1:** Visual Studio 2010 Express welcome screen.

- Create a new project by going to File → New → Project. See Figure B.2.

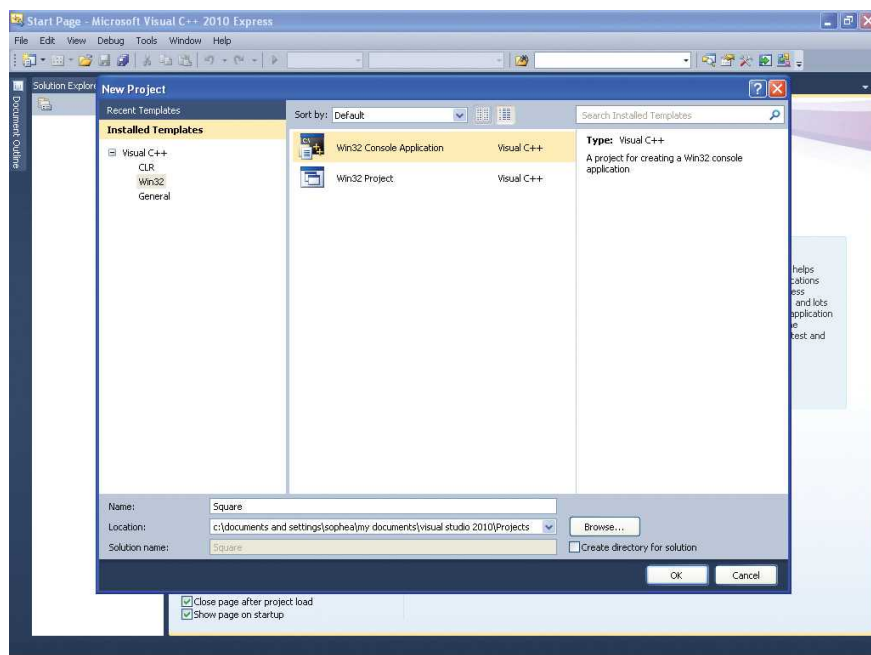
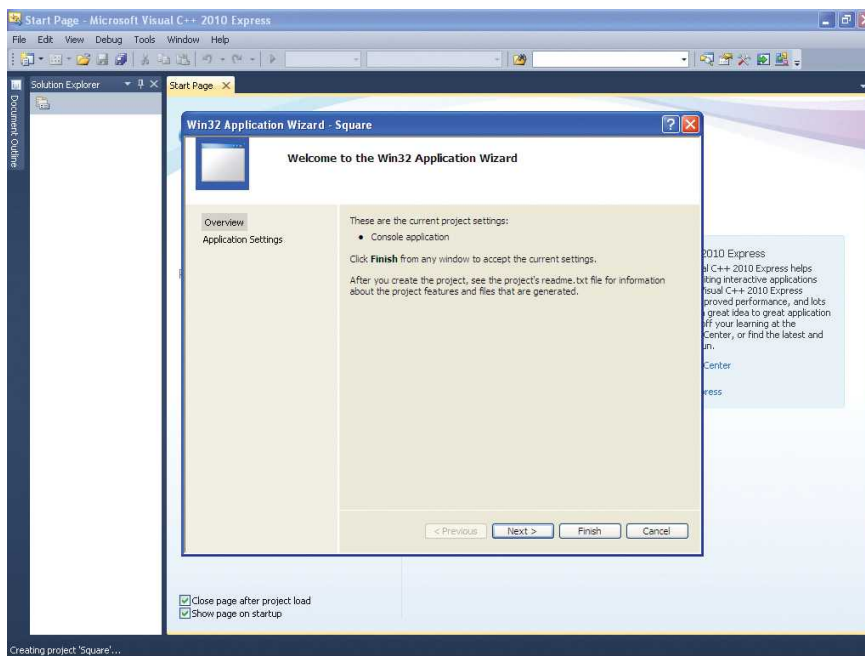


Figure B.2: New project window.

- Select Win32 from the Installed Templates panel and then Win32 Console Application from the next panel. Name your project and select the folder where you want to save it. Uncheck the box which says “Create directory for solution”. Click OK to bring up a wizard welcome window. See Figure B.3.

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**Section B.1**  
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**Figure B.3:** Win32 application wizard welcome window.

- Click Application Settings for the settings dialog box. See Figure B.4.

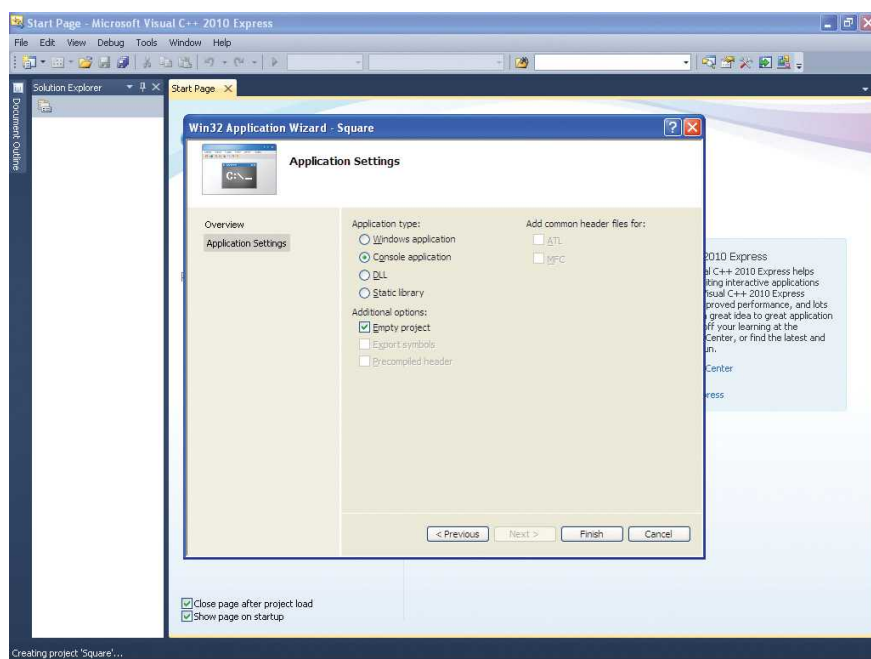
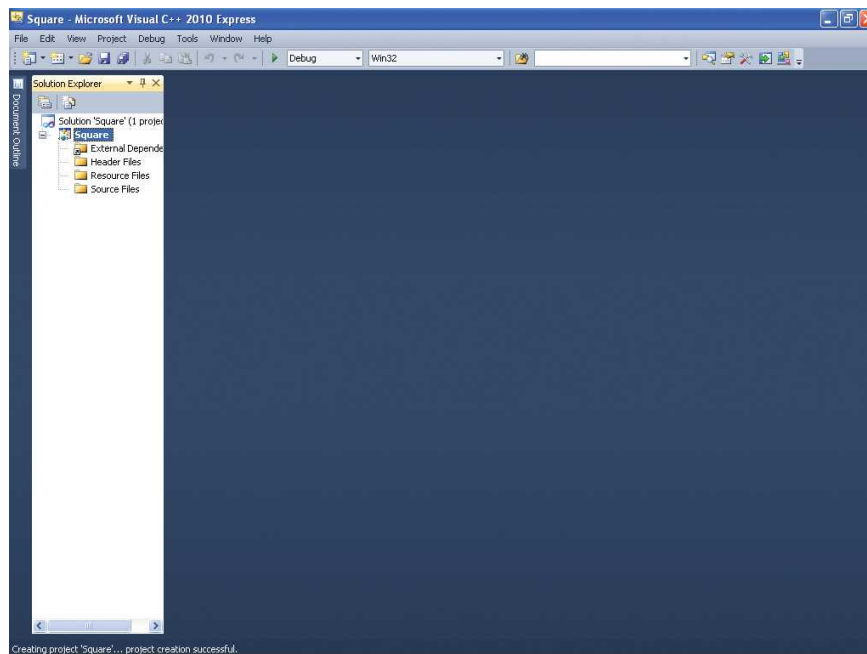


Figure B.4: Win32 application settings dialog box.

- Uncheck the Precompiled header box, check the Empty project box and choose Console application. Click Finish to see a new project window. See Figure B.5

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**Section B.1**  
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**Figure B.5:** New project window.

- Right click on Source Files and choose Add → New Item to bring up a dialog box. See Figure B.6.

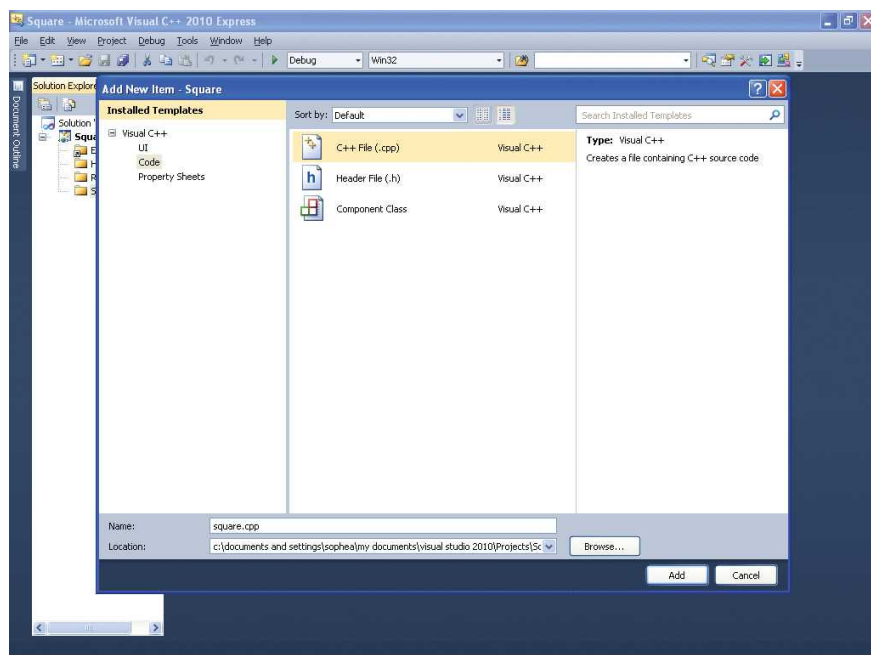


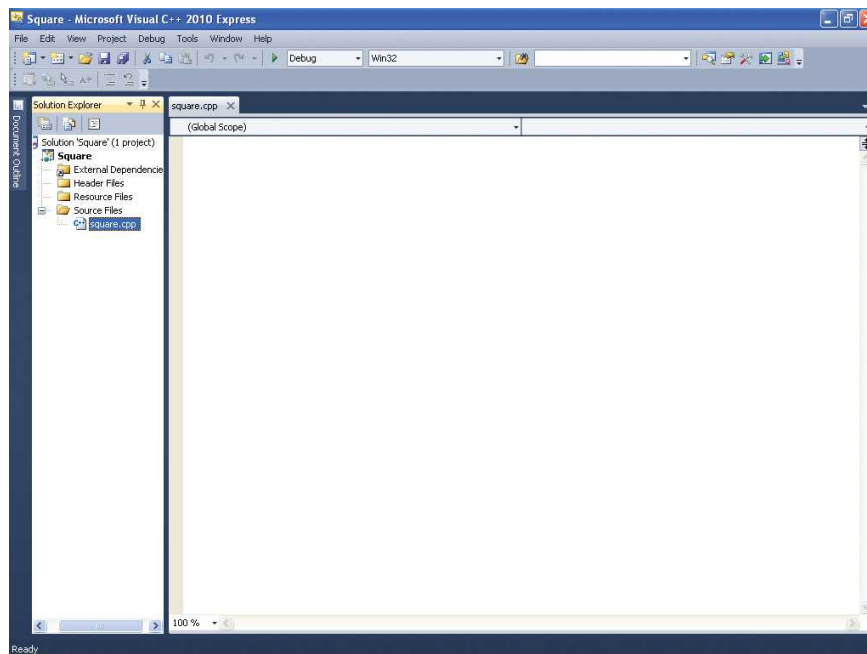
Figure B.6: Add new item dialog box.



- Select Code from the Installed Templates panel and C++ File(.cpp) from the next panel. Name your file and click Add to see an empty code panel in the project window titled with your chosen name. See Figure B.7.

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**Section B.1**  
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**Figure B.7:** Project window with empty code panel.

- Copy any of our book programs into or write your own in the code panel. See Figure B.8.

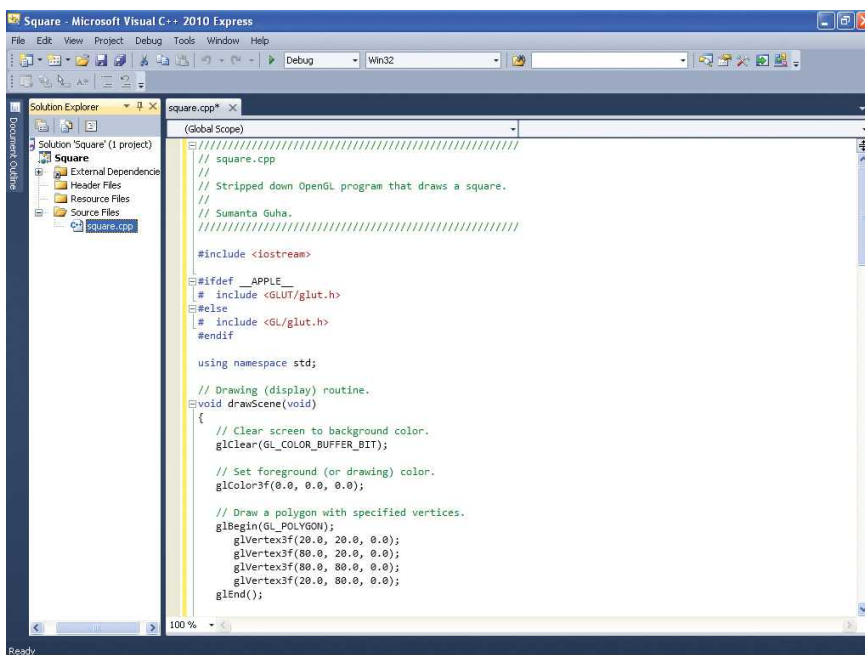


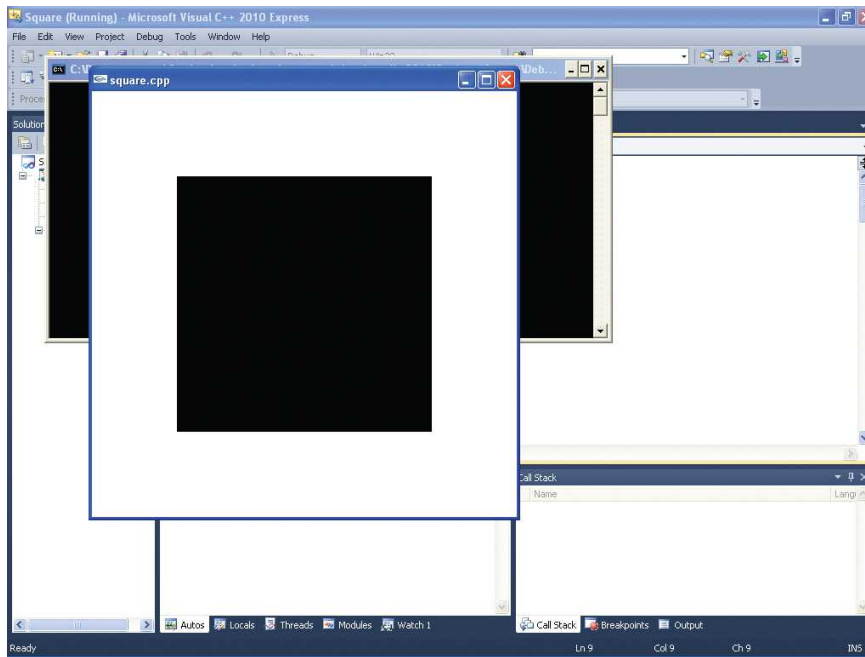
Figure B.8: Code panel with `square.cpp` copied into it.

- Save and build your project by going to Debug → Build Solution. Then execute the program with Debug → Start Debugging. If the program has been built successfully, then you should see no error in the output window.

Congratulations! Output from our `square.cpp` program is shown in Figure B.9.

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**Figure B.9:** Square.cpp output in Windows XP.

## B.2 Mac OS X Snow Leopard

The steps to installing and running OpenGL on the Mac OS X are few because OpenGL is integrated into the operating system:

- Install GLEW by going to <http://glew.darwinports.com/> and following instructions there.
- Open a book program or write your own using your preferred editor. Let's assume the program file is `square.cpp`.
- Open the terminal window, change to the directory where the source code is located and compile the program with the command `g++ square.cpp -o square -framework Cocoa -framework OpenGL -framework GLUT`.
- Run the program by entering the command `./square`. Figure B.10 shows the output of our `square.cpp` program.

*Note:* For a GLSL program the command is `g++ glslProgram.cpp -o glslProgram -framework Cocoa -framework OpenGL -framework GLUT -I/opt/local/include -L/opt/local/lib -lGLEW`

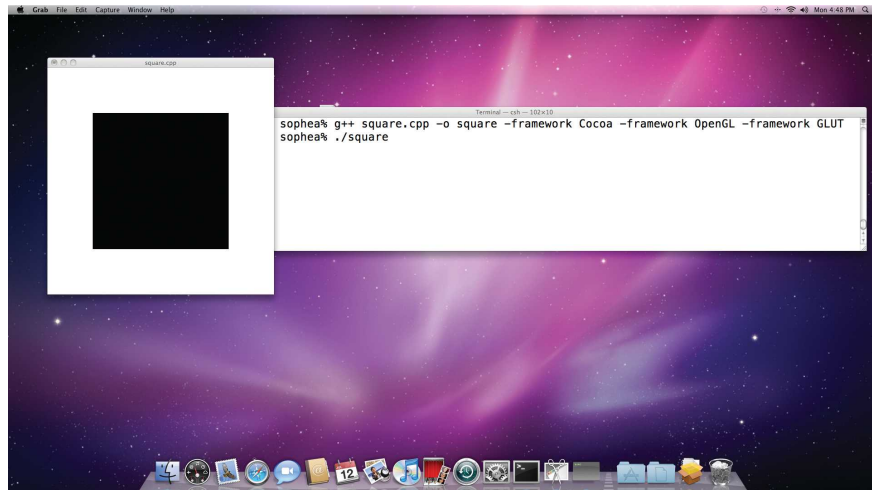


Figure B.10: Square.cpp output in Mac OS X Snow Leopard.

## B.3 Ubuntu Linux

Here are the steps to setting up and running OpenGL on the Ubuntu Linux distribution:

- Go to **System** → **Administration** → **Synaptic Package Manager** and check the boxes to install `g++`, `libglut3-dev` and `libglew-dev`. Synaptic Package Manager will ask you to install dependent packages if necessary for the C++, GLUT and GLEW libraries.
- Open a book program or write your own using your preferred editor. Let's assume the program file is `square.cpp`.
- Open the terminal window, change to the directory where the source code is located and compile the program with the command `gcc square.cpp -o square -I/usr/include -L/usr/lib -lglut -lGL -lGLU -lX11`.
- Run the program by entering the command `./square`. Figure B.11 shows the output of `square.cpp` program.

*Note:* For a GLSL program the command is `gcc glslProgram.cpp -o glslProgram -I/usr/include -L/usr/lib -lglut -lGLEW -lGL -lGLU -lX11`.

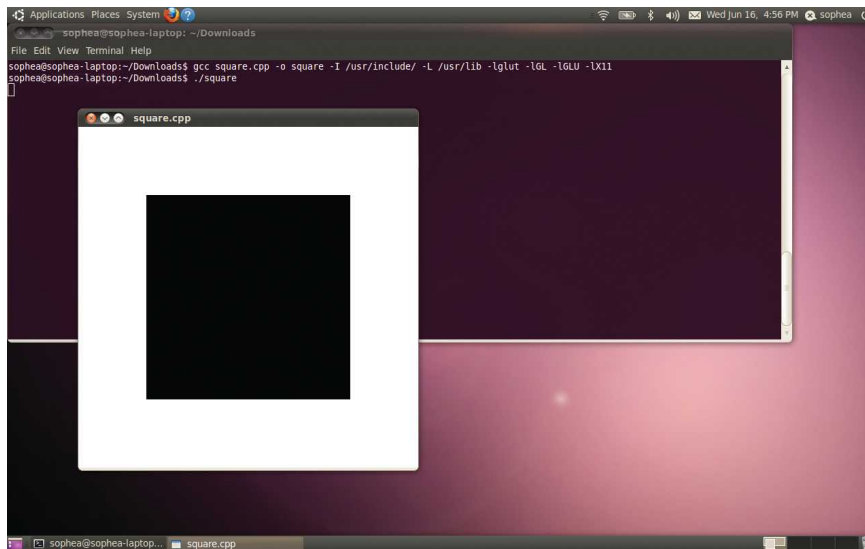


Figure B.11: Square.cpp output in Ubuntu 10.04.