

Using GTKmm in the student environment

*Note: you **must** test your graphical display on the `linux.student.cs.uwaterloo.ca` environment before the project is due. We recommend testing your program in MC 3022 as the marking demos will occur in this room.*

1 Accessing the student environment

If you have never logged into a school computer, you will first have to set your password through <https://www.student.cs.uwaterloo.ca/password/>.

1.1 Computing Labs

If you do not wish to install these programs on your personal computer, you can `ssh` into your `linux.student.cs.uwaterloo.ca` account using Mac and Linux Labs in the MC.

To enable X11 forwarding, include the `-X` and `-Y` flags in the `ssh` command. You should also check your `ssh` application's settings to ensure that X11 forwarding is enabled.

Login using a terminal and the command: `ssh -X -Y userid@linux.student.cs.uwaterloo.ca`

1.2 Using Windows

1. Install PuTTY, which is a free SSH client.
2. Login by entering `ssh userid@linux.student.cs.uwaterloo.ca` into the box labelled **Host Name or IP address**. (We recommend saving this as your default setting.) Press the **Open** button at the bottom right of the window. A terminal will open after requesting your password. **Note:** *no characters will appear while you are typing your password.*

1.3 Using Mac OS X

1. Open a terminal using either **Terminal** or **XQuartz** (they can usually be found in the **Utilities** folder in your **Applications** folder).
2. Type the command: `ssh -X -Y userid@linux.student.cs.uwaterloo.ca`. This will ask for your password. **Note:** *no characters will appear while you are typing your password.*
3. If you are using **XQuartz**, make sure that you enable the **Authenticate connections** option under the **Security** pane from the **Preferences** menu option.

2 Using Linux

If you are new to Linux, see the provided Linux commands sheet, [linuxCommands.pdf](#).

3 Using GTKmm with ssh

To use GTKmm through an `ssh` connection, X11 forwarding must be used. You must first install:

- On Windows: **Xming**. Install an X-server for Windows such as **Xming** and run it. Nothing will show up on the screen when you run **Xming**. You will need to make sure **Xming** is turned on each time you access your `linux.student.cs.uwaterloo.ca` account. To enable X forwarding in PuTTY, under **Connection/SSH/X11**, check the box labeled **Enable X11 forwarding**. You may want to save this setting.
- On Mac: **XQuartz**. To enable X11 forwarding include the `-X` and `-Y` flags in the `ssh` command. You should also check your `ssh` application's settings to ensure that X11 forwarding is enabled.
`ssh -X -Y userid@linux.student.cs.uwaterloo.ca`

4 Debugging GTKmm over ssh connections

You may experience some trouble using GTKmm over an `ssh` connection. A common error message is `Gtk-WARNING **: cannot open display:`

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When having trouble using GTKmm over an `ssh` connection, first try removing all of the files starting with `.Xauth` in your home directory by entering the following commands¹:

```
$ cd
$ pwd
/u/userid
$ rm .Xauth*
```

5 Working with GTKmm

First, make sure that you have the correct version of GTKmm installed. The student environment (`ubuntu1604-NNN`) is using version 3.18 (GTKmm 3.0) as the default. You can use the command

```
dpkg -l "*gtkmm*"
```

to see what version is installed if you want to be sure.

Note that when you both compile and link, you **must** specify the GTKmm package as the last argument on each of your compilation and linking command, as in:

```
g++ -c Window.cc `pkg-config gtkmm-3.0 --cflags` --libs` -std=c++14
...
g++ Window.o ... -o game `pkg-config gtkmm-3.0 --cflags` --libs` -std=c++14
```

It is thus highly recommended that you set up your `Makefile` to do this for you, so that you don't forget. See the sample in the provided examples, [gtkmm-examples-3.0.zip](#).

Resources

- GTKmm API documentation: <https://developer.gnome.org/gtkmm/stable/pages.html>
- GTKmm 3 reference manual: <https://developer.gnome.org/gtkmm/stable/>
- GTKmm 3 tutorial: <https://developer.gnome.org/gtkmm-tutorial/stable/>
- Glade: https://developer.gnome.org/glade/stable/index.html.en_GB
- GTKmm 3 examples
 - <https://www.student.cs.uwaterloo.ca/~cs246/common/gtkmm/gtkmm-examples-3.0>,
 - <https://www.student.cs.uwaterloo.ca/~cs246/common/gtkmm/MVC-gtkmm3.0>

¹ Note that `$` is the `bash` shell prompt, so you don't actually type it in. You don't need to enter the `pwd` command, but it's useful to confirm that you're in the correct location first.