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,
https://www.student.cs.uwaterloo.ca/~cs247/current/Assignments/P2/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:
```

Using GTKmm in the student environment

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 commands[1]:

```
$ 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, https://www.student.cs.uwaterloo.ca/~cs247/current/Assignments/P2/provided/gtkmm-examples.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/~cs247/current/Assignments/P2/provided/gtkmm-examples.zip,
  - https://www.student.cs.uwaterloo.ca/~cs247/current/Assignments/P2/provided/gtkmm-examples/MVC/

[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.