

Use X Forwarding if you want to enable graphic user interface of tools, such as Emacs, from GRACE server.

X Forwarding in Mac

Here's how the students using Mac laptops should connect to the Grace systems using their Glue account after they're connected to the network.

- They should start X11 by double clicking the X11 utility found in /Applications/Utilities.
- In the window entitled xterm, run the command

```
ssh -X directory-id@linux.grace.umd.edu
```

where *directory-id* is their UMCP directory ID (the same as their Glue account name).

Then they need to type in their directory password when prompted, and they should be logged in.

NOTE: You should also mention here that, if they are SSH'ing from home, the -C switch (for compression) can help speed up their session if they are using X forwarding.

Note: if X forwarding doesn't work from the Mac laptops, have the students log out and log back in again, using the -Y option in the login command:

```
ssh -Y directory-id@linux.grace.umd.edu
```

Lastly, you don't need to cover this unless anyone asks, in which case you can just tell them. If any students use Macs but say they prefer to use the Terminal instead, here are the steps to do that:

- Start the Terminal (found in the dock and also in /Applications/Utilities.)
- Set the DISPLAY variable by running the command "export DISPLAY=:0".
- Run `ssh -Y directory-id@linux.grace.umd.edu` in the terminal window.

X Forwarding in Windows

Encourage students who want to use personal Windows machines to connect to the Grace hosts and do their programming work to download and install Xming, using the link on the class webpage (Resources page, search for Xming). Xming runs an X server on a Windows machine, meaning that when you're logged into a UNIX machine applications which are able to will open up in separate windows, as if you were logging in from another UNIX machine. I'd ask you to get and use it on your own machine, if it's Windows, so you become familiar with the way things works when running it, and can show students.

Download Xming at:

http://sourceforge.net/project/showfiles.php?group_id=156984

(In encouraging students to get and use Xming, note that for basic use you only have to download and install Xming itself, not any of the fonts or tools and clients or anything else. Obviously Xming has a number of additional capabilities, which we won't be explaining, but interested students can explore on their own.)

Xming is installed on the room PCs. Run it now so you can use it in showing Emacs, and so students can see that it's more advantageous.

To run Xming:

1. First enable X11 tunneling. Start the Windows SSH client, and first click on your profile (if you created one) which is set up to log into linux.grace. (Tunneling preferences are set on a per-profile basis.)
Go into Edit, Settings, Tunneling (under Connections), and click "Tunnel X11 connections". Click OK, and then File, Save Settings, so this setting is saved.
Then quit the SSH client, since Xming has to be running first for things to work.
(You only have to enable X11 tunneling once, if you did it right and saved the settings.)
2. Then run Xming by double-clicking on the desktop icon. (You can ignore the warning message about some features not being usable on the room PCs due to user permissions.)
3. Then (re)run the Windows SSH client.

4. Now when you connect to linux.grace and run any application which would cause a window to open, it'll pop up as a separate Windows window. For example, you can run Emacs as

```
emacs &
```

and it'll pop up in a separate window, allowing you to keep typing commands in the original window. (Note the `&` is necessary, to cause Emacs to run in the background.) You can also run a new terminal just via the command `"xterm &"`. Color and nice syntax highlighting of C programs should work in Emacs when run in this way, as opposed to running it not under an X server. You also get to use the Emacs menus for many common commands. (Also color works in `ls`, for instance, if you want to add an alias like the following to your `.aliases` file:)

```
alias ls 'ls --color=auto'
```

Try using Xming before the day of the discussion section, and ask if you have any trouble with it. Lastly, if it comes up when students ask about installing it, I don't know whether many students still use dialup access anymore, but (although I haven't tried it under dialup) I suspect that Xming would need high-speed internet access for any type of acceptable performance.

Note that students should have all of the advantages of Xming while logged in from a Mac (such as the departmental laptops), since the Mac is already running an X server.

Emacs

Give a brief introduction to basic Emacs commands, sufficient for entering, compiling, and correcting programs. Mention that the Resources section of the class web page has an Emacs tutorial and Cheat sheets. Students not using X forwarding can start emacs as follows:

```
emacs -nw
```