Computational Modelling: Using your own Windows computer

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1 Introduction

One of the aims of Computational Modelling is to introduce you to working in a Unix environment. A common issue is that people want to use their own computers at home to complete the worksheets but will most likely be running Windows, not Mac OSX or one of the many flavours of Linux. You maybe wondering why that would be a problem, for this module if your work doesn't run/compile in a Unix environment you lose marks. But more generally Unix style operating systems are used throughout science and much of computing. Prolonging learning it will only hinder you later in life if you stick in the field!

This document will help explain how to connect to the Phymat servers, run a Unix style bash with the correct compilers for this module and setup X Tunnelling. The main aim is to recreate a Unix style environment in Windows for you to work in.

If you know nothing start at section 2. If you have Putty installed and can connect to Phymat on your computer, but are now not so keen on paying for Exceed, head to section 2.1 for information on setting up X Tunnelling. If you want to have a Unix style bash running on Windows so you need not connect to Phymat read section 3.

Lastly, although you have been taught to use Quincy for the last several years of computing, don't! Not only is it a horrible program for writing programs, this course is about using Unix. Quincy does not generate code that compiles nicely on Unix and will result in you losing marks! If you insist on writing code using a Windows based program please use Notepad++, see section 4, a freely available tool that is a must for any technical Windows user.

This document is a guide, not an indepth tutorial. It merely points you in the right directions to getting setup on Windows, you may well come across some problems or errors specific to your computer. Unfortunately developing software on computers can be a pain at times and part of the learning process is figuring out these sorts of problems.

2 Putty: Windows based SSH client

Putty is a free program that runs on Windows and allows you to create SSH connections. You should have used this already in worksheet 1. Putty is useful in that you can save settings and means you don't have to remember all the various login details.

Download Putty from http://www.chiark.greenend.org.uk/~sgtatham/putty/, it is not an installer just one executable file.

1. Download Putty and place on the Desktop or somewhere else safe
2. Open Putty and enter the Host Name -¿ phymat2.adf.bham.ac.uk
3. Next from the tree menu select Connection-¿Data and fill in the Auto-login Username
4. Go back to Session at the top of the menu, enter 'phymat' for the session name in the empty box and click save

From now on all you need to do is double click 'phymat' from the menu and you'll connect, you just need to enter your password. For the more technically inclined put the putty.exe file in a directory listed in your PATH environment variable (See http://lmgtfy.com/?q=windows+7+path+environment+variable), from the command line you can then type `putty`-load phymat and you will connect straight to phymat.

2.1 XMing: X Tunelling with SSH

X Tunnelling is a way of running a program remotely on another machine through an SSH connection but having the GUI displayed and interacted with on your own machine. Windows doesn't support this feature natively but can be replicated using Exceed - as seen in worksheet 1 - or XMing. As XMing is free I will assume you will choose to use that.

Simply download and install XMing and once installed run it. You should have a little XMing icon down in your system tray. Setup Putty as outlined in worksheet 1 for using X Tunnelling and save the 'phymat' session so you don't have to set it up everytime. Connect and hopefully you should be able to run GEdit, Emacs, clock and XMGrace (Don't forget the `&`).

3 Cygwin: Unix bash and commands

Cygwin is a helpful compilation of tools and programs that replicates to the best of it's abilities a Unix bash shell in windows. It is freely available and provides far more functionality than you will need for this module.

Download Cygwin and run the setup file. Eventually it will take you to a huge list of possible programs you can download to run in Cygwin. You will need to select a few extras on top of the default installation: Click the word "Default" in the tree list until it says "Install" next to groups of programs devel and X11. Then goto Net-¿openssh and select install. It will ask you to accept to install some other dependencies for the items you selected, just click next/continue.

Once installed run the Cygwin bash shell and you should now be able to use all the commands you learnt in worksheet 1.

You should now be able to run `g++` and compile using the same compiler as on the Unix server, ensuring more marks for you - hopefully. Try `g++ --version` to see which version you are running. Get to the directory your code files are in and run the same command as you would on the phymat server. If this works you need not have to connect to phymat to compile your programs, useful if it is crowded and running slow or you are stuck on a train and want to get some work done.

3.1 Installing GSL

Using GSL in cygwin is easy, just simply run the cygwin setup and search for GSl. When you install it however, you still notice it only has version 1.4 or 1.5, on phymat we use 1.3. This can cause some issues, especially as GSL changes names of functions between versions occasionally. Make sure it runs and compiles on phymat, otherwise you will get no marks for compilation!

4 Notepad++

Notepad++ is an extremely useful tool in Windows. Although the original Notepad has it uses, Notepad++ adds alot more useful features, especially for software developing. For writing c++ programs with it, you just simply need to goto the menu Language → C → C++. You will now get the usual keyword colour coding in your file. This is not a development environment like Qunicy that you may have used in previous years, too compile you program you still need to go into a bash console and work from there.

5 WinSCP: SSH file transfer

Moving file around via SSH can be a pain using a command prompt, especially if you have a lot to move. WinSCP is again freely available and is immensely useful for moving file around over an SSH connection between your Windows computer and Phymat. Always copy your code across to the phymat servers and double check it compiles and works on it.

You should have realised by now that when you login to phymat you should be able to see all your files that would normally access on the university computers. If you are ever stuck somewhere and need to get hold of a file or some data you have left on one of the university computers, WinSCP is a great way of getting hold of them.

6 Installing Ubuntu with Wubi

You may want to try out using a Linux OS on your computer at home but can't be bothered with the hassle of installing it or potentially messing up your Windows installation or data files. A very handy tool is Wubi which we recommend, it is a Windows installer for Ubuntu. Download it from http://www.ubuntu.com/download/ubuntu/windows-installer and run like any other installer. You will need administrator rights on the computer for this. You will also need a spare disk partition. A disk partition is simply a way of dividing up a single hard drive into multiple ones. You cannot install Ubuntu and Windows on the same partition.

To create a new partition you will have to have a lot of free space on your hard drive, I recommend about 40GB. Once you have some free space you need to shrink your main partition to make room for a new one. If you are somewhat worried about this process, it should be fine! However we can't take responsibility if you end up deleting or doing something wrong and losing all your data. See http://technet.microsoft.com/en-us/magazine/gg309169.aspx on shrinking a partition in Windows 7. Next create a new partition and then install Wubi. When you boot up your computer now you will have an option to either load Windows or Ubuntu. Boot into Ubuntu and it should all

work, you may have issues with various device drivers that you will have to search the internet for. Using Ubuntu/Linus is beyond this document, so I suggest you start looking around on the web! To use it for writing c++ you will need to make sure g++ and GSL is installed, again you will have to search the internet on how to do this. Good Luck!