

Today we started out testing the computer lab...

The computers are running Microsoft Windows and need to be rebooted with the Linux network boot USB stick inserted.

Select "restart" from the Microsoft Windows login screen, as the system reboots continually press F9 to enter the UEFI/BIOS boot menu.

It may happen that one of the other function keys works better, so experiment if F9 is not working.

Also, some lab computers may need reconfiguring so if our computer can not enter the boot menu please switch and let me know the number of the computer that needs fixing.

After entering the UEFI/BIOS boot menu select the entry with either

- . USB Drive
- . UDrive

in it. You should obtain a window that looks like

```
GNU GRUB version 2.06
*iPXE fractal.math.unr.edu
iPXE yellow.wulf
iPXE system updates
```

The first entry denoted by the * is correct the others are related to system maintenance and should be avoided.

Press return to select fractal.math.unr.edu

This should lead to another menu that looks like

```
BIOS iPXE Boot Menu
----- Math 466 Boot Images -----
Void Linux (squashfs) left.math.unr.edu
Void Linux (squashfs) right.math.unr.edu
Void Linux (squashfs) data.math.unr.edu
-----
Start the iPXE command line
```

Sorry for the maze of menus.

Any of the Math 466 Boot Images should work fine. There are multiple choices to distribute the load and in case one of them is broken.

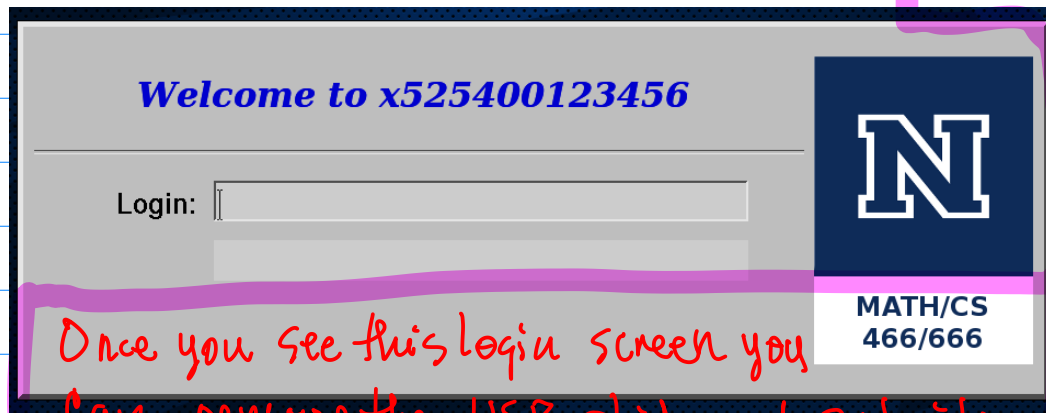
↑
(on Monday the second choice was broken. This has now been fixed.)

After selecting one of the boot images the system should load Linux with the root filesystem served by the system indicated.

If everything goes well, you should now see the login screen:

The system is now running from the network it's safe to remove the USB stick...

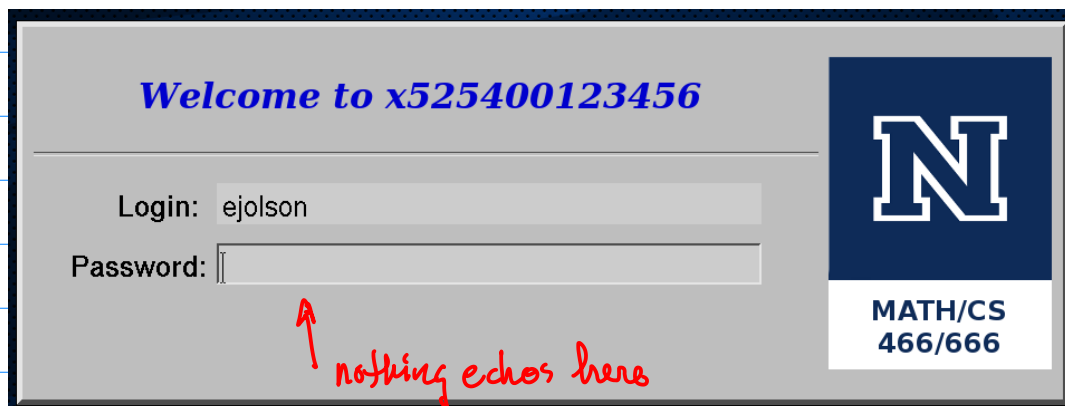
Important!
don't lose your USB stick



Once you see this login screen you can remove the USB stick and put it away for next time

The name of the computer is some weird number based on the network MAC address. You can ignore it.

Enter your NetId under "Login:" and press return. Note that tab does not move to the password entry as in Windows. Press return instead.



After pressing return, the "Password:" field will become active and you can type your password there.

Note that nothing appears as you type your password, not even symbols such as * * *. From a security point of view this obscures how long your password is. Still, it's a little confusing since Microsoft Windows and many other login screens work differently.

If successful the login screen will vanish and you will be able to use the system. It may happen that your NetId does not work. In that case please enter

Login: guest
Password: math466

} not a longterm solution

after which you can still use the system but your work will not be saved.

Logging in as guest will not be satisfactory long term, so if you continue to have difficulties with your NetId please let me know.

There are two window systems available on the boot image:

One based on FVWM which I will use in class
Another based on MATE more like Microsoft Windows

I prefer the first because I'm used to it and by default it allows me to overlap windows in a way that is useful when teaching.

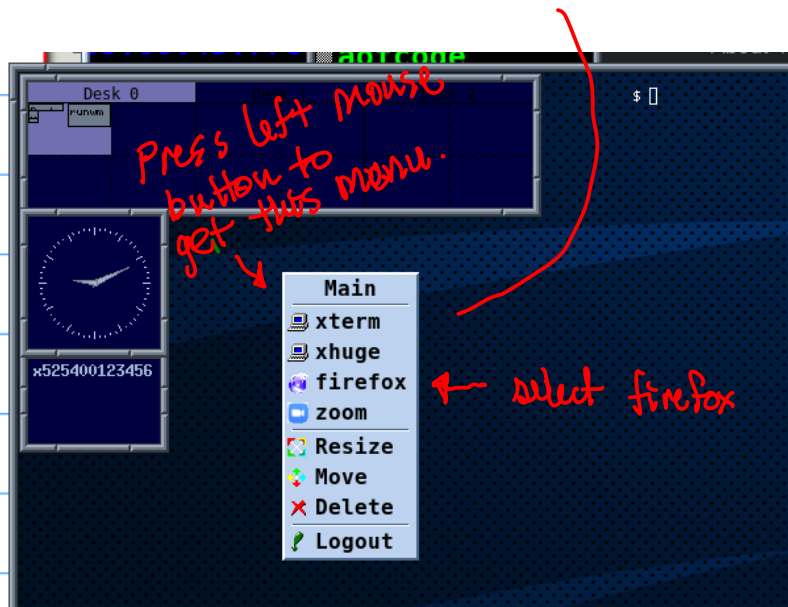
Most screenshots with appear in the notes will be from FVWM.

We didn't discuss how to switch back and forth between window systems in class because the NetId was not working. I'll include how to do that at the end of today's notes for future reference.

For now, let's continue with FVWM as guest...

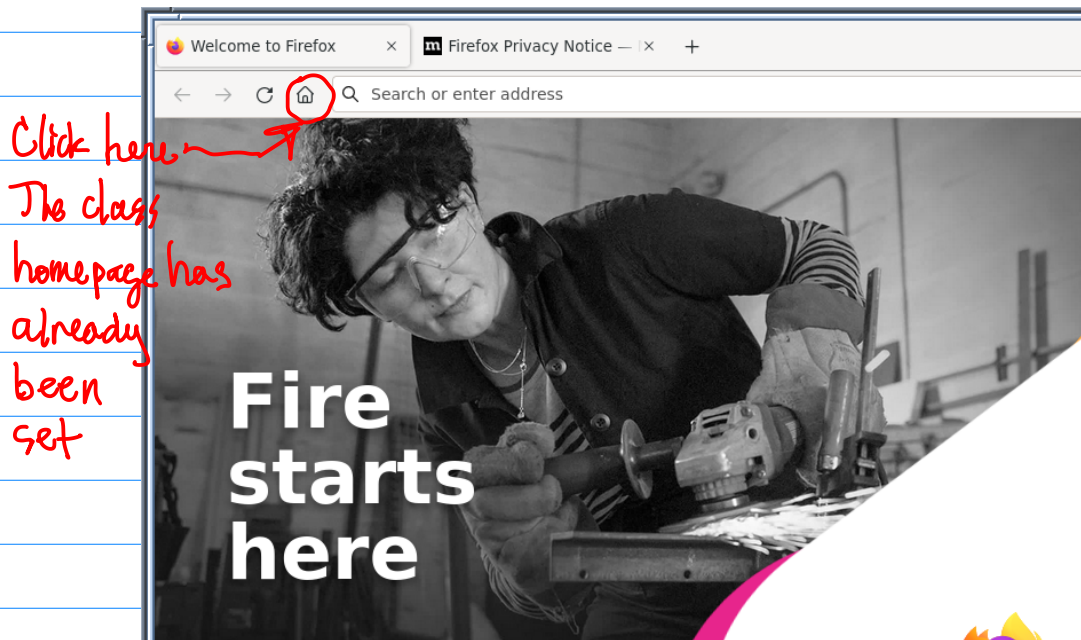
The mouse menu is hidden in FVWM. To access it, find an empty spot on the screen (except the right corner where there is a transparent console) and click the left mouse button.


You should obtain a menu that looks like



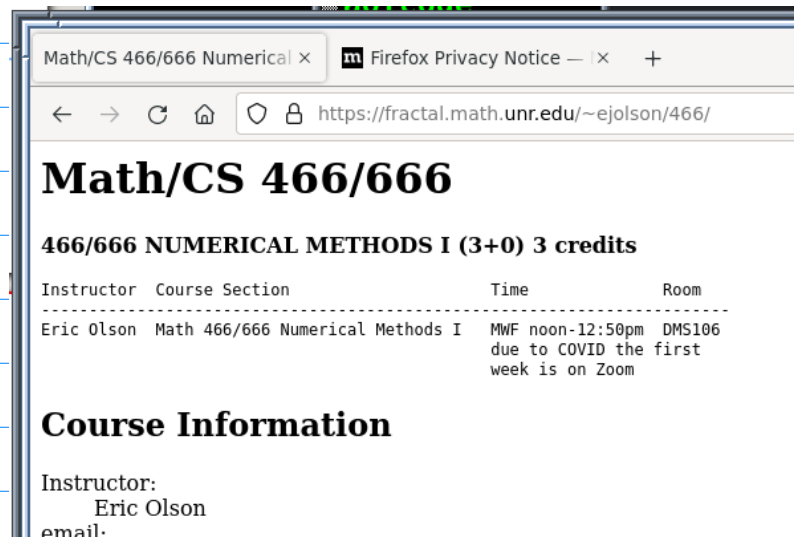
For now select firefox to start the web browser.

The first time it loads you will see something like

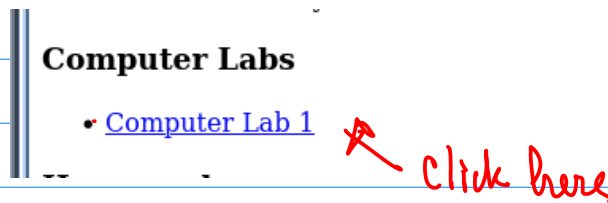


Click on the  as the class homepage as already been set.

The screen should now look like



Scroll down to

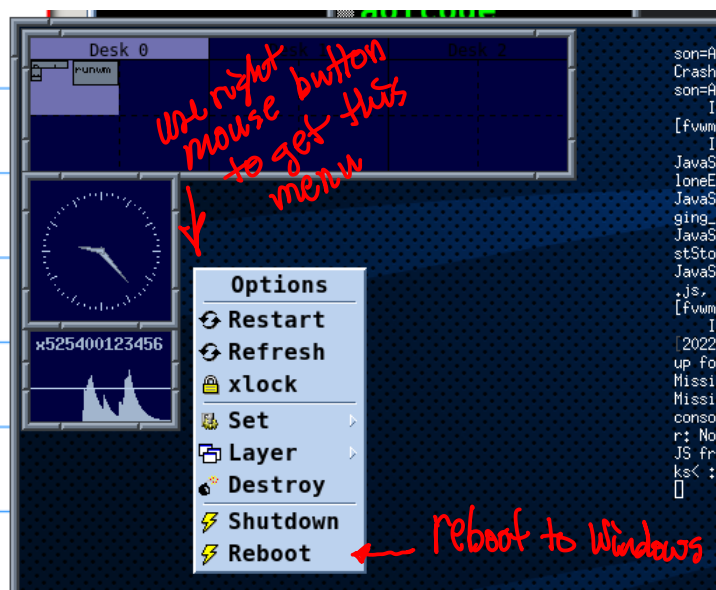


Click on "Computer Lab 1" to see what we will be trying on Wednesday.

Now close all the tabs until the browser goes away.

The next class will want to use Microsoft Windows, so it's better to reboot the computer before leaving.

There is another mouse menu connected to the right button.



Important: Make sure you have removed the USB stick before rebooting (if you did not already remove it earlier as suggested)

Bisection Method Step 7

Finally, note that bisection is rather slow; after n iterations the interval containing the root is of length $(b - a)/2^n$. However, provided values of f can be

↗ read this section...

Quadratic formula...

$$ax^2 + bx + c = 0$$

Answer:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

either + or - will result in loss of precision (depending whether $b > 0$ or $b < 0$).

Suppose $b > 0$
the + is the
bad one

Fix for the loss of precision is algebra...

$$\frac{-b + \sqrt{b^2 - 4ac}}{2a} \cdot \frac{b + \sqrt{b^2 - 4ac}}{b + \sqrt{b^2 - 4ac}} = \frac{-b^2 + b^2 - 4ac}{2a(b + \sqrt{b^2 - 4ac})}$$

$$= \frac{-2c}{b + \sqrt{b^2 - 4ac}}$$

↗ plus = no more cancellation

Next time we will work a project in the lab and turn it in through WebCampus.

The project is simple, but turning the code and output in requires practice so that's the main thing to focus on.

Please read the lab for next time. Doing so will make things easier.

The rest of these notes have been added to describe how to switch from FVWM to the MATE window manager (and back).

This is entirely optional.

If you are okay with FVWM, my recommendation is to stick with that as that is what I will be using most of the time in class.

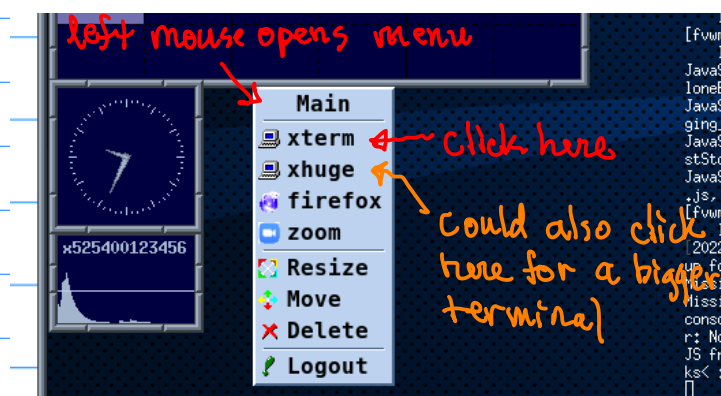
There is a program (I wrote myself) called

chwin

that allows one to easily switch between active window managers.

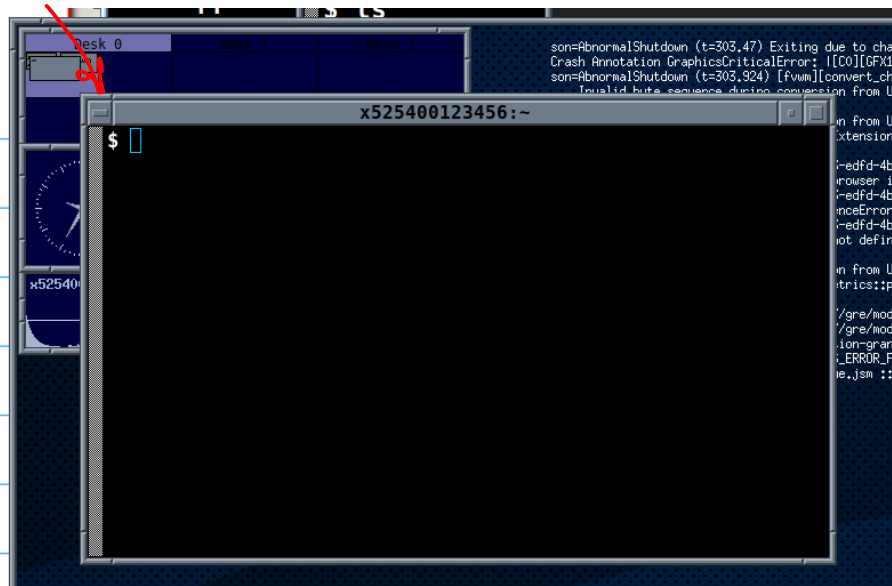
Here is how to use it.

Open a terminal window by clicking the left button and selecting xterm.



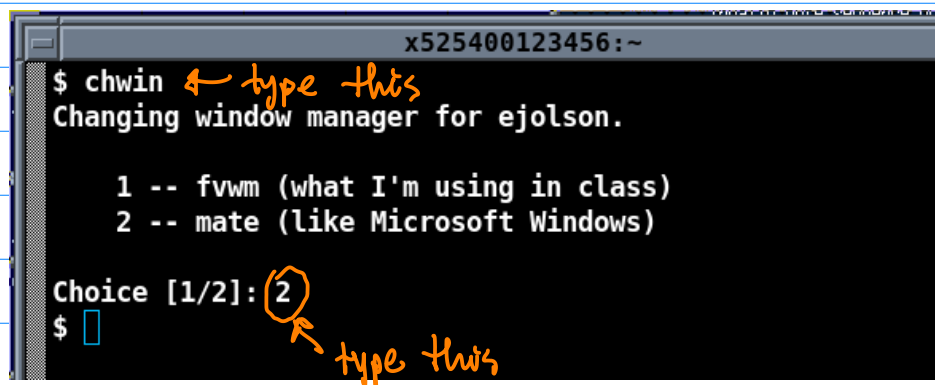
A terminal window should appear:

xterm terminal window



Move the mouse pointer into the terminal so the border lights up and type `chwin` followed by enter.

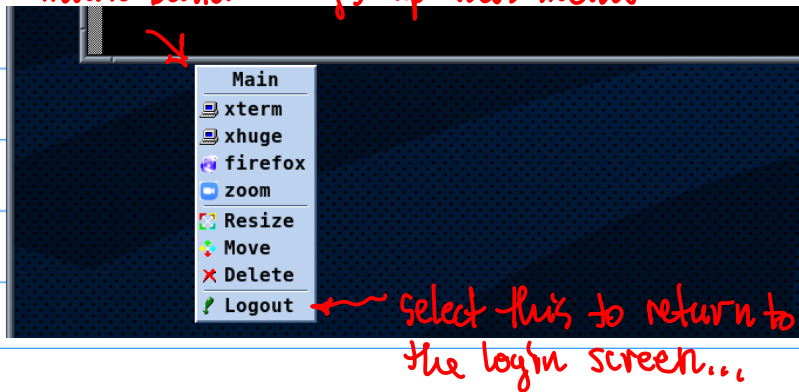
Then type `"2"` followed by return to change the window manager.



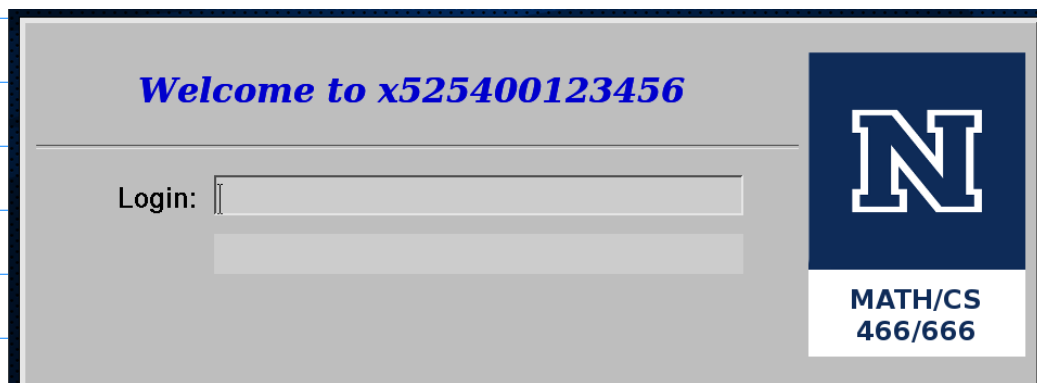
The window manager has been changed but one needs to log out and log back in for the change to take effect.

To logout (without rebooting) use the left mouse menu.

left mouse button brings up this menu

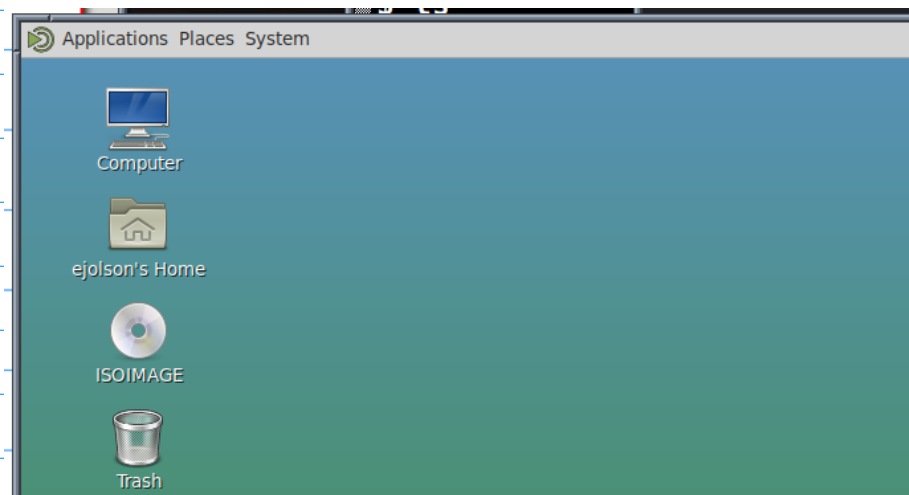


You should now be back to the login screen.



Enter your NetId and password again.

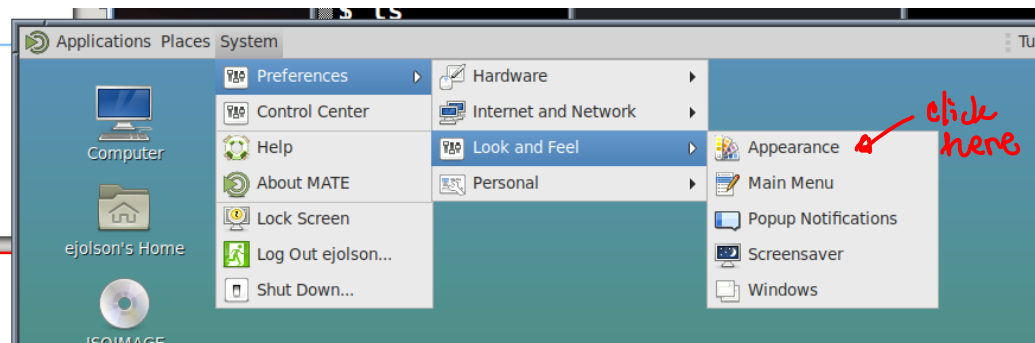
If everything goes well, the screen will look like:



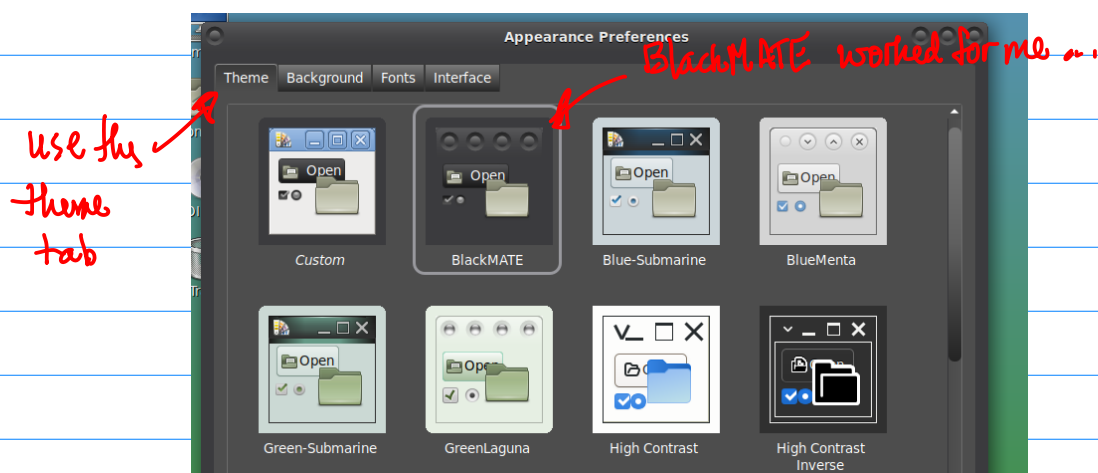
Unfortunately, the default color scheme uses black on black for the MATE terminal, which is inconvenient. I tried to fix it system wide but couldn't. You will have to select a different color scheme yourself.

To select a different color scheme, choose

System->Preferences->Look and Feel->Appearance



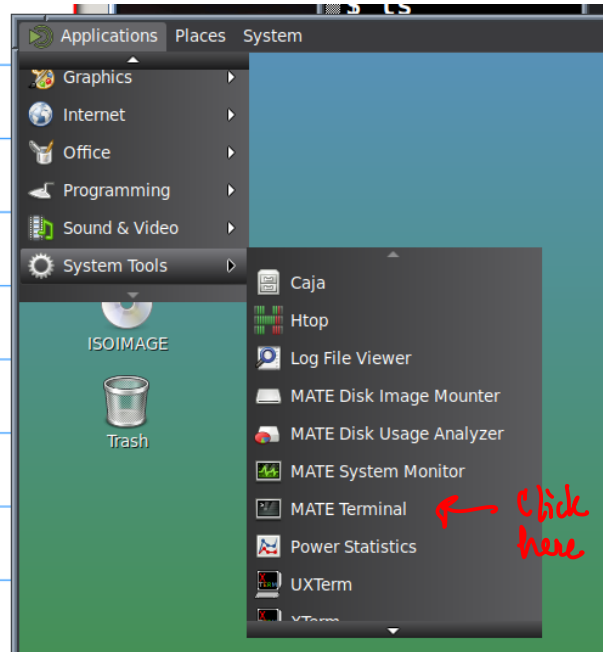
Select the "Theme" tab. I found that "BlackMATE" worked well enough.



Instead of changing the Theme, one could alternatively change only the background for MATE terminal.

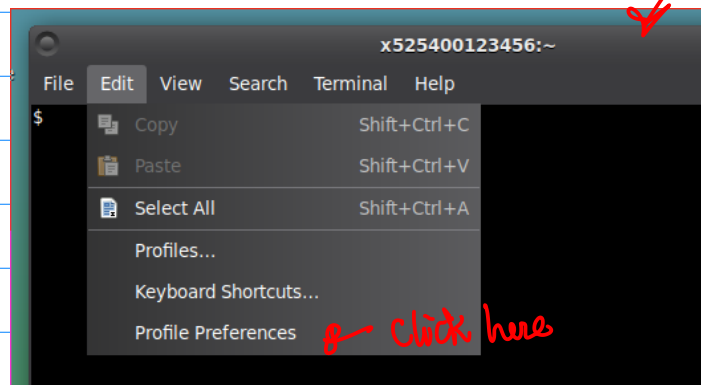
This can be done by opening the terminal with

Applications->System Tools->MATE Terminal



Then in MATE terminal select

Edit -> Profile Preferences

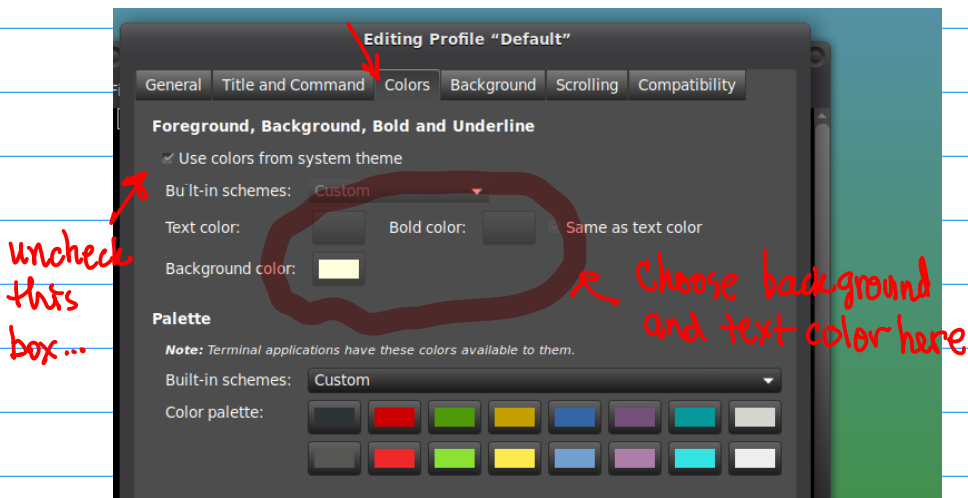


This is MATE terminal

Open the "Colors" tab.

Then uncheck the "Use colors from system theme"

Select this tab



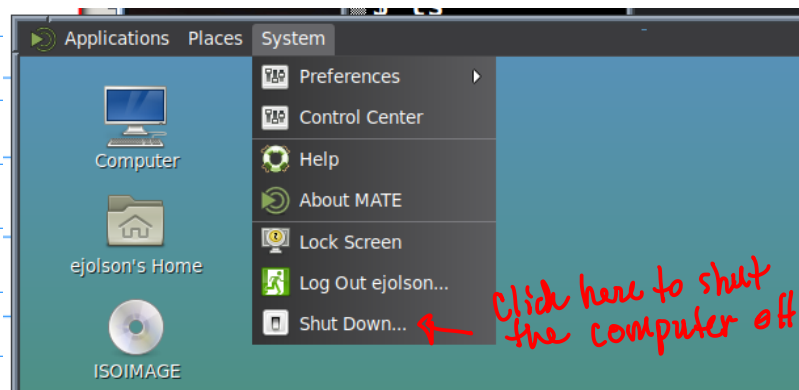
You can switch back to FVWM by typing

chwin

in the MATE terminal, selecting "1" and then logging back out and in to make the change effective.

```
x525400123456:~  
File Edit View Search Terminal Help  
$ chwin  
Changing window manager for ejolson.  
  
1 -- fvwm (what I'm using in class)  
2 -- mate (like Microsoft Windows)  
  
Choice [1/2]: 1  
$
```

As with the FVWM window manager, don't forget to reboot into Microsoft Windows before leaving the lab.



Make sure your USB stick is removed and then power it back on to start Microsoft windows..