Introduction to CUNIX

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Operating Systems
What is UNIX?

• Unix is a **multi-user** and **multi-tasking** operating system:
  – multiple users on the same system
  – run multiple programs, seemingly simultaneously
  – maintain permissions that determine which users have access to which files and programs
  – regulate the amount of disk space each user can use

• Mostly command-line driven (instead of a GUI)

• CUNIX is Columbia’s cluster of UNIX machines
Why do I need to know this? ("I just want to learn Java")

1. You must use CUNIX to submit your homework in this class

2. Your programming assignments will be tested on CUNIX

3. It is very likely that, sometime in your life, you will need to use UNIX again outside of this class!
Part I: Creating a web page
What you need to do

1. Connect to CUNIX
2. Log in
3. Create a directory called public_html
4. Change its permissions to make it readable
5. Change to the public_html directory
6. Use a text editor to create a simple web page called index.html
7. Change its permissions
8. View the page with a web browser
Access to CUNIX

- 251 Engineering Terrace is a good place to work (second floor of Mudd)
  - Also 215 SIPA and 213 Butler

- Click on the “cunix” shortcut on the machine in 251 (or use PuTTY)
Using Your Own Computer

• Download an “ssh” program
  – Windows:  
    http://www.columbia.edu/acis/software/putty/
  – Mac:  
    http://www.columbia.edu/acis/software/osxterminal/

• Do NOT use “telnet”!

• Open cunix.cc.columbia.edu
1. Connect to CUNIX

You can just type "cunix.cc" if you’re on campus
2. Log In

Log in with your Columbia email ID and password

Go to http://www.columbia.edu/acis/tools/index.html if you need help!
This is the “command prompt”
Yours may look different!
3. Create a public_html directory

This command makes a new directory called “public_html”
4. Change its permissions

This command makes it possible for other people to read the "public_html" directory.
5. Change directory

This command changes to the “public_html” directory
6. emacs index.html

This indicates that the file needs to be saved

Ctrl-X-S: Save
Ctrl-X-C: Exit
7. Change its permissions

This command makes it possible for other people to read the "index.html" file.
8. View the page

Use your UNI (not mine!)
To review...

1. Connect to CUNIX
2. Log in
3. Create a directory called public_html
   - mkdir public_html
4. Change its permissions to make it readable
   - chmod a+rx public_html
5. Change to the public_html directory
   - cd public_html
6. Create a simple web page
   ➢ emacs index.html

7. Change permissions of the page
   ➢ chmod a+rx index.html

8. View the page with your web browser
   ➢ http://www.columbia.edu/~xxxxx/index.html
Part II: Creating a Java program
This is what you need to do...

1. Connect to cunix.cc.columbia.edu
2. Log in
3. Create a cs1004 directory and a hwk1 subdirectory
4. Use an editor to create a Java source file
5. Compile your Java program
6. Run your Java program
3. Create Directories

1. Make a cs1004 directory
2. Change to the cs1004 directory
3. Make a subdirectory called hwk1
4. emacs HelloWorld.java

```java
/**
 * HelloWorld.java
 * Your name
 * CS1004 Fall 2005
 */

public class HelloWorld {
    public static void main (String[] args) {
        System.out.println("Hello world!!");
    }
}
```

This indicates that the file needs to be saved

Ctrl-X-S: Save
Ctrl-X-C: Exit
5. `javac HelloWorld.java`

If you don’t get any errors... it worked!!
Common Errors

error: cannot read: helloworld.java

BE CAREFUL ABOUT CAPITALIZATION!

Class HelloWorld is public, should be declared in a file named HelloWorld.java

THE NAME OF THE FILE MUST MATCH THE NAME OF THE CLASS!
6. java HelloWorld

```java
/* Your name
 * CS1004 Fall 2005
 */

public class HelloWorld {

    public static void main (String[] args) {
        System.out.println("Hello world!!");
    }
}

```

Success!!
What was that again?

1. Connect to cunix.cc.columbia.edu
2. Log in
3. Create a cs1004 directory and a hwk1 subdirectory
   - mkdir cs1004
   - cd cs1004
   - mkdir hwk1
4. Use an editor to create a Java source file
   - emacs HelloWorld.java
5. Compile your Java program
   - javac HelloWorld.java
6. Run your Java program
   - java HelloWorld
7. Log out
   - exit
Part III: Other Useful Utilities
Transferring between CUNIX and your PC/Mac

• You need to download an “sftp” tool
  – Mac: http://www.columbia.edu/acis/software/fugu/

• Connect and log in to cunix.cc.columbia.edu

• You can use WinSCP in 251 Eng Terr
Connecting with WinSCP
Transferring files with WinSCP
Windowing software

• Terminal programs like PuTTY don’t give you windows (which you’ll want for emacs and need for later homework assignments!)

• If you’re on the campus network, you can download X-Win32

• Otherwise:
  – Windows: http://www.xwin32.com/
  – Mac: http://www.microimages.com/freestuf/mix/

• Already installed in 251 Eng Terr
Creating a New Window

- On your PC or in 251 Engineering Terrace:

1. Start X-Win32

2. Find the IP address of the machine and type “export DISPLAY=xxx.xxx.xxx.xxx:0” in your CUNIX terminal window (in 251 Eng Terr, this would be 128.34.59.xxx:0)

3. Type “xterm &” and you should see a new window pop up
Part IV: Useful UNIX Info
UNIX Directories

• Similar to Windows/Mac “folders”
• Each directory contains files and subdirectories
• You have a “home” or “root” directory; this is where you start when you log in
• You should keep your files in separate directories
Useful Directory Commands

**pwd**  print (show) working directory

**ls**  list the files in the current directory

**ls –a**  list the files, including hidden files

**ls –l**  list the files with additional info

**ls –al**  list the files, including hidden files, with additional info

**ls *.java**  list the files ending with .java
$ pwd
/u/8/c/cdm6

$ ls
bin  cs1004  dead.letter  isolation  mail  mbox  public_html  temp

$ ls -a
.  .bash_history  .pine-debug1  .profile  dead.letter  temp
..  .emacs.d  .pine-debug2  .profile~  isolation
.Xauthority  .history  .pine-debug3  .ssh  mail
.addressbook  .mminit  .pine-debug4  bin  mbox
.addressbook.lu  .newsread  .pinerc  cs1004  public_html

$ ls -l
```
drwx------ 2 cdm6 studmail  4096 Mar 29 18:46 bin
```
drwx------ 3 cdm6 studmail  4096 Sep 10 00:25 cs1004
```
-rw------- 1 cdm6 studmail  1094 Apr  6 13:11 dead.letter
```
drwx------ 4 cdm6 studmail  4096 Mar 31 20:31 isolation
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drwx------ 2 cdm6 studmail  4096 Sep  9 20:28 mail
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Directory Navigation

**mkdir** `name` make a directory called `name`

**rmdir** `name` remove the directory called `name`

**cd** `name` change directory to `name`

**cd ..** change directory to parent (go up)

**cd ~** change directory to home/root

You can also mix the **cd** commands, like this:

**cd ~*/cs1004** change directory to the root and then go to “cs1004”; the forward slash is the separator
Editing Files

- **pico**: very easy to use, but very simple (like Notepad)

- **emacs**: better for programming

- **vi**: impress your friends!
pico test.txt

Hello world!!

^O = save

^R = open

^U = paste
## Working with Files

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>mv</strong> name1 name2</td>
<td>rename <em>name1</em> as <em>name2</em></td>
</tr>
<tr>
<td><strong>mv</strong> name1 dir/</td>
<td>move <em>name1</em> to directory <em>dir</em></td>
</tr>
<tr>
<td><strong>cp</strong> name1 name2</td>
<td>copy <em>name1</em> to <em>name2</em></td>
</tr>
<tr>
<td><strong>cp</strong> name1 dir/</td>
<td>copy <em>name1</em> to directory <em>dir</em></td>
</tr>
<tr>
<td><strong>rm</strong> name</td>
<td>delete (remove) <em>name1</em></td>
</tr>
<tr>
<td><strong>rm</strong> –f name</td>
<td>delete <em>name1</em> without confirmation (be careful!)</td>
</tr>
</tbody>
</table>
Other Useful Commands

- **clear**
  - clear the screen

- **finger, who**
  - show other users

- **man command**
  - show the online manual about *command*

- **more filename**
  - show *filename* one screen at a time
Words of Warning

• UNIX is case-sensitive, Windows isn’t
  – MyProgram.java is not the same as myprogram.JAVA

• Be careful when using “rm”
  – Don’t accidentally delete your mailbox!

• Don’t play with permissions until you know what you’re doing

• Use caution when editing hidden files