

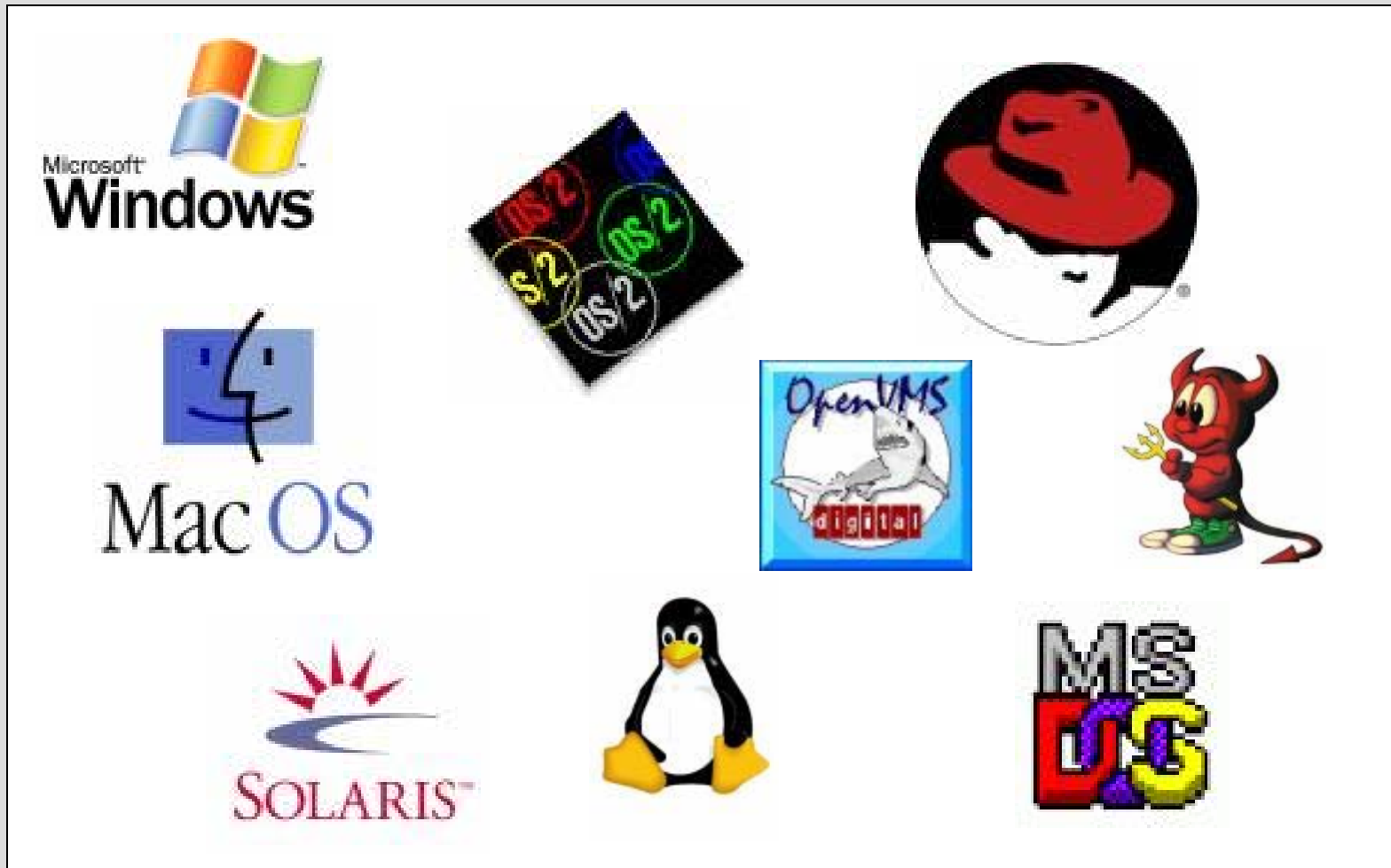


# Introduction to CUNIX

Chris Murphy

[cmurphy@cs.columbia.edu](mailto:cmurphy@cs.columbia.edu)

# 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

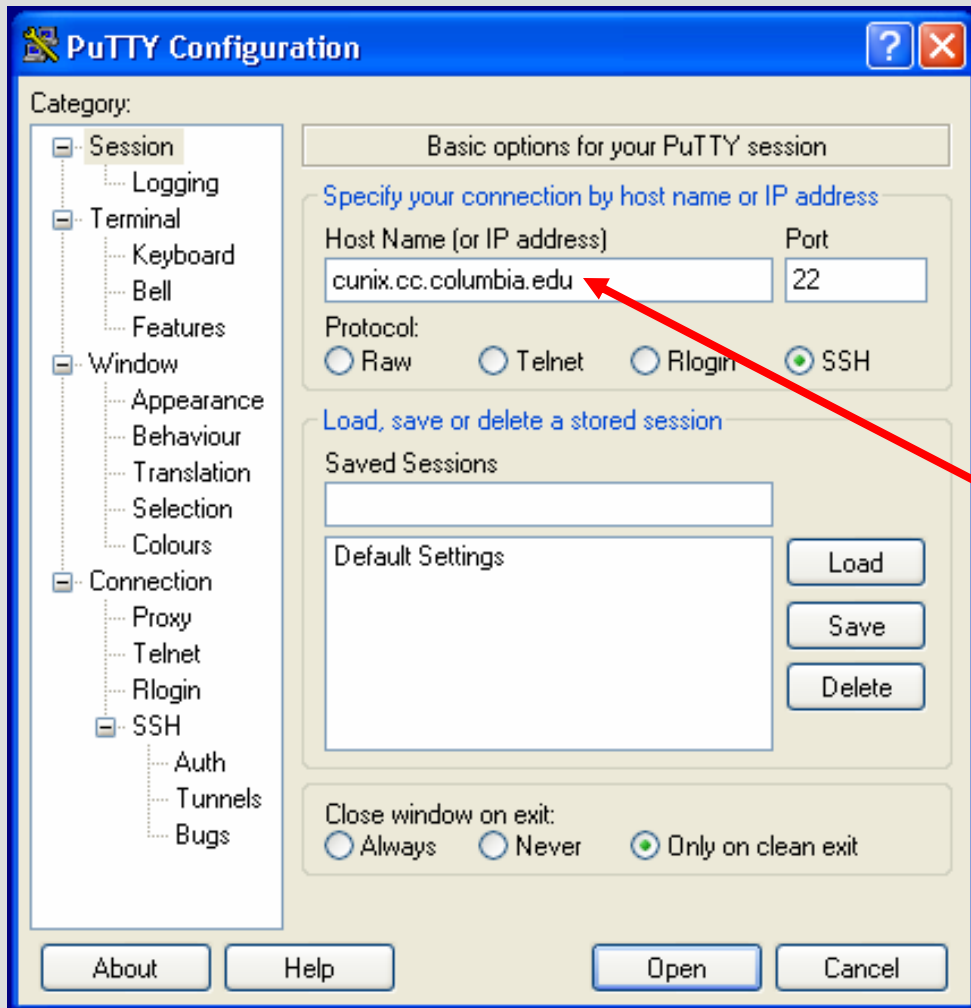
- 251 Engineering Terrace is a good place to work (second floor of Mudd)
  - Also 215 SIPA and 213 Butler
- Click on the “cunix” shortcut on the machine in 251 (or use PuTTY)

# 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](http://cunix.cc.columbia.edu)

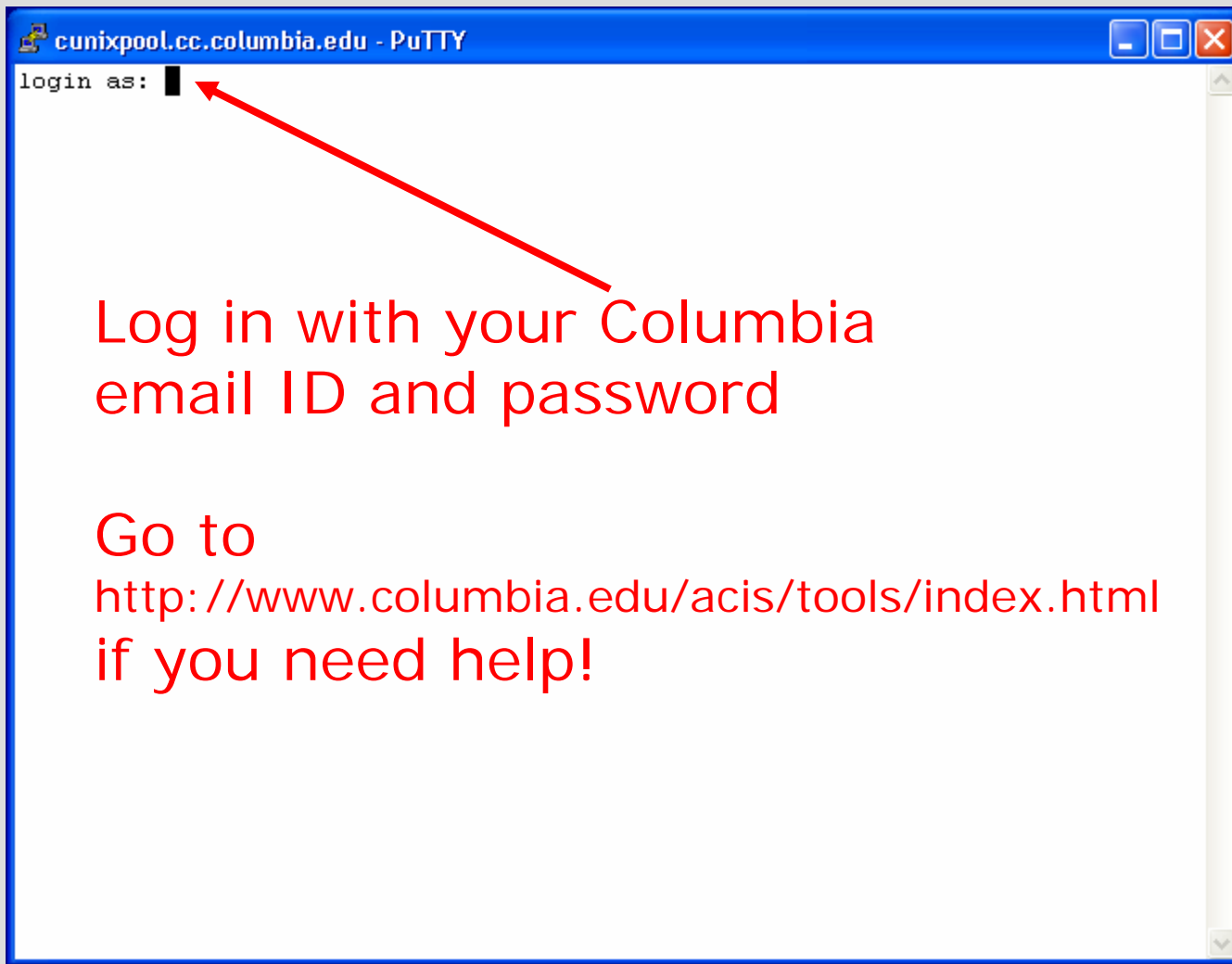


# 1. Connect to CUNIX



You can just type  
"cunix.cc" if you're  
on campus

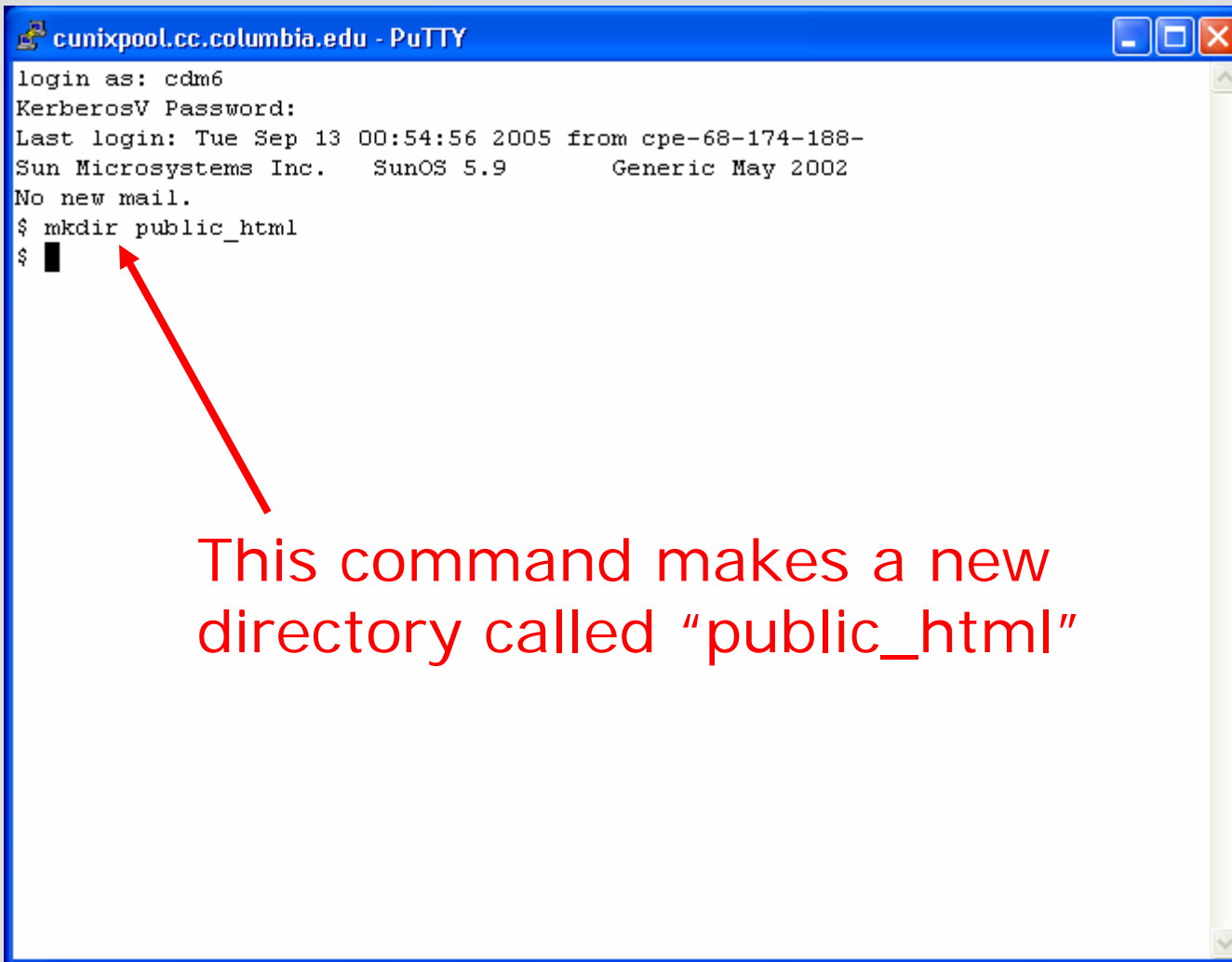
## 2. Log In



```
cunixpool.cc.columbia.edu - PuTTY
login as: cdm6
KerberosV Password:
Last login: Sun Sep 11 21:29:29 2005 from cpe-68-174-188-
Sun Microsystems Inc. SunOS 5.9 Generic May 2002
No new mail.
$
```

This is the "command prompt"  
Yours may look different!

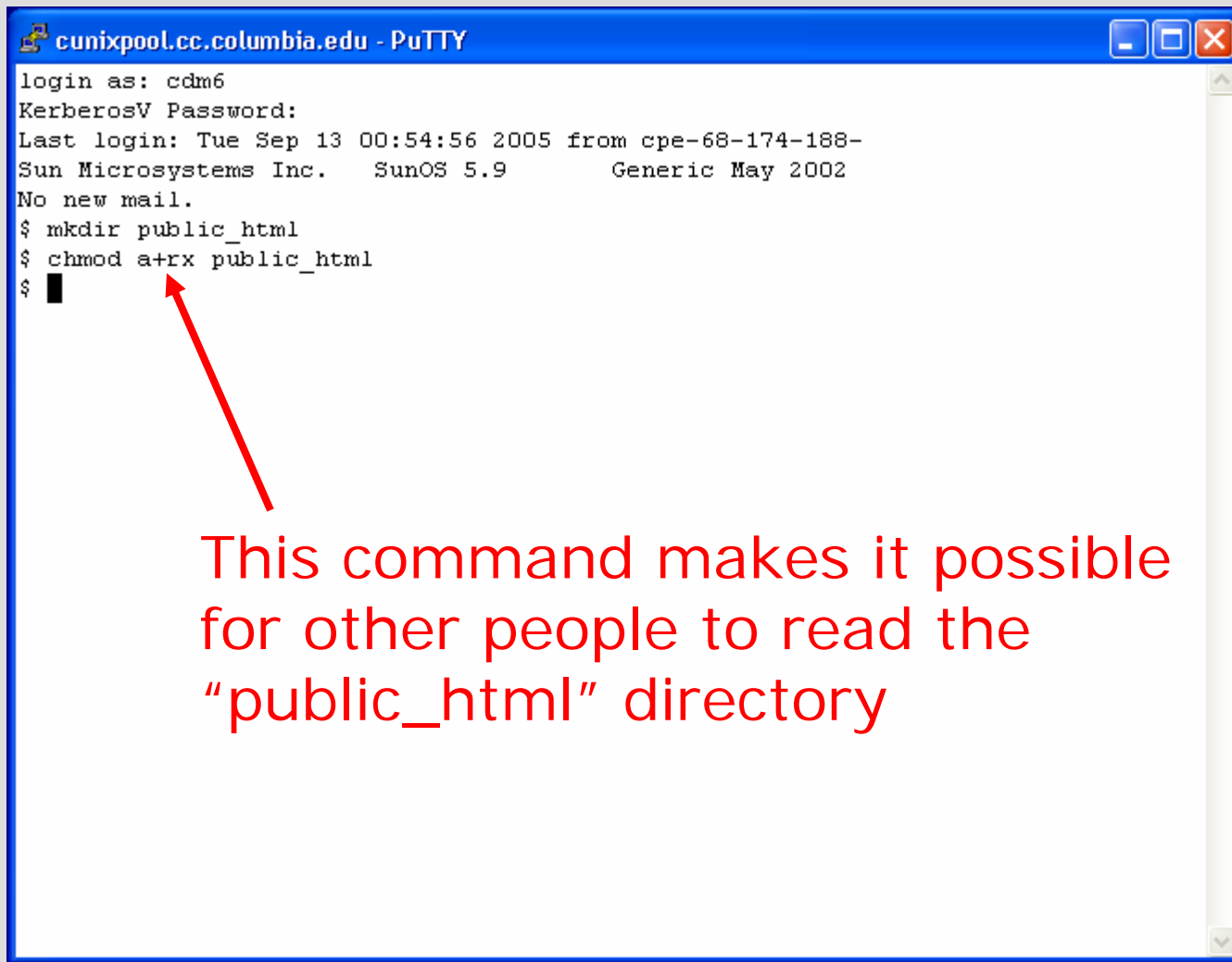
# 3. Create a public\_html directory



```
cunixpool.cc.columbia.edu - PuTTY
login as: cdm6
KerberosV Password:
Last login: Tue Sep 13 00:54:56 2005 from cpe-68-174-188-
Sun Microsystems Inc. SunOS 5.9 Generic May 2002
No new mail.
$ mkdir public_html
$ █
```

This command makes a new directory called "public\_html"

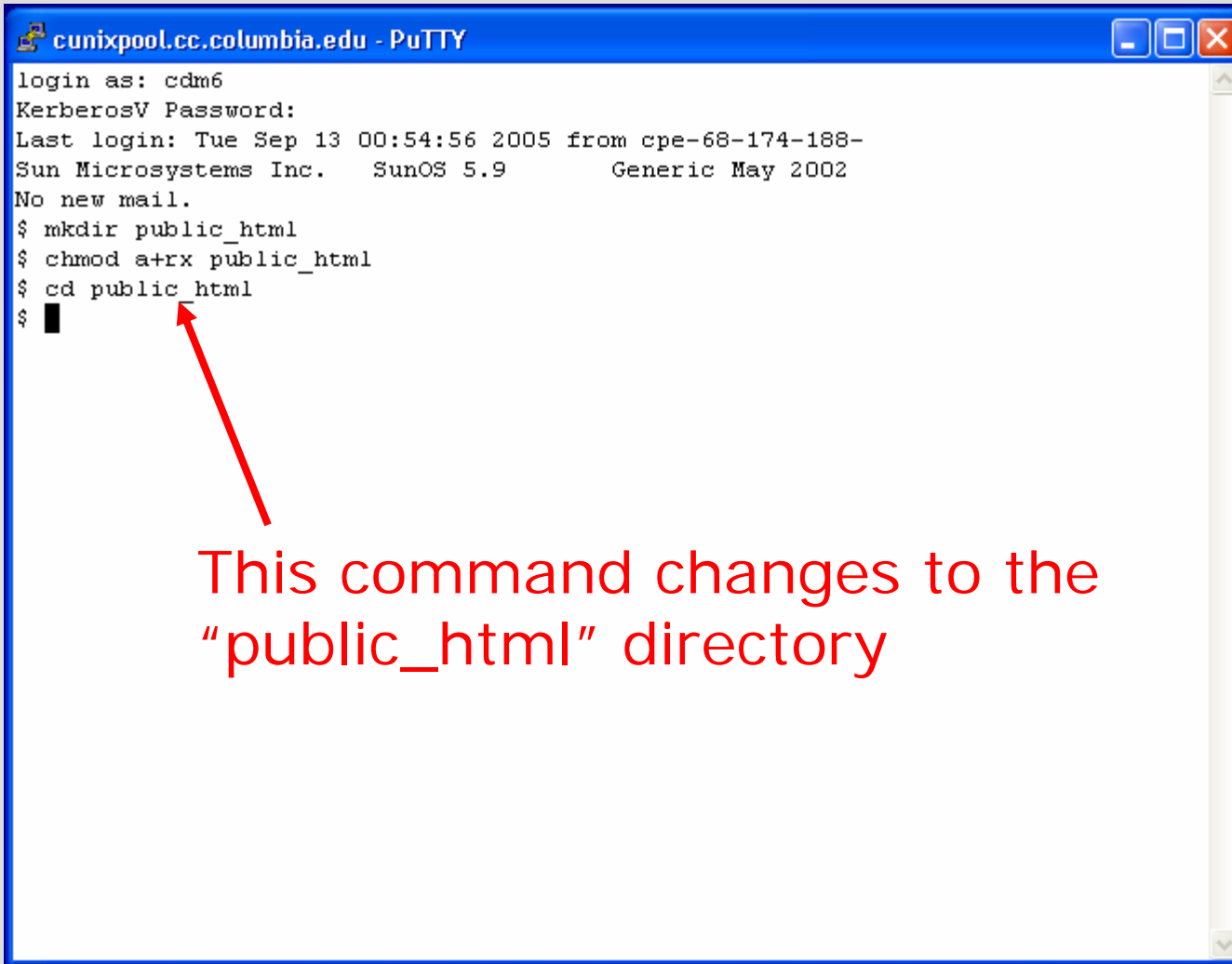
# 4. Change its permissions



```
cunixpool.cc.columbia.edu - PuTTY
login as: cdm6
KerberosV Password:
Last login: Tue Sep 13 00:54:56 2005 from cpe-68-174-188-
Sun Microsystems Inc. SunOS 5.9 Generic May 2002
No new mail.
$ mkdir public_html
$ chmod a+rx public_html
$ █
```

This command makes it possible for other people to read the "public\_html" directory

# 5. Change directory



```
cunixpool.cc.columbia.edu - PuTTY
login as: cdm6
KerberosV Password:
Last login: Tue Sep 13 00:54:56 2005 from cpe-68-174-188-
Sun Microsystems Inc. SunOS 5.9 Generic May 2002
No new mail.
$ mkdir public_html
$ chmod a+rx public_html
$ cd public_html
$ █
```

This command changes to the "public\_html" directory

# 6. emacs index.html

```
cunixpool.cc.columbia.edu - PuTTY
File Edit Options Buffers Tools HTML SGML Help
<html>
<body>

This is my very first webpage!

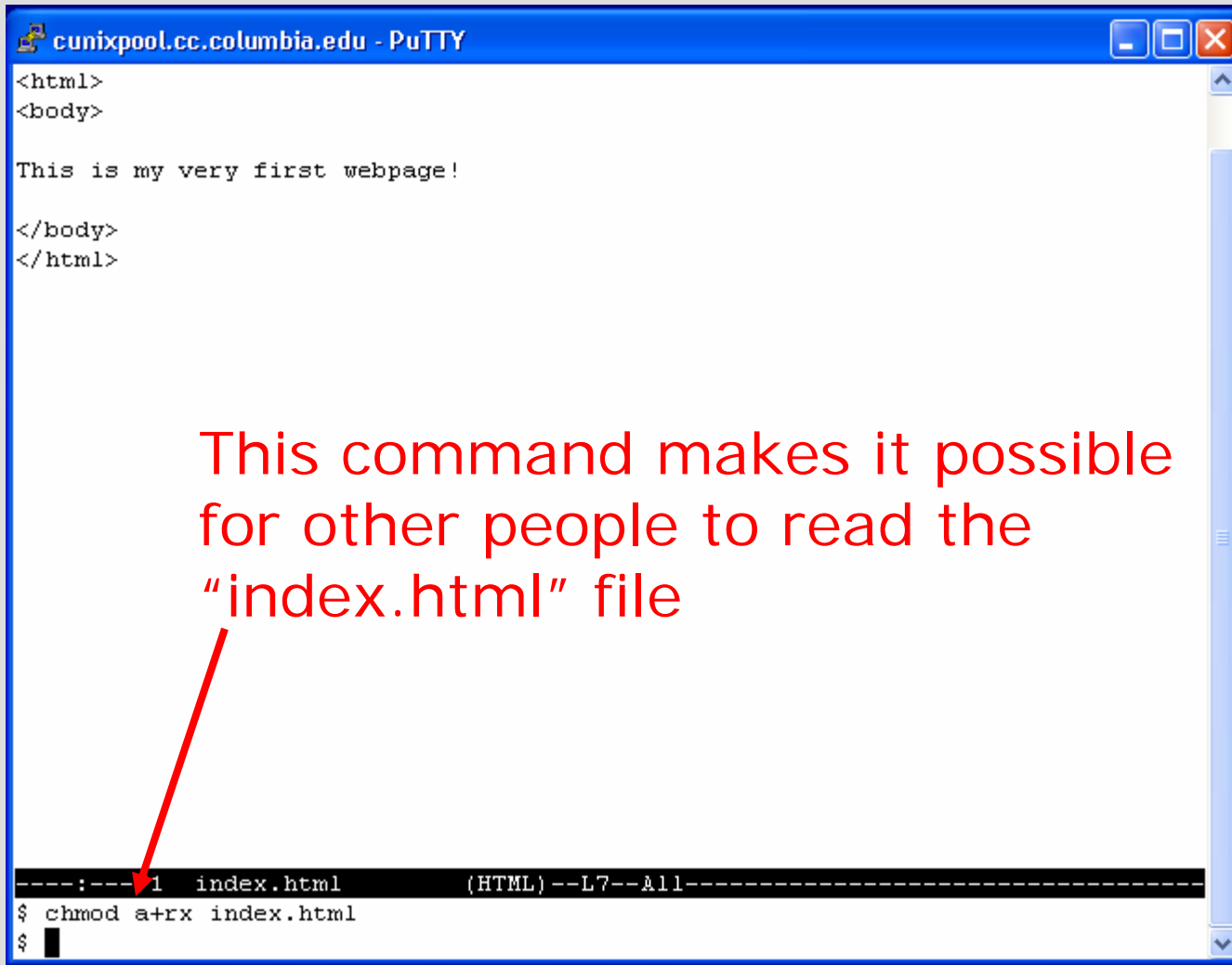
</body>
</html>

:~**~F1 index.html (HTML) --L7--A11--
```

This indicates that the file needs to be saved

Ctrl-X-S: Save  
Ctrl-X-C: Exit

# 7. Change its permissions



The screenshot shows a PuTTY terminal window titled "cunixpool.cc.columbia.edu - PuTTY". The terminal displays the content of an HTML file, which is a simple webpage with the text "This is my very first webpage!". Below the webpage content, the terminal shows the command `chmod a+rx index.html` being executed. A red arrow points from the text "This command makes it possible for other people to read the 'index.html' file" to the `chmod` command in the terminal. The terminal also shows the file permissions for `index.html` as `-----1 (HTML) --L7--A11-----`.

```
<html>
<body>

This is my very first webpage!

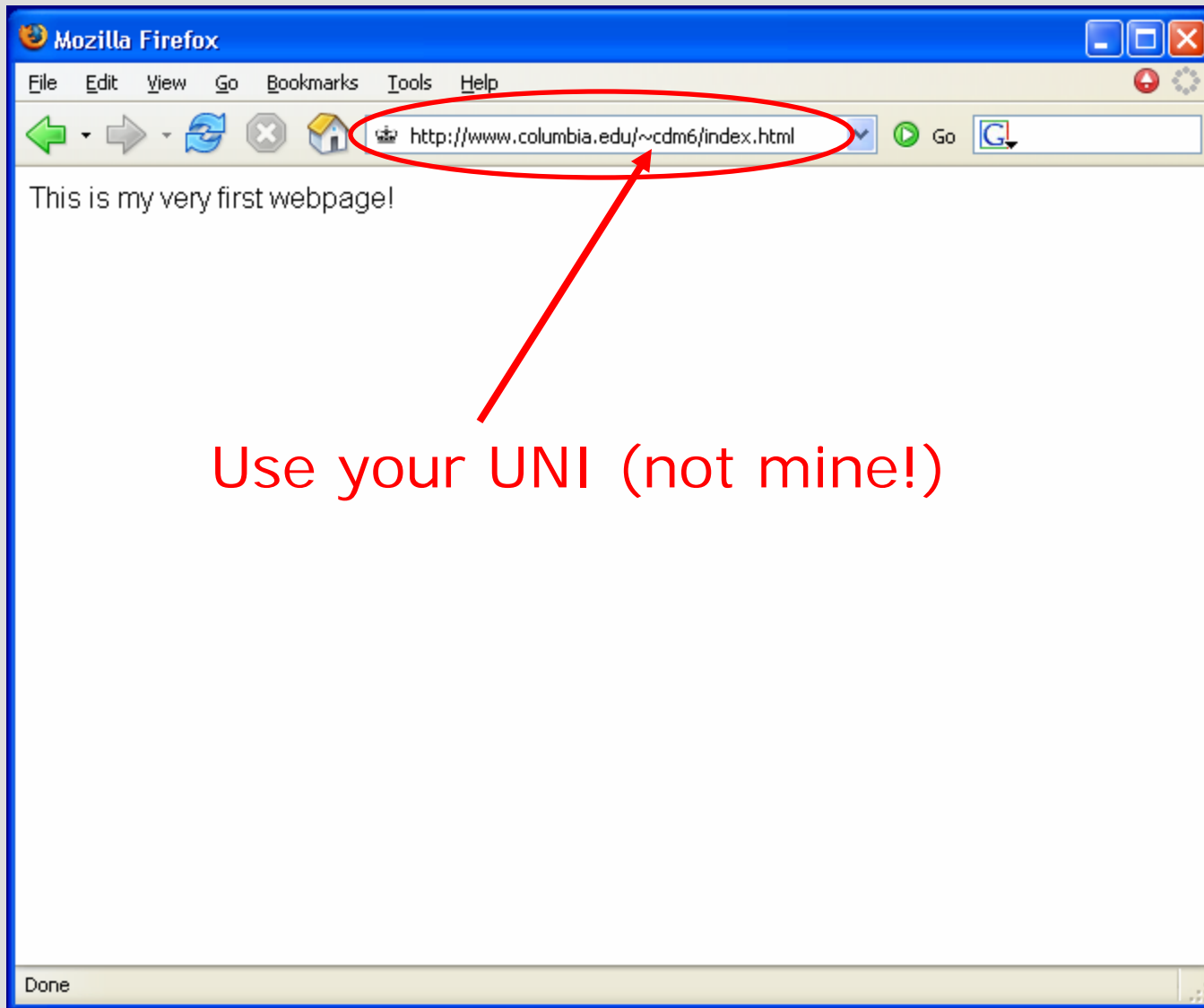
</body>
</html>
```

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

```
-----1 index.html (HTML) --L7--A11-----
$ chmod a+rx index.html
$
```



# 8. View the page



# 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

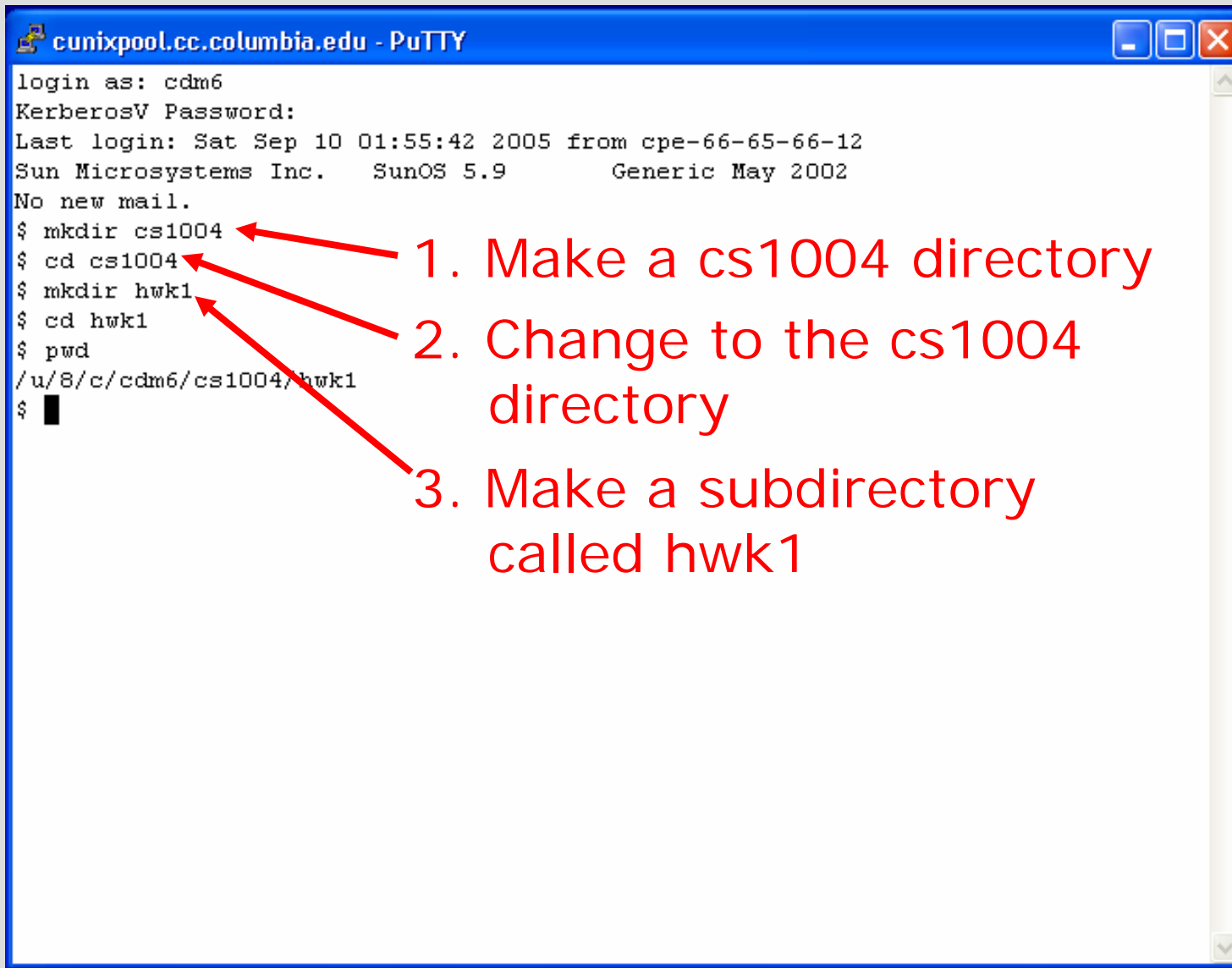
- `http://www.columbia.edu/~xxxxxx/index.html`

# 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



```
cunixpool.cc.columbia.edu - PuTTY
login as: cdm6
KerberosV Password:
Last login: Sat Sep 10 01:55:42 2005 from cpe-66-65-66-12
Sun Microsystems Inc. SunOS 5.9 Generic May 2002
No new mail.
$ mkdir cs1004
$ cd cs1004
$ mkdir hwk1
$ cd hwk1
$ pwd
/u/8/c/cdm6/cs1004/hwk1
$
```

1. Make a cs1004 directory
2. Change to the cs1004 directory
3. Make a subdirectory called hwk1

# 4. emacs HelloWorld.java

```
File Edit Options Buffers Tools Java Help
/**
 * HelloWorld.java
 * Your name
 * CS1004 Fall 2005
 */

public class HelloWorld {

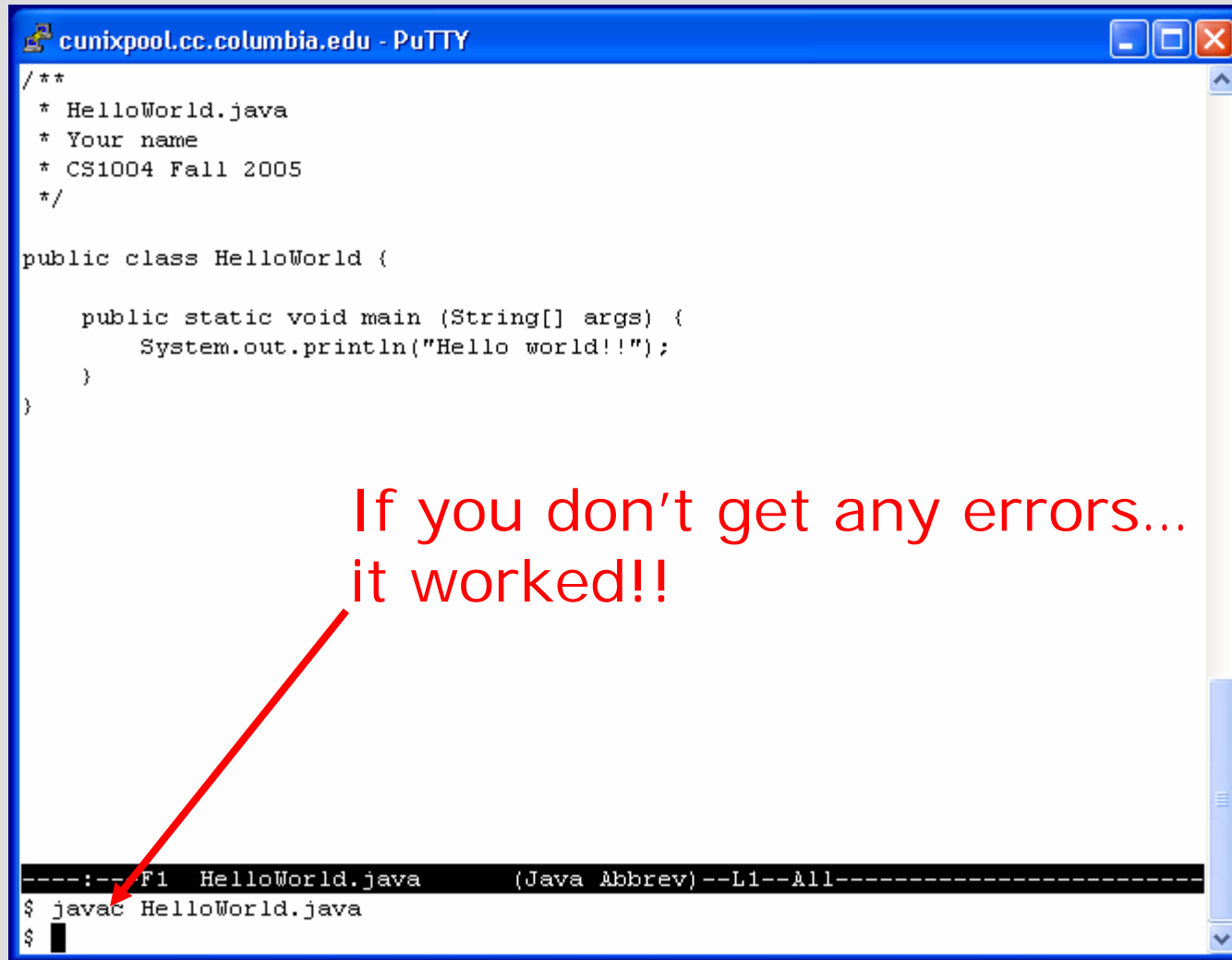
    public static void main (String[] args) {
        System.out.println("Hello world!!");
    }
}
```

This indicates that the file needs to be saved

Ctrl-X-S: Save  
Ctrl-X-C: Exit

---:\*\*-F1 HelloWorld.java (Java Abbrev)--L12--A11-----

# 5. javac HelloWorld.java



```
cunixpool.cc.columbia.edu - PuTTY
/**
 * HelloWorld.java
 * Your name
 * CS1004 Fall 2005
 */

public class HelloWorld {

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

-----:-- F1 HelloWorld.java      (Java Abbrev) --L1--All-----
$ javac HelloWorld.java
$
```

If you don't get any errors...  
it worked!!



# Common Errors

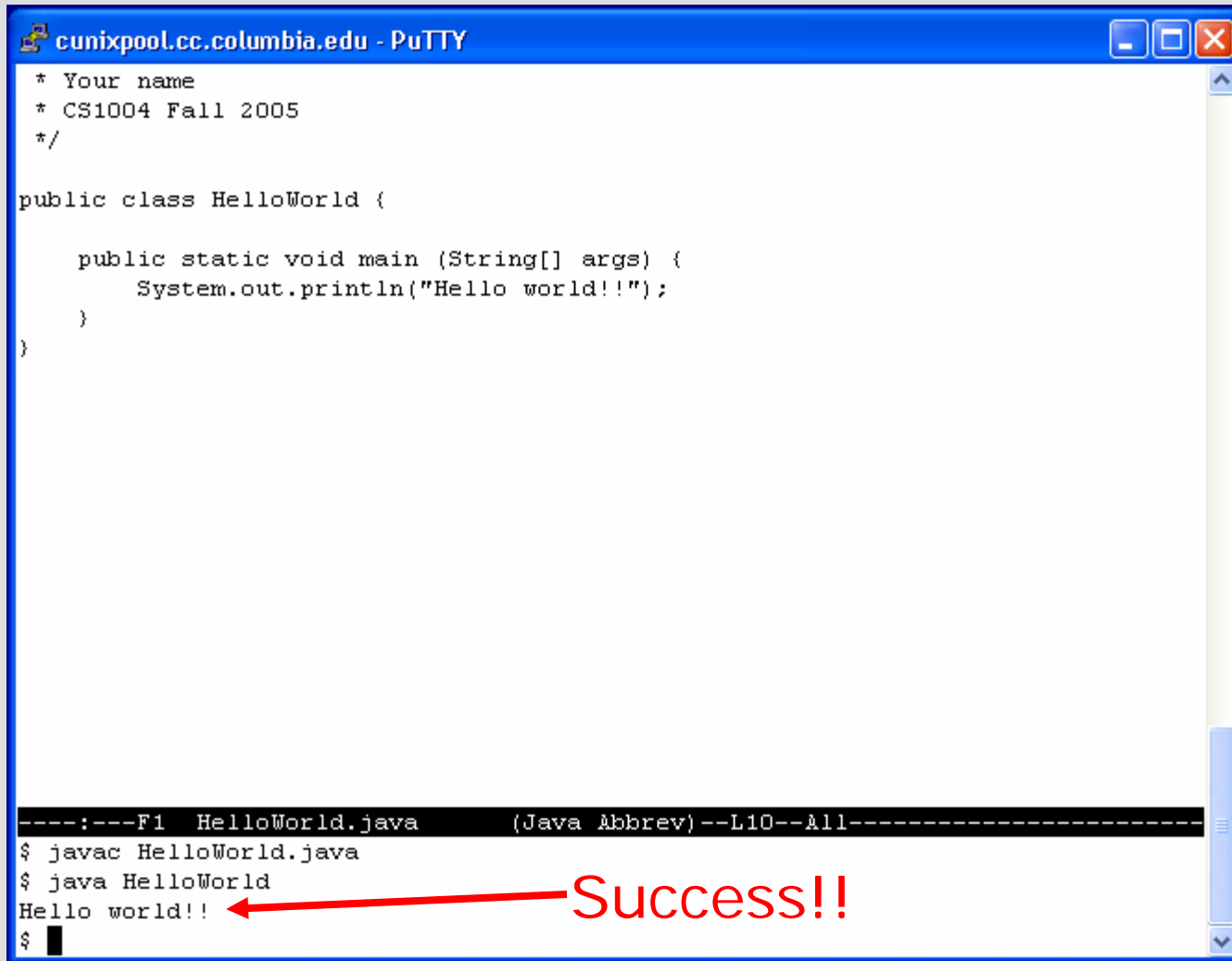
error: cannot read: helloworld.java

- **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



```
cunixpool.cc.columbia.edu - PuTTY
* Your name
* CS1004 Fall 2005
*/

public class HelloWorld {

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

-----:---F1 HelloWorld.java      (Java Abbrev)--L10--All-----
$ javac HelloWorld.java
$ java HelloWorld
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

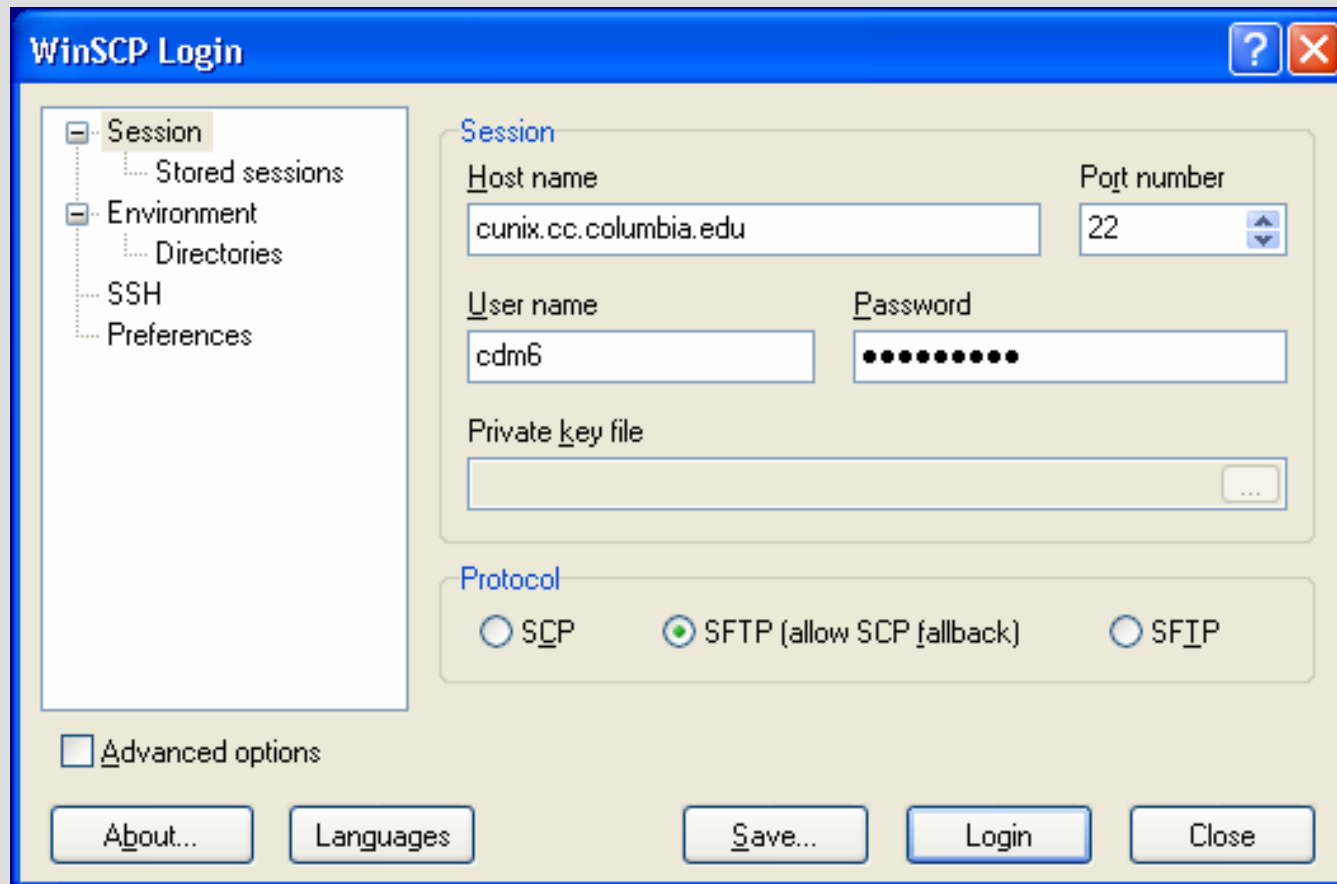
➤ `exit`

# Part III: Other Useful Utilities

# Transferring between CUNIX and your PC/Mac

- You need to download an “sftp” tool
  - Windows: <http://www.columbia.edu/acis/software/winscp>
  - 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



The image shows the WinSCP Login dialog box. It has a blue title bar with the text "WinSCP Login" and standard window control buttons (help, close). On the left is a tree view with the following items: Session (selected), Stored sessions, Environment, Directories, SSH, and Preferences. The main area is divided into two sections: "Session" and "Protocol".

**Session**

Host name:  Port number:

User name:  Password:

Private key file:

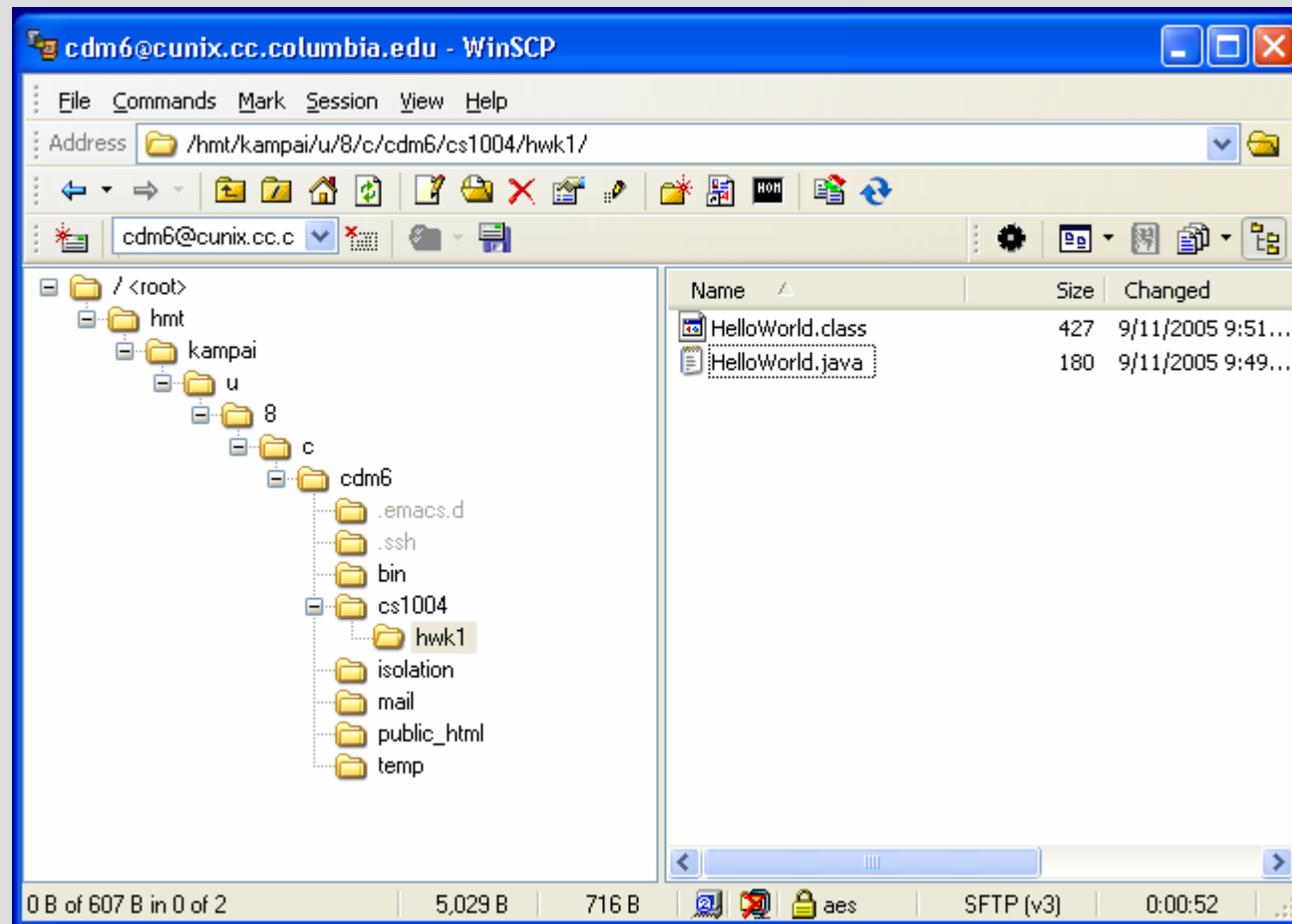
**Protocol**

SCP  SFTP (allow SCP fallback)  SFTP

Advanced options

Buttons at the bottom: About..., Languages, Save..., Login, Close

# 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  
<http://www.cs.columbia.edu/~crf/crf-guide/resources/software/xwin32.html>
- 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

<b>pwd</b>	print (show) working directory
<b>ls</b>	list the files in the current directory
<b>ls -a</b>	list the files, including hidden files
<b>ls -l</b>	list the files with additional info
<b>ls -al</b>	list the files, including hidden files, with additional info
<b>ls *.java</b>	list the files ending with .java

cunixpool.cc.columbia.edu - PuTTY

login as: cdm6  
KerberosV Password:  
Last login: Sat Sep 10 00:27:39 2005 from cpe-66-65-66-12  
Sun Microsystems Inc. SunOS 5.9 Generic May 2002  
No new mail.

\$ 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 .rminit      .pine-debug4  bin           mbox
.addressbook.lu .newsrc     .pinerc       cs1004        public_html
```

\$ ls -l

```
total 92
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
drwx----- 2 cdm6 studmail 4096 Sep 9 20:28 mail
-rw----- 1 cdm6 studmail 62662 Sep 9 23:12 mbox
drwxr-xr-x 4 cdm6 studmail 4096 Sep 9 19:25 public_html
drwx----- 9 cdm6 studmail 4096 Sep 8 14:12 temp
```

permissions

owner

group

size

last modified date/time

name

# Directory Navigation

<b>mkdir</b> <i>name</i>	make a directory called <i>name</i>
<b>rmdir</b> <i>name</i>	remove the directory called <i>name</i>
<b>cd</b> <i>name</i>	change directory to <i>name</i>
<b>cd</b> ..	change directory to parent (go up)
<b>cd</b> ~	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

```
UW PICO(tm) 4.10 File: test.txt Modified
Hello world!!

^O = save
^R = open
^U = paste

[ New file ]
^G Get Help ^O WriteOut ^R Read File ^Y Prev Pg ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where is ^V Next Pg ^U UnCut Text ^T To Spell
```

# Working with Files

**mv** *name1 name2*

rename *name1* as *name2*

**mv** *name1 dir/*

move *name1* to directory *dir*

**cp** *name1 name2*

copy *name1* to *name2*

**cp** *name1 dir/*

copy *name1* to directory *dir*

**rm** *name*

delete (remove) *name1*

**rm -f** *name*

delete *name1* without  
confirmation (be careful!)

# 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