# *“Prof” Joe's Tutorial on*

# *Linux (well Unix) basics*

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# What is Unix?

- Invented by ATT, has a few common flavors
  - System V (ATT)
  - BSD (University of California Berkeley)
  - Linux (Linus Torvalds/GNU Project)
  - Solaris (by Sun, now Oracle)
- Popularized at Universities in 1970s and 1980s
- Learned from OS's that came before it
  - Purposefully “stripped down” from complicated Multics
  - “*Each command should do one thing, and well*”
- Influential
  - Running Apple's OS X? *It's Unix!*

# Why use Unix?

- Relatively robust
- Relatively flexible
- Relatively general
- Has open source implementations:
  - Linux (of course)
  - OpenBSD
- Lets you see what is going on “under the hood”

# How do I set up my Linux account?

- As a DePaul CDM student you have the right to an account, but it may need to be activated

1. Go to http://www.cdm.depaul.edu/Pages/default.aspx.
2. Click on MyCDM in the upper right.
3. Log in with your DePaul Campus Connect password.
4. Click on Hawk/CDM Accounts. Note your CDM user name and establish your CDM password as needed.

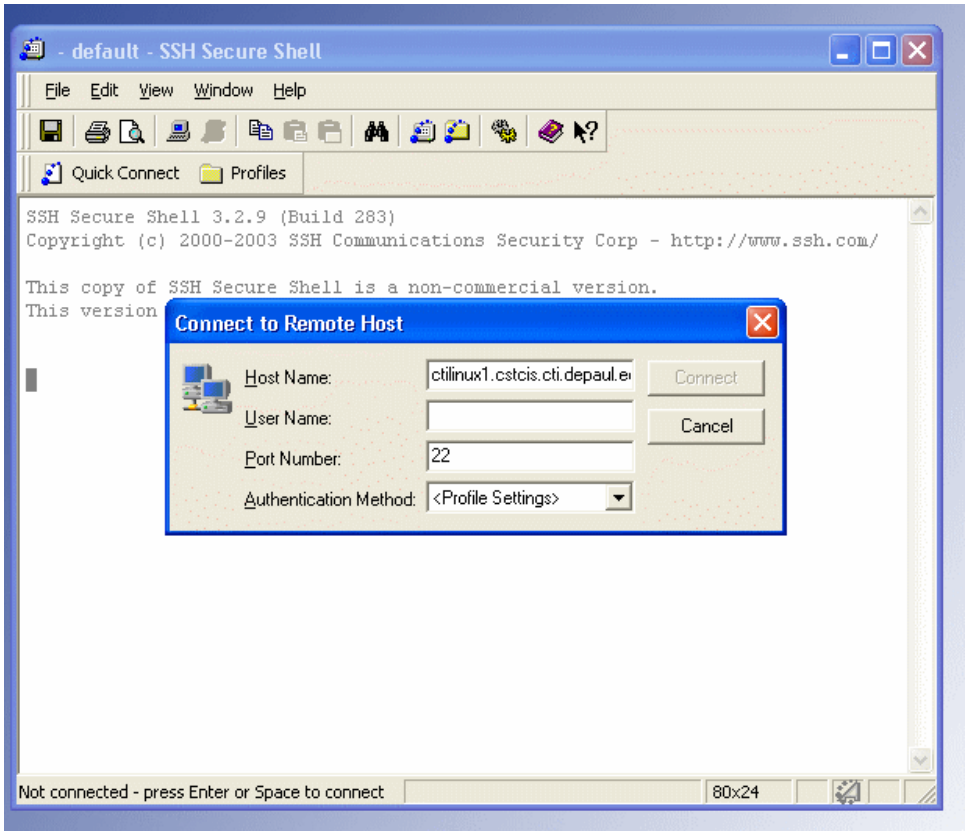
# Logging in and exiting

- To start: use an ssh (*S*ecure *SH*ell) program like **putty**
  - free at http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html
- Login to one of:

**ctilinux1.cstcis.cti.depaul.edu**
**ctilinux2.cstcis.cti.depaul.edu**
**ctilinux3.cstcis.cti.depaul.edu**

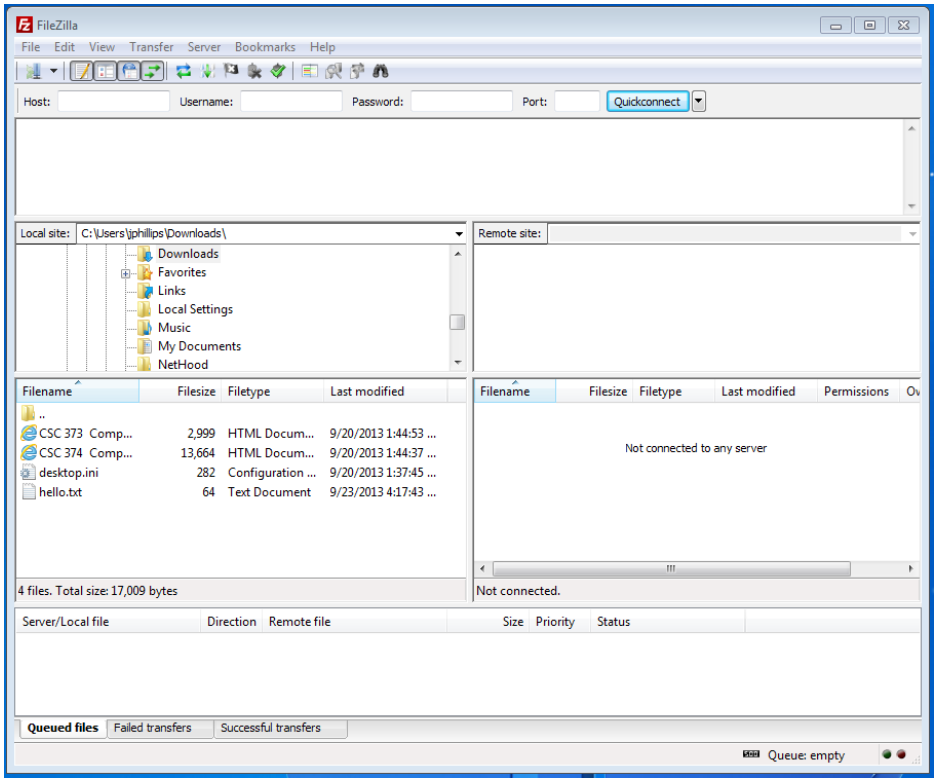
- To stop: type ***exit***

**$** ***exit***



# Transferring files

- Use an sftp (*Secure File Transfer Program/Protocol*) like ***filezilla***
  - free at https://filezilla-project.org/
- ***Hostname***: one of:
  **ctilinux1.cstcis.cti.depaul.edu**
  **ctilinux2.cstcis.cti.depaul.edu**
  **ctilinux3.cstcis.cti.depaul.edu**
- ***Username***: your CDM name (not necessarily your Campus Connect)
- ***Password***: Don't tell me!
- ***Port***: ***22***



# Getting around

- Folders are called "*directories*"
  - They look like folders on GUIs like KDE or Gnome
  - *Use them*: They will organize your work for this class!
- Special directory names:

| | | |
|---|---|---|
| .. | (two periods) | The parent of current directory |
| . | (one period) | The current directory |
| ~ | (tilde) | User's home directory |
| / | (forward slash) | Root directory |

Also used separator for subdirectories

- Directory commands:

| | |
|---|---|
| `mkdir dirName` | Make directory `dirName` |
| `cd dirName` | Change to dir `dirName` |
| `rmdir dirName` | Remove (delete) `dirName` |
| `pwd` | *P*rint *W*orking *D*irectory |

# Example

jphillips@localhost:~/CSC373

File Edit View Terminal Tabs Help

```
[jphillips@localhost ~]$ pwd
/home/jphillips
[jphillips@localhost ~]$ mkdir CSC373
[jphillips@localhost ~]$ cd CSC373/
[jphillips@localhost CSC373]$ mkdir Temp
[jphillips@localhost CSC373]$ cd Temp
[jphillips@localhost Temp]$ pwd
/home/jphillips/CSC373/Temp
[jphillips@localhost Temp]$ cd ..
[jphillips@localhost CSC373]$ rmdir Temp/
[jphillips@localhost CSC373]$ pwd
/home/jphillips/CSC373
[jphillips@localhost CSC373]$
```

# Managing files

- Commands:

| | |
|---|---|
| `ls` | *L*i*S*t files in current directory |
| `ls dirName` | *L*i*S*t files in dirName |
| `rm fileName` | *R*e*M*ove (delete) file dirName |

- Wildcard chars for `ls` and `rm`:

| | |
|---|---|
| `*` | Matches anything |
| ? | Matches just one letter |

# Managing Files: the `cat` cmd

The (con)`cat`(enate) Unix command:

- Types `file1` to screen:

```
cat file1
```

- Types `file1 file2 . . . fileN` to screen:

```
cat file1 file2 . . . fileN
```

- Makes `outFile` the concatenation of `file1 file2 . . . fileN`:

```
cat file1 file2 . . . fileN > outFile
```

- Whatever you type on the keyboard goes into `outFile`. Stop with `Ctrl-D`. (An alternative to filezilla)

```
cat > outFile
```

# Example

jphillips@localhost:~/CSC373

File Edit View Terminal Tabs Help

```
[jphillips@localhost CSC373]$ cat > 1.txt
1 2 3
[jphillips@localhost CSC373]$ ls
1.txt
[jphillips@localhost CSC373]$ cat > 2.txt
A B C
[jphillips@localhost CSC373]$ ls
1.txt  2.txt
[jphillips@localhost CSC373]$ cat 1.txt 2.txt
1 2 3
A B C
[jphillips@localhost CSC373]$ cat 1.txt 2.txt > 12.txt
[jphillips@localhost CSC373]$ ls ?.txt
1.txt  2.txt
[jphillips@localhost CSC373]$ ls 1*.txt
12.txt  1.txt
[jphillips@localhost CSC373]$ cat 12.txt
1 2 3
A B C
[jphillips@localhost CSC373]$ rm *
rm: remove regular file `12.txt'? y
rm: remove regular file `1.txt'? y
rm: remove regular file `2.txt'? y
[jphillips@localhost CSC373]$
```

# Editing files

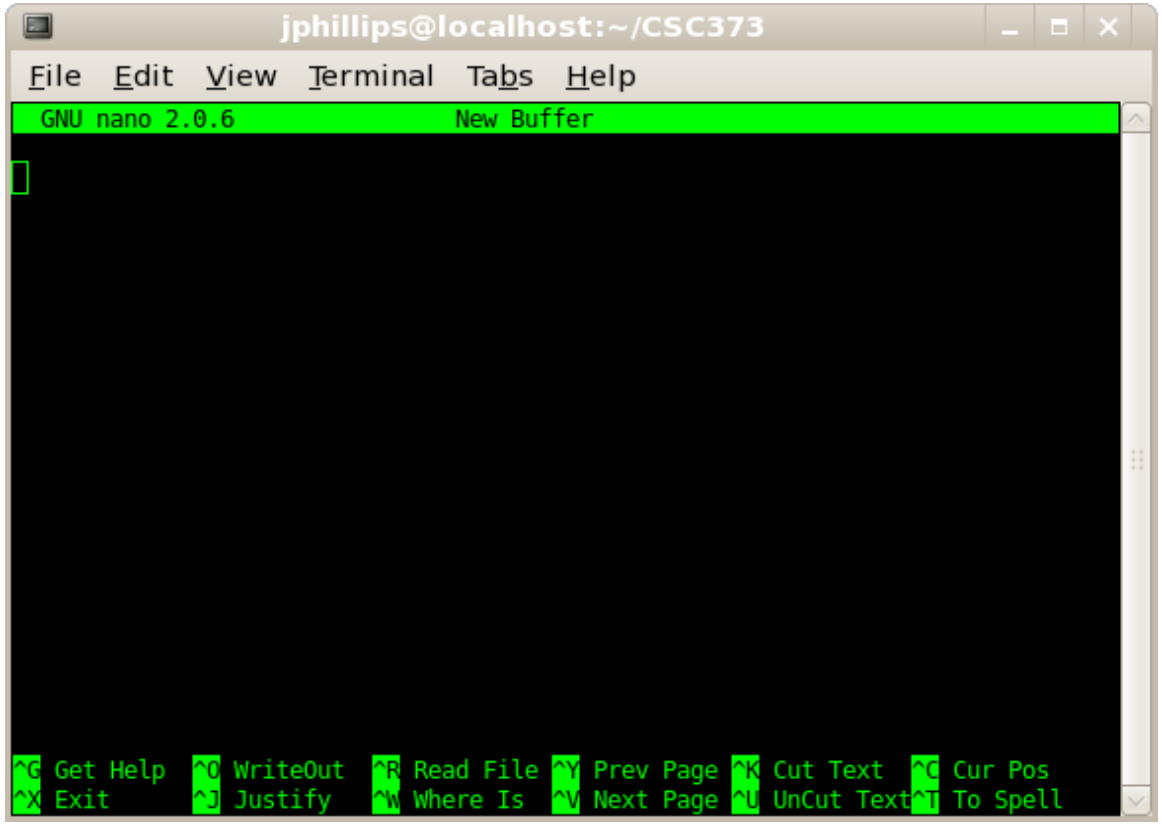
- Most popular Unix editors:

  `emacs`
  - Very powerful
  - For big, multi-file projects

  `vi`
  - Very flexible
  - For big files
  - See Joe's vi tutorial
- Serious hackers should learn both
- For the ***lazy***, I recommend `nano`

```
nano filename
```

# nano




Commands at bottom:

- Most important:
- Ctrl-X (exit)
- Ctrl-O (Write file)
- Ctrl-R (Read file)
- Ctrl-K (Del line)
- Ctrl-U (Paste line)

# Compiling Files, 1

- Let's compile and run a file:
  - Type this file (either with `cat`, `nano` or `vi`)

```
#include        <stdio.h>
#include        <stdlib.h>

int     main    ()
{
  printf("Hello world!\n");
  return(EXIT_SUCCESS);
}
```

# Compiling Files, 2

- Compiling:
  `gcc source.c -g -o executable`
  Run *G*nu *C* *C*ompiler on `source.c` with debugging info (`-g`) output (`-o`) to file `executable`.
- Running:
  `./executable`