

## CMPSCI 105: Lecture #7 Introduction to UNIX

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## Styles of Operating Systems

- Operating Systems come in two styles:
  - Command-Line Interfaces (CLI)
  - Graphical User Interfaces (GUI)
- CLIs
  - Earliest form of computer command interface
  - Commands (verbs) are typed in first, then options (nouns)
  - Difficult to learn: Users have to remember what to type
- GUIs
  - Items (nouns) are selected, then actions (verbs) applied
  - Easy to learn: Users select options from a menu

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## Operating Systems

- CLI
  - UNIX
  - MS-DOS (original IBM-PC and later clones)
- GUI
  - Microsoft Windows
  - Apple Mac interface (but under-layer is UNIX)

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## UNIX

- Dates from early 1970s
- Used in academia ever since
- Used today in many servers on the Internet
- Variations include Linux
- The Web server for our class runs it, and is:
  - Physically located in the CMPSCI Building
  - Accessible only through the Internet
  - Through Host Address: elsrv3.cs.umass.edu

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## Our UNIX Server, elsrv3.cs.umass.edu

Where is the elsrv3 server?



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## Internet Tools

- Telnet
  - Connect over the Internet to remote server for the purpose of giving it commands
  - Original version was unencrypted
  - Modern versions are encrypted
- FTP (File-Transfer-Protocol)
  - Connect over the Internet to copy files between remote machines
  - Original version was unencrypted
  - Modern versions are encrypted

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## Modern Tools

- Encrypted Telnets:
  - Microsoft Windows: PuTTY (download from UK)
  - Apple Mac: ssh from Terminal (built-in standard)
- Encrypted FTP:
  - Microsoft Windows: WinSCP (download)
  - Apple Mac: Fugu (download 1.2.1pre1 for Lion)

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## Student Accounts

- Usernames are the same as UMail usernames.
- Passwords are initially ELxxxxaaa, where xxx is the last three digits of the SPIRE ID number, and aaa is the first three letters of the username (lower case).
- Example: Fred Smith with username fsmith and ID number 12345678 would have initial password EL678fsm.
- First successful telnet connection demands that the password be changed.

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## UNIX Commands (Telnet)

- `logout` Terminate connection
- `ls -al` List all files with all options
- `pwd` Where am I? (Pr. Work. Dir.)
- `cd name` Change dir to named folder
- `cd ..` Change to enclosing folder
- `mkdir name` Make a new directory folder
- `chmod permissions name`  
Change permissions on named file

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## File Permissions

- Permissions are three triplets: `rxwxrwxrwx`
  - r = read (ability to examine file's contents)
  - w = write (ability to modify/delete file)
  - x = execute (execute programs or open folders)
- Triplets, in order:
  - u = User (owner of file)
  - g = Group (collaborative group)
  - o = Others (everybody else)
- Presence of a letter: permission granted
- Presence of a dash (not letter): permission denied.

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## chmod

- Symbolic Form:
  - `chmod ugo±rwx,ugo±rwx filename`
  - a is a shortcut for ugo
- Absolute Form:
  - `chmod nnn filename`
  - nnn is an octal (base 8) number
  - each n encodes rwx in binary number, letters = 1, dashes = 0.

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## chmod Examples

- Add read permission to user, group, and others, but deny write permission from group and others on file `Frog.gif`

```
chmod a+r,go-w Frog.gif
```
- Set permissions `rw-r--r--` on `Frog.gif`

```
chmod 644 Frog.gif
```
- Set permissions `rxwx-rx-x` on `public_html`

```
chmod 755 public_html
```

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## Setting up the Web nest on UNIX

- Create special folder for Web files  
`mkdir public_html`
- Set permissions so outsiders can see in:  
`chmod 755 .`
- Set permissions so outsiders can get Web files:  
`chmod 755 public_html`
- Now, any files in `public_html` may be visible on the Web (if they have the right permissions).

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