

# Basic UNIX Commands

For use with Linux

# UNIX Type Operating Systems

- UNIX is a family of multitasking, multiuser computer operating systems (O/S):
  - developed in the 1970s
  - immensely popular, but some basic design flaws (some importantly dealing with security)
- With the advances in networking in the last couple decades (i.e. the World Wide Web) several other O/S were created to address vulnerabilities.
- Several have been created, and the majority were designed to look/feel like UNIX, ergo “UNIX Type” Operating Systems
- The course web server is currently running Ubuntu, a popular version of Linux, arguably the most popular “UNIX Type” O/S
- Therefore, in this class students will need some basic knowledge of UNIX commands

# File System Commands

- `cd` – change directory  
`cd file_directory` (go into file directory)
- `ls` – list files  
`ls -l` (list files with details/long listing)
- `mv` – move files
- `cp` – copy file
- `rm` – remove file
- `rmdir` – remove directory
- `mkdir` – make/create directory
- `passwd` – change your password
- `pwd` – present-working-directory
- `man` – manual or help for the command

# File Permissions

- Operating Systems support placing permissions on who can and cannot access files and directories
- Windows
  - You right-mouse click and select the file/folders properties
- UNIX/Linux
  - You must set file permissions manually

# File Permission Commands

- Change mode (permissions) of file/directory
- using 'ls -l', 10 fields of information are shown
- ex: drwxr-xr--
- first position: 'd' (directory) or '-' (file)
- next three: user permissions:
  - 'r' – Read permissions
  - 'w' – Write permissions
  - 'x' – eXecute permissions
- next three: group permissions
- last three: world/other permissions

# File Permission Commands

- permissions are represented as octal numbers
- `rwXrwxrwx = 111 111 111 = 777`
- `rwXr-x-r-- = 111 101 100 = 754`
- `rw----- = 110 000 000 = 600`

## Format

`chmod <mode> <file>`

## Example:

`chmod 750 index.html`

- Give yourself (the owner) all permissions, group read and execute permission, the world has no access on the file `index.html`

# File Permission Commands

What do the permissions mean for files and folders/directories?

Access Type	File	Folder/ Directory
<u>R</u> ead	A user/group with read permission can open the file to view its contents	A user/group with read permission on a folder can list the folders contents using the <code>ls</code> command (used in combination with the <code>eXecute</code> permission below)
<u>W</u> rite	A user/group with write permission can open the file and change or overwrite its contents	A user/group with write permission on a folder can: make new files/folders; rename existing files/folders; and, delete existing files/folders in the folder.
<code>eX</code> ecute	A user/group with <code>eXecute</code> permission can run the file (if it is executable)	A user/group with execute permission on a folder can make the folder it current directory (i.e. <code>cd</code> into the directory)

# File Permission Commands

- For this course your files and directories permissions should be: **0750**
  - For directories this corresponds to `drwxr-x---`
    - Which means you (the owner) can do anything to the folder, and that the group (in our case `www-data` aka Apache) can list the files and access the directory
  - For files this corresponds to `-rwxr-x---`
    - Which means you (the owner) can do anything to all of your files, and that the group can read the content of the files and is allowed to process (i.e. execute) your `*.php` pages
- To set this permission to all files/folders in your work directory, through PuTTY (Note the “-R” flag tells the OS to set all files/folders and subfolders permissions recursively):

```
cd /var/www/html/webd2201/userid
```

```
chmod -R 0750 *
```



# File Permission Commands

- Or you can use WinSCP
  - Right-mouse click on file or folder and set appropriate permissions

# chgrp Commands

- If you were to navigate into your website directory on the web server and run (assuming you have a file named `file.php`):

```
ls -l file.php
```

- The output would be similar to the following

```
-rwxr-x--- 1 usrid www-data 452 Apr 5 05:52 file.php
```

- This indicates that the user with id `usrid` is the owner (with full permissions) and that the group `www-data` has read and execute permissions for the file.
- If the group is anything other than `www-data`, your browser will give a “forbidden error” for the page you are trying to access. If so you should log into PuTTY, navigate (i.e. `cd`) into your web site folder and run the command:

```
chgrp www-data file.php
```

- Or to change all files groups in the folder and its subfolders:

```
chgrp -R www-data *
```