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SPEED UP EDUCATION

CSCB09

Software Tools and Systems Programming

导师： **VC**

UTSC Week 01 Class | 2024/1/17

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Unix Commands

Special Terms:

directory (folder) a collection of files and sub-directories
stdin (standard in) by default is terminal
stdout (standard out) by default is terminal

Commands:

`pwd`

Output the current working directory path to stdout

`ls`

Output a list of the file and sub directory of the current working directory to stdout

- `-l` Show all Information

`cd [dir path]`

Change your working directory to the given path

- `.` current directory
- `..` paraent directory

`cat`

Read data from stdin and output to stdout

`cat [file name]`

Ouput the content of the given file to stdout

`mkdir [dir name]`

Create a new directory with the given name in the current working directory

`clear`

Clear the terminal

`sort`

Read data from stdin, sort it, and output to stdout

- `-r` Reverse order

`sort [file name]`

Sort the content of the file, output to stdout

`uniq`

Read data from stdin, remove duplicates , and output to stdout

`uniq [file name]`

Read the content of the file, remove duplicates, output to stdout

```
cp [file/dir name] [dir path]
```

Copy a file/dir to a different path

```
mv [file/dir name] [dir path]
```

Rename a file/dir or move it to a differernt path

```
rm [file/dir name]
```

Remove a file/dir

```
diff [file name1] [file name2]
```

Compare files, Show where they differ.

```
wc [file name]
```

Tells you how many lines, words, and characters in the file.

So many more.. Will cover them later in the course ☺

Redirection:

`command that outputs to stdout > filename`

`>` Redirect the data from stdout into the given file.

Create the file if not exist. **Erease** the content of the orginal file.

`cat > a.txt`	Read data from Stdin, and output them into a.txt

`>>` Redirect the data from stdout into the given file.

Create the file if not exist. **Append** the content of the orginal file.

`command that inputs data from stdin < filename`

`<` Redirect the data from stdout into the given file.

Create the file if not exist. Erease the content of the orginal file.

`sort < a.txt`	Sort data from a.txt
`sort < a.txt > b.txt`	Sort data from a.txt and output it into b.txt

`commandA | commandB`

commandA must be a command that outputs data to stdout.

commandB must be a command that inputs data from stdin.

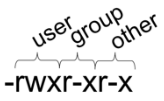
`|` is called **Pipe**. It makes the output data from commandA become the input data for commandB

```
cat a.txt | sort -r | uniq
```

File and Directory Persmission:

Example:

```
drwxr-xr-x
-rw-r--r--
```



first letter: `d` directory, `-` regular file
next 3 letters: user permissions
next 3 letters: group persmissions
last 3 letters: other permissions

permission	**Files**	**Directories**
r	can read the file	can 'ls' the dir
w	can write the file	can modify the dir's contents
x	can execute the file	can 'cd' to the dir

Modify permission for one user type:

Use `chmod (class)(operator)(type) [filename]`

Access class	**Operator.**	**Access Type**
u (user)	+ (add access)	r (read)
g (group)	- (remove access)	w (write)
o (other)	= (set axact access)	x (execute)
a (all)		

`chmod a+r a.txt`	Add Read permission to all users
`chmod g-w a.txt`	Remove Write permission for group users

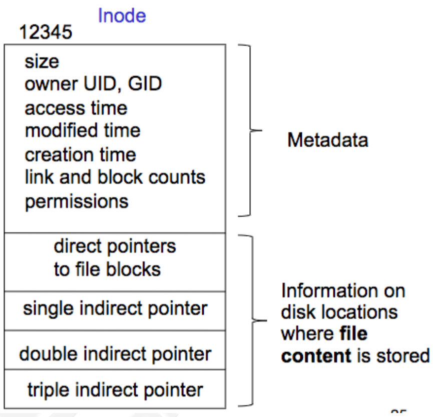
Modify permission using Absolute Form:

Permission	**Number**
Read (r)	4
Write (w)	2
Execute (x)	1

`chmod 751 a.txt`   read, write, execute permissions to yourself (4+2+1=7)
read and execute permissions to users in your group (4+0+1=5)
only execute permissions to others users (0+0+1=1)

File in Unix:

Inode:



- Every file in the Unix system has a **inode** (Index node)
- Contains all file information except the file contents and name.
- Just like a personal ID or a passport (without a name!)
- They contain the following
  - Inode Number
  - File Size
  - Owner information
  - Permissions
  - File Type
  - Number of links
  - ..etc
- Every directory is a file itself!
- `ls -li filename` to see the iNode Number

Soft link (Symbolic Link)

- It is a **pointer** to the original file (Shortcut in Windows)
- Smaller file size
- **Different Inode Number**
- If we delete the original file, the softlinks become useless!
- *Think as a Shortcut of the file.*
- `ln –s targetFile nameOfLink`

Hard link

- Different name of the same file
- Same file size
- **Same Inode Number**
- If the oringal file is deleted, the hard links will still contain the data that were in the orginal file
- *Think as a copy of the file*
- `ln targetFile nameOfLink`