

# Compute System Administration

## Homework 2: Shell Script

---

ZSWU

# Requirements

---

- ❑ 2-1: File System Statistics (10%)
- ❑ 2-2: System Info Monitor (60%)
- ❑ Demo (May include code modifications)(30%)
  - 2-1 10%
  - 2-2 20%

## 2-1: Filesystem Statistics

```
$ wget https://github.com/Thomas-Tsai/partclone/archive/0.2.89.tar.gz -O - | tar jxf -
--2016-09-29 10:32:25-- https://github.com/Thomas-Tsai/partclone/archive/0.2.89.tar.gz
正在查找主機 github.com (github.com)... 192.30.253.113
正在連接 github.com (github.com)|192.30.253.113|:443... 連上了。
已送出 HTTP 要求，正在等候回應... 302 Found
位置: https://codeload.github.com/Thomas-Tsai/partclone/tar.gz/0.2.89 [跟隨至新的 URL]
--2016-09-29 10:32:26-- https://codeload.github.com/Thomas-Tsai/partclone/tar.gz/0.2.89
正在查找主機 codeload.github.com (codeload.github.com)... 192.30.253.120
正在連接 codeload.github.com (codeload.github.com)|192.30.253.120|:443... 連上了。
已送出 HTTP 要求，正在等候回應... 200 OK
長度: 1051296 (1.0M) [application/x-gzip]
Saving to: 'STDOUT'

-                               100%[=====]

2016-09-29 10:32:30 (362 KB/s) - written to stdout [1051296/1051296]

$ cd partclone-0.2.89/
$ ../../sahw2-1.sh
1:402607 Makefile.in
2:312642 configure
3:173953 xfs_bmap.c
4:118770 ChangeLog
5:111736 extent-tree.c
Dir num: 24
File num:428
Total: 4992643
```

## 2-1: Filesystem Statistics – Requirement (1/3)

---

- Inspect the current directory(“.”) and all sub-directories.
- Calculate the number of directories.
- Do not include ‘.’ and ‘..’
- Calculate the number of files.
- Calculate the sum of size of all files.
- List the top 5 biggest files.
- Only consider the regular files. Do not include links, FIFO, block devices... etc.

## 2-1: Filesystem Statistics – Requirement (2/3)

---

- ❑ Use only **Bourne Shell (/bin/sh)**.
  - No bash, csh, Python, Ruby...
  - /bin/sh in Linux is bash not Bourne Shell. Remember to test your code in a FreeBSD machine.
- ❑ In **ONLY ONE LINE**. That is, use PIPE to calculate the results.
  - E.g. “ls | magic1 | magic2 | magic3” => results
- ❑ **No temporary files or shell variables.**
- ❑ Only PIPE is allowed.
- ❑ Hint: ls(1) with -A and -R

# 2-1: Filesystem Statistics – Requirement (3/3)

---

## ❑ Grade

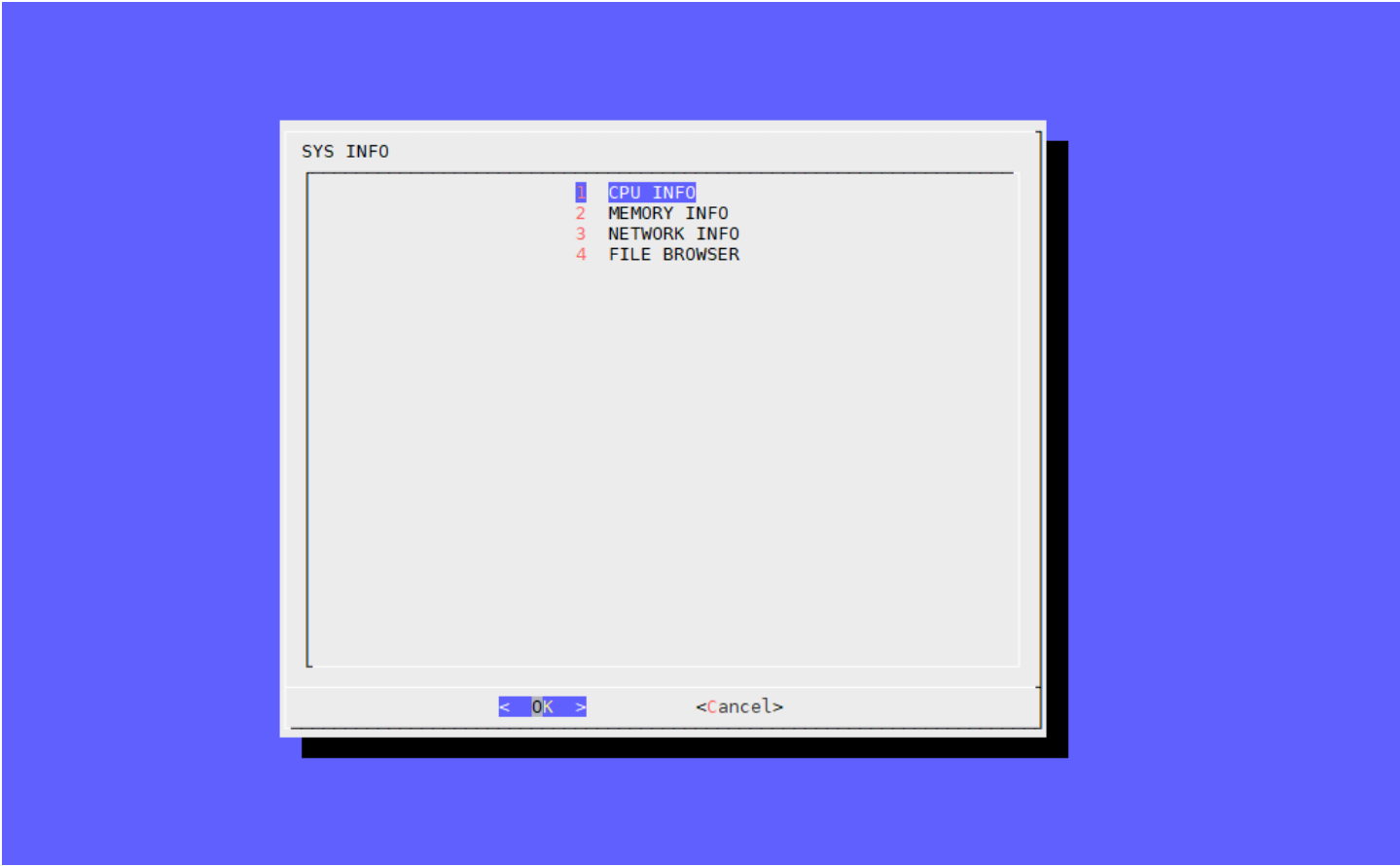
- File is executable. (4%)
  - You must know how to run your script with the following command
    - `$ ./YOUR_SCRIPT_FILENAME`
- List the size and the name of the biggest 5 files. (4%)
- Number of directories is correct. (4%)
- Number of files is correct. (4%)
- Total size is correct. (4%)

## 2-2: System Info Monitor (SIM)

---

- Control Flow (10%)
- CPU INFO (10%)
- MEMORY INFO (10%)
- NET INFO (10%)
- FILE BROWSER (20%)
- Please write the scripts in these shell languages.
  - sh, csh, tcsh, bash, ksh, zsh
  - No other languages. (e.g. Python, Ruby)
  - You can call “awk” in your script. (But you CANNOT call other languages like Python, Ruby... in your script)

# 2-2: SIM – Control Flow (1/2)



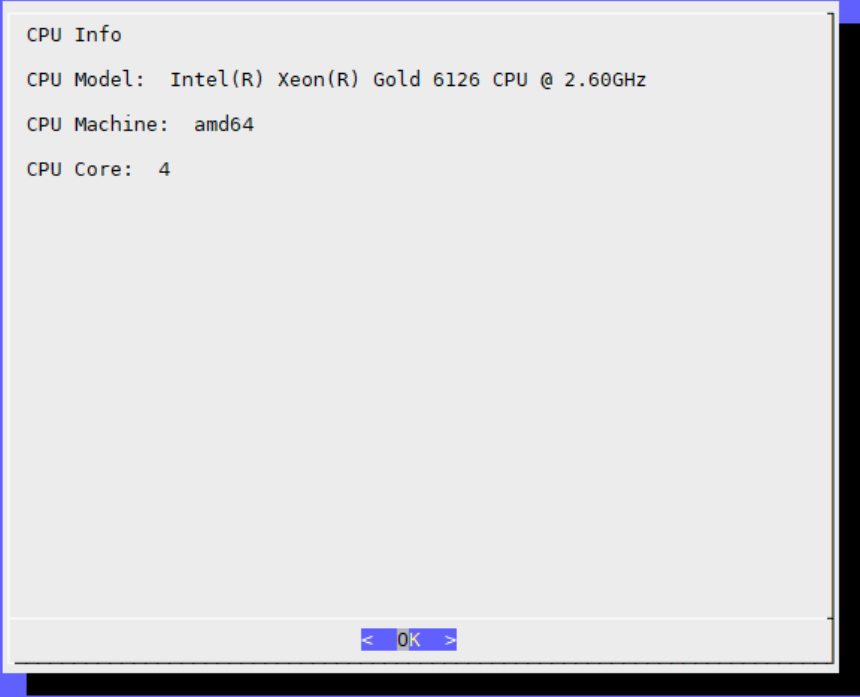


## 2-2: SIM – Control Flow (2/2)

---

- First menu shows four sub menus.
- User can enter each of these sub menus by choosing each option.
- User will return to the first menu after sub menu exit.
- Program exit with return code 0 when user press “Cancel” button. If program exit by other ways (e.g. Ctrl + C), return code should be non-zero.

# 2-2: SIM – CPU INFO (1/2)



## 2-2: SIM – CPU INFO (2/2)

---

### Show CPU Info

- CPU Name
- CPU Architecture (e.g. i386, amd64)
- Number of CPU Cores

### Hint: `sysctl(8)`

# 2-2: SIM – MEMORY INFO (1/2)



## 2-2: SIM – MEMORY INFO (2/2)

---

### Show Memory Info

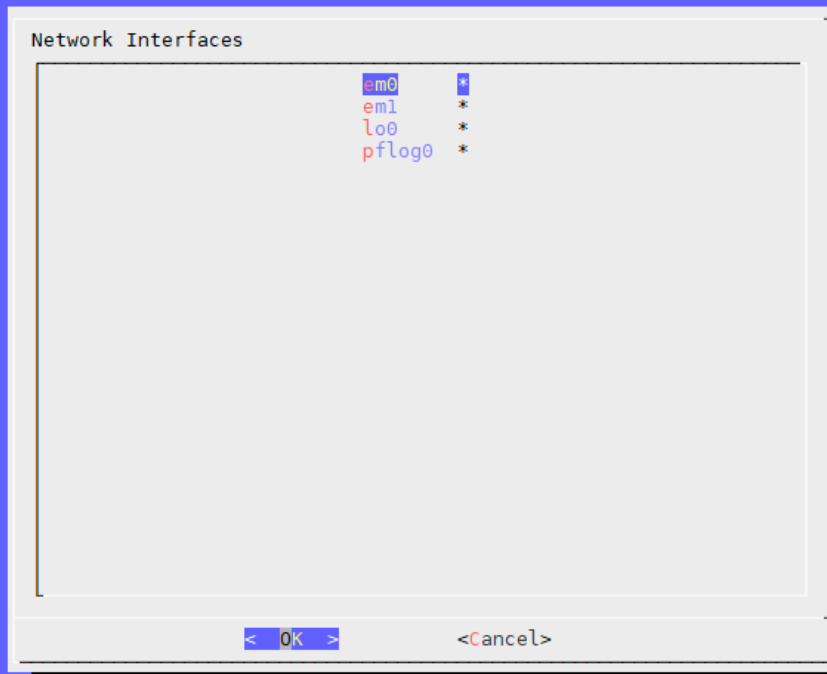
- Total Memory
- Used Memory
- Free Memory
- Percentage of used / total memory (progress bar)
- Keep showing until user pressing ENTER.

### Show suitable units

- Number of memory must in the range 1 ~ 1024
- If number is too large, use a bigger unit.
- B, KB, MB, GB, TB...

### Hint: `sysctl(8)`

## 2-2: SIM – NET INFO (1/3)



## 2-2: SIM – NET INFO (2/3)



## 2-2: SIM – NET INFO (3/3)

---

### Show Net Info

- Show all network devices in the sub menu.
- For each devices show the following info
  - IPv4
  - Netmask
  - MAC
- If the devices doesn't have these info, keep that row blank.
- After user press the OK button of the devices info panel, return to the Net Info sub menu.

### Hint: `ifconfig(8)`

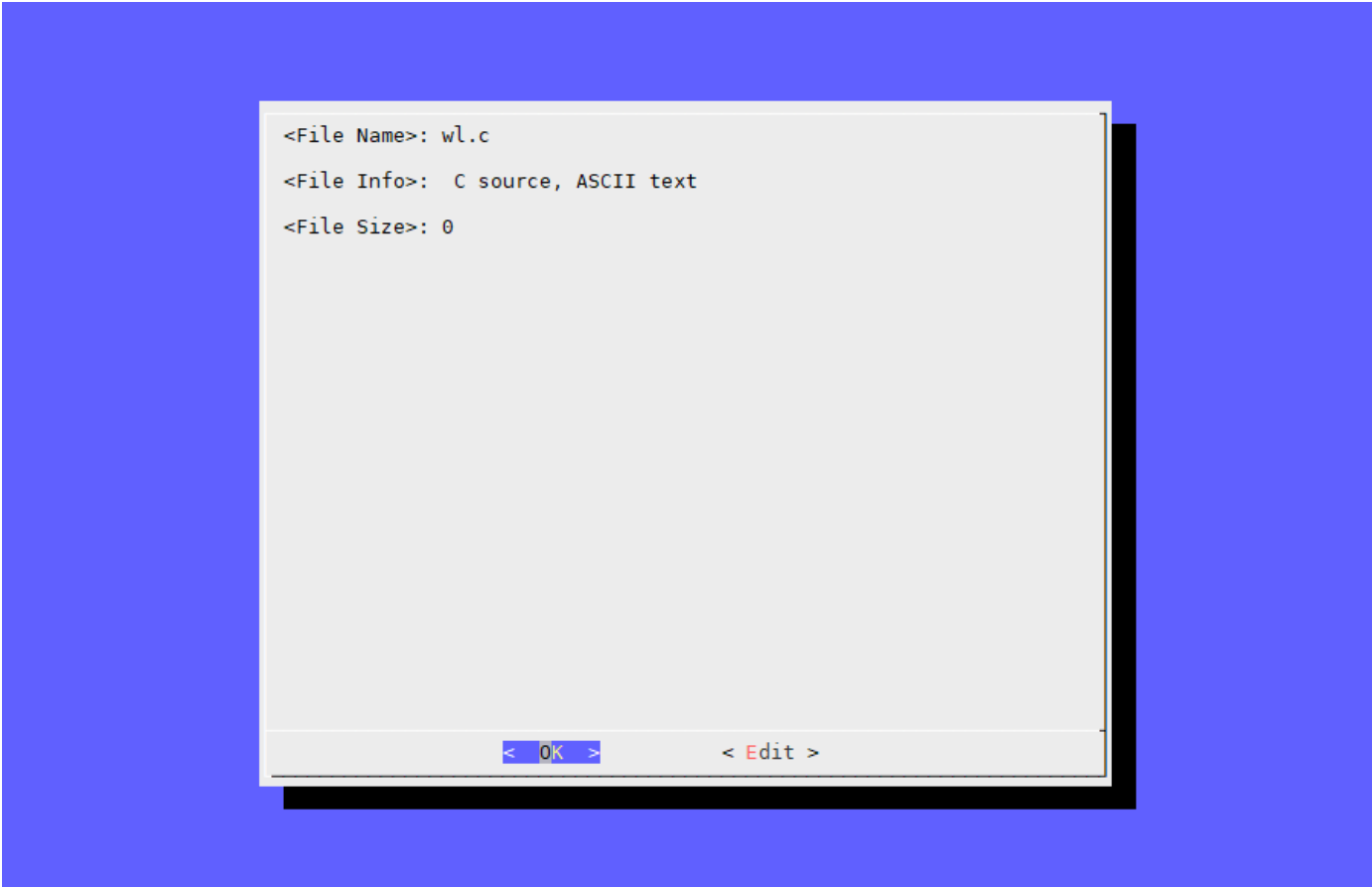


## 2-2: SIM – FILE BROWSER (1/4)

```
File Browser: /u/cs/105/0516074
|
| ..                               inode/directory
| .ansible                         inode/directory
| .bash_history                    text/plain
| .bash_profile                   inode/symlink
| .bashrc                         inode/symlink
| .bin                             inode/directory
| .cache                          inode/directory
| .config                         inode/directory
| .dockersh-history              text/plain
| .forward                       text/plain
| .gitconfig                     text/plain
| .history                       text/plain
| .i_will_not_forget_to_logout_anymore inode/x-empty
| .imap                          inode/directory
| .lessht                        text/plain
| .links                         inode/directory
| .nfs0000000000709c1500000001   inode/x-empty
| .nfs0000000000709c1600000003   inode/x-empty
| .nfs0000000000709c1900000005   inode/x-empty
| .pki                          inode/directory
| .python_history                text/x-python
| .rnd                          application/octet-stream
|
| i(+)                            31%
```

< OK > <Cancel>

## 2-2: SIM – FILE BROWSER (2/4)



# 2-2: SIM – FILE BROWSER (3/4)



## 2-2: SIM – FILE BROWSER (4/4)

---

- Show the current directory at the title.
- Show all the files and directories under the current directory.
  - Name and MIME type of each file.
- When user choose a directory, enter that directory and show the menu again.
- When user choose a file, show a file panel with these info:
  - File name
  - File info (Hint: file(8))
  - File size (Suitable units, see MEMORY INFO)
  - If the file is a text file, show “edit” button.
    - When user press this button, open an editor to edit the file.
    - After the editor exit, return to the file panel.
    - Use “\$EDITOR” environment variable to determine which editor to use.

# 2-2: SIM – Bonus

```
CPU Loading  
CPU0: USER: 00.1% SYST: 01.9% IDLE: 98.0%  
CPU1: USER: 00.2% SYST: 00.1% IDLE: 99.7%
```



## 2-2: SIM – Bonus

---

### ❑ Show CPU Usage (+10%)

- CPU usage is **NOT** average loading.
- The style is similar to MEMORY INFO panel.
  - Show a progress bar of CPU loading.
  - Run until user pressing ENTER.
  - Show percentage of USER / SYS / IDLE CPU time for **EACH CPU**.

### ❑ Hint

- Try to understand what is user / sys / idle CPU time
- top(8), htop(8), and others

# Attention !

---

- ❑ Don't copy paste, or you will get 0 point.
- ❑ If you use a shell or a language that is not allowed, you will get only 50% points in that part.
  - If you do not sure what can be use, ask TA first.
  - TA reserve the right of final explanations. Spec are subject to change without notice.
- ❑ Due date: 2019/10/24 18:30
- ❑ Upload  $\${student\_ID}.tar$  which include all your scripts to New E3 (<http://e3new.nctu.edu.tw>)
- ❑ Date of demo will be announced later.

# Help!

---

- ❑ Email to [ta@nasa.cs.nctu.edu.tw](mailto:ta@nasa.cs.nctu.edu.tw)
  - Don't email to TA directly. Use this mailing list.
  - Reply All !!!
- ❑ ~~New E3~~ <https://e3new.nctu.edu.tw>
  - Don't ask question through E3.
- ❑ Office hour: 3GH at EC318